



SUPREME AUDIT INSTITUTION OF INDIA
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Dedicated to Truth in Public Interest

**Report of the
Comptroller and Auditor General of India
on
Performance Audits of
Punjab Agricultural University and
Solid Waste Management by Urban Local Bodies in
Punjab**



**Government of Punjab
Report No. 5 of 2025**

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Preface

This Report of the Comptroller and Auditor General of India for the period April 2017 to March 2022 has been prepared for submission to the Governor of the State of Punjab under Article 151 (2) of the Constitution of India.

The Report contains the results of two Performance Audits on ‘Punjab Agricultural University’ and ‘Solid Waste Management by Urban Local Bodies in Punjab.’

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Executive Summary

Executive Summary

This Report contains two Performance Audits viz. “Punjab Agricultural University” and “Solid Waste Management by Urban Local Bodies in Punjab”.

Performance Audit-I: Punjab Agricultural University

Punjab Agricultural University (PAU) at Ludhiana was established in the year 1962 through the Punjab Agricultural University Act of the State Legislature. The Performance Audit was conducted with a view to verifying whether; i) the financial management was efficient, effective and the financial resources were mobilised and utilised optimally; ii) academic functions in the field of agriculture, agricultural engineering and allied fields were performed efficiently and effectively; iii) research activities were carried out in agriculture, agricultural engineering and allied fields as per terms of funding agencies; and iv) dissemination of agricultural technologies to farmers through various extension programmes was done efficiently and effectively. PAU played a leading role in the “Green Revolution” in India. In recognition of its outstanding contributions to the nation, PAU was the first Agricultural University to be conferred with the “Best Institution Award” by the Indian Council of Agricultural Research (ICAR) in the year 1995 and again in 2017. However, the National Institutional Ranking Framework (NIRF) ranking of PAU declined from 24 (2017) to 51 (2019) amongst 100 Universities in India; and 40 (2017) to 75 (2019) amongst 100 Institutes and Universities (combined) in India.

The Performance Audit of PAU covering the period 2017-18 to 2021-22 was conducted between June 2022 and February 2023. The records maintained in the offices of the Registrar, Comptroller, Director Research, Director Extension, Deans of Colleges and other controlling offices at the University campus, 12 out of 35 departments of five colleges, six out of 18 Krishi Vigyan Kendras (KVK), three out of nine Research Stations and two out of six Seed Farms (implementing units) were examined.

The audit findings relating to each of the four audit objectives have been arranged under the headings ‘Planning and Financial Management’, ‘Academic Activities’, ‘Research Activities’ and ‘Extension of Agricultural Technologies’.

Apart from financial plans for obtaining requisite budget, no strategic plan describing measurable targets, strategies and requirements was prepared. The University spent 71 to 86 *per cent* of the total available funds during 2017-22. The increasing trend of the closing balances during 2017-20 showed unchecked deficiencies in budgeting and expenditure projection on the part of the University.

Temporary advances were drawn on a routine basis without ensuring the urgency of disbursement of payments, in contravention of the extant rules/instructions. As on 31 March 2022, temporary advances of ₹ 64.61 crore remained unadjusted, of which ₹ 13.42 crore pertained to the period of more than five years old i.e. 1971-72 to 2016-17. Various inconsistencies were noticed in the preparation/maintenance of financial statements of the University, which were not in line with the codal provisions.

The University remained without the requisite accreditation of Indian Council of Agricultural Research (ICAR) for more than five months due to delay in applying for reaccreditation with National Agricultural Education Accreditation Board (NAEAB). There was a shortfall in enrolment of students from 14 to 31 *per cent* of the intake capacity during the period 2017-22. Besides, admission of students in Persons with Disabilities (PwD) category remained less than 20 *per cent*.

There was overall shortage of teaching staff ranging between 39 and 44 *per cent* and non-teaching staff ranging between 51 and 58 *per cent* during the period 2017-22. The shortfall in various cadres of teaching staff ranged between 22 and 44 *per cent* as on 31 March 2022. PAU neither established any distance education centre nor introduced any online course (except for French language). As against 345 to 682 students seeking placements, 29 to 71 *per cent* students got placement during the period 2017-22.

Out of total 616 new research projects proposed by the University, only 193 research projects (31.33 *per cent*) were sanctioned by the project funding agencies during 2017-22. The University did not evolve any mechanism to ascertain/review the reasons for non-approval of research project proposals by the funding agencies so as to bring improvement in their future project proposals. Despite availability of funds from the funding agencies, cases of termination/non-completion of the projects were also noticed due to inadequate monitoring by PAU.

The Technology Marketing and Intellectual Property Rights (TMIPR) Cell of PAU did not have any dedicated full-time staff. No Standard Operating Procedure (SOP) prescribing timelines for registration, transfer of technologies/plant varieties and mechanism for their valuation for determination of license fee was framed by the University. There was no system of periodic reporting of the technologies/plant varieties developed, patented, registered (yet to be commercialised) to the Vice Chancellor and Board of Management (BoM) so as to ensure timely dissemination of the benefits of these technologies/plant varieties to the end users.

As against 48 developed technologies applied under the Patents Act, 1970, 18 technologies were granted patent rights as of November 2022. Of these, in four cases having collaborative research of PAU and ICAR, the patent certificates were granted in the name of ICAR instead of joint registration.

Similarly, out of 97 developed plant varieties applied for registration under the Protection of Plant Varieties and Farmers' Right (PPV&FR) Act, 2001, 36 varieties were registered as of June 2022. Additionally, 34 varieties were registered in the name of ICAR instead of joint registration as these varieties were developed under collaborative research of PAU and ICAR. As many as 17 plant varieties were got commercialised during 2017-22 but without getting them registered under PPV&FR Act. Besides, various plant varieties having geographical indication, were not registered under the Geographical Indication of Goods Act, 1999 by the University.

The cases of short transfer of land to the University were also noticed thereby impacting cultivable area of the University for research work and seed production. Against the yield of 1,274.77 quintal of graded seed of Bt cotton, only 25.31 quintal, i.e., two *per cent* (Bt1 cotton in the year 2017) was sold as seed and the remaining was sold as produce during the period 2017-21. The University suffered a loss of ₹ 7.26 crore due to sale of graded seeds as produce in respect of Kharif and Rabi crops during the period 2017-21.

Manufacturing and sale of two insecticides during 2017-22 without obtaining mandatory licenses were noticed. Nine fruit nurseries were being operated without obtaining mandatory licenses. Only *five to 52 per cent* of the total research publications in respect of seven colleges could find a place in journals with Thompson Reuters Impact Factor with score of 6.00+ during the period 2017-22.

The shortage of staff deployed for extension activities ranged between 44 *per cent* and 48 *per cent* during 2017-22. In 17 out of 18 KVKs, shortage of cultivable land ranged from one to 47.8 acre as per requirement in the respective Memorandum of Understandings (MoU) with ICAR thereby impacting dissemination of practical training/work experience to the beneficiaries.

Except for two KVKs at Ferozepur (achieving targets in respect of number of courses and participants) and Ropar (achieving targets in terms of participants), none of the other four selected KVKs could achieve the targets for imparting trainings to the beneficiaries during the period 2017-22. Besides, the frontline demonstrations (FLD) on major crops and the newly developed technologies were lacking in the selected KVKs.

The Agricultural Technology Information Centre (ATIC) set up in PAU did not serve fully as a single window delivery system for technology products, diagnostic services and information for farmers and other end users.

Recommendations:

The University may:

- *expedite the process for preparation of Strategic Plan to utilise the available funds optimally;*

- *ensure adjustment of temporary advances in accordance with the codal provisions;*
- *ensure preparation of financial statements properly to reflect true and correct financial position of the University;*
- *ensure accreditation of ICAR in a time bound manner;*
- *take effective measures to fill up the vacant posts of teaching and non-teaching staff;*
- *develop a robust process for evaluating research proposals before submission to the funding agencies and for reviewing the unapproved or unsuccessful projects;*
- *strengthen the Technology Marketing and Intellectual Property Rights (TMIPR) Cell to ensure timely registration and commercialisation of its own developed technologies and plant varieties;*
- *take effective measures to increase the cultivable area so as to increase production of Kharif and Rabi seeds and ensure distribution/sale of yield as graded seeds instead of produce;*
- *ensure requisite landholdings with KVKs as per MoUs with ICAR for adequate dissemination of practical training/work experience to the beneficiaries; and*
- *strengthen the Agricultural Technology Information Centre (ATIC) to operate as single window supporting delivery system providing technology products, diagnostic services and information to farmers and other end users.*

Performance Audit-II: Solid Waste Management by Urban Local Bodies in Punjab

Municipal Solid Waste (MSW) management in urban areas is a growing challenge. It not only poses environmental concerns but also threatens public health due to improper handling and disposal of waste. The issue has been worsened by rapid urbanisation. MSW includes various types of waste such as domestic, sanitary, commercial, institutional, catering, market and non-residential waste. It also encompasses street sweepings, silt from drains, horticultural, agricultural and dairy waste. The composition of waste varies depending on factors like food habits, lifestyle, income and climate.

Solid Waste Generation in India and Punjab:

According to the Central Pollution Control Board (CPCB) Report (2021-22):

- India generates 1,70,339 Metric Tonnes (MT) of solid waste per day. Out of this, 92 *per cent* (1,56,449 MT) is collected, of which only 58 *per cent* (91,511 MT) is treated.
- In Punjab, the daily solid waste generation in 2021-22 was 4,222 MT. Of this, 4,207 MT was collected, but only 35 *per cent* (1,471 MT) was treated. This means that about 65 *per cent* of waste remains untreated, which highlights a significant gap in Solid Waste Management (SWM) that needs urgent attention from the 166 Urban Local Bodies (ULBs).

Solid waste is generally categorised into Biodegradable Waste and non-Biodegradable Waste (including Saleable Waste, Refused Derived Fuel, and inerts).

A Performance Audit of SWM by ULBs in Punjab, covering the period from 2017 to 2022, was conducted between August 2022 and March 2023. The audit reviewed records of the Director, Department of Local Government, the Chief Executive Officer of the Punjab Municipal Infrastructure Development Company and 20 selected ULBs (Five Municipal Corporations, 10 Municipal Councils and Five Nagar Panchayats).

A joint physical inspection of 25 dumpsites and waste processing facilities was also conducted.

The audit examined: (i) The planning process for SWM; (ii) Financial management of SWM funds; (iii) Efficiency in waste collection, segregation, transportation and processing; and (iv) Achievement of SDGs and Monitoring and internal control mechanisms.

Audit noticed that the State Government did not formulate SWM and Construction & Demolition (C&D) Waste Management policies on time. This led to a delay in the preparation of bye-laws by ULBs. As a result, key

activities like waste segregation, waterbody waste prevention, legacy waste management and the establishment of SWM infrastructure were not efficiently addressed. ULBs could not prepare adequate action plans for SWM. The assessment for waste generation and composition was not conducted in compliance with the prescribed rules and stakeholder involvement in planning was minimal. ULBs did not optimally utilise the available funds for SWM. Of ₹ 1,011.33 crore allocated for SWM between 2017 and 2022, only ₹ 692.32 crore was spent. Similarly, selected 20 ULBs, utilised ₹ 306.87 crore against the available funds of ₹ 620.18 crore. Additionally, the selected ULBs collected only ₹ 1.06 crore (0.52 *per cent*) as user charges, falling short of the projected ₹ 204.84 crore from April 2019 to March 2022.

Waste collection efficiency was inadequate, with instances of waste being dumped into water bodies and the creation of "Garbage Vulnerable Points" (GVP). Moreover, waste segregation was inefficient as unsegregated waste, including hazardous and sanitary waste was found at dumpsites during physical visits. Necessary infrastructure for waste processing, such as Material Recovery Facilities (MRFs), compost pits and sanitary landfills, was insufficient. As a result, 68 *per cent* of collected waste remained unprocessed, leading to the accumulation of legacy waste. This also led to harmful gas emissions, such as methane a potent greenhouse gas. Furthermore, fire outbreaks at dumpsites were observed, with one incident resulting in the tragic death of seven people, which led to levy of a ₹ 100 crore penalty by the National Green Tribunal (NGT).

The Department identified eight Public Private Partnership (PPP) projects, but only one was operational. Municipal Corporation (Corporation) Amritsar could not close three dumpsites, eliminate secondary collection points, construct sanitary landfills and install weighbridges. The Modern Carcass Utilisation Plant in Corporation Ludhiana, built at a cost of ₹ 8.48 crore, remained idle due to public protests. Additionally, slaughterhouses in selected ULBs did not follow scientific practices. Despite spending ₹ 20.57 crore on a modern slaughterhouse in Ludhiana, it was underutilised. The C&D Waste Management was not carried out in any of the selected ULBs except Corporation SAS Nagar, where C&D waste was used for construction of channels and kerbs.

ULBs featured in this report did not maintain records as required under Municipal Solid Waste Management Rules. The State Level Advisory Body did not meet as per the required frequency and District Administration meetings were not conducted as required. Out of 100 required Annual reports from 20 ULBs, only 74 reports were submitted to higher authorities between 2017 and 2022. Data captured in the Management Information System (MIS)

was inaccurate, with discrepancies between ULB records and the figures reported in the MIS.

Audit observed good practices in solid waste management across six ULBs, as highlighted below:

- *in three ULBs - Mehraj, SBS Nagar and Rupnagar - cloth or jute bags were distributed to encourage the public for refusing/reducing their reliance on the plastic bags.*
- *two ULBs - Ferozepur and Sirhind purchased and distributed steel utensils to the public as substitute of disposable items.*
- *in ULB SAS Nagar, Construction & Demolition waste was used for making channels and kerbs.*

Recommendations:

The State Government/ ULBs may ensure:

- *involvement of stakeholders in the planning process;*
- *optimum and full utilisation of available funds for creating better civic facilities for SWM;*
- *collection of due user charges from waste generators for financial sustainability of ULBs;*
- *compliance with SWM Rules to increase the efficiency in collection, segregation, transportation and disposal of solid waste including legacy waste in scientific manner to protect the public and environment from the hazardous effects of untreated waste;*
- *preparation of an integrated implementation plan for managing other wastes such as carcass waste, C&D waste and slaughterhouse waste as required under rules;*
- *identification of viable Public Private Partnership projects and professional management of these projects for scientific management of solid wastes in the State; and*
- *proper maintenance of records and data so that the performance of SWM system could be assessed.*

**Performance Audit on
Punjab Agricultural University**

1.1 Introduction

1.1.1 Background

Punjab Agricultural University (PAU) at Ludhiana was established in the year 1962 through the Punjab Agricultural University Act passed (October 1961) by the State Legislature. Originally, the University had three campuses, one each at Ludhiana, Hisar and Palampur. PAU was bifurcated (February 1970) by an Act¹ of the Parliament to establish PAU at Ludhiana and Haryana Agricultural University (now Chaudhary Charan Singh Haryana Agricultural University) at Hisar. Further, the College of Agriculture at Palampur, earlier under the aegis of PAU, Ludhiana was transferred to Himachal Pradesh University in July 1970. In April 2006, a new University, namely Guru Angad Dev Veterinary and Animal Sciences University at Ludhiana was carved out of the PAU.

Since its inception, PAU has contributed significantly to the farm and food sector not only in the State but also at the national level. In view of the significant impact of new technologies and high-yielding varieties during 1960s and 1970s on agricultural productivity in Punjab and national food security, PAU played a leading role in the “Green Revolution” in India. In recognition of its outstanding contributions to the nation, PAU was the first Agricultural University to be conferred with the “Best Institution Award” by the Indian Council of Agricultural Research (ICAR) in the year 1995 and again in 2017.

1.1.2 Mandate and Mission Statement of PAU

The Mandate of PAU is to:

- impart education in agriculture, agricultural engineering, allied basic sciences and home science for developing quality human resources;
- conduct research for seeking solutions to the emerging problems in agriculture and allied fields; and
- disseminate agricultural technologies to the farmers through various extension programmes.

The Mission of PAU is to serve the farming community through the generation and dissemination of knowledge for sustainable agricultural production.

In pursuance of its mandate and mission, the University imparts education, conducts research and provides extension services in agriculture, agricultural engineering, home science, and other allied basic sciences. PAU is spread over to an area of 494 hectares at Ludhiana, with an off-campus area of

¹ The Haryana and Punjab Agricultural Universities Act, 1970.

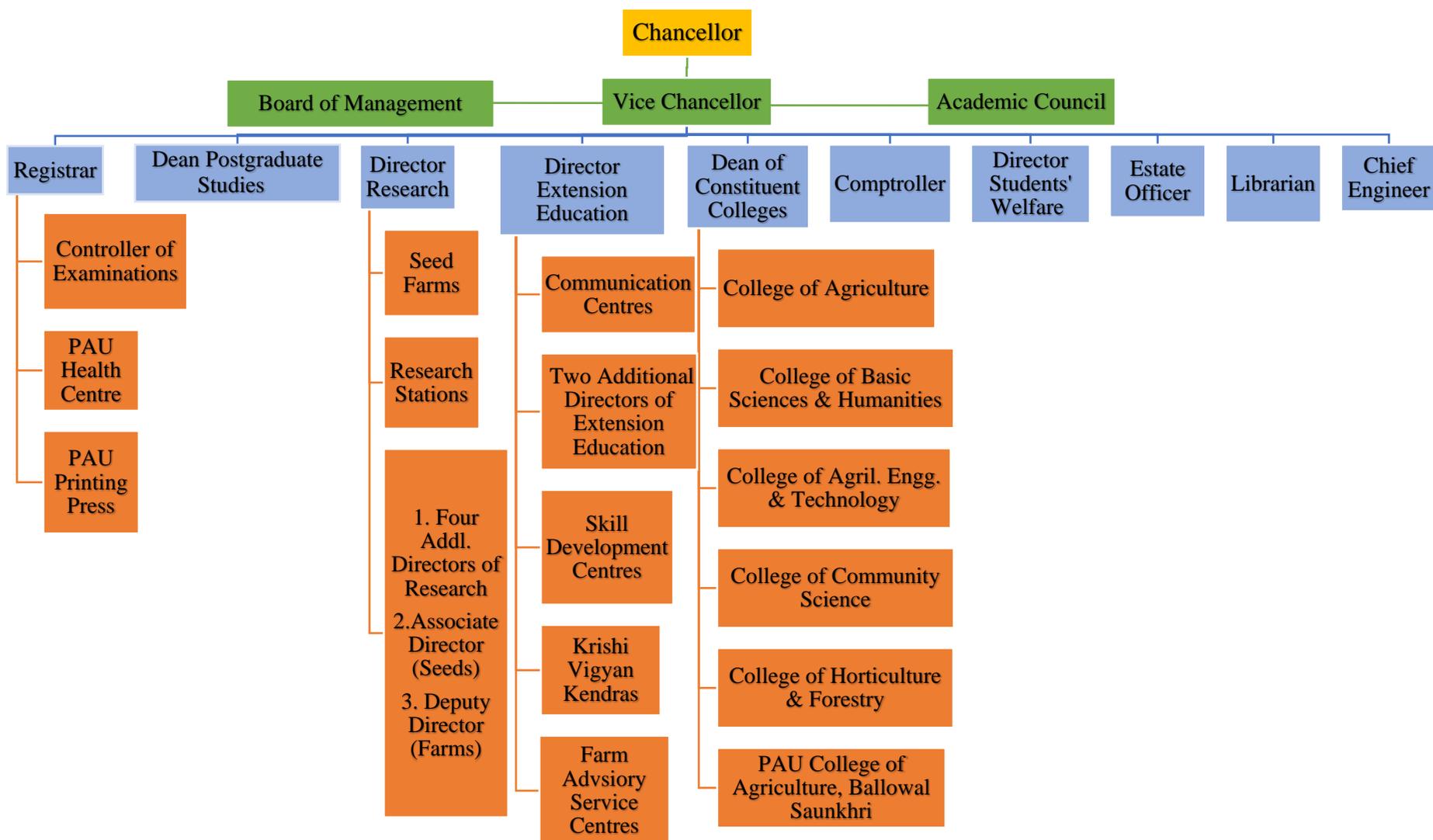
1,793 hectares. PAU has six constituent colleges², nine Research Stations (RSs), six Seed Farms besides 18 Krishi Vigyan Kendras (KVKs), as detailed in **Appendix 1.1**.

1.1.3 Organisational Set-up

The Governor of Punjab is the Chancellor and Honorary Chairman, while the Vice Chancellor (VC) is the Chief Executive of the University and serves as the Chairman of the Board of Management (BoM). The BoM is the apex body of the University which makes policy decisions, provides guidance for governance, appoints faculty & staff, controls assets and finances of the University. Other administrators assisting the VC are the Registrar for general administration and the Comptroller for financial management. The undergraduate teaching programmes of various faculties are administered by respective College Deans whereas postgraduate programmes are administered by the Dean, Postgraduate Studies. The Academic Council at the University level is responsible for designing new courses, modifying course curriculum and other academic matters. The organisational structure of PAU is shown in **Chart 1.1**.

² (i) College of Basic Sciences and Humanities; (ii) College of Community Science (Home Science); (iii) College of Agricultural Engineering and Technology; (iv) College of Agriculture; (v) College of Horticulture and Forestry; and (vi) College of Agriculture at Ballawal Saunkhri, SBS Nagar.

Chart 1.1: Organisational Structure of Punjab Agricultural University, Ludhiana



Source: Punjab Agricultural University

1.1.4 Scope of Audit and Methodology

The Performance Audit of PAU covering the period from 2017-18 to 2021-22 was conducted during June 2022 to February 2023. Test-check of records of offices of the Registrar, Comptroller, Director Research, Director Extension, Deans of Colleges and other controlling offices at the University campus were carried out. Besides, 12 out of 35 departments of five colleges³, six out of 18 KVKs, three out of nine RSs and two out of six Seed Farms (implementing units) were also selected⁴ for test-check, as detailed in **Appendix 1.1**. Further, students' and farmers' surveys were also conducted to assess their responses towards various facilities and extension services provided by the University and by KVKs respectively.

An entry conference was held with the University (VC, Registrar and Comptroller) in August 2022, wherein audit objectives, criteria, scope and methodology were discussed. The Audit findings were discussed with the University (VC, Registrar and Comptroller) in the exit conference held in June 2023 and the replies furnished by them had been suitably incorporated in the Report.

The working of PAU, Ludhiana for the period 2000-05 was earlier reviewed, which featured in the Report of the Comptroller and Auditor General of India (Civil) - Government of Punjab for the year ended 31 March 2006. The Public Accounts Committee (PAC) of Punjab Vidhan Sabha discussed the audit findings in its meetings held in January and July 2008. The recommendations of the PAC in this regard were taken into account while conducting the Performance Audit.

1.1.5 Audit Objectives

The objectives of the Performance Audit were to assess whether:

1. Financial management was efficient & effective, and the financial resources were mobilised and utilised optimally;
2. Academic functions in the fields of agriculture, agricultural engineering and allied fields were performed efficiently and effectively;
3. Research activities were carried out in agriculture, agricultural engineering and allied fields as per terms of funding agencies; and
4. dissemination of agricultural technologies to farmers through various extension programmes was done efficiently and effectively.

³ College of Agriculture, Ballawal Saunkhri, SBS Nagar (sixth college) started functioning from the academic year 2021-22.

⁴ Selection of Departments, KVKs, RSs and Seed Farms was made through stratified random sampling using IDEA (Interactive Data Extraction and Analysis) software, taking into account the expenditure as a criteria.

1.1.6 Audit criteria

The audit criteria were mainly derived from the following sources:

- Act and Statute of the University; University Accounts Code; Intellectual Property Rights Policy for Punjab Agricultural University issued in 2007; Punjab Agricultural University Pension Scheme, 1991; University's revised purchase procedure issued in 2009 and Punjab Agricultural University Calendar⁵, 2003;
- Norms of Indian Council of Agricultural Research (ICAR) and funding agencies for academic, research and extension activities;
- Plan and budget estimates, project proposals, minutes of meetings of BoM and Academic Council;
- Related provisions of various Acts viz. Protection of Plant Varieties and Farmers Rights Act, 2001; Geographical Indications of Goods (Registration and Protection) Act, 1999; Insecticides Act, 1968; Patents Act, 1970; Punjab Fruit Nurseries Act, 1961; Punjab Land Revenue Act, 1887; Rights of Persons with Disabilities Act, 2016; Punjab Municipal Building Bye-laws, 2018; Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 and Punjab Transparency in Public Procurement Act, 2019; and
- Guidelines/instructions/orders issued by the Government of India (GoI), the State Government and ICAR from time to time.

1.1.7 Organisation of audit findings

The audit findings, conclusions and recommendations relating to each of the objectives have been reported under the following heads:

1.2	Planning and Financial Management
1.3	Academic Activities
1.4	Research Activities
1.5	Extension of Agricultural Technologies

1.1.8 Acknowledgement

Audit acknowledges the cooperation and assistance extended by the management and staff of PAU, including the field units viz. RSs, KVKs, Seed Farms, etc. in conducting the Performance Audit.

⁵ PAU Calendar contains rules and regulations on various subjects framed by the University authorities from time-to-time.

1.2 Planning and Financial Management

The Comptroller of the University assists the Vice Chancellor for financial management and optimum utilisation of financial resources.

The audit findings related to the planning and financial management of the University are discussed in the succeeding paragraphs.

1.2.1 Planning

Board of Management (BoM) in its 297th meeting desired (June 2020) to prepare a Strategic Plan of the University initially for the five years from 2021-22 to 2025-26, followed by 10 years' Plan from 2021-22 to 2030-31. The Plan was to clearly describe vision, measurable targets and strategies and requirements for achieving these targets.

Audit noticed that:

- No Strategic Plan describing measurable targets, strategies and requirements was prepared during the period of Audit.
- PAU did not fix any activity-wise or department-wise physical targets like number of research projects, number of research papers, technologies and varieties to be developed and patent and registration thereof. In the absence of these details, oversight over the activities executed by the various departments of the University could not be verified.
- No faculty/scientist-wise targets were fixed for submission and execution of research projects.

The PAU stated (October 2024) that the preparation of Strategic Plans was under process, and the draft would be presented before BoM in due course. It further stated that the Strategic Plan would be finalised accordingly after the approval of BoM.

1.2.1.1 Shortfall in conduct of Board of Management meetings

Section 14 (K) of the Haryana and Punjab Agricultural Universities Act 1970, providing for the powers and duties of the Board, states that the Board should meet at such times and as often as it may deem necessary, provided that regular meetings of the Board shall be held once in every two months.

During 2017-18 to 2021-22, the BoM of the University conducted 26 meetings instead of 30 meetings required as per the Act *ibid*, leading to shortfall of four meetings.

The Registrar, PAU stated (October 2024) that the meeting of the BoM depends upon the availability and importance of the agenda items to be discussed in the meetings and availability of the Chief Secretary, GoP. The Registrar added that 10 meetings were held during 2022-24 (2022-23: four and 2023-24: six).

Non-conducting of requisite number of meetings as per the Act may affect the governance framework of the University in fulfilling its objectives.

1.2.1.2 Receipts and Expenditure

The University receives funds from the State Government as (Grants-in-Aid) (GIA) under education and research schemes. Though the University prepares scheme-wise budget estimates, it submits only demand for funds on a lump-sum basis to the State Government. It receives funds from the State Government from time to time. Besides, the Indian Council of Agricultural Research (ICAR) and other agencies⁶ also provide funds for “All-India Coordinated Research Projects⁷” (AICRP) and various other research projects, establishment and running of Krishi Vigyan Kendras (KVKs) for extension activities, etc. In addition, the University also generates income from own resources⁸.

The details of receipts and expenditure of the University during 2017-22 are depicted in **Table 1.1**.

Table 1.1: Receipts and expenditure of Punjab Agricultural University during 2017-22

(₹ in crore)

Year	Opening balance	Funds received from			Own income	Total funds available	Expenditure (per cent)	Closing balance
		GoP	ICAR	Other agencies				
1	2	3	4	5	6	7 (2+3+4+5+ 6)	8	9 (7-8)
2017-18	57.12	364.96	81.79	32.70	80.76	617.32	529.26 (85.74)	88.06 (14.26)
2018-19	88.06	380.05	101.44	33.13	82.24	684.93	528.25 (77.12)	156.68 (22.88)
2019-20	156.68	379.75	97.43	32.18	87.11	753.16	554.58 (73.63)	198.58 (26.37)
2020-21	198.58	401.56	91.16	33.65	80.49	805.49	589.47 (73.19)	215.97 (26.81)
2021-22*	215.97	421.82	93.23	35.05	80.02	846.09	596.25 (71.12)	249.84 (29.53)
Total		1,948.14	465.05	166.71	410.62	3,706.94	2,797.81	

Source: Data provided by PAU

*The accounts for 2021-22 onwards were yet to be prepared and laid before the Examiner Local Fund Accounts (ELFA), GoP. Hence, figures of grant, income and expenditure for the years 2021-22 had been taken from the statements provided by PAU. PAU intimated that these figures were subject to reconciliation and audit.

⁶ Department of Science and Technology (GoI), Department of Biotechnology (GoI), University Grants Commission and other agencies from public and private sectors for implementation of various projects with specific conditions relating to different components viz. expenditure, timelines, etc. for completion of the projects.

⁷ AICRP is a scheme of Indian Council of Agricultural Research for development/testing/identification of technologies through multi-location trials.

⁸ Application fee, tuition fee, examination fee, book and publications, bank interest income, PAU Museum income, rent of shops, sale of farm produce, fruits, vegetables, etc.

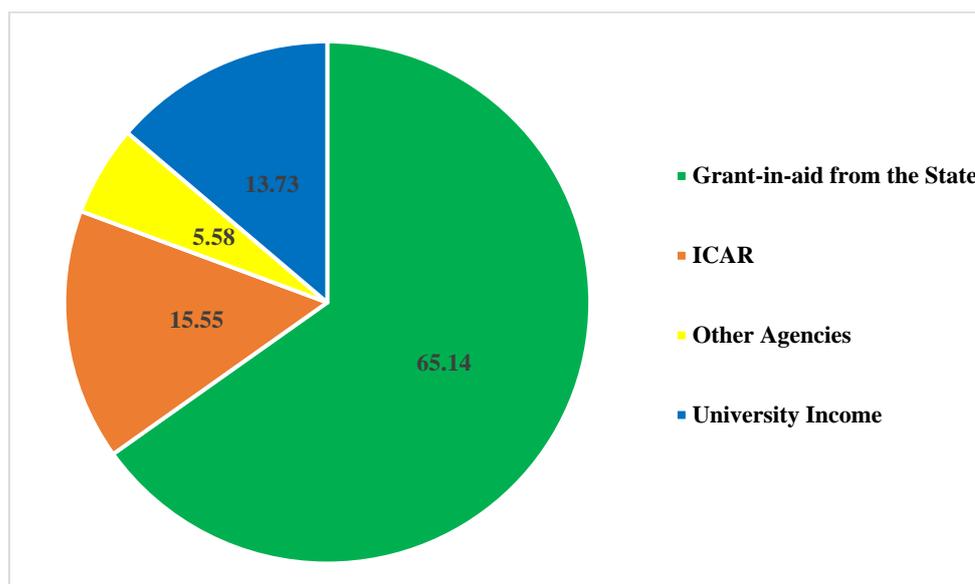
Table 1.1 shows that as against the available funds of ₹ 3,706.94 crore, an expenditure of ₹ 2,797.81 crore was incurred during the period 2017-22. During this five-year period, unspent funds with the University at the close of the financial year consistently increased from 14 *per cent* to 29 *per cent* of total available funds⁹. The increasing trend of the closing balances during 2017-22 showed an inability to use the funds and that budgeting was not realistic.

University replied (October 2024) that year-wise closing balances of funds received and expenditure incurred mainly consisted of University income from its own sources and of other *ad hoc* projects having a duration of three to five years, which was utilized against the short release of Grant-in-Aid to the University by the State Government.

1.2.1.3 Financial management

Components of receipt and expenditure of the University are depicted in **Charts 1.2(a) & 1.2(b)**.

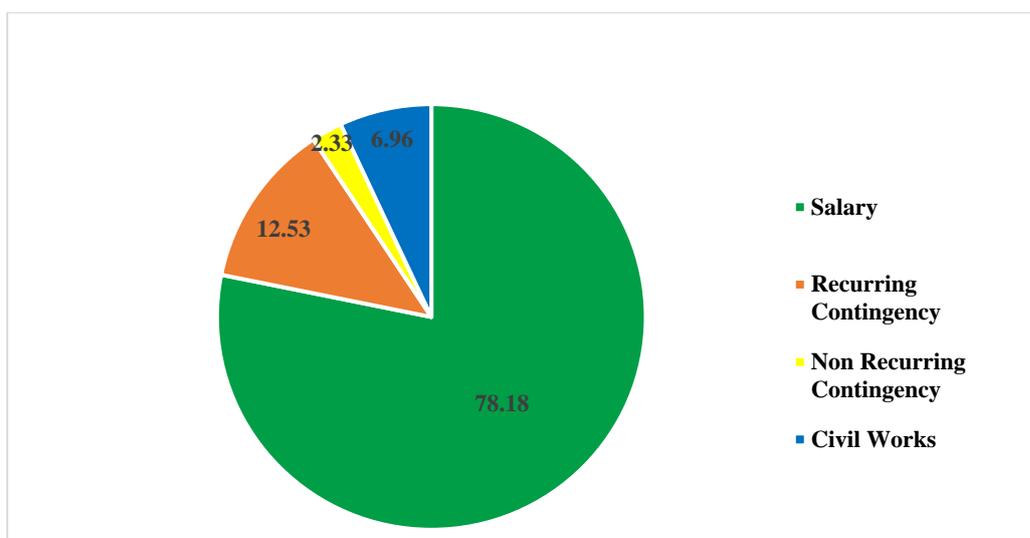
Chart 1.2(a): Average receipt sources during 2017-22¹⁰ (in per cent)



Source: Information supplied by PAU

⁹ Closing funds of the University does not include Pension Fund and Endowment Funds as discussed in paragraphs 1.2.1.4 and 1.2.1.5 (v) in this Report. It is pertinent to mention that the Pension Fund was not a registered Pension Fund or a Pension Trust and was being managed by the University on its own. The pension was being paid from the University account out of GIA instead of being routed through the Pension Fund. These closing balances mainly constituted unspent amount out of grants received from ICAR and own income (Revolving Fund & Consultancy and Self-Financing Schemes).

¹⁰ The accounts for the year 2017-18 to 2020-21 were finalised. The accounts for 2021-22 onwards were yet to be prepared and laid before ELFA, GoP.

Chart 1.2(b): Average head-wise expenditure during 2017-22 (in per cent)

Source: Information supplied by PAU

1.2.1.4 Inadequate Pension Fund

The Board of Management of the University in its 134th meeting held on 30 May 1991 approved the Pension Scheme for its employees with effect from 1st January 1986. The existing employees of the University had the right to opt for Pension Scheme by foregoing the University contributions credited to their Contributory Pension Fund (CPF) account along with interest thereon.

The PAU Pension Scheme (1991) provided that a Corpus Fund (to be called Pension Fund) would be constituted for PAU employees by transferring the CPF contributions made by the University along with interest accrued thereon. This would be subject to the condition that the Punjab Government and other financing agencies contribute 10 *per cent* of the salaries of the employees.

Audit observed that the Pension Fund created in the year 1992 for payment of pensionary benefits to PAU employees got exhausted in 2007, as due to implementation of the New Pension Scheme (2004) by the Government of Punjab and transfer of some employees of PAU to Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) after its bifurcation (2006), the available matching share was not sufficient to pay the monthly pension. As the Pension Fund was exhausted in 2007 and the requisite funds were not available for payment of pension, the Confederation of PAU Pensioners Association filed (2008) a Civil Writ Petition (CWP) in the Hon'ble Punjab & Haryana High Court for payment of pension. The High Court ordered (May 2008) for payment of pensionary and retiral benefits to retired employees. Thereafter, the payment of pensionary benefits was being made¹¹ out of Grants-in-Aid (GIA) received from the Government of Punjab (GoP). Details thereof for the period 2017-22 are given in **Table 1.2**.

¹¹ As per orders (May 2008) of the Hon'ble Punjab and Haryana High Court.

Table 1.2: Details of payment of pensionary benefits out of GIA received from GoP during 2017-22

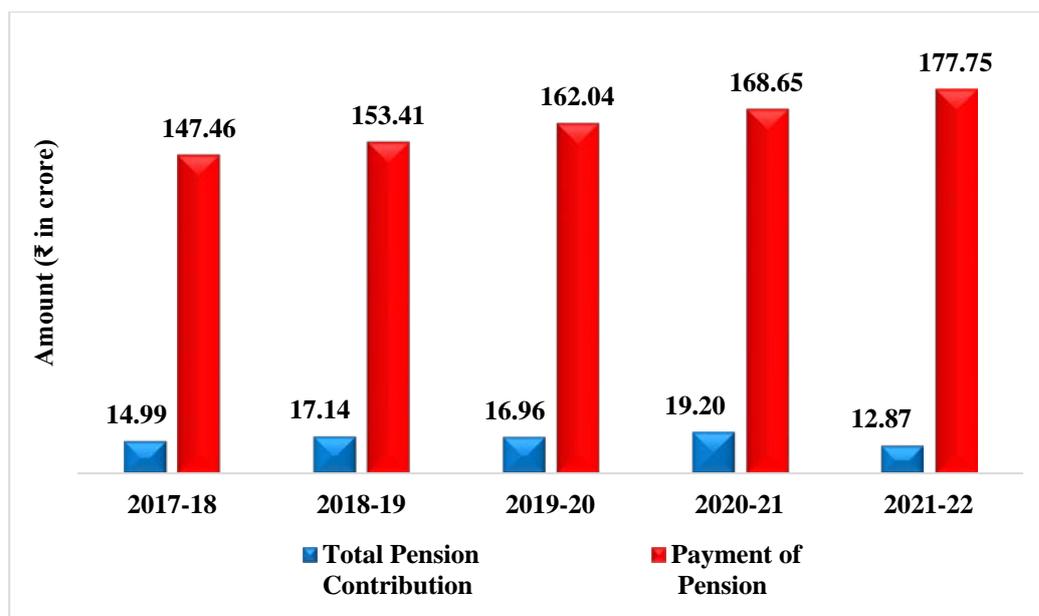
(₹ in crore)

Particulars	2017-18	2018-19	2019-20	2020-21	2021-22
Total GIA received from GoP	364.96	380.05	379.75	401.56	421.82
Payment of pensionary benefits	147.46	153.41	162.04	168.65	177.75
GIA utilised for payment of pensionary benefits (in per cent)	40.40	40.37	42.67	42.00	42.14

Source: Information provided by PAU

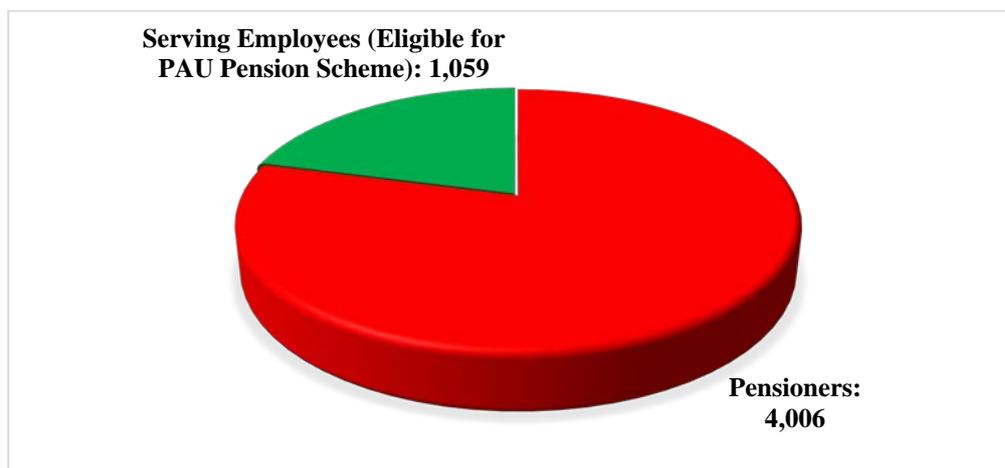
The position regarding total pension contributions recovered from the salaries of the employees *vis-a-vis* total pension payments made out of GIA by the University during the period 2017-22 is depicted in Chart 1.3. The status of pensioners and serving employees who had opted for PAU Pension Scheme as on 31 March 2022 is shown in **Chart 1.4**.

Chart 1.3: Details of pension payment liability from GIA *vis-a-vis* pension contributions to the Pension Fund during the year 2017-22



Source: Information provided by PAU

Chart 1.4: Total pensioners and employees opted for PAU Pension Scheme as on 31 March 2022



Source: Information provided by PAU

It was noticed that after court decision in 2008, an amount of ₹ 247.16 crore was accumulated in the Pension Fund as on 31 March 2022, but no amount was spent by the University out of this fund for payment of pension liabilities as the University is making payments of pensionary benefits out of GIA.

No actuarial valuation of this fund was made to assess the long-term sustainability for payment of defined pensionary benefits.

It was further noticed that out of the accumulated Pension Fund of ₹ 247.16 crore, an amount of ₹ 245.93 crore had been invested in FDRs, and ₹ 1.23 crore was lying in the Savings bank account. However, the University did not diversify the amount of the Pension Fund as per the investment pattern¹² notified (March 2015) by the Ministry of Finance, Department of Financial Services, GoI, to be followed for Non-Government Provident Funds, Superannuation Funds and Gratuity Funds with effect from 01 April 2015. Though the State Government does not have this kind of prescribed investment pattern, there was a prescribed investment pattern notified (March 2015) by the Ministry of Finance, Department of Financial Services, GoI. The prescribed limit for investment in term deposits, not less than one year, is only 35 to 45 per cent of the fund. The University invested 100 per cent of the fund in term deposits.

The University stated (October 2024) that after the implementation of New Pension Scheme in 2004, the number of employees who opted for the PAU Pension Scheme started declining, viz. (31 March 2022: 1059 and 31 March 2024: 923), and the number of retirees started increasing

¹² (i) Government Securities and related investment (minimum 45 per cent and upto 50 per cent); (ii) Debt instruments and related investment viz. listed debt securities issued by body corporate, Basel-III tier-I bonds, term deposit receipts of not less than one year duration, units of mutual funds, etc. (minimum 35 per cent and upto 45 per cent); (iii) Short-term debt instruments and related investments viz. money market instruments, etc. (upto five per cent); (iv) Equities and related investments (minimum five per cent and upto 15 per cent); and (v) Asset backed, Trust structured and miscellaneous investments (upto five per cent).

(31 March 2022: 4006 and 31 March 2024: 4046). It was added (October 2024) that from April 2024, the pension demands are separately raised under GIA (36-Non salary) by the University and provided by the State Government without change in the quantum of total GIA received by the University.

Thus, in view of the inadequate Pension Fund, the University had no option but to rely on GIA being received from the State Government to meet its pension liabilities.

1.2.1.5 Preparation of financial statements

As per provisions of Section 34(4) of the Haryana and Punjab Agricultural Universities Act, 1970, the accounts and the Balance Sheet shall be submitted by the Vice-Chancellor through the Board of Management (BoM) to the appropriate Government, which shall cause them to be audited by the Examiner, Local Fund Accounts (ELFA). However, though ELFA had been auditing the Accounts (Utilisation of Grants) of the University, the Balance Sheet audit was not being conducted by them due to non-receipt of the Balance Sheet from the University.

(i) Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) was established (August 2005) at Ludhiana by an Act of Punjab Legislature No. 16 of 2005 and started functioning with effect from 21 April 2006. GADVASU was carved out of PAU, with staff and resources bifurcated between the two institutions.

Test-check of records showed that at the time of establishment of GADVASU in 2006-07, an amount of ₹ 13.12 crore was shown in the certified accounts¹³ of PAU as recoverable from GADVASU being excess expenditure incurred on Non-plan Vet Scheme during the period 1996-97 to 2005-06. The request (September 2009) of the University for release of ₹ 13.12 crore for settlement of this excess expenditure was turned down (February/April 2011) by the Animal Husbandry Department, GoP. Thereafter, the records of the University did not indicate any efforts made to recover the amount. However, the University kept on reducing this amount (₹ 13.12 crore) from the unutilised grants at the end of each financial year. This resulted in an understatement of unutilised grants by ₹ 13.12 crore during the years 2017-18 to 2019-20.

The University prepared two sets of accounts, i.e., Accounts related to utilisation of grants (audited by the ELFA) and Financial Statements (audited by the chartered accountant).

(ii) The following deficiencies were noticed in the format and preparation of accounts and Balance Sheet:

¹³ Depicted as minus entry in the certified annual accounts for the years 2017-18 to 2019-20, as accounts for the years 2020-21 and 2021-22 were yet to be finalised (March 2023).

1. The provisions of the Haryana and Punjab Agricultural Universities Act, 1970 and Fifth Deans' Committee regarding the timeline for preparation/submission of Accounts and Balance Sheet within six months after the closure of the financial year, i.e., by September-end, were not adhered to by the University as is evident from the following facts:
 - Annual Statement of Accounts containing Grant Utilisation Certificates (GUCs) for the years 2017-18 (₹ 529.26 crore), 2018-19 (₹ 528.25 crore), 2019-20 (₹ 554.58 crore) and 2020-21 (₹ 589.47 crore) were placed before BoM during March 2019, August 2020, March 2021 and July 2024 respectively with delay of six to 33 months.
 - GUCs for the years 2021-22 having an expenditure of ₹ 596.25 crore were not placed before BoM (October 2024) and resultantly could not be forwarded to the State Government.

Delays in the submission of GUCs may impact the superintendence of the legislature on the effective utilisation of grants.

The Comptroller attributed (October 2024) the delayed submission of GUCs to a staff shortage in ELFA and added that the GUCs for the years 2021-22 onwards are still pending due to delay in ELFA audit.

2. The Annual Statement of Accounts (Balance Sheet) was being prepared on cash basis of accounting instead of accrual basis system as recommended (June 2016) by the Fifth Deans' Committee of ICAR. PAU did not include the money accruing to and payables by the University, except for the details of cheques issued but not cleared, outstanding receipts from banks and bank charges recoverable. Further, Annual Accounts for the year 2020-21 and 2021-22 were not certified so far (February 2023).

In the absence of an accrual basis system and proper disclosures in Notes to Accounts, the true and fair position of assets and liabilities of the University could not be ascertained.

The University stated (October 2024) that adoption of accrual basis of accounting for preparing University accounts requires Enterprise Resource Planning (ERP) software and involves huge expenditure. The ERP system would be implemented after obtaining a grant from the State Government.

The reply is not acceptable, as only ERP is not meant to prepare financial statements.

3. As per recommendations (June 2016) of the Fifth Deans' Committee, the University shall have a General Fund to which shall be credited its

income from fees, endowments and grants and income from properties of the University. Further, as per the evaluation proforma for ranking of Agricultural Universities for the year 2017 submitted to ICAR, it was stated that recommendations of the Fifth Deans' Committee had been fully implemented.

Audit observed that the University formed an endowment fund in August 2011. As per documents, the stated objective of the fund was to utilise interest earned on the corpus towards research, teaching and extension education. PAU was maintaining the Endowment Fund in a savings bank account, wherein all contributions received were being credited. As on 31 March 2022, an amount of ₹ 8.24 crore (including interest of ₹ 0.35 crore) had been invested in FDRs out of the fund and ₹ 0.33 crore was lying in the Savings bank account. However, as per recommendations of the Fifth Deans' Committee, the endowment fund should have been subsumed into the General Fund. The University maintains this fund separately.

The accumulated amount of the Endowment Fund had not been used for the envisaged purposes since its formation. Only in one instance, a budget estimate of ₹ 5.89 lakh on Strengthening of Research on prioritised areas Misc.101 (PC-4261) (Primary Unit: Recurring Contingency) was envisaged during the year 2012-13 out of this fund. However, records related to expenditure out of this scheme (recurring contingency) were not made available.

The University informed (October 2024) that preparation of the Balance Sheet for Endowment Fund was under process. The balance of the Endowment Fund was ₹ 9.57 crore as on 31 March 2024. Further, no amount was spent from the Endowment Fund during 2022-23 and 2023-24.

4. As per the provisions contained in Section 34 (3) of the Haryana and Punjab Agricultural Universities Act, 1970, the Finance Committee was required to examine the annual accounts of the University and to review the financial position of the University from time to time.

Audit noticed that as many as 33 bank accounts having a balance of ₹ 4.01 crore were being maintained by five colleges of the University as on 31 March 2020¹⁴ (**Appendix 1.2**) but the closing balances of these accounts were not reflected in the books of accounts of the University. There was nothing on record to suggest that these bank accounts were placed before the Finance Committee for review. Thus, non-reflection of a huge amount in the Balance Sheet of the University did not present a true picture of its financial position.

¹⁴ Balance Sheets for the years 2020-21 and 2021-22 were not finalised (March 2023).

The University stated (October 2024) that these accounts (pertaining to colleges) would be shown in the Balance Sheet after approval from the appropriate authority.

5. Other Deficiencies

- (a) The format of accounts and Balance Sheet was neither prescribed in the Act nor approved by the BoM.
- (b) Previous year figures were not depicted in the Balance Sheet and Income & Expenditure Account.
- (c) Schedule to accounts was not showing details of all the heads of Balance Sheet and Income & Expenditure Account.
- (d) All the significant accounting policies were not disclosed in the relevant schedule.
- (e) Pension Fund (₹ 247.16 crore) and Endowment Fund (₹ 8.24 crore) as on 31 March 2022¹⁵ were kept out of the accounts and Balance Sheet of the University. Non-reflection of amount of both the funds in the accounts and Balance Sheet does not give a true and fair view of the financial position of the University.
- (f) Notes to Accounts did not provide details like contingent liabilities and other explanatory notes. The University did not mention details of Pension Fund and Endowment Fund in the Notes to Accounts also.

The University stated (October 2024) that the standardised/customised format of Balance Sheet would be adopted, if applicable, after approval of the BoM.

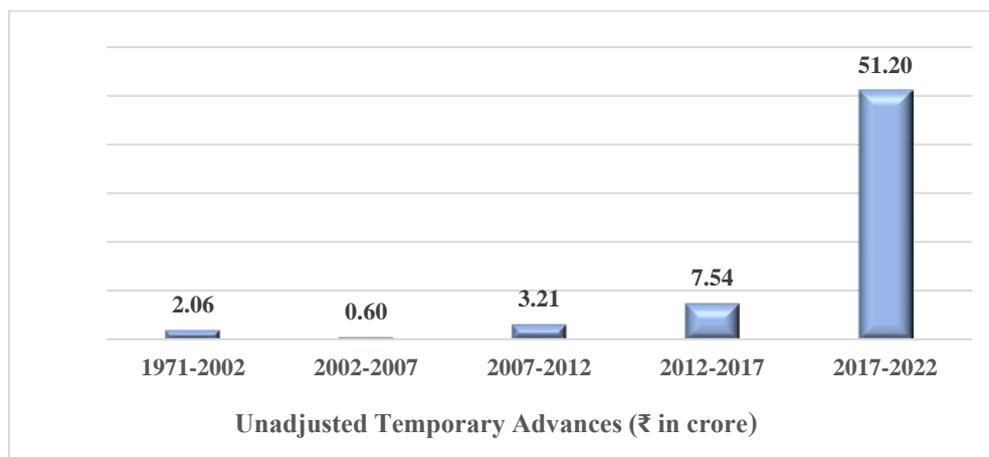
1.2.1.6 Outstanding temporary advances

Para 6.13 of the University Accounts Code provides that the account of temporary advances is rendered as early as possible and unspent balance, if any, refunded during the same financial year.

The University submitted a year-wise abstract of advances drawn and adjusted. From the data provided, Audit noticed that temporary advances of ₹ 64.61 crore remained unadjusted as on 31 March 2022, as detailed in **Appendix 1.3** and the age-wise break-up thereof has been shown in **Chart 1.5**.

¹⁵ University prepared accounts and Balance Sheet for the year 2017-18 to 2019-20. University accounts and Balance Sheet for the year 2020-21 and 2021-22 were not prepared/ finalised as of September 2023. However, the updated figures as on 31 March 2022 prepared by the University are taken.

Chart 1.5: Age-wise breakup of unadjusted temporary advances issued and lying unadjusted as on 31 March 2022



Source: PAU records

Age analysis of these advances showed that temporary advances totalling ₹ 13.42 crore¹⁶ were very old and outstanding for more than five years. This showed a weak internal control in the University. The chances of non-settlement of these advances cannot be ruled out.

PAU submitted year-wise details of outstanding temporary advances, which had particulars like advance number, amount and account head total of the temporary advances.

As evident from the chart above, temporary advances had shot up manifold during the period covered in audit. The description of the advances showed that these were drawn even for long term construction projects in many cases. It showed that temporary advances were drawn on routine basis without judging the urgency of disbursement of payments, in contravention of the rules/instructions, which provide that the account of temporary advances should be rendered as early as possible and unspent balance, if any, refunded during the same financial year.

Further test-check of records showed that five temporary advances amounting to ₹ 2.92 crore were drawn (March 2016-January 2018) for executing three civil works. Although these works were completed (October 2018-May 2019) after incurring an expenditure of ₹ 2.01 crore, leaving an unspent amount of ₹ 91.60 lakh¹⁷, yet the whole amount of temporary advance of ₹ 2.92 crore remained unadjusted as of March 2022. The reasons for non-adjustment were not found in the records.

Temporary advances remaining unadjusted for a long period could lead to their untraceability, thereby posing a risk of misappropriation of funds.

¹⁶ 1971-72 to 1979-80 (₹ 0.15 crore); 1980-81 to 1989-90 (₹ 0.16 crore); 1990-91 to 1999-2000 (₹ 1.72 crore); 2000-01 to 2009-10 (₹ 2.96 crore); and 2010-11 to 2016-17 (₹ 8.43 crore).

¹⁷ Construction of International Hostel at PAU, Ludhiana, Chain Link Fencing around University Seed Farm, Nabha and Extension of Seed sale Centre at Gate No. 01, PAU, Ludhiana.

The Public Accounts Committee (PAC) while discussing audit observation (*paragraph 3.2.7*) of the Report of the Comptroller and Auditor General of India (Civil) for the year ended 31 March 2006-Government of Punjab, had recommended (March 2009) to expedite the recovery process and also stressed upon effecting recovery in the same year in which they became due.

Despite the recommendation of the PAC, a huge amount of temporary advances was lying unadjusted as of March 2022.

In the exit conference, the University, while admitting the facts, assured (June 2023) that it would expedite the process for adjustment of outstanding temporary advances. Further, the University replied (October 2024) that temporary advances amounting to ₹ 71.86 crore were still pending adjustment as on 31 March 2024.

The University may discourage temporary advances for construction of projects. Instead, clear budget lines should be made operational.

1.2.1.7 Other issues

(i) Non-receipt of compensation of land

a) National Highways Authority of India (NHAI) acquired (between February 2021 and March 2022) 20.85 hectares of land falling in three villages, viz. Allowal, Kharak and Chohle under the jurisdiction of University Seed Farm (USF), Ladhawal. The Land Acquisition-cum-District Revenue Officer, Ludhiana (Competent Authority), on behalf of NHAI, announced (June 2021-April 2022) awards of ₹ 15.29 crore for the said land. The University was required to approach the said authority to receive the said amount and get the entire amount credited into the Accounts of the University. However, it was noticed that instead of approaching the Competent Authority promptly, PAU in December 2022 (with a delay of one and a half years after the award of compensation for the said land was pronounced) raised the matter with the Additional Chief Secretary, Government of Punjab for getting alternate land in lieu of compensation. There was nothing on record to show any timely action by the University with the Government to get equivalent alternate land. The indecision of the University is further evident from the fact that it initially pursued (December 2022) the matter with the State Government for allotment of alternate land in lieu of compensation (after the acquisition of land by the competent authority in February 2021 and March 2022) and then for enhancement of the compensation amount of the land (April 2023). When the claim for enhancement of compensation amount was rejected by the Competent Authority (June 2023), the BoM decided (August 2023) to accept the due compensation of ₹ 15.29 crore. The University stated that (October 2024), out of the awarded amount of ₹ 15.29 crore announced by the NHAI, it has received ₹ 14.91 crore. The process is underway to receive the remaining amount of compensation.

b) The State Government transferred (October 2010) 25 acres of land, on which KVK, Ropar had been functioning since 2004, to Indian Institute of Technology (IIT), Ropar. In lieu thereof, the State Government decided (November 2010) to allot 25 acre 01 *kanal* and 10 *marla* of land in village Bara Phul, Rupnagar to KVK (PAU) along with compensation of ₹ 25.00 lakh. Though the allotted land (25 acre 01 *kanal* and 10 *marla*) was in the possession of KVK Ropar since 2013-14, mutation of 11 acre 02 *kanal* and 01 *marla* had not yet been transferred in the name of PAU from Punjab State Co-operative Milk Producers Federation Limited (Milkfed). Besides, compensation of ₹ 25.00 lakh had not been received (May 2023) by the University. The Estate Officer, PAU attributed (May 2023) the reasons for non-mutation of the land in the name of PAU and non-receipt of compensation to non-issuance of notification/orders regarding transfer of the remaining piece of land (11 acre 02 *kanal* and 01 *marla*) by the State Government.

c) The Ministry of Road Transport and Highways (MoRTH), GoI notified (February 2014) for acquisition of land for four-laning of Sangrur-Patran-Khanauri road. Accordingly, possession of 0.0354 hectares of land of KVK Kheri (Sangrur) under PAU was taken by MoRTH in February 2016, though mutation of the said land in the name of PAU¹⁸ was carried out in December 2016. The BoM granted (November 2017) ex-post facto approval for the transfer of land.

Audit observed that although the University had received (April 2018) compensation amount of ₹ 2.12 lakh on account of dismantling of the boundary wall, they did not receive any compensation in respect of the land measuring 0.0354 hectares occupied by MoRTH. However, the University did not take up the matter with the authorities concerned to get its due compensation of land.

The University stated (October 2024) that the Vice Chancellor, PAU was regularly pursuing the matter with the State Government for compensation of land in respect of KVK Ropar but compensation of transferred land amounting to ₹ 25 lakh and mutation of remaining piece of land was still pending. It also stated that the Registrar, PAU had requested the Land Acquisition officer-cum-SDM, Sangrur to release compensation for the land acquired at KVK, Kheri (Sangrur) but compensation was still pending.

In both cases, responses from the State Government were awaited.

(ii) *Irregular maintenance of Security Deposit Account*

The Rules for Security Deposits by students of PAU Calendar (Chapter III) provide that the securities remaining unclaimed for three academic semesters succeeding the end of the semester in which the students left the college, either

¹⁸ Earlier, the land was in the name of the Horticulture Department, GoP.

by completing a particular course or otherwise, shall lapse. The amount so lapsed is to be credited to the Students Aid Fund.

Audit observed that:

- As on 31 March 2022, an amount of ₹ 6.75 crore was lying as balance in the security deposit accounts of five¹⁹ institutions of PAU {four colleges and Director Students' Welfare (DSW)}. The amount of security deposits lying in the bank accounts of these institutions had not been reconciled with that shown in their security deposit registers. The College of Community Science was not even maintaining separate accounts for securities deposited by students; thus, its closing balance could not be ascertained.
- No exercise was done by the respective colleges/DSW to declare security deposits as lapsed during the audit period (2017-22) as per rules *ibid*, except for two colleges *viz.* College of Agriculture (COA) (2017-18, 2019-20 and 2020-21) and College of Basic Sciences & Humanities (COBS&H) (2017-18 and 2018-19), which declared security deposits as lapsed intermittently.

This signifies weak financial control in respect of security deposits. Due to non-declaration of securities as lapsed timely as per the rules *ibid*, the requisite amounts were not transferred to the Students' Aid Fund, which could have been utilised for the benefit of students.

The University replied (October 2024) that the COA, College of Agriculture Engineering & Technology (COAE&T) and COBS&H had been transferring the interest from April 2022 onwards, as well as the amounts of lapsed securities, to the Students' Aid Fund on a regular basis. The amount was parked in the current account. Replies of other two colleges were awaited.

1.2.2 Internal Audit

The internal audit of the University was being conducted by its Internal Audit wing, consisting of one In-charge Internal Audit (two days a week), one Section Officer, and one Auditor (one day a week).

Audit noticed that:

- The Internal Audit Wing was functioning without sanctioned strength. One Assistant Accounts Officer, one Superintendent and four auditors were deputed on a full-time basis and one In-charge and two auditors were assigned on additional duty to the wing. Thus, continuous and critical appraisal of the functioning of the University and compliance to prescribed rules, regulations and guidelines could not be ensured.

¹⁹ (i) College of Agricultural Engineering and Technology (₹ 0.64 crore); (ii) College of Agriculture (₹ 1.81 crore); (iii) College of Horticulture and Forestry (₹ 0.28 crore); (iv) College of Basic Sciences and Humanities (₹ 1.14 crore); and (v) Director Students' Welfare (₹ 2.88 crore – hostel security).

- The University had neither prepared any internal audit manual nor prescribed any codified procedure specifying internal audit planning process, allocation of duties, checks to be applied, etc.
- The details of coverage and the period up to which the internal audit had been conducted, were not made available.
- No internal audit report had been prepared by the Internal Audit wing.
- There was no system in place for monitoring the functioning of the Internal Audit wing along with the irregularities noticed and action taken thereon, if any, by the higher management.

The University stated (October 2024) that its accounts were previously pre-audited by the Examiner Local Fund Accounts (ELFA) through a Resident Audit Examiner/Deputy Controller Local Audit (DCLA) and there was no internal audit wing in place. The pre-audit system was deemed suitable due to the large volume of research, teaching, extension and administrative activities at PAU. However, from August 2020, due to administrative reasons and staff shortages in ELFA, PAU's Internal Audit Cell took over the audit function, while some bills continued to be processed by ELFA (DCLA).

However, the response failed to address the main concern - the absence of a proper internal audit system. Assigning pre-audit duties to the Internal Audit Cell without a formal structure, defined procedures, or consistent reporting did not meet the standards of a comprehensive internal audit function, which is crucial for effective risk management and compliance.

1.2.3 Conclusion

Apart from preparing annual financial plans for obtaining requisite budget, no Strategic Plan describing measurable targets, strategies and requirements was prepared. The University spent 71 *per cent* to 86 *per cent* of the total available funds during 2017-22. The increasing trend of closing balances during 2017-20 showed unchecked deficiencies in budgeting and expenditure projection on part of the University.

The yearly pension payment liability of the University ranged between ₹ 147.46 crore and ₹ 177.75 crore, whereas yearly pension contributions to the Pension Fund was between ₹ 12.87 crore to ₹ 19.20 crore, which was far less than the pension payment liability during 2017-22. The accumulated Pension Fund of ₹ 247.16 crore was not utilised, and the University was meeting its pension liabilities out of GIA from the GoP.

Temporary advances were drawn on a routine basis without ensuring the urgency of disbursement of payments, in contravention of the extant rules/instructions. As on 31 March 2022, temporary advances of ₹ 64.61 crore remained unadjusted, of which ₹ 13.42 crore pertained to the period more than five years, i.e., 1971-72 to 2016-17.

Various inconsistencies were noticed in the preparation/maintenance of financial statements of the University, which were not in line with the codal provisions. The Annual Statement of Accounts containing Grant Utilisation Certificates for the year 2021-22 had not been prepared (October 2024).

The Internal Audit Wing was functioning without any sanctioned strength. The University had neither prepared any internal audit manual nor prescribed any codified procedure specifying internal audit. There was no system in place for monitoring the functioning of the Internal Audit wing.

1.2.4 Recommendations

In light of the audit findings, the University may:

- (i) *expedite the process for preparation of Strategic Plan to utilise the available funds optimally and to meet its mandate and mission more effectively;*
- (ii) *conduct actuarial valuation of its Pension Fund to fill the gap between Pension Fund contributions and pension liabilities;*
- (iii) *ensure preparation of financial statements properly to reflect true and correct financial position of the University;*
- (iv) *ensure adjustment of temporary advances in accordance with the codal provisions; and*
- (v) *ensure amendments to its Act or statute to formally establish a structured internal audit function. This inter-alia could include:*
 - a. defined sanctioned strength and structure*
 - b. guidelines on scope; independence and reporting lines*
 - c. defined roles, responsibilities, scope, planning and procedures of internal audit wing to ensure a systematic and standardised evaluation of the functioning of the University.*

1.3 Academic Activities

Academic programmes of the University are run through its six constituent colleges, namely the College of Agriculture (CoA), College of Agricultural Engineering and Technology (CoAE&T), College of Basic Sciences and Humanities (CoBS&H), College of Community Science (CoCS), College of Horticulture and Forestry (CoH&F) situated in the PAU Campus, Ludhiana and the College of Agriculture, at Ballawal Saunkhri²⁰, SBS Nagar.

The audit findings related to the academic activities of the University are discussed in the succeeding paragraphs.

²⁰ Started functioning from the academic year 2021-22.

1.3.1 Delay in renewal of accreditation

According to the University Grants Commission (UGC) Regulations, 2012, accreditation is compulsory for all universities. The National Agricultural Education Accreditation Board (NAEAB) of ICAR grants accreditation to agricultural universities and related institutions. The validity of accreditation is for five years. Each accredited higher educational institution is required to apply for re-accreditation, six months before the expiry of the existing accreditation, in accordance with the norms and procedures prescribed by the relevant Accreditation Agency. As per ICAR guidelines, Universities seeking grants must be accredited by the Accreditation Board of ICAR from the financial year 2016-17 onwards.

Audit noticed that NAEAB of ICAR gave accreditation (March 2014) to the University and its four²¹ constituent colleges, valid up to 10 March 2019. However, the University applied for reaccreditation on 07 December 2018, i.e., after a delay of nearly three months from the due date (10 September 2018) in contravention of the provisions *ibid*. Thereafter, the accreditation was renewed by NAEAB on 30 August 2019.

Due to non-accreditation during the period from March 2019 to August 2019, students of PAU were denied admission to postgraduate courses by the Himachal Pradesh Agricultural University.

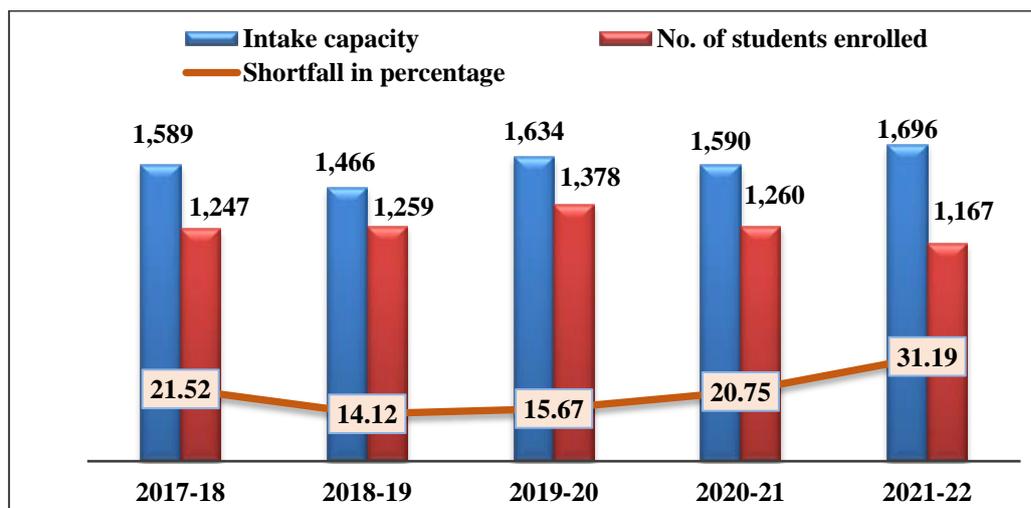
The University stated (October 2024) that the accreditation of PAU had been renewed successfully w.e.f. 1 April 2024 to 31 March 2029. Although the accreditation was granted with retrospective effect, the distress experienced by the students could have been avoided if prompt action was taken.

1.3.2 Shortage in enrolment of students

The position of intake capacity *vis-a-vis* enrolment of students in PAU for the period from 2017-18 to 2021-22 is depicted in **Chart 1.6**.

²¹ Other two colleges *viz* College of Horticulture and Forestry; and College of Agriculture at Ballawal Saunkhri, SBS Nagar were established in 2019 and 2021 respectively.

Chart 1.6: Position of intake capacity vis-a-vis enrolment of students during 2017-22



Source: Compiled from the Information supplied by PAU

Year-wise position of intake capacity vis-a-vis students enrolled in Undergraduate, Graduate and Doctoral (Ph.D.) Programmes offered by the University for the period 2017-18 to 2021-22 is given in **Table 1.3**.

Table 1.3: Position of intake capacity vis-a-vis enrolment of students in various programmes during 2017-22

Year	Intake capacity			Enrolled			Shortfall		
	Ord.	SSP	Total	Ord.	SSP	Total	Ord ²² .	SSP ²³	Total
Undergraduate Programmes									
2017-18	473	251	724	392	223	615	81	28	109(15)
2018-19	498	188	686	444	188	632	54	0	54(8)
2019-20	532	180	712	508	176	684	24	4	28(4)
2020-21	523	180	703	432	176	608	91	4	95(14)
2021-22	610	180	790	430	170	600	180	10	190(24)
Postgraduate Programmes									
2017-18	600	140	740	417	104	521	183	36	219(30)
2018-19	529	120	649	415	84	499	114	36	150(23)
2019-20	577	120	697	441	87	528	136	33	169(24)
2020-21	576	80	656	434	43	477	142	37	179(27)
2021-22	597	90	687	363	39	402	234	51	285(41)
Doctoral (Ph.D.) Programmes									
2017-18	125	Nil	125	111	Nil	111	14	Nil	14(11)
2018-19	131		131	128		128	3		3(2)
2019-20	225		225	166		166	59		59(26)
2020-21	231		231	175		175	56		56(24)
2021-22	219		219	165		165	54		54(25)

Source: Information supplied by PAU

As evident from Table 1.3, the shortfall of enrolment during 2017-22 was ranging between two to 41 per cent in various programmes (Undergraduate: four to 24 per cent); Postgraduate: 23 to 41 per cent) and Doctoral Programmes (two to 26 per cent).

²² Ordinary

²³ Self-Supporting Programme.

The shortfall in enrolment could be attributed to, among others, various deficiencies like shortage of faculty (*paragraph 1.3.4*), low placement (*paragraph 1.3.7*) and poor hostel, food facilities (*paragraph 1.3.14*) and decline in National Institutional Ranking Framework (NIRF) ranking²⁴ (*paragraph 1.3.15 (i)*).

Course-wise analysis revealed that there was 100 *per cent* enrolment in B.Sc. (Hons.) Agriculture (4 years) in 2017-18 and 2019-20; B.Sc. (Hons.) Horticulture (4 years) in 2020-21 and 2021-22; B.Sc. (Hons.) Agriculture (2+4 years) during 2017-22; B.Tech. - Food Tech. (4 years) during 2017-22; B.Tech. (Biotech.) in 2017-18 and 2018-19; B.Sc. (Hons.) Nutrition and Dietetics (4 years) from 2017-18 to 2020-21; and M.Sc. Horticulture and Forestry during 2019-22. However, there was shortfall in M.Tech. (45-67 *per cent*); M.Sc. Basic Science and Humanities (25-60 *per cent*); Business Administration (Agribusiness) (10-50 *per cent*); Business Administration (22-74 *per cent*); M.Sc. Home Science/Community Science (36-67 *per cent*); and five-year integrated M.Sc. (Hons.) (5-57 *per cent*) for the period 2017-22, as detailed in **Appendix 1.4**.

The University intimated (July 2024 and October 2024) that from the year 2023-24, they had started conducting third counselling for undergraduate programmes (10+2 merit on an all-India basis) as well as for postgraduate programmes. It was added that they had received double the application forms during 2023-24 as compared to last year. Further, the University replied that approximately 96 *per cent* seats in undergraduate programmes had been filled for the year 2024-25.

The University's response, asserting that 96 *per cent* of undergraduate seats had been filled for the academic year 2024-25, was not supported by the enrolment data provided. According to PAU's own figures, undergraduate programs had experienced enrolment shortfalls of 22, 25 and 13 *per cent* in the academic years 2022-23, 2023-24, and 2024-25 respectively. Postgraduate programs had shown even greater shortfalls, with enrolment gaps of 46, 51 and 45 *per cent* for the same academic years. Ph.D. programs had faced enrolment deficits of 39 *per cent* in 2022-23 and 35 *per cent* in 2023-24, with admissions for 2024-25 still ongoing. This consistent under-enrolment highlighted an ongoing gap between intake capacity and actual student enrolment, which had not been sufficiently addressed by the University's efforts, including the addition of a third round of counselling.

²⁴ NIRF ranking of PAU declined from 24 (2017) to 51 (2019) amongst 100 Universities in India; and 40 (2017) to 75 (2019) amongst 100 Institutes and Universities (combined) in India, as detailed in *paragraph 1.3.15*.

1.3.3 Low admission ratio of Persons with Disabilities

The Right of Persons with Disabilities Act, 2016 (hereinafter referred as the PwD Act) provides that every establishment shall notify an equal opportunity policy detailing the measures proposed to be taken by it.

Audit observed that though the University had circulated (December 2017) a notification for implementation of the PwD Act, it did not formulate any equal opportunity policy for Persons with Disabilities (PwDs) in line with the provisions of the Act.

(i) The status of admission of students and recruitment of staff in respect of PwD category during the period 2017-18 to 2021-22 is given in **Table 1.4**.

Table 1.4: Position of admission of students in PwD category

Year	Total seats reserved for PwD students*	No. of student applied in PwD category	PwD students admitted	Percentage admission w.r.t. total number of seats reserved for PwD students
2017-18	59	17	5	8.5
2018-19	57	17	10	17.5
2019-20	65	22	12	18.5
2020-21	65	17	7	10.8
2021-22	71	10	5	7.0

Source: Information provided by PAU

* Five per cent of the total seats are reserved for students in PwD category, as per PwD Act.

(ii) Section 16 (ii) of the Act provides that all educational institutions shall make building, campus and various facilities accessible. Section 45 provides a time limit for making existing infrastructure and premises accessible as per rules within a period not exceeding five years from the date of notification of such rules. Section 45 further provides that the Central Government may grant extension of time to the States on a case-to-case basis for adherence to this provision depending on their state of preparedness and other related parameters. Government of India framed Rules under the Act vide notification dated 15th June 2017. The rules provided that infrastructure should be as per the Harmonised Guidelines issued in February 2016.

As such, the rules provided that educational institutions should make the infrastructure accessible by 15 June 2022. These guidelines as well as the Punjab Municipal Building Bye-laws, 2018 *inter-alia* provide for requirement of lifts or ramps in addition to stairs, handrails on both sides of stairways, special toilets, drinking water facility and barrier-free entry/exit for wheelchair users.

Audit noticed the following deficiencies in providing these facilities to PwDs in line with the provisions of the rules *ibid* in the selected departments/ KVKs/ RSs/ Seed Farms/ Hostels of the University:

- None of the buildings of the selected units of the University had special provisions for toilets and drinking water for persons with disabilities (PwDs).

- Multi-floor buildings of nine Departments²⁵, eleven Hostels²⁶, two KVKs²⁷, and two RSs²⁸ did not have lifts or ramps in addition to stairs.
- Multi-floor buildings of two Departments²⁹, eight Hostels³⁰, one KVK (Nurmahal), and one RS (Abohar) did not have handrails on both sides of staircases.
- The entry/exit in respect of the buildings of six hostels³¹, two KVKs³², two RSs³³ and one Seed Farm (Ladhowal) was not barrier-free for wheelchair users.

No extension of timeline by the Central Government to PAU for implementing these measures in its buildings and campuses was found on record. Non-adherence to these provisions not only put the University in violation of the rules but also affected the students in PwD category.

The University assured (June 2023) to improve the PwD infrastructure at the earliest. Subsequently, the Director Students' Welfare informed (October 2024) that construction of ramps in eight hostels and washrooms in six hostels was still under consideration. However, data pertaining to the filling of seats reserved for PwD was not provided for the period 2022-24.

1.3.4 Position of teaching and non-teaching staff

The overall position of teaching and non-teaching staff of PAU for the period 2017-22 is depicted in **Table 1.5** and **Chart 1.7**.

Table 1.5: Position of teaching and non-teaching staff excluding outsourced staff

Year	Teaching staff			Non-teaching staff		
	SS	PIP	Shortage	SS	PIP	Shortage
2017-18	1,382	782	600	4,327	2,135	2,192
2018-19	1,359	758	601	4,273	1,946	2,327
2019-20	1,362	792	570	4,244	1,916	2,328
2020-21	1,355	822	533	4,193	1,796	2,397
2021-22	1,364	834	530	4,168	1,735	2,433

Source: Information provided by PAU

SS= Sanctioned Strength; PIP=Persons in Position

Note: This excludes outsourced staff, as the position thereof was not provided by the University.

²⁵ (i) Vegetable Science; (ii) Floriculture and Landscaping; (iii) Civil Engineering; (iv) Processing and Food Engineering; (v) Food and Nutrition; (vi) Extension Education and Communication Management; (vii) Botany; (viii) Chemistry; and (ix) Math, Statistics and Physics.

²⁶ (i) Hostel No.1; (ii) Hostel No. 2; (iii) Hostel No. 4 (iv); Hostel No. 5 (v); Hostel No. 7; (vi) Hostel No. 13; (vii) Hostel No. 10; (viii) Hostel No. 14; (ix) Hostel No. 15; (x) Hostel No. 16; and (xi) International Hostel

²⁷ (i) Ropar; and (ii) Nurmahal (Jalandhar).

²⁸ (i) Ballawal Saunkhri (SBS Nagar); and (ii) Abohar.

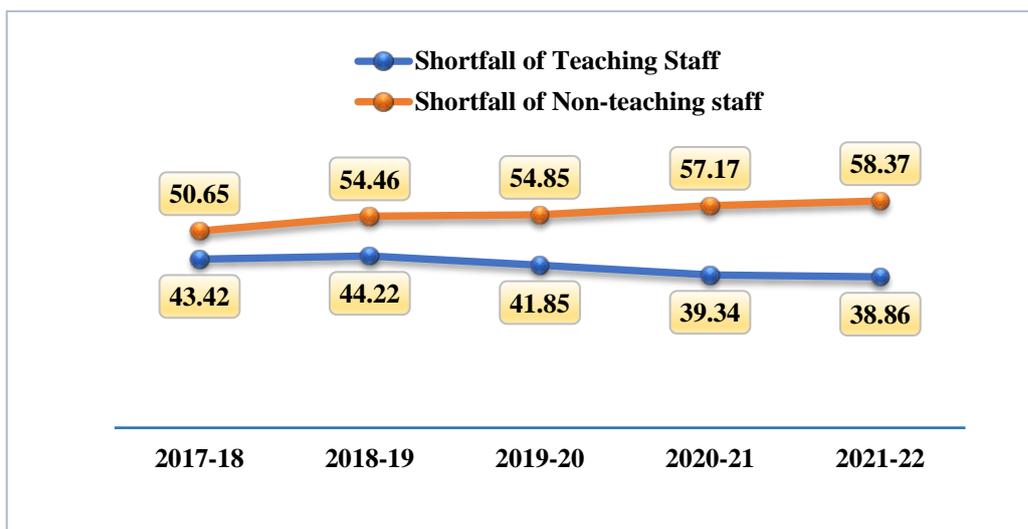
²⁹ (i) Civil Engineering; and (ii) Processing and Food Engineering.

³⁰ (i) Hostel No. 1; (ii) Hostel No. 2; (iii) Hostel No. 6; (iv) Hostel No. 12; (v) Hostel No. 13; (vi) Hostel No. 15; (vii) Hostel No. 16; and (viii) International Hostel.

³¹ (i) Hostel No. 1; (ii) Hostel No. 5; (iii) Hostel No. 10; (iv) Hostel No. 11; (v) Hostel No. 13; and (vi) Hostel No. 16.

³² (i) Faridkot; and (ii) Nurmahal (Jalandhar).

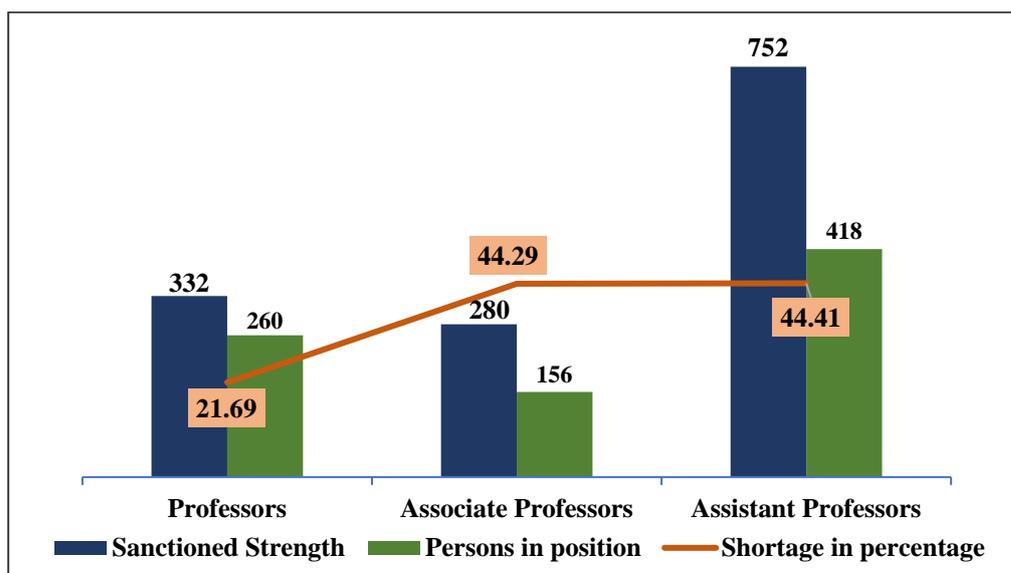
³³ (i) Bahadurgarh; and (ii) Ballawal Saunkhri (SBS Nagar).

Chart 1.7: Shortfall in percentage of Teaching and Non-teaching staff

Source: Information provided by PAU

As can be seen from the above chart, there was a substantial overall shortage of teaching staff and non-teaching staff during the period 2017-22. It was noticed that cadre strength of teaching and non-teaching staff was not reviewed despite instructions (March 2019) of BoM. The fact was admitted by the University in February 2023. Besides, a five-years Human Resource (HR) Plan giving the present profile of the faculty & other human resources and future requirements in view of the set objectives and targets was though initiated, but not finalised (February 2023), as desired (June 2020) by BoM.

The cadre-wise position of teaching staff as on 31 March 2022 is given in **Chart 1.8**.

Chart 1.8. Cadre-wise position of teaching staff as on 31 March 2022

Source: Information provided by PAU

As can be seen from **Chart 1.8**, there was substantial shortfall in various cadres of teaching staff as on 31 March 2022 which was 21.69 per cent in case of

Professors and 44.29 *per cent* in case of Associate Professors and 44.41 *per cent* in case of Assistant Professors. The issue of vacancy in the posts was also pointed out by the Peer Review Team of ICAR in August 2019. It recommended filling up these in a time-bound manner to make research and teaching more effective.

Shortfall in teaching staff not only affects enrolment (*paragraph 1.3.2*) and placement (*paragraph 1.3.7*) of students but also ranking of the University (*paragraph 1.3.16*).

In the exit conference, the University attributed (June 2023) the reasons for vacant posts of teaching and non-teaching staff to financial constraints; and stated that they would conduct the cadre review shortly. It was added that the University was also considering to invite guest faculty and experts from agriculture industries on need basis and to depute final year Ph.D. students for engaging them as teachers to meet the gap in teaching staff.

The University further replied (October 2024) that cadre review of non-teaching posts will be conducted as and when required. However, need based posts of non-teaching staff are being filled in the University keeping in view the financial position of the University. The University further stated that 33 Assistant Professors Level teachers and 66 Clerks have been recruited by the University since April 2023 to September 2024.

The reply of the PAU is not satisfactory as the efforts made to fill up the vacant posts are not adequate as the gap between sanctioned strength and men-in-position is still substantial.

1.3.5 Additional charge against vacant key posts

Section 11(b) of Haryana and Punjab Agricultural University Act, 1970 provides for key posts like Vice-Chancellor, Dean of Post-graduate Studies; Deans of the Colleges; Director Research; Director Agricultural Extension Education; Director Students' Welfare; Registrar, Comptroller, Estate Officer, Librarian; and such other persons in the service of the University as may be declared by the Statutes to be whole-time officers of the University.

Audit observed (November 2022) that the following posts of officers of the University were pending for regular appointments for periods ranging from one year to 21 years (May 2023), due to superannuation/completion of term/Extraordinary leave and were being looked after by other Deans/Professors and Scientists of PAU, as detailed in **Table 1.6**.

Table 1.6: Details of vacant key posts being looked after by other staff as of May 2023

Sr. No.	Name of post	Pending for regular appointment since	Period of pendency for regular appointment (In years/months)	Presently looked after by
1.	Registrar	01/12/2021	1 year 6 months	Dean, CoH&F
2.	Comptroller	01/09/2013	9 years 9 months	Dean, CoBS&H
3.	Dean of Post Graduate Studies (PGS)	01/08/2021	1 year 10 months	Professor, Entomology
4.	Dean, College of Agriculture (COA)	04/08/2020	2 years 10 months	Professor, Extension Education
5.	Director of Extension Education (DEE)	24/01/2022	1 year 4 months	Additional Director, Extension Education
6.	Director of Research (DoR)	29/05/2021	2 years	Additional Director, Research (H&FS)
7.	University Librarian	20/08/2004	18 years 9 months	Principal, Soil Chemist
8.	Estate Officer	07/06/2002	21 years	Principal Scientist, Agroforestry

Source: Information provided by PAU

In respect of posts at Sr. Nos. 1-6, the Act specifically provides that the incumbent of the post shall be a whole-time officer.

The University replied (October 2024) that key posts viz; Registrar, Dean PGS, Director Research, Dean College of Agriculture and Director Extension Education were filled in November/December 2023. However, key posts of the Comptroller, University Librarian and Estate Officer were still lying vacant.

1.3.6 Non-establishment of Distance Education Centre

As per the Report of the Fourth Deans' Committee (2006), colleges are encouraged to offer non-formal training programmes that are need-based, customised and self-financed. The Committee had also recommended provision of funds for hardware content development and to establish centres of Distance Education in each State Agricultural University/Deemed University. Further, Fifth Deans' Committee also recommended (June 2016) that individual universities should develop custom-designed Massive Open Online Courses to meet the skill requirements of their students, as desired under the Skill India Initiative.

Audit observed that PAU neither established a Distance Education Centre for providing distance education nor introduced online courses as per recommendations of the Fourth and Fifth Deans' Committee. Thus, the University could not provide education to those students who were unable to come physically to the University for various reasons. Further, during COVID-19 pandemic, when physical interaction became minimal and the need for digital initiatives as well as IT infrastructure development increased manifold, having a distance education learning process would have greatly benefited students. However, no such course was designed by PAU during the audit period.

Thus, distance education could not be imparted in agriculture and agricultural technologies to the workforce of the State for accelerating the pace of agricultural development.

Audit further noticed that other agricultural universities like Acharya N.G. Ranga Agricultural University, Guntur, Andhra Pradesh and Kerala Agricultural University, Thrissur were offering courses through Distance Education Centres.

The University stated (October 2024) that the PAU was a research-based University and most of its degree programmes were practical oriented. Therefore, it was not possible to establish a Distance Education Centre to provide distance education in science to the students. However, it could be established in courses without practical orientation. Further, to cater to the needs of students residing outside the city, a proposal for a one-year certificate course in French (online mode) was approved by the Academic Council and the admission notice to the said course had been advertised.

The response of the PAU was not acceptable as other agriculture universities had already established Distance Education Centres and are offering various courses through them.

1.3.7 Counselling and Placement Guidance Cell

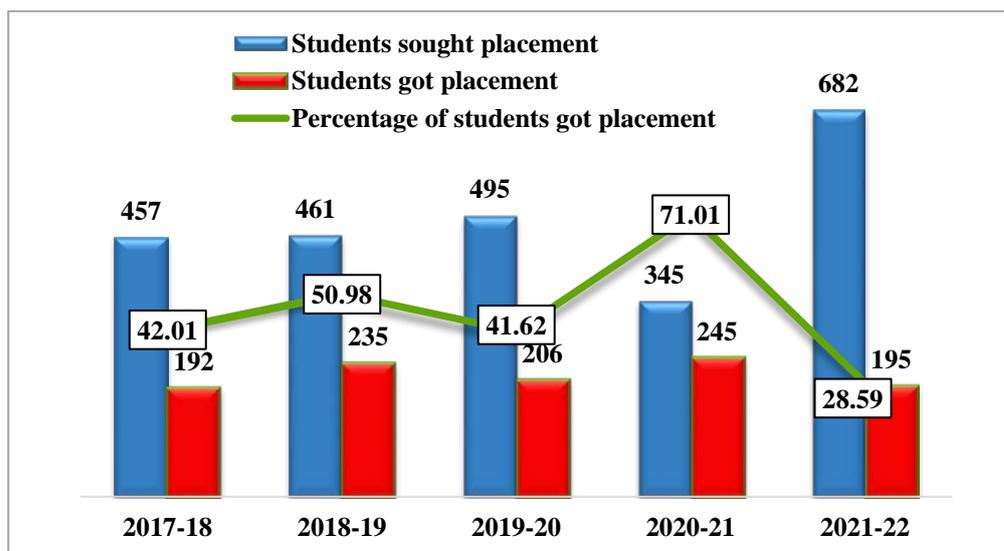
The PAU has a University Counselling and Placement Guidance Cell for providing career counselling and placement assistance to the students in securing placements.

Audit noticed that:

- There was no sanctioned strength of staff for the counselling and placement guidance cell.
- Director Students' Welfare was holding the additional charge of the Cell and other manpower was working there on contractual basis. As can be concluded, the placement cell was being run on *ad hoc* basis.
- The Placement Cell did not maintain college-wise/course-wise database of passed out students, students seeking placement and placed before July 2019. However, PAU furnished year-wise number of registered students and students getting placement during the year. Even, the college-wise/course-wise details of students claimed to be maintained post- July 2019 was not provided to Audit.

The position of placement of students during the period 2017-22 is depicted in **Chart 1.9**.

Chart 1.9: Position of placement of students during the period 2017-22



Source: Information provided by PAU

As can be seen from the Chart, the University was not able to place even its willing students during campus placements, as the percentage of student's placed ranged between 28.59 and 71.01 during 2017-18 to 2021-22.

The University provided data of highest, medium and lowest package. However, survey of 259 students conducted during the course of the Performance Audit showed that 53 *per cent* of the students were not aware about campus placement, while 47 *per cent* of those aware (121), were not satisfied with campus placement and the packages offered.

The University stated (October 2024) that information was collected from all the constituent colleges for preparing the database of final year students seeking placement. Various organisations were contacted and invited for campus placement on regular basis. University Counselling and Placement Guidance Cell also organised an "Employment Fair" in PAU campus on 11 October 2024 for giving a boost to the placements of PAU students.

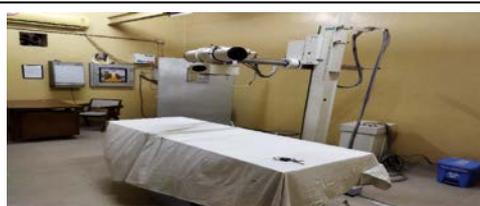
The University's response, citing data collection from constituent colleges and the recent employment fair held in October 2024, did not address the fundamental concerns identified. While organising an employment fair and contacting organisations for placements were commendable steps, they were insufficient to compensate for the systemic issues. Without college-wise and course-wise data on placements, the University could not effectively monitor, assess, or improve the success of its placement activities or cater to specific industry requirements for each course. The reliance on *ad hoc* staffing, with no sanctioned positions and key responsibilities held by the Director Students' Welfare as additional duties, indicates a lack of dedicated support for the placement cell.

1.3.8 Medical facilities to students and staff

PAU has a hospital named “PAU Hospital” (operational 24 hours with indoor capacity of 20 beds) in its campus since 1962 to provide medical facilities to its staff (present as well as retirees), their dependents and students. “PAU Hospital” was renamed as PAU Health Centre, with reduced capacity of 12 beds, from 30 March 2021.

Audit noticed that:

- Against the originally approved sanctioned strength of 28 posts in various cadres (7 Medical and 21 Paramedical), 10 persons (3 Medical and 7 Paramedical) were in position as on 31 March 2022. The key posts of three Medical Officers (MO), Pharmacist-cum-Store Keeper, Nurse, Senior Radiographer, Dark Room Attendant, Maid Attendant and Lab Attendant were vacant for 9-20 years (up to 31 March 2021). The University stated (November 2022) that the process to fill the vacant posts had been initiated.
- No corresponding change in sanctioned strength was made by the University while downgrading the capacity of the Health Centre with effect from 30 March 2021.
- An X-ray machine was available, but technicians to operate the machine were not available. Likewise, eye testing equipment and dental equipment were available, but the concerned doctors were not available. The operation theatre was non-functional due to non-availability of a Surgeon.



Photograph 1: Idle X-ray machine due to non-availability of Technician (31 August 2022)

The Chief Medical Officer, PAU Ludhiana intimated (October 2024) that the posts of three MOs and the post of MO (Dental) were lying vacant due to financial crisis or non-allotment of budget to fill these posts. The posts of Radiography Technician, Diet Assistant and Physiotherapy Assistant had been filled by the Registrar, PAU. Further, the recruitment for the posts of Multi-Purpose Health Worker (Female), Medical Lab Technician and Laboratory Attendants was under process.

The reply was not satisfactory as the University did not provide details of status of the operation theatre, eye-testing equipment and dental equipment. Further, the University did not provide any evidence indicating any effort made for budget allocation for filling up the vacant positions of three MOs and one MO (Dental).

Thus, non-functional medical infrastructure deprived staff and their dependents of requisite medical facilities in the University campus during medical emergency.

1.3.9 Non-establishment of Internal Quality Assurance Cell

Regulation No. 6.0.11 of UGC Regulations, 2010 prescribed establishment of an Internal Quality Assurance Cell (IQAC) in all Universities/Colleges as per the UGC/National Assessment and Accreditation Council (NAAC) guidelines. The IQAC is supposed to act as the documentation and record keeping cell of the Institution, including assistance in developing the API criteria-based Performance Based Appraisal System (PBAS).

Audit noticed that the University had not established an IQAC which serves as a coordinating cell to bring together academic, administrative and financial functions at one place, thereby depriving itself of quality improvement. Besides, due to non-formation of IQAC, the requisite academic and administrative audits could not be conducted as required by the Accreditation Board. Resultantly, the University could not ensure internalisation of quality culture, enhancement and integration amongst various activities of the institution and institutionalise good practices to improve institutional functioning.

Further, due to non-establishment of an IQAC, the impact of shortage of staff, reasons for poor placement, decline in ranking and enrolment of students could not be assessed and reported to the management to take corrective action.

The University informed (October 2024) that an IQAC had been established in January 2023 at PAU to promote conscious, consistent and catalytic action plans for improving its academic and administrative performance. However, details pertaining to academic and administrative audits to be performed by IQAC as mandated by accreditation board were not provided to Audit as of October 2024.

1.3.10 Grievance redressal mechanism

As per University Grants Commission (Redressal of Grievances of Students) Regulations, 2019, all Higher Education Institutes, whether established or incorporated by or under a Central Act or a State Act, shall constitute Collegiate Student Grievance Redressal Committee (CSGRC), Departmental Student Grievance Redressal Committee (DSGRC), Institutional Student Grievance Redressal Committee (ISGRC) and University Students' Grievance Redressal Committees (USGRC) for redressal of grievances of students. As per para 8(i) of the UGC (Redressal of Grievances of Students) Regulations 2019 (notified on 06 May 2019), each institution shall, within a period of three months from the date of issue of the notification, establish an online portal where any aggrieved may submit an application seeking redressal of grievances.

Audit observed that during 2017-18 to 2021-22:

- No such committees in line with UGC Regulations *ibid* were constituted in the University.
- Neither any policy/guidelines were framed for grievance redressal of students nor any Students' Grievance Redressal Cell was established in the University.
- There was no online portal for students for registration of their grievances/complaints.

Non-establishment of a grievance forum renders students vulnerable, as they may not have a readily available body/forum to report their grievances.

The University stated (June 2023 and October 2024) that a Grievance Redressal Cell had been established in College of Agriculture Engineering & Technology and that the Student Grievance Redressal Committee was constituted (September 2023) for the academic sessions 2023-24 & 2024-25. The Committee was re-constituted (September 2024) at the University level as per UGC Regulations 2023 for the academic sessions 2024-25.

The University did not provide any details regarding establishment of an online portal for grievance redressal, as mandated by the UGC.

1.3.11 Implementation of provisions under Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013

Rules framed under the “Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 (Act)” provide that every employer shall *inter alia* formulate and widely disseminate an internal policy for prohibition, prevention and redressal of sexual harassment at workplace.

Audit observed that though an internal policy regarding sexual harassment had been framed by the University in the year 2002 to comply with the directions of the Supreme Court, it was yet to be reviewed in the light of new provisions of the Act. The provisions as outlined in PAU notification issued in the year of 2002 were more than 20 years old, which may require changes in the context of the Act as detailed below.

- Para 12 of notification of the University provides a timeline of 15 days for filing of the complaint whereas Section 9 of the Act provides timeline of three months. A relook of the old internal policy would ensure policy alignment with the provisions of the Act.

The University assured (May 2023) to look into the internal policy.

Further contraventions noticed during audit were as under:

- Two members of the Internal Complaint Committee (ICC) continued for more than three years (six years & eight months and three years & two

months as of March 2022) in contravention of the provisions of Section 4 (3) of the Act.

- No information regarding penal consequences and constitution of Committee as required under Section 19 (b) of the Act was displayed in the University premises.
- Section 19 (c) of the Act provides organisation of workshop/ awareness programmes at regular intervals. However, only three workshops for sensitising the staff/students were organised (March 2020, January 2021 and April 2021) during the audit period.
- Only two reports (2016-17 and 2018-19) were submitted by the Committee during the period of five years (2017-22) against the requirement of annual submission of report in each calendar year as per provisions of Section 21(1) of the Act.

The University stated (October 2024) that a new ICC had been constituted on 11 August 2023. The penal consequences and the Constitution of ICC had been displayed on the University website. Three workshops/interactive sessions had been organised after the constitution of the new ICC. The annual report of ICC for the period 2022-24 was pending submission.

The University's response to the audit findings regarding the implementation of the Act did not adequately address the systemic issues identified. While the establishment of a new ICC in August 2023 and the display of penal consequences on the University website were positive steps, these measures did not retrospectively resolve the deficiencies in compliance observed during the audit period.

1.3.12 Establishment of new College of Agriculture at Ballowal Saunkhri, SBS Nagar

(i) As per recommendations of the Fifth Deans' Committee, ICAR issued directions (July 2016) regarding minimum requirements for the establishment of new colleges in agriculture and allied disciplines. These recommendations, which were made mandatory by ICAR, were linked to the accreditation of institutions and the release of ICAR grants.

The Government of Punjab (GoP) approved (March 2021) the proposal (November 2019) of the University to start a new College at Research Station Ballowal Saunkhri, SBS Nagar. Accordingly, the College of Agriculture, Ballowal Saunkhri started functioning by admitting the first batch of 61 students from the academic year 2021-22.

Audit observed that the faculty strength and the infrastructure facilities available at this new College were far below the requirements recommended by the Fifth Deans' Committee, as detailed in **Table 1.7**.

Table 1.7: Details of facilities available vis-a-vis required in College of Agriculture at Ballawal Saunkhri, SBS Nagar

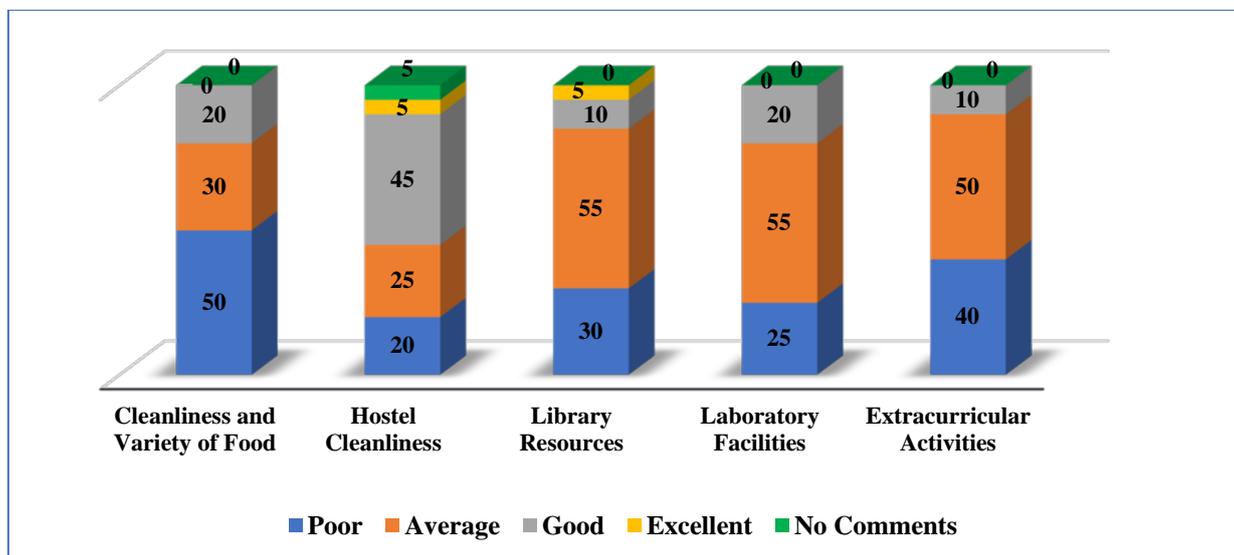
Sr. No.	Minimum facilities required as per Fifth Deans' Committee recommendation/ ICAR directions	Facilities available
1.	Five smart lecture halls	Though eight lecture halls have been planned, only two lecture halls with projectors were available as on 31 March 2022.
2.	31 teaching staff	Only seven contractual teaching assistants were serving in the College. Besides, 15 scientists of RS at Ballawal Saunkhri were assigned with additional duties of teaching. The detailed roles of these teaching staff with that of requirement could not be compared for want of breakup of data provided.
3.	Two hostels (separate for boys and girls with 150 capacity each)	Regular hostels were under construction, temporary arrangements were made to accommodate the students in college campus.
4.	12 full-fledged laboratories	There were provisions of nine laboratories but only five were operational during period of audit.

Source: Recommendations of Fifth Deans' Committee and information provided by the College

A joint inspection of this college was also carried out by audit. During joint inspection, it was observed that no interactive touch-screen boards, first-aid box, firefighting equipment and grievance redressal information boards were installed.

(ii) Audit conducted (January 2023) students' survey (sample size of 20 out of a total of 61 students) and joint inspection of the infrastructure at the College of Agriculture, Ballawal Saunkhri; results thereof are shown in **Chart 1.10**.

Chart 1.10: Results of Survey (in percentage) of the infrastructure at the College of Agriculture, Ballawal Saunkhri, SBS Nagar



Source: Survey results

Thus, students were discontented with the infrastructure due to poor transportation, fewer laboratories, no library and reading rooms, medical facilities etc. which also impacted brand value of the University.

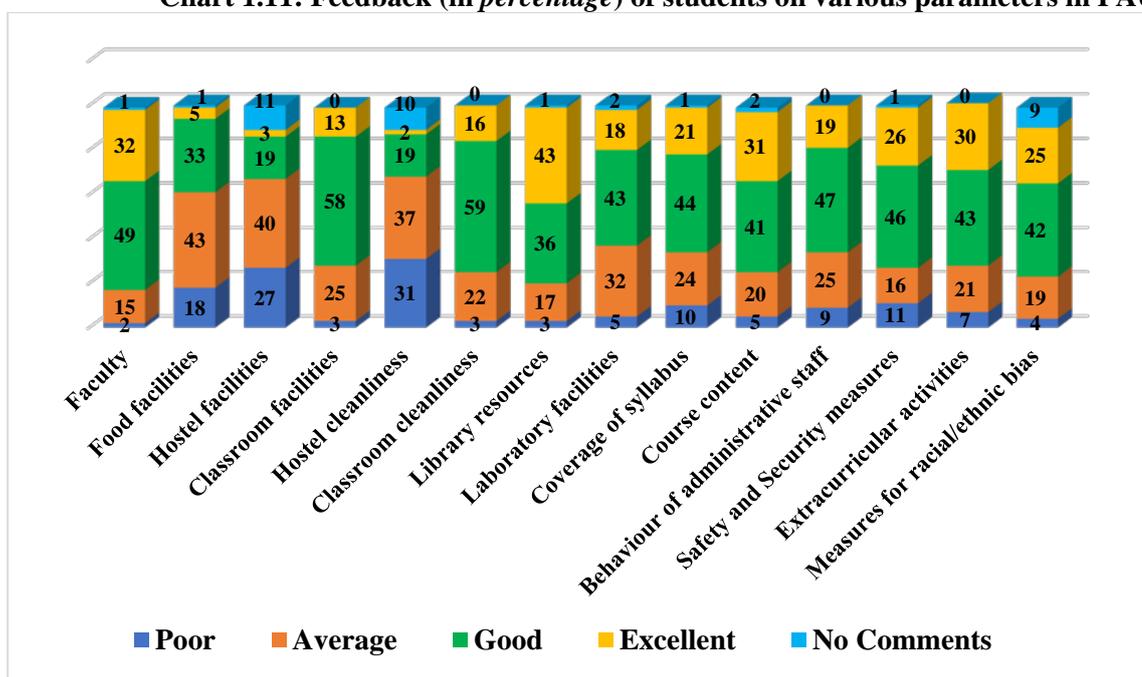
In the exit conference, the University assured (June 2023) to provide necessary facilities to students at the new College of Agriculture, Ballawal Saunkhri at the earliest. Subsequently, the Dean, PAU College of Agriculture, Ballawal Saunkhri informed (October 2024) that the main building of college – comprises of eight lecture rooms, six laboratories, eighteen faculty rooms, one committee room, one multipurpose hall with 500 seating capacity, one Library with reading area and evaluation room and first phase of girls’ hostel with a capacity of 100 students had been completed whereas the construction of first phase of boys’ hostel had been started. Nine well equipped laboratories (six in college main building and three in research station building) had been established.

The details of the completion of work were awaited in Audit as of October 2024.

1.3.13 Feedback of students on various parameters

As IQAC was not implemented in the University, there was no independent mechanism for audit to ascertain feedback of the students. Hence, feedback of 259 out of 4,016 students (as on 31 March 2022) of 12 selected departments in respect of five constituent colleges located in the University Campus, was taken to assess their satisfaction level on various parameters/activities; outcome thereof is depicted in **Chart 1.11**.

Chart 1.11: Feedback (in percentage) of students on various parameters in PAU



Source: Student Survey

Chart 1.11 shows that:

- More than 60 *per cent* of the students rated the “hostel and food facilities” besides “hostel cleanliness” as either poor or average.

- 37 per cent of the students (most of them were from Departments of Chemistry; Vegetable Sciences; and Extension Education & Communication Management) had rated the ‘laboratory facilities’ provided by the University as either poor or average; and
- As many as 34 per cent of the students (most of them were from Departments of Vegetable Sciences; Extension Education & Communication Management; and Entomology) had rated the ‘coverage of syllabus’ during the course study as either poor or average.

The University stated (October 2024) that the sample size of the students from which the feedback was noted, was only five per cent of the total students of the University. The remarks of such small sample could not be generalised. Further, the University requested that feedback may be taken again but with a bigger sample and from the department of the entire University so that the generalisation of facts could be ascertained. Reply of the University was not satisfactory as students for survey were randomly selected and it was the representative sample of the overall students.

1.3.14 Joint inspection of campus buildings

Joint inspection of 12 selected academic departments and 14 hostels of the University was carried out during the course of audit to ascertain availability of various facilities for the students. The deficiencies noticed during the joint inspection are detailed in **Table 1.8**.

Table 1.8: Results of joint inspection of campus buildings of the selected departments and hostels of PAU

Sr. No.	Facility	Academic Departments (12)	Hostels (14)
1.	Firefighting System	Firefighting equipment were absent in seven ³⁴ departments and in Chemistry Department, firefighting equipment had expired (2021).	Firefighting equipment were available in three ³⁵ hostels only.
2.	First-aid box	First-aid box facility was not available in eight ³⁶ departments.	First-aid box facility was not available in five ³⁷ hostels.
3.	Fixed assets marking	Marking on fixed assets was not available in six ³⁸ departments whereas in five ³⁹ departments, marking was partial.	Marking on fixed assets was available only in two hostels viz. Hostel Nos. 10 and 16.

Source: Joint inspection of selected departments and hostels

³⁴ (i) Extension Education & Communication Management; (ii) Floriculture & Landscaping; (iii) Food & Nutrition; (iv) Maths, Stats & Physics; (v) Plant Pathology; (vi) Processing & Food Engineering; and (vii) Vegetable Science.

³⁵ Hostel Nos. 4, 7 and 10.

³⁶ (i) Entomology; (ii) Ext. Education & Communication Management; (iii) Floriculture & Landscaping; (iv) Food & Nutrition; (v) Maths, Stats & Physics; (vi) Plant Pathology; (vii) Processing & Food Engineering; and (viii) Vegetable Science.

³⁷ Hostel Nos. 1, 11, 12, 14 and 15.

³⁸ (i) Botany; (ii) Civil Engineering; (iii) Entomology; (iv) Extension Education; (v) Extension Education & Communication Management; and (vi) Processing & Food Engineering.

³⁹ (i) Chemistry; (ii) Floriculture & Landscaping; (iii) Maths, Stats & Physics; (iv) Plant Pathology; and (v) Vegetable Science.

In addition to the above,

- Interactive board/touch screens were not available in classrooms of six departments⁴⁰.
- Grievance redressal board was not available in all the departments except for Department of Botany, Civil Engineering and Extension Education.
- Washrooms were not well-maintained in two hostels⁴¹. A sample of deficiency is shown in the photographs attached as **Photograph number 2 and 3**.
- Separate dustbin facility for segregation of waste was not available in five hostels⁴².
- Generator facility was not available in any of the hostels despite power cuts.
- TV and newspaper facility were not available in Hostel Nos. 12 and 13.



Photograph 2 and 3: Broken washroom of Hostel No. 1 (11-01-2023)

Further, in the absence of asset marking, the proper identification of assets cannot be ensured, thereby posing risk of their misappropriation.

The University stated (October 2024) that the firefighting equipment and first aid boxes had been installed in all the hostels. Hostel staff had been instructed to complete the process of marking fixed assets and it will be completed shortly.

The details of the completion of work were awaited in Audit as of October 2024.

1.3.15 Ranking of Punjab Agricultural University

(i) The National Institutional Ranking Framework (NIRF) outlines a methodology which ranks various universities and institutions on the basis of

⁴⁰ (i) Chemistry; (ii) Entomology; (iii) Extension Education; (iv) Extension Education & Communication Management; (v) Processing & Food Engineering; and (vi) Vegetable Science.

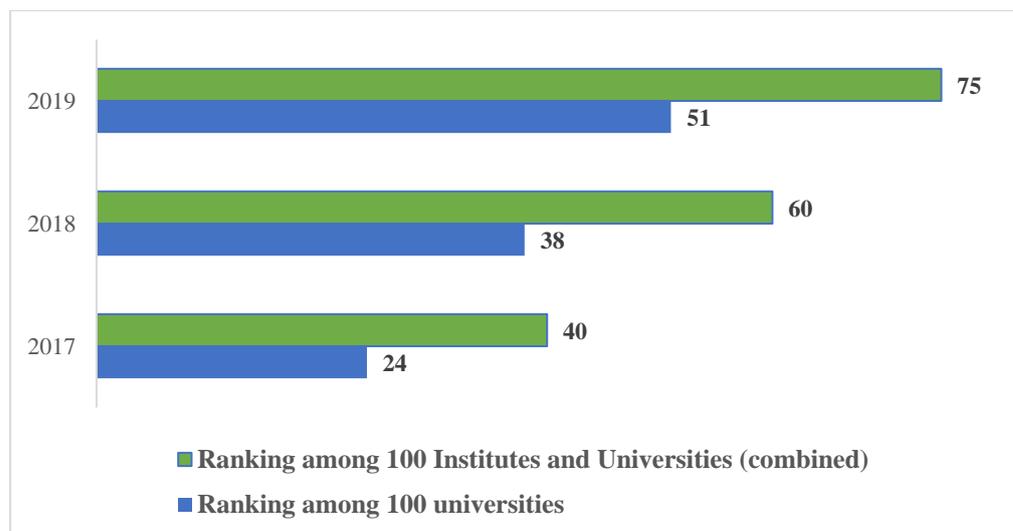
⁴¹ Hostel Nos. 1 and 13.

⁴² Hostel Number 1, 2, 11, 13 and 15.

five parameters viz. Teaching, Learning and Resources (30 per cent); Research and Professional Practice (30 per cent); Graduation Outcome (20 per cent); Outreach and Inclusivity (10 per cent); and Perception (10 per cent). As per directions (24 December 2020) of the ICAR, the NIRF has not ranked the Agricultural Universities during 2020-21. Subsequently, ICAR (September 2022) asked the State Agricultural Universities to initiate the process of NIRF ranking.

The trend of NIRF ranking of PAU amongst 100 universities in India; and 100 Institutes and Universities (combined) in India during 2017-19⁴³ is depicted in **Chart 1.12**.

Chart 1.12: NIRF ranking of PAU during 2017-19



Source: Website of National Institutional Ranking Framework (NIRF)

There was a marked gradual decline in the NIRF ranking of the University year after year. The decline in NIRF ranking of the University was attributable to decrease in scores in respect of four parameters⁴⁴ “Teaching, Learning & Resources, Graduation Outcome, Outreach & Inclusivity and Perception” while in respect of the fifth parameter⁴⁵, the scores increased slightly.

Audit further noticed that PAU did not analyse the reasons for decline in NIRF rankings, thus, could not take corrective measures.

(ii) In line with the National Initiative on Ranking of Indian Institutions, ranking of Agricultural Universities was initiated by ICAR in the year 2017.

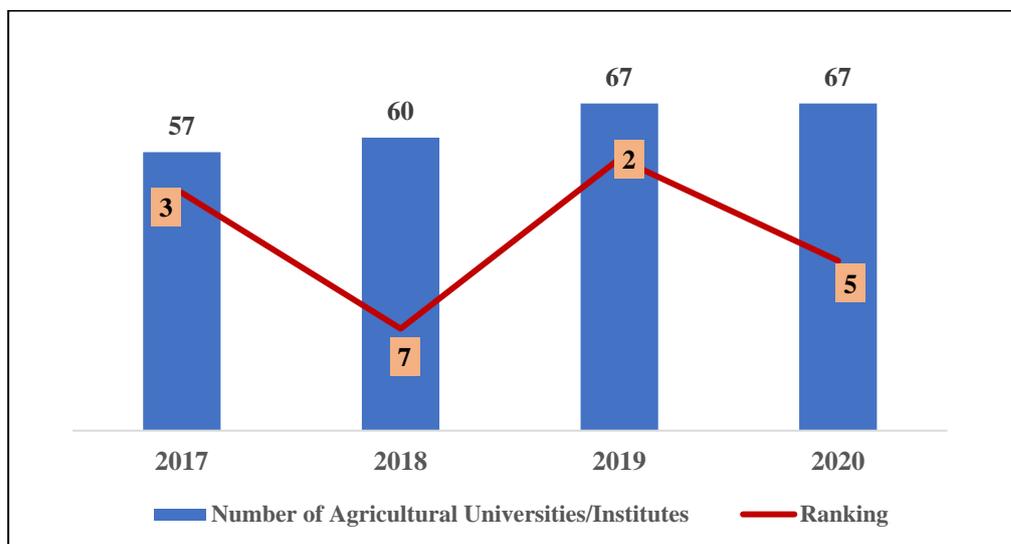
⁴³ NIRF did not rank the Agricultural Universities for the year 2019-20 onwards, as per directions of ICAR.

⁴⁴ Teaching, Learning and Resources (77.94 per cent in the year 2017 to 76.96 per cent in the year 2019); Graduation Outcome (57.20 per cent in the year 2017 to 56.22 per cent in the year 2019); Outreach and Inclusivity (from 48.44 per cent in the year 2017 to 40.94 per cent in the year 2019); Perception (3.83 per cent in the year 2017 to 3.19 per cent in the year 2019).

⁴⁵ Research and Profession Practice: scores increased from 16.51 per cent in the year 2017 to 19.73 per cent in the year 2019

The ranking was discontinued from 2021 onwards. The ICAR ranking of PAU during the period 2017-20⁴⁶ is depicted in **Chart 1.13**.

Chart 1.13: ICAR ranking of PAU during the period 2017-20



Source: Website of ICAR

However, the performance of the University on the aforesaid individual parameters could not be assessed as the parameter-wise scores for ranking were not released by ICAR.

In the exit conference, the University assured (June 2023) to take necessary steps to improve NIRF ranking. Subsequently, the University stated (October 2024) that PAU secured 74th and 80th position in the overall category by NIRF in 2023 and 2024 respectively. Further, the University secured third position among agriculture and allied sector category by NIRF-2023 and 2024.

The reply of the University was not satisfactory as it reflected continued decline in NIRF ranking in the overall category (82nd position).

1.3.16 Conclusion

The University remained without the requisite accreditation of Indian Council of Agricultural Research (ICAR) for more than five months due to delay in applying for reaccreditation with National Agricultural Education Accreditation Board (NAEAB).

There was shortfall in enrolment of students from 14 *per cent* to 31 *per cent* of the intake capacity during the period 2017-22. Besides, admission of students in PwD category remained less than 20 *per cent*.

There was overall shortage of teaching staff ranging between 39 and 43 *per cent* and non-teaching staff ranging between 51 and 58 *per cent* during the period

⁴⁶ ICAR ranking has been discontinued from 2021 onwards, as confirmed by the University.

2017-22. The shortfall in various cadres of teaching staff ranged between 22 and 44 *per cent* as on 31 March 2022.

PAU neither established any Distance Education Centre nor introduced any online course (except for French language).

As against 345 to 682 students seeking placements, 29 to 71 *per cent* students got placement during the period 2017-22. While percentage of student placement increased from 42 to 71 during 2017-18 to 2020-21, it decreased to 29 *per cent* during 2021-22.

The University did not establish Internal Quality Assurance Cell (IQAC). Grievance redressal mechanism for the students was also lacking.

The National Institutional Ranking Framework (NIRF) ranking of PAU declined from 24 (2017) to 51 (2019) amongst 100 Universities in India; and from 40 (2017) to 75 (2019) amongst 100 Institutes and Universities (combined) in India.

1.3.17 Recommendations

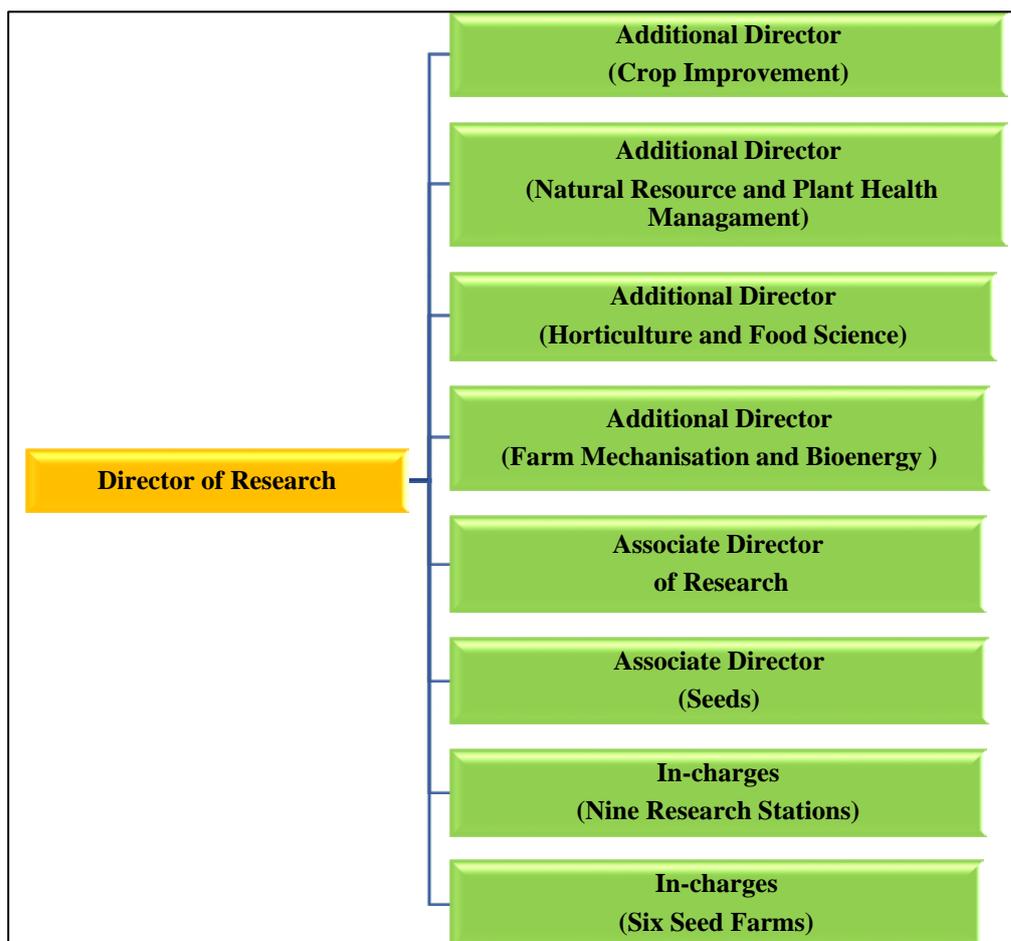
In the light of the audit findings, the University may:

- (i) *ensure accreditation of ICAR in a time bound manner so as to avoid any adverse impact on the activities of the University;*
- (ii) *take effective measures to fill up the vacant posts of teaching and non-teaching staff;*
- (iii) *explore establishing of distance education centers;*
- (iv) *strengthen Counselling and Placement Guidance Cell and grievance redressal mechanism;*
- (v) *strive to improve the NIRF ranking by addressing the related issues.*

1.4 Research Activities

PAU conducts varied research in agriculture and allied disciplines including basic sciences and humanities, farm engineering and home science through its Directorate of Research. The organisational structure thereof is given on the next page.

Organisational structure of Directorate of Research, PAU



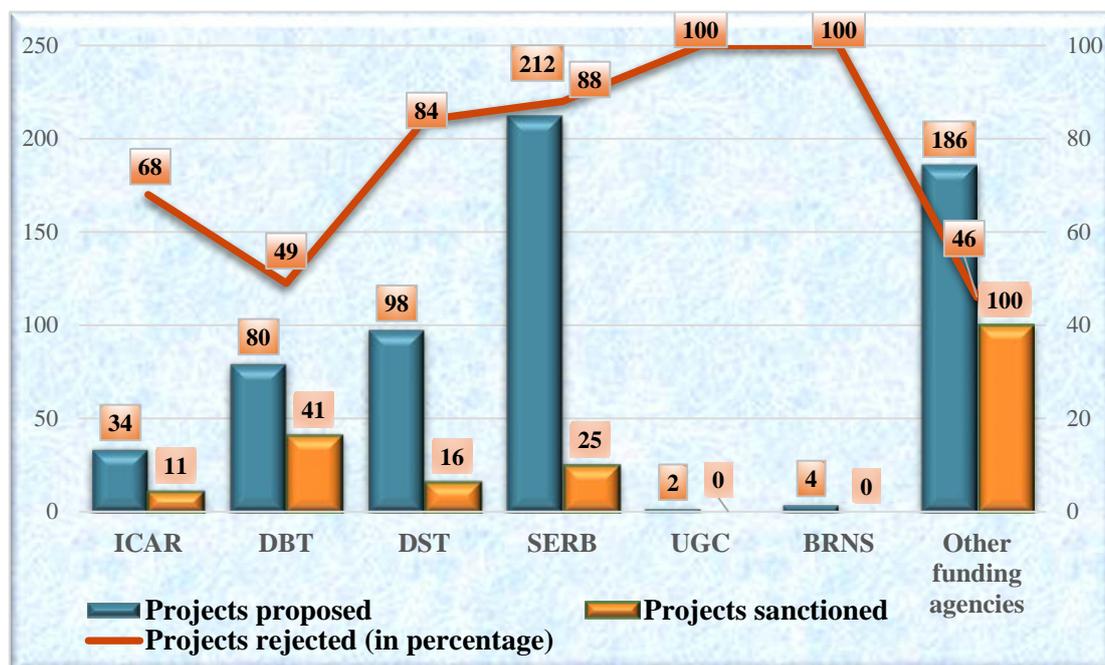
The audit findings related to research activities of PAU are discussed in the succeeding paragraphs.

1.4.1 Execution of research projects

Various agencies *viz.* ICAR, Ministry of Science and Technology, Department of Biotechnology (DBT) and Department of Science and Technology (DST), GoI, Science and Engineering Research Board (SERB), Board of Research in Nuclear Science (BRNS), Indian Meteorological Department (IMD), University Grants Commission (UGC), etc. give funds to the University to carry out their research activities/projects.

The agency-wise details of research projects proposed and sanctioned to the University during the period from 2017-18 to 2021-22 are given in **Chart 1.14**.

Chart 1.14: Funding agency-wise details of research projects proposed and sanctioned during the period 2017-22



Source: Information supplied by PAU

Note: Projects sanctioned by other funding agencies include two jointly funded projects.

Audit noticed that out of a total of 616 new research projects proposed during 2017-22 by the University, only 193 research projects (31.33 per cent) were sanctioned by the project funding agencies. DST (GoI) and SERB, New Delhi sanctioned only 16.33 and 11.79 per cent of proposals respectively, whereas no project was sanctioned by UGC and BRNS during the period 2017-22, as shown in **Chart 1.14**.

Out of a total of 397 research projects (204 ongoing projects as on 01 April 2017 and 193 research projects sanctioned during 2017-22), 218 research projects (55 per cent) were completed during the period 2017-22.

1.4.1.1 Non-approval of research project proposals by funding agencies

Audit called for decision letters issued by the funding agencies to analyse the reasons for non-acceptance of research proposals. In the absence of any system to obtain the decision letters from the funding agencies in the University, Audit could get only 41 decision letters out of 423 unapproved projects. On detailed scrutiny of 41 decision letters of the funding agencies (as provided by the University), Audit observed the following:

- In 15 out of 41 cases, the funding agencies cited reasons for rejection as lack of novelty, absence of a basic scientific question, unimpressive publication record of Principal Investigators (PI), lack of clarity in methodology, etc. (**Appendix 1.5**).

- Nothing was found on record to show that the University devised any checklist to reduce such high rejection rate of proposals by the funding agencies.
- The University could not evolve any mechanism to ascertain/review the reasons for non-approval of research project proposals by the funding agencies so as to bring improvement in their future project proposals.

The University informed (October 2024) that it had circulated (June 2024) a standard operating procedure under which the research proposals submitted by the Principal Investigator through the Head of Department would be forwarded to the Project Evaluation and Review Committee by the Director of Research (DoR). The DoR would approve such proposals for final submission to the funding agency. Now the Research proposals were being considered (July 2024) by the Project Evaluation and Review Committee accordingly.

1.4.1.2 Review of research projects

On test-check of 104⁴⁷ research projects (26 per cent) (61 completed and 43 ongoing) out of total 397 research projects, it was found that database of research projects and the related files were not properly maintained/updated by the office of Director (Research). Some of the discrepancies noticed in maintenance of records of test-checked research projects are detailed in **Table 1.9**.

Table 1.9: Discrepancies in maintenance of records of test-checked research projects

Sr. No.	Particulars	No. of projects (percentage)
Completed projects		61
1.	Sanction letter not on record	3 (4.92)
2.	Final UCs not on record	16 (26.22)
3.	Completion Report not on record	34 (55.74)
4.	Approval of completion Report/Remarks, if any, not on record	54 (88.52)
5.	Outcome of the project/ research to Director Extension Education not on record	60 (98.36)
Ongoing projects		43
6.	Sanction letter not on record	5 (11.63)
7.	Progress reports not on record	23 (53.49)
8.	Periodical UCs not on record	13 (30.23)

Source: PAU records

The University intimated that completion reports were being uploaded/submitted by the concerned scientists directly to the funding agencies. This indicated that the University did not maintain any library of outcomes of

⁴⁷ Selected by adopting Systematic Sampling method.

research projects executed by its scientists. In the absence of such a system, there was nothing on record to suggest that the said results were being disseminated to the stakeholders viz. students, fellow scientists and farmers.

Director (Research) stated (October 2024) that the requisite instructions regarding maintenance of proper documentation of research projects submitted, approved, completed and the outcome of these projects by the scientists had been issued (February 2023) to the concerned departments.

1.4.1.3 Termination of the project due to “poor progress”

The Department of Science and Technology (DST), GoI (funding agency) sanctioned (November 2016) financial assistance of ₹ 16.78 lakh (revised to ₹ 19.78 lakh⁴⁸ in February 2018) for the project “Development of farmer-friendly Immunochromatographic Strips for the detection of potato virus” to be completed within a period of three years. The funding agency released (November 2016 and December 2018) an amount of ₹ 16.06 lakh for execution of the research project.

Audit observed that after completion of 75 *per cent* of the project work with an expenditure of ₹ 15.43 lakh, the Director (Research) requested (December 2018) the funding agency to transfer the project to another Principal Investigator (PI) as the present PI was leaving the country/job and thus, would not be able to continue the project. However, the funding agency, after reviewing the progress of the project, rated it as ‘Poor’ and recommended (May 2019) closure of the project. Accordingly, the project was closed and the unspent balance of ₹ 0.67 lakh (including interest) was refunded (November 2019) to the funding agency. It was noticed that the University was not monitoring the progress of the project periodically in accordance with the provisions under Statute of PAU. As per Statute of PAU (Clause 6 (a), Chapter IV), the Director Research office shall monitor and review the progress of different research schemes and provide coordination among the researchers in the college.

Thus, due to inadequate monitoring at the level of the University for successful completion of the research project, it lost the opportunity of research in the area of development of farmer friendly immunochromatographic strips for potato virus. Further, impact assessment due to non-achievement of objectives under this project was also not done by the University.

The University informed (October 2024) that Internal Project Monitoring and Implementation of External funded projects committee(s) of the concerned department had now been formed and were reviewing the externally funded projects.

⁴⁸ General component (₹ 15.25 lakh); Capital Assets (₹ 1.53 lakh); and Manpower (₹ three lakh).

1.4.1.4 Non-completion of the research project

The Department of Biotechnology, Ministry of Science and Technology, GoI sanctioned (December 2017) a Joint Research Project (DBT-INNOVATE, United Kingdom) “Development and Optimisation of Fresh Produce Supply Chain and Storage Systems” to be completed by the University within two years i.e. up to December 2019. The main objectives of the project were:

- end-to-end supply chain review;
- development of a low cost on-farm cold store and farm packaging system;
- improvement in the performance of high-volume cold storage systems etc.

The Indian component of this joint research project was sanctioned at a total cost of ₹ 200.86 lakh⁴⁹, which included the University’s share of ₹ 69.87 lakh. The details of receipt and expenditure under the research project in respect of PAU component are given in **Table 1.10**.

Table 1.10: Details of receipt and expenditure under the research project

(₹ in lakh)

Instalment	Year	Opening Balance	Funds received (Date of receipt)	Interest earned	Total available funds	Amount utilized	Closing Balance
1 st	2017-18	00.00	48.44 (08.12.2017)	0.13	48.57	4.22	44.35
	2018-19	44.35	-	1.19	45.54	10.20	35.34
2 nd	2019-20	35.34	12.02 (03.12.2019)	0.41	47.77	11.02	36.75
	2020-21	36.75	-	0.69	37.44	2.01	35.43*
Total			60.46	2.42	62.88	27.45	35.43

Source: PAU records

* Refunded to GoI in October/November 2022

Table 1.10 shows that against the sanctioned amount of ₹ 69.87 lakh, the University received ₹ 60.46 lakh between December 2017 and December 2019. However, the project could not be completed by the stipulated date and the University continued to incur expenditure till the year 2020-21.

Audit noticed that the first instalment of ₹ 48.44 lakh included ₹ 28.00 lakh meant for equipment⁵⁰. Though the University spent ₹ 27.45 lakh mainly on manpower, travel, contingency, etc., no expenditure was incurred on purchase of requisite equipment till March 2021. The reasons for non-procurement of the specified equipment viz. Spectrophotometer were attributed (February 2023) to lockdown due to COVID pandemic from March 2020 onwards and non-receipt

⁴⁹ Centre of Innovative and Applied Bioprocessing (CIAB) Mohali (₹ 44.80 lakh); PAU Ludhiana (₹ 69.87 lakh); and Sangha Innovation (P) Limited, Jalandhar (₹ 86.19 lakh).

⁵⁰ Purchase of Spectrophotometer (₹ eight lakh); and Restructuring of old cold rooms into CA Stores (₹ 20.00 lakh).

of quotations in respect of restructuring of old cold room into Controlled Atmosphere⁵¹ (CA) stores.

Subsequently, on being asked (May and December 2021) by the Department of Biotechnology, GoI to refund the unspent amount, the University, after spending 44 *per cent* (March 2021) of the total available funds i.e. ₹ 62.88 lakh (including interest), refunded (October and November 2022) the unspent funds of ₹ 35.43 lakh to GoI.

Thus, despite availability of funds since December 2017, the University could not procure the requisite equipment, etc., thereby resulting in non-completion of the research project and deprivation of benefits from the envisaged objectives of the project.

The Director of Research stated (October 2024) that care would be taken to avoid such lapses in future. project monitoring would be strengthened to monitor projects more closely.

1.4.1.5 Research Project on Menace of Pink Bollworm

The Pink Bollworm is an insect known for being a pest in cotton farming. They chew through the cotton lint to feed on the seeds. Since cotton is used for both fiber and seed oil, the damage is two-fold. Their disruption of the protective tissue around the boll is a portal of entry for other insects and fungi.

During the year 2015, severe damage to BG-II cotton by Pink Bollworm and resultant loss to its yield was observed in many regions of Gujarat and some parts of Andhra Pradesh, Maharashtra and Telangana.

In Punjab, the Pink Bollworm infestation on BG-II cotton was noticed in the year 2019 at two locations in Bathinda district. Further surveys carried out during the year 2020 revealed presence of Pink Bollworm in 31 villages of Bathinda district as well as Mansa district at the fag-end of 2020 crop season, and outbreak of this pest occurred again in these areas during 2021 crop season too. Low incidence of Pink Bollworm was also recorded in certain pockets of Sangrur, Sri Muktsar Sahib, Fazilka, Faridkot, Barnala and Moga districts in 2022 crop season.

The PAU submitted two projects⁵² to the funding agencies to combat the menace of Pink Bollworm in cotton crop. However, these projects were not approved by the funding agencies as detailed below:

- One of the projects (Developing CRISPR-Cas9 based genome editing system for Pink Bollworm) was not shortlisted by SERB (DST) with the

⁵¹ A controlled atmosphere is an agricultural storage method in which the concentrations of oxygen, carbon dioxide and nitrogen, as well as the temperature and humidity of a storage room are regulated.

⁵² (i) Elucidating the role of cry toxin receptors in imparting resistance to Pink Bollworm (Department of Biotechnology, GoI); and (ii) Developing CRISPR-Cas9 based genome editing system for pink bollworm (Science and Engineering Research Board under Department of Science and Technology, GoI).

remarks that the scientific rationale for the project was not presented convincingly with strong preliminary evidence. Thus, the project lacked focus and scientific merit.

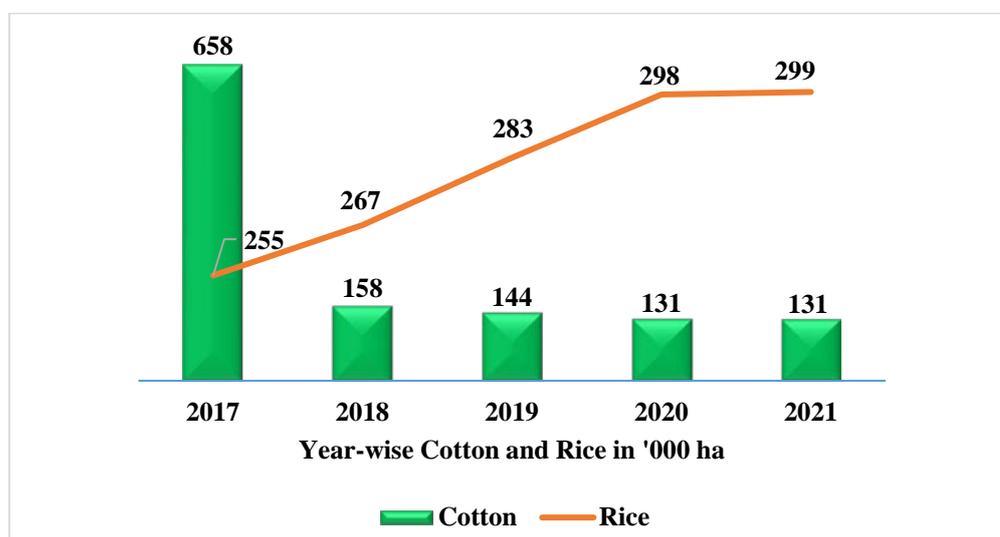
- No response in respect of the second project was received from Department of Biotechnology, GoI.

Subsequently, the University submitted (October 2021) a strategy to combat the menace to the Department of Agriculture and Farmers Welfare, Punjab and demanded a budget of ₹ 73.88 crore for the purpose. However, the information regarding approval of the proposal by the State Government was awaited (May 2023).

Thus, even after a span of more than three years of the outbreak of Pink Bollworm in Punjab during 2018-19, no research could be conducted to combat the menace of Pink Bollworm in cotton crop.

Further, the University in its report (October 2021) concluded that due to Pink Bollworm incidence losses were above 75 per cent in many cases in Bathinda and Mansa districts. Audit noticed that the cultivated area of cotton in Bathinda and Mansa districts reduced from 6.58 lakh hectares in 2017 to 1.31 lakh hectares in 2021, whereas the cultivated area of rice increased from 2.55 lakh hectares in 2017 to 2.99 lakh hectares in 2021, as shown in **Chart 1.15**.

Chart 1.15: Trend of cultivated area of cotton crop vis-a-vis rice crop in Bathinda and Mansa districts during 2017-21



Source: Statistical Abstract of Punjab State

In the exit conference, the VC stated (June 2023) that resistance of cotton to various insect-pests had gone down. However, the University was doing various extension activities to create awareness amongst the farmers. As regards reduction in cultivated area of cotton, he added that cotton was a risky crop and rice/wheat crops were much better placed than cotton, as per economies of agricultural crops.

The reply of the University was not in line with its vision document “Vision 2040” which resolved for remunerative cropping system of cotton-wheat/ mustard which would have helped in saving water as compared to the rice-wheat cropping system.

The University stated (October 2024) that they had submitted a strategy in October 2021 to combat the menace to State Government and demanded ₹ 73.88 crore, but no budget was sanctioned till date (October 2024). Further, the University, citing reference of meeting (September 2024) of Inter-State Consultative & Monitoring Committee on cotton, stated that during the current season the crop was in very good condition.

The reply was not acceptable as area under cotton in affected districts i.e. Bathinda and Mansa was reduced to 1.17 lakh hectares in 2023 and information of the area covered under cotton and yield of the crop (as claimed in the reply) in these districts was awaited.

1.4.1.6 Setting up Food Testing Laboratory

ICAR approved (October 2015) a Grant-in-Aid of ₹ 131.00⁵³ lakh for setting up a Food Testing Laboratory (FTL) at RS, Bathinda, of which the Ministry of Food Processing Industries (MFPI) share (₹ 101.10 lakh) was to be released by ICAR in three instalments⁵⁴. Besides, emoluments at the rate of 80 per cent for two technical staff for two years were to be released as fourth and final instalment after meeting all requisites⁵⁵. The FTL was to be set up within two years from the date of release of the first instalment. Further, as per the guidelines, NABL⁵⁶ accreditation was required to be obtained after setting up of FTL.

Audit noticed that ICAR released the first instalment of ₹ 40.44 lakh in December 2016 for setting up the FTL at RS, Bathinda. The second instalment of ₹ 40.44 lakh was to be received after utilisation of the first instalment. However, PAU could utilise only ₹ 38.20 lakh (out of ₹ 40.44 lakh) till December 2019, leaving a balance of ₹ 2.24 lakh. Subsequently, ICAR released (January 2020) second instalment of ₹ 37.24 lakh (out of ₹ 40.44 lakh), of which ₹ 36.56 lakh was utilised for the purpose during 2020-21. Thus, the University could not set up the FTL within the stipulated period of two years (24 months) from receipt of the first instalment (December 2016). It took 46 months (i.e. December 2016 to October 2020) to purchase and install

⁵³ Ministry of Food Processing Industries (MoFPI), GoI contribution: ₹ 101.10 lakh and PAU’s contribution: ₹ 29.90 lakh.

⁵⁴ 1st installment of 40 per cent of the total grant would be released after receiving requisite documents/confirmations; and 2nd installment of 40 per cent and 3rd of 20 per cent of the total grant would be released only after ensuring full utilisation of 1st/2nd installment of grant towards purchase of lab equipment, expenditure on Technical Civil Works and fixing of Furniture & Fixtures for housing the equipment, as the case may be.

⁵⁵ Procurement and installation of PAC approved equipment and submission of utilisation certificate for 3rd instalment along with the status of NABL accreditation.

⁵⁶ National Accreditation Board for Testing and Calibration Laboratory.

equipment and furniture & fixture, with an expenditure of ₹ 74.76 lakh⁵⁷ (out of ₹ 77.68 lakh).

Further, request (January 2022) of the University for release of third instalment (20 *per cent* of the total grant) was turned down (March 2022) by ICAR citing immense delay in implementation of the project and consequently closed the project. The University had to refund the unspent amount of ₹ 2.92 lakh to ICAR.

Thus, due to non-adherence of the timeline for setting up of FTL, funds towards third instalment (₹ 9.60 lakh) were not released. Had the University completed its setting up in time, it could have claimed reimbursement of 80 *per cent* of salary for two technical staff as well. Further, the University did not obtain the requisite NABL accreditation and was running the FTL partially from April 2021 without NABL accreditation thereby failing to establish a fully functional surveillance system for monitoring the quality and composition of food, etc.

In the exit conference, the University stated (June 2023) that NABL accreditation would be obtained at the earliest and FTL would be made fully functional.

The University stated (October 2024) that the FTL was fully functional now and NABL accreditation of the lab was in progress.

The reply was not acceptable as FTL was functioning without NABL accreditation, contrary to the assurance given in the exit conference.

1.4.2 Intellectual Property Management

India, as a member of the World Trade Organisation (WTO), is obliged to comply with the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreement), which requires member countries to provide for the protection of Intellectual Property Rights (IPR) in one form or the other, in all fields of technology including agriculture. IPRs, among other things include patents, protection of plant varieties and Geographical Indication (GI) of goods.

Audit observed that:

- The Technology Marketing and Intellectual Property Rights (TMIPR Cell, formed (2006) by the University, did not have any dedicated full-time staff. Against two sanctioned posts for the Cell, the Associate Director of Research was holding additional charge of the Cell and a scientist from the Department of Plant Breeding and Genetics was assigned additional duty of the Cell. Non-availability of dedicated staff impacted the protection/registration of intellectual property rights and commercialisation of technologies and varieties developed by the

⁵⁷ Equipment (₹ 72.26 lakh out of ₹ 89.00 lakh meant for the purpose); and Furniture & Fixtures (₹ 2.50 lakh).

University, as discussed in the succeeding paragraphs. The University assured (January 2023) to post full-time staff in the Cell as per requirement.

- PAU prepared its IPR Policy in February 2007. The Policy, however, did not incorporate detailed guidelines regarding management of patents and plant varieties protection, commercialisation of intellectual properties, joint ownership of intellectual properties, etc. in the line with the guidelines issued by ICAR. The University assured (January 2023) to revise the policy guidelines as per requirement.
- No Standard Operating Procedure (SOP) prescribing various timelines for registration, transfer of technologies/plant varieties and mechanism for their valuation for determination of licence fee was framed by the University.
- There was no system of periodic reporting of the technologies/plant varieties developed, patented or registered (yet to be commercialised) to the VC and BoM so as to ensure timely dissemination of the benefits of these technologies/plant varieties to the end users. Thus, the role of the Cell in commercialisation was limited and ineffective.

The University stated (October 2024) that Technology and Marketing & IPR Cell had started preparing a database for various technologies approved by Research Evaluation Committee (REC). All the technologies, approved by REC from 25 July 2023 to till date, for commercialisation had been entered into the database.

However, the University remained silent on SOP and system of periodic reporting.

1.4.2.1 Protection of Intellectual Properties

ICAR Guidelines prescribe that all research results which are patentable under law should be taken up for patent protection. The developed technologies need to be protected against unauthorised use/exploitation by other agencies within and outside the country for commercial gains.

(i) Patent of technologies under Patents Act, 1970

Research results in any field of technology are patentable under the Patents Act, 1970, subject to the conditions/provisions contained therein. The Patents Act defines "inventive step" as a feature of invention⁵⁸. If the Controller of Patents is satisfied that patent application or specification did not comply with the provisions of the Act, the same can be refused.

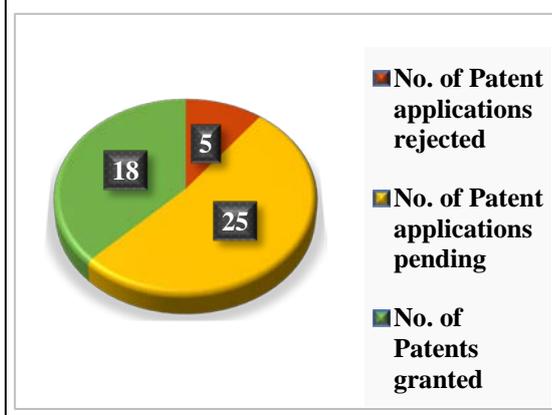
On detailed scrutiny by Audit, it was observed that:

⁵⁸ Involving technical advance as compared to the existing knowledge or having economic significance or both and that makes the invention not obvious to a person skilled in the art.

➤ PAU could not provide any consolidated database of the inventions/technologies developed by its various departments.

➤ Chart 1.16 indicates that the University applied (2006-22) for registration of 48 technologies under the Patents Act, of which 18 technologies⁵⁹ were granted patent rights as of November 2022 (**Appendix 1.6**), five applications were rejected and 25 technologies were lying pending.

Chart 1.16: Status of 48 technologies applied for registration under the Patents Act, 1970



➤ Five patent applications filed (May 2008-March 2015) by PAU were refused (September 2016 to

June 2020) by the Controller of Patents under Section 15 of the Act, on the following reasons:

- Alleged invention lacked inventive step;
- The application did not qualify the provisions of Patent Act, 1970;
- Mere discovery of any new property or new use for a known substance and mere use of known process could not be treated patentable invention;
- It was not a patentable subject matter; and
- In case of patent application for production of probiotic fruit juices, reply was not filed by PAU to the Controller General of Patents, Design and Trade Marks, hence, patent was not granted in this case.

➤ As many as 25 patent applications (May 2013-July 2022) of PAU were pending with Controller General of Patents, GoI as of November 2022, as detailed in **Appendix 1.7**. Of these:

- Seven pending applications pertained to the period prior to the year 2017 i.e. more than five years old.
- As many as 13 applications were under amended examination⁶⁰. Five of these applications under amended examination were more than five years old.

⁵⁹ Include patent rights in respect of four collaborative developed technologies which were granted in the name of ICAR, as discussed in *paragraph 1.4.2.2*.

⁶⁰ When an examination is made for a patent application, the patent examiner issues FER (First Examination Report) citing the defects in the application including claims; and to address all the deficiencies identified in patent application by the examiner, the applicant amends patent claims through an amendment.

- In one case (Sr. No. 13 of **Appendix 1.7**), reply was not submitted and in three cases (Sr. Nos. 18, 19 & 20 of **Appendix 1.7**) request for examination⁶¹ was not submitted.
- Rest five applications were filed between April 2021 and July 2022 and were under “application not yet published” status.

It was further noticed that no request was made by the University for the expeditious examination⁶² of the patent application as per Rule 24C of the Patent Rules.

The VC assured (June 2023) to constitute a strong screening committee for patent applications. The University further intimated (October 2024) that Intellectual Property Assessment committee (IPAC) had been formed. IPAC was constituted by including various Heads of the Departments and senior level experts from various departments of the University as per the subject matter of the patent proposal. However, the University had not given any specific reply to the rejection of patent applications and follow-up of pending applications.

(ii) Registration of plant varieties under ‘The Protection of Plant Varieties and Farmers’ Rights (PPV&FR) Act, 2001’

Under the Patents Act, plant varieties cannot be patented in India, rather these can be protected by registering them under ‘The Protection of Plant Varieties and Farmers’ Rights (PPV&FR) Act, 2001’. Section 28 of the PPV&FR Act provides that a certificate of registration for a variety issued under this Act shall confer an exclusive right on the breeder or his successor, his agent or licensee, to produce, sell, market, distribute, import or export the variety. Section 64 of the Act provides that if a person sells, exports, imports or produces a registered variety without permission of the breeder, it is considered as an infringement of the law.

Audit observed that:

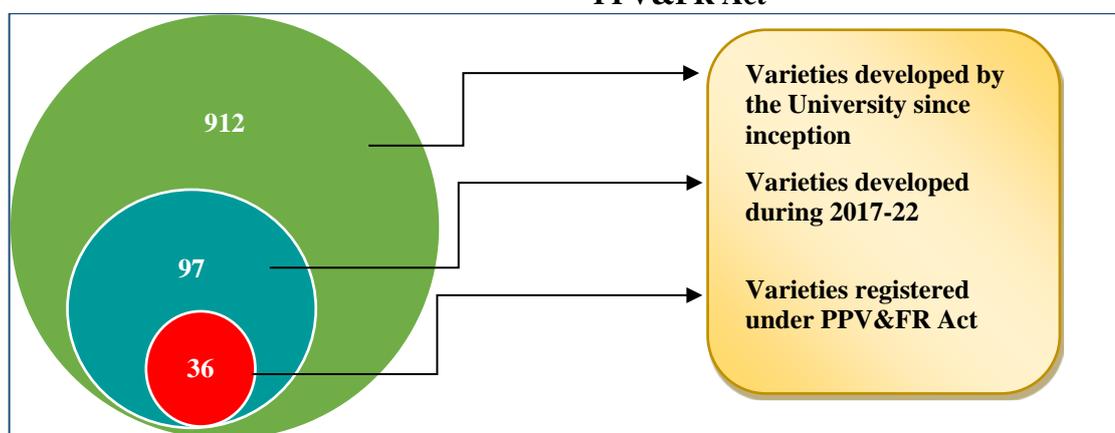
- There was a data mismatch between University and PPV&FR website. It was intimated to Audit by the IPR cell that since its inception in 1962 to March 2022, PAU has developed 912 varieties of various crops (including 97 varieties developed during 2017-22), out of which only 118 varieties were applied for registration under the PPV&FR Act and only 55 varieties were registered under the PPV&FR Act up to

⁶¹ An application for the grant of a patent is taken up for examination by the Indian Patent Office only when a request for examination of the application is filed. Unless a request for examination is filed by either *the Applicant or any other interested party* there shall be no examination of a patent application. The time for filing a request for examination shall be 48 months from the date of priority of the application or from the date of filing of the application, whichever comes earlier.

⁶² As per Rule 24C of the Patent Rules as amended in 2019, a request for expedited examination can be filed with the prescribed fees in Form 18A along with the fee within the period prescribed in Rule 24B on the ground that the *applicant* is an institute established by a Central, Provincial or State Act, which is owned or controlled by the Government.

31 March 2022. It was also intimated that out of 97 varieties developed during 2017-22, only two varieties were proposed for registration under PPV&FR Act (detailed in **Chart 1.17**). Audit, however, noticed from the official website of Protection of Plant Varieties and Farmers' Rights Authority, Ministry of Agriculture and Farmers Welfare that only 36 varieties were registered in the name of the University under the PPV&FR Act up to October 2022 (**Appendix 1.8**). Thus, the figures of varieties registered under PPV&FR Act provided by IPR cell did not match with the figures available with official website of PPV&FR Authority.

Chart 1.17: Details of the plant varieties developed and registered under PPV&FR Act



Source: Information provided by PAU and Website of PPV&FR

- Audit further noticed that certain seed varieties developed by PAU were available for online sale by various private vendors. A review of the website of one private vendor⁶³ revealed that seeds of popular paddy varieties of PAU viz. PR-122, PR-123, PR-124, PR-126 and PR-127 were available for sale by the private vendor. The seeds of PAU's most popular paddy variety i.e. PR-126 were available for online sale by four⁶⁴ other vendors. Had these varieties been got registered under the PPV&FR Act, the University could have taken suitable legal action against the vendors selling these varieties in the open market, in accordance with Sections 64 and 65 of the Act *ibid*.

Thus, the University was not only suffering financial loss but brand value of its developed varieties also got impacted, as the private vendors selling the products may not have the requisite quality as that of PAU.

The University stated (October 2024) that registering agricultural technologies and varieties under the Patents Act or PPV&FR Act was very costly and a lengthy (4-5 years) affair and by that time better varieties become available.

⁶³ M/s. Brar Seed Store.

⁶⁴ (i) M/s Yamuna Seeds; (ii) M/s MK Natural Grain EXIM; (iii) M/s Shakti Vardhak Hybrid Seeds Private Limited; and (iv) M/s. Mahaluxmi Seeds (available on Amazon).

The reply was not acceptable as additional revenue could be generated by commercialising these technologies and varieties. Further, IPR policy of PAU provided for registration of varieties under PPV&FR Act. Moreover, even after release of new improved varieties, the old varieties⁶⁵ did not become redundant and remained part of the publication of PAU 'Package of Practice for Crops of Punjab' and Seed Production Programme of the University.

(iii) Geographical Indication of Goods

The protection of agricultural goods indicated to specific geographical territories/regions is governed by the Geographical Indication (GI) of Goods Act, 1999. Clause 3.6 of the IPR policy of the University provides that it will file registration for GI if a plant variety or other goods were developed and owned by the University.

Audit observed that the University developed several varieties like Punjab Kheera-1, Punjab Tinda-1, Punjab Swarna, Punjab Raunak, Punjab Safeda, Punjab Apple-Guava, Punjab Kiran, Punjab Shingar, Punjab Mohini, Punjab Haldi, Punjabi Mixed Tadka, etc. However, these varieties were not registered under GI of Goods Act.

It was noticed that Kerala Agricultural University (KAU) obtained GI registration for Pokkali rice, Vazhakkulam Pineapple, Wayanad Jeerakasala Rice and Wayanad Gandhakasala Rice. Assam Agricultural University obtained GI registration of Joha Rice. Himachal Pradesh Agricultural University also applied for GI registration of Japonica Red Rice.

The University stated (October 2024) that they were pursuing with the Geographical Indications Registry, Intellectual Property office, GOI the application for Potato Seed (grown in Doaba Region of Punjab). The University further stated that it intended to identify more such products in future.

The University, however, remained silent regarding non-registration of already developed varieties under the Act *ibid*.

1.4.2.2 IPR developed in Collaborative research registered in the name of ICAR only

As per clause 2.2.1.1 of the IPR Policy (February 2007), in case of collaborative research, Intellectual Property generated by PAU under collaborative/sponsored research projects will be jointly owned by PAU and its collaborators/partners. The umbrella Memorandum of Understanding (MoU) entered into (December 2015) between PAU and ICAR provides that techniques, technologies, material etc. developed by PAU and ICAR would be joint property of both the agencies' provided claims/formalities are filed by PAU.

⁶⁵ Paddy varieties like PR-113 (1998) and PR-114 (1999) were part of Package of Practice for Crops of Punjab (Kharif 2021) and Seed Production Programme for 2021.

Audit observed that:

- Out of 18 patents, as discussed in Paragraph 1.4.2.1(i), in four cases having collaborative research of PAU and ICAR, the patent certificates were granted in the name of ICAR only, as detailed in **Table 1.11**. It was noticed that the Intellectual Property claims of these technologies were filed by ICAR and not by PAU.

Table 1.11: Details of collaborative developed technologies (PAU and ICAR) registered in the name of ICAR

Sr. No.	Name of the technology	Date of grant of patent
1.	Beneficiation of phosphate rock for segregation of phosphorous containing heavy metal free minerals	19 September 2018
2.	Nanofabrication of phosphorous on kaolin mineral receptacles	24 July 2019
3.	Zinc in clay-mineral receptacles in Nanoforms for their use as advance mineral including novel fertiliser	26 December 2020
4.	Nanofabrication process involving clay minerals as receptacles for manufacturing advance Nanomaterials including novel fertiliser (Process)	21 July 2021

Source: Information provided by PAU

- In addition to 36 plant varieties registered in the name of PAU, as discussed in **paragraph 1.4.2.1 (ii)**, 34 varieties were registered in the name of ICAR though these varieties were developed under collaborative research of PAU and ICAR (**Appendix 1.9**).

PAU could not provide any justification as to how the ICAR could get sole registration in violation of the joint registration as agreed to between ICAR and PAU. In the absence of documentation, Audit was not able to ascertain whether PAU had made adequate efforts to include its name as joint owner of these technologies and varieties, thereby losing the opportunity of benefit sharing, as ICAR was the sole IPR holder of these properties developed by PAU.

The VC assured (June 2023) that joint ownership registration would be taken care of in case of collaborative projects. Further, the University intimated (October 2024) that no instance of filing of IP under collaborative work with ICAR had come up since June 2023. The University further assured the filing of joint IP ownership, in case of such future instances.

1.4.2.3 Commercialisation of Intellectual Properties

As per ICAR guidelines (2006 and 2018), commercialisation means the transfer of IPR-enabled technologies or other know-how through licensing under the terms and conditions specified in the licence agreement entered into for the purpose or through auction or sale. As per Paragraph 9.5 of ICAR guidelines,

the licence fee, royalty and/or sale price of breeder seed shall be determined⁶⁶ either on a fixed basis, through negotiations with the licensee, or through an open bidding process, as appropriate.

Audit noticed the following inconsistencies in the commercialisation of Intellectual Properties (technologies and plant varieties) developed by PAU:

(i) Commercialisation of intellectual properties on ad-hoc basis

Audit observed that:

- The PAU entered into (2017-22) 261 Memoranda of Agreement (MoA) in respect of its 53 Intellectual Properties (36 technologies and 17 plant varieties) developed, and received one-time licence fee ranging from ₹ 10,000 to ₹ 5,00,000 per MoA from different companies/firms/individuals, which was determined on *ad-hoc* basis without any standardised process.
- There was no provision for collection of royalty based on number of items sold although other State Agricultural Universities (SAUs) like Junagarh Agricultural University and Tamil Nadu Agricultural University provided for receipt of royalty for technology transfers. The Govind Ballabh Pant University of Agriculture & Technology (GBPUAT), Pantnagar (Uttarakhand) adopted the process of bidding for transfer of patented technologies.

In the absence of provisions regarding collection of royalty in MoA, the University not only suffered financial loss but also could not ascertain the quantum of sale of its technologies/plant varieties to ensure their reach to the farmers/end users.

The University assured (October 2024) to include royalty clause in MoAs on case-to-case basis to ensure that the buyers are bound by the royalty terms specified in MoA.

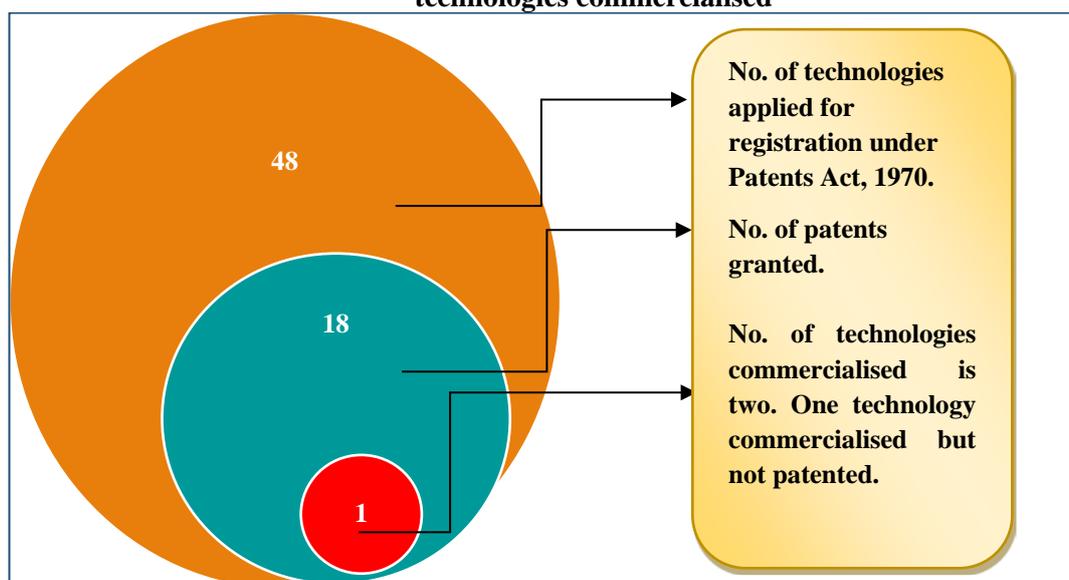
(ii) Non-commercialisation of patented technologies

The PAU did not maintain any consolidated database of the technologies developed by its various departments. The University applied for 48 technologies and was granted 18 patents (including four patents granted in the name of ICAR) under the Patents Act. However, only two⁶⁷ out of 48 technologies were commercialised as of August 2022 (**Chart 1.18**).

⁶⁶ Expert opinion and judgment together with the cost of seeking and maintaining the plant variety, cost of production, handling and supply of breeder seed and other institutional costs to be considered to fix the price/licence fee.

⁶⁷ (i) Straw Cutter cum Spreader (published but not patented) commercialised on 25 June 2018; and (ii) Electric Soil Disinfectant (patented) commercialised on 18 August 2022.

Chart 1.18: Details of technologies applied for patents, patents granted and technologies commercialised



Source: Information provided by PAU

No efforts were made to commercialise the remaining 36 technologies⁶⁸ by TMIPR Cell of PAU. Resultantly, these technologies could not be transferred from lab to land even after patenting/publishing.

During test-check of records, Audit noticed that some of the technologies which were developed by the University had neither been patented nor were commercialised (as of March 2022) even after a lapse of 4-17 years, as detailed in **Table 1.12** as an illustration.

Table 1.12: Details of some technologies developed by PAU but not commercialised

Sr. No.	Name of the technology	Year of development	Features of technology
1.	Radial honey extractor	2005	The machine extracts honey from combs using centrifugal force. It is easy to operate, saves time and maintain hygiene.
2.	Honey wax uncapping knife	2009	The machine facilitates fatigue-less operation and results in more number of frames to be uncapped in less time and can replace the prevalent practice of uncapping with non-scientific and unhygienic conventional knives.
3.	Red Wine	2016	It is a technology for preparation of red wine from Punjab Macs Purple Cultivar of Grapes.
4.	Pectin extraction plant	2018	The machine is suitable for Kinnow/Musambi peel. It is easy to operate, saves time and maintain hygiene.

Source: Concerned Departments of PAU

⁶⁸ Patented technologies (17); and Published technologies but not patented (19). As per Section 11A of the Patents Act, 1970, the applicant shall have privileges as if patent was granted on the date of publication of application.

(iii) Non-commercialisation of developed plant varieties

PAU developed 97 varieties of various crops during 2017-22 (as detailed in **Appendix 1.10**). Of these, only seven varieties were commercialised by entering into MoAs with private parties. Besides, 10 varieties⁶⁹ which were developed prior to the audit period had also been commercialised. (**Appendix 1.11**). No action was taken to commercialise the remaining 90 crop varieties.

PAU though carried out seed production of only 52 out of 90 varieties in its seed farms, 38 varieties could not be transferred from lab to land. PAU could not furnish any reason for the non-commercialisation of these plant varieties.

The University stated (October 2024) that now it was actively commercialising its technologies. University also added that post June 2023, two patents and 10 technologies / varieties had been commercialised for the first time. However, Audit could not verify the same as the University declined to share MoAs on account of confidentiality clause.

1.4.3 Seed Production

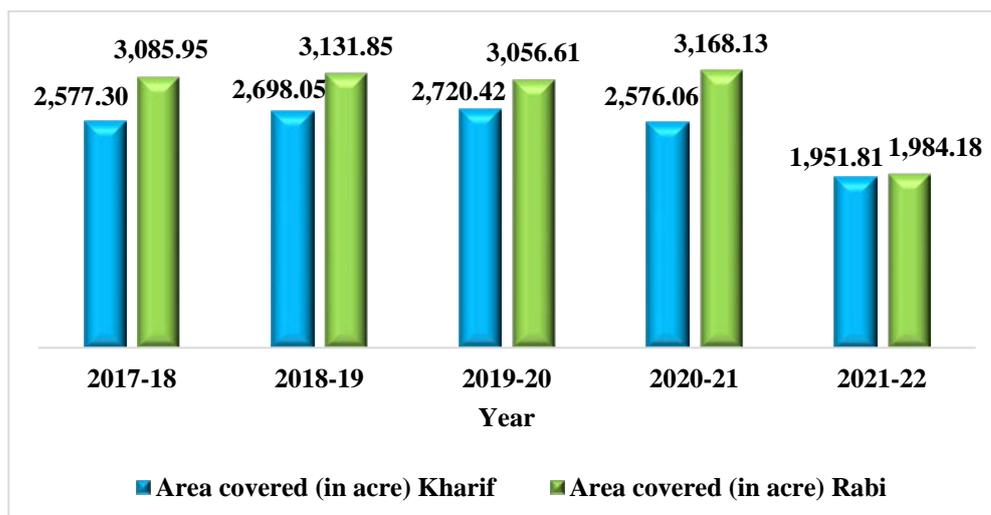
1.4.3.1 Decrease in cultivable area and seed production

(i) Kharif and Rabi crops seeds

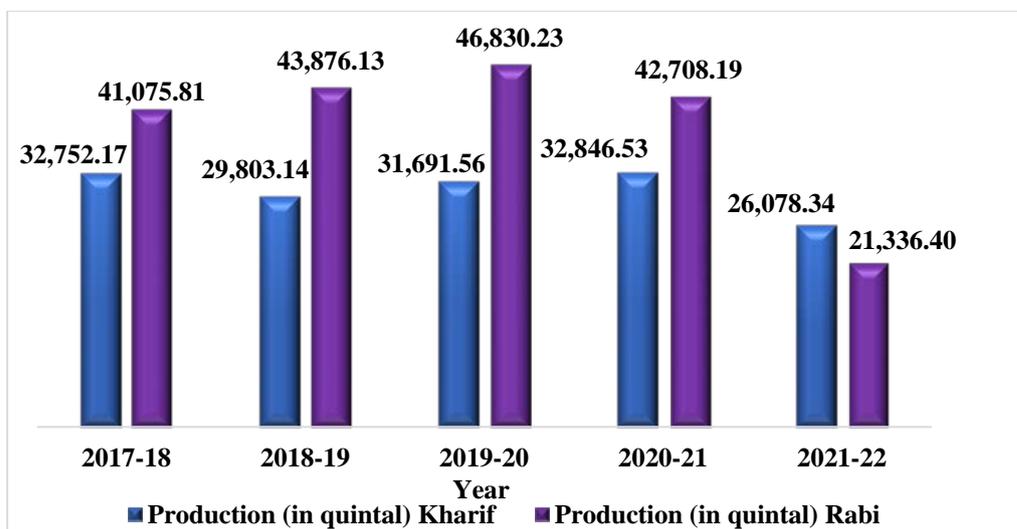
PAU has its own seed production programme of field crops⁷⁰ for rabi and kharif. Whenever a new variety is recommended by Research Evaluation Committee (REC) for Adaptive Research Trails, the seed production of that variety is undertaken at University Seed Farms so that at the time of release of the variety, sufficient seed is available to distribute to the farmers of the State. After release of the variety, seed production is undertaken as per the demand for seed of a particular variety. The details of area covered and seed production during the period 2017-22 are shown in **Chart 1.19** and **Chart 1.20** respectively.

⁶⁹ Sr. Nos. 37 to 42, 44, 45, 51 and 53 of Appendix 1.11.

⁷⁰ Rabi Crops: Wheat, Barseem, Oats, Barley, Sunflower, African sarson, Gram, etc.; and Kharif Crops: Paddy, Basmati, Maize, Cotton, Moong, Arhar, Mash, etc.

Chart 1.19: Details of seed production area of PAU during the period 2017-22

Source: Concerned Department of PAU

Chart 1.20: Details of seed production during the period 2017-22

Source: Concerned Department of PAU

Chart 1.19 shows that there was reduction of 24.23 and 37.37 per cent in cultivable area of Kharif and Rabi respectively. Resultantly, the production of Kharif and Rabi seeds reduced by 20.61 and 50.04 per cent during the year 2021-22 when compared with previous year (**Chart 1.20**). The reasons for reduction were attributed to non-renewal of lease of 1,220 acre of land at Raja Harinder Singh Seed Farm (RHSSF), Faridkot due to a litigation⁷¹ between the lessor and the owner of the land. The University replied (October 2024) that it had stopped cultivation at RHSSF, Faridkot after termination of lease agreement in April 2021 and as a result, quantity of seed production decreased. However, the land remained in possession of PAU. PAU had again started cultivation at RHSSF, Faridkot during Kharif 2023. It was further stated that

⁷¹ Litigation of 1,220 acre of land between Maharawal Khewaji Trust (with whom the lease was to be executed) and descendants of the Royal Family (to whom the land pertained).

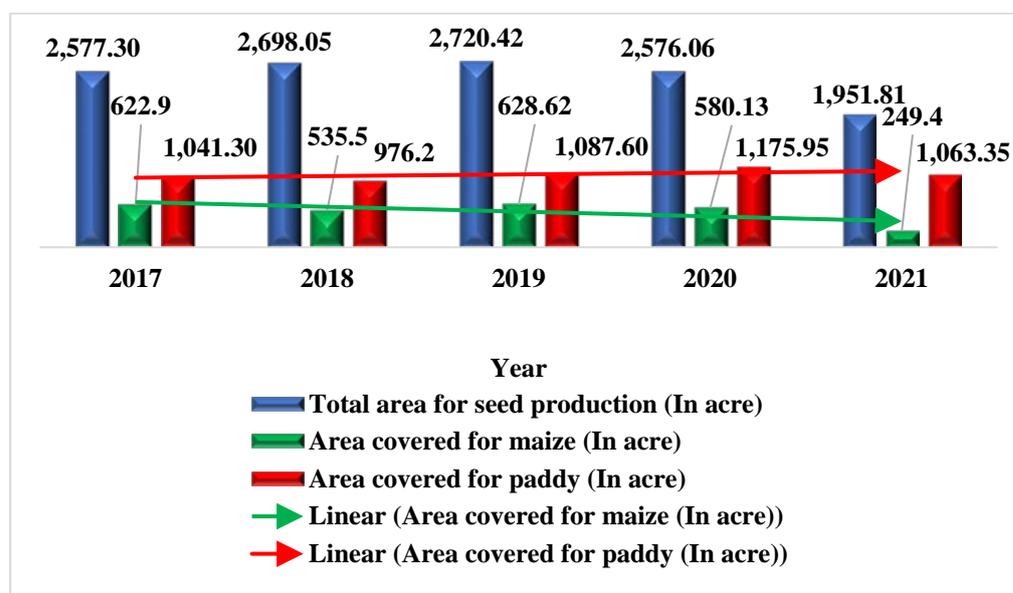
seed production at RHSSF, Faridkot was undertaken on 711.50 acres and 999.50 area was brought under seed production during Rabi 2023-24.

(ii) **Maize seeds**

Punjab is facing problem of depletion of groundwater level⁷². In order to save groundwater, PAU through its vision document “Vision 2040” resolved to promote alternative crops having less water requirement like pulses, maize, oilseeds, fruits, vegetables etc.

The seed production programme of the University witnessed no substantial improvement in maize production even after incurring expenditure of ₹ 12.54 crore on various maize schemes during 2017-22. The details of area covered for seed production of maize and paddy by PAU during 2017-22 are given in **Chart 1.21**.

Chart 1.21: Area covered for seed production in respect of Maize and Paddy by PAU during the year 2017-21 (Kharif)



Source: Concerned Department of PAU

Chart 1.21 shows that the maize area to total area reduced from 24.17 per cent in the year 2017 to 12.78 per cent in the year 2021.

The University attributed the reasons for a sharp reduction in the maize area to the expiry of the lease of 1,220 acres of land at RHSSF, Faridkot. The reply was not acceptable as the area under maize to total area was reduced to 22.52 per cent in the year 2020 too.

It was further noticed that only two⁷³ of the selected six KVKs had conducted frontline demonstrations on maize crops, though many new varieties of the crop were released by PAU and despite it recognising the huge demand for maize in

⁷² Average Maximum Ground Water Level depleted from 25.28 meter to 32.88 meter in a span of 10 years (October 2011-October 2021).

⁷³ (i) Langroya (SBS Nagar); and (ii) Nurmahal (Jalandhar).

the industry. Thus, on one side, the University recognised a huge demand for maize in the industry whereas, on the other side, frontline demonstrations were not conducted in all the KVKs.

This shows that adequate efforts to increase the area of maize were lacking, which was not in line with the diversification and water-saving resolution as per the vision document of the University. Even the National Seminar on ‘Maize for crop diversification under changing climate scenario’ held in 2020 also stressed addressing the issue of declining water table through diversification of rice with maize.

In the exit conference, the VC stated (June 2023) that the University had received back the said piece of land at RHSSF, Faridkot and they had started growing seeds from the current season (Kharif 2023). It was added that the University was trying its best to promote maize in Punjab.

The University stated (October 2024) that PAU again started cultivation at RHSSF Faridkot during Kharif 2023 as land remained in possession of the University. Further, during Kharif 2023, a 421.30 acre area was under seed production of maize, and total seed production of maize was 1026 quintal releasing in substantial increase in seed production in maize. Reply did not address the issue of reduction of maize during 2017-21 despite incurring expenditure of ₹ 12.54 crore on various maize schemes.

1.4.3.2 Poor performance of Bt cotton varieties

The “PAU Bt-1 (April 2017), Bt-2 (December 2021) and Bt-3 (October 2020)” are the cotton varieties developed by the University for commercial cultivation in Punjab. The details of production and sale of various varieties of PAU Bt Cotton during 2017-22 are given in **Table 1.13**.

Table 1.13: Details of production and sale of various varieties of PAU Bt Cotton during 2017-22

Year	Station	PAU Bt Cotton variety	Planned area (in acre)	Actual area (in acre)	Yield (in quintal)	Sale as seed (in quintal)	Sale as produce (in quintal)
2017	RS Bathinda	Bt1	20.0	20.0	65.10	25.31	39.79
2018	RS Bathinda	Bt1	-	30.0	131.76	-	131.76
	USF Faridkot		10.0	164.0	797.0	-	797.0
2019	RS Bathinda	Bt1	5.0	4.0	20.60	-	20.60
	USF Faridkot		50.0	54.0	199.29	-	199.29
2020	USF Faridkot	Bt1	10.0	20.0	47.22	-	47.22
		Bt3	-	3.0	6.5	-	6.5
2021	RS Bathinda	Bt2	5	5.0	7.30	-	7.30
	USF Faridkot	Bt3	10.0	-	-	-	-
2022	RS Bathinda	Bt1	0.5	-	-	<i>Seeds to be sold during Kharif 2023</i>	
		Bt2	6.0	5.0	7.35		
		Bt3	-	2.0	3.50		
	RS Abohar	Bt3	5.0	4.0	4.12		
Total			121.5	311.0	1,289.74	25.31	1,249.46

Source: Information provided by PAU

Table 1.13 shows that:

- Against the yield of 1,274.77 quintals (excluding yield of 14.97 quintals in the year 2022) of the graded seed of Bt cotton, only 25.31 quintals i.e. two *per cent* (Bt1 cotton in the year 2017) was sold as seed and the remaining 1,249.46 quintal was sold as produce during the period 2017-21.

The University attributed (December 2022) the reasons for this to less demand for PAU varieties in comparison to the varieties developed by major private producers owning Bollguard-II technology in the market. The University, however, could not justify the reasons for continued production of PAU cotton varieties having less demand and also for not exploring the development of improved cotton varieties.

- The entire yield of Bt2 and Bt3 cotton, though produced in small quantity, was sold as produce during the years 2020 and 2021.

This not only shows poor planning on the part of PAU but also indicates that its efforts were not in line with its seed production programme to provide adequate seed to the farmers of the State.

A review of records related to research and Adaptive Research Trials from 2018-19 to 2021-22 revealed that average seed cotton yield of PAU Bt1 was 7.6 quintals per acre. However, average seed cotton yield of PAU Bt1 was mentioned as 11.2 quintals per acre in the Package of Practices for Crops of Punjab Kharif 2022 (a book published by PAU for awareness of farmers), thereby disseminating incorrect information to the farmers. Although the production of PAU Bt1 was stopped under University Seed Programme after 2020 yet PAU Bt1 variety was kept in the Package of Practices for Crops of Punjab Kharif for the years 2021 and 2022.

The University stated (October 2024) that the Research Evaluation Committee of PAU had approved the proposal (February 2023) for deletion of PAU Bt1 cotton from Package of Practices for Crops of Punjab 2023.

1.4.3.3 Loss due to sale of graded seed as produce

PAU has its own seed production programme (for the University seed farms, KVKs and RSs) of field crops for Kharif and Rabi for each crop year, wherein, the demand of each variety is discussed in detail (on the basis of feedback from farmers obtained through *kisan melas* and committee members of seed production programme) to finalise seed production. They also fix seed sale rates of field crops for Kharif and Rabi sowing seasons. The Report of the Comptroller and Auditor General of India (Civil) for the year ended 31 March 2006 - Government of Punjab (*paragraph 3.2.11*) had highlighted losses due to sale of seeds as grains.

Audit noticed that the University not only suffered a loss of ₹ 7.26 crore due to sale of graded seed as produce in respect of Kharif and Rabi crops during the period 2017-21, as detailed in **Table 1.14**, but also faced a potential impact on the brand value of PAU seeds.

Table 1.14: Sale of graded seeds as produce in respect of Kharif and Rabi crops during the period 2017-22

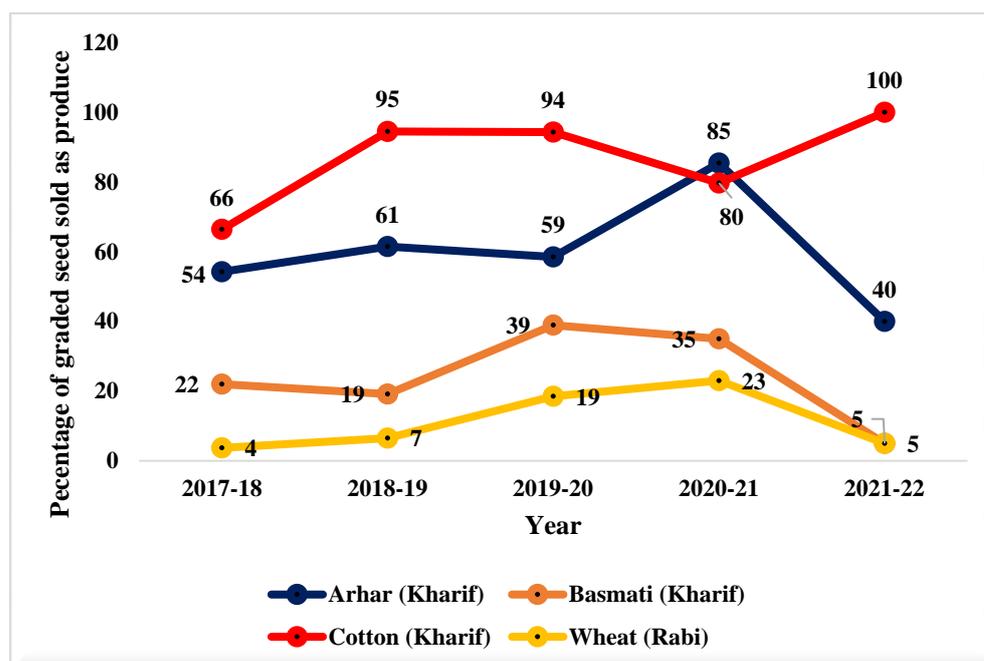
Crop Season	Particulars	2017-18	2018-19	2019-20	2020-21	2021-22	Total
Kharif	Graded Seed Production (in quintal)	25,720.08	21,719.72	23,433.85	25,330.09	20,033.87	1,16,237.61
	Sale as Seed (in quintal)	21,436.20	19,238.48	20,934.95	23,197.63	18,968.11	1,03,775.37
	Sale as produce (in quintal)#	4,283.88	2,481.24	2,498.90	2,132.46	1,065.76	12,462.24
	Loss due to sale of yield as produce (₹ in crore) (A)	1.00	0.73	0.98	1.06	0.31	4.08
Rabi	Graded Seed Production (in quintal)	34,220.55	35,880.71	38,328.12	35,677.54	16,140.33	1,60,247.25
	Sale as Seed (in quintal)	32,760.98	33,291.77	31,051.84	27,502.64	15,212.49	1,39,819.72
	Sale as produce (in quintal)#	1,459.58	2,588.94	7,276.28	8,174.90	927.84	20,427.54
	Loss due to sale of yield as produce (₹ in crore) (B)	0.33	0.34	1.02	1.30	0.19	3.18
Total Loss (A+B) (₹ in crore)		1.33	1.07	2.00	2.36	0.50	7.26

Source: PAU records

#The rates of sales of graded seed as produce were considered on average basis.

The trend of sale of graded seed as produce in respect of major Kharif and Rabi crops is depicted in **Chart 1.22**.

Chart 1.22: Trend of sale of graded seeds as produce in respect of major Kharif and Rabi crops during the period 2017-22



Source: Information provided by PAU

The mandate of PAU is to provide different varieties of seeds (not produce) to farmers. The demand of seeds is anticipated by PAU in the seed production programme and by holding *Kisan Melas* for farmers, wherein, the feedback of farmers was taken for the purpose. The University should have prepared realistic estimates in respect of seeds having less demand to avoid sale of its graded seed as produce to avoid loss.

In the exit conference, the University attributed (June 2023) the reasons for the loss due to sale of graded seed as produce to diversification of crops as these crops were not popular amongst the farmers. The VC further stressed upon the realistic estimates of seed production.

The reply was not acceptable as the major constituent of the loss was attributable to key crops *viz.* wheat, cotton, Basmati and Arhar, seeds of which were sold as produce (as depicted in **Chart 1.22**). Moreover, PAU Bt1 (cotton) variety was kept in the seed production programme despite its graded seed being sold as produce.

The University replied (October 2024) that varieties of various crops developed by PAU were resistant to major diseases but with passage of time, a variety might become susceptible to new races of a pathogen. In such a situation, cultivation of a single variety in large area of the state might result in epidemic. To avoid this, different varieties needed to be grown and therefore, PAU was producing seed of various varieties of a crop. This may also sometimes result in unsold seed of a few varieties. Precise estimation of seed requirement for particular variety to be sold in next year was very difficult as the demand for seed was governed by many factors like biotic and abiotic stresses, market preference and availability of seed of newly developed varieties.

The reply was not acceptable as University, while chalking out the seed production programme, conducted deliberations about each variety as per the crop season with various stakeholders.

During the survey (October 2022/January 2023), the farmers expressed demand for PAU seeds through KVKs. Seven of the surveyed farmers (out of 120) also highlighted shortage of certain varieties of seeds at university seed outlets at KVKs. The claim of seed shortage by farmers and sale of seeds as 'Produce' by the University indicated that either the demand estimation for seed production programme was faulty or the PAU's distribution network of seeds was not proper.

Further, the inconsistency was persisting despite being pointed out earlier through the Audit Report *ibid.*

1.4.4 Manufacture and sale of insecticides

As per the Insecticides Act, 1968 (Act), manufacturing, sale and distribution of insecticides without licence is strictly prohibited and is punishable with fine and

minimum imprisonment for a term which may be extended to two years. Further, the Insecticides Rules, 1971 notified under the Act *inter alia* specify that the packing of insecticides must bear a label as well as a leaflet, duly approved by Registration Committee (RC) which would contain the requisite information⁷⁴.

During test-check of records, inconsistencies noticed related to manufacturing and sale of insecticides are discussed as under:

(i) PAU manufactured formulations of two insecticides⁷⁵ during 2017-22 and sold these insecticides to the farmers through KVKs and Farmer Advisory Service Centres and also used these insecticides internally for demonstrations. However, the University did not apply for registration/licence of these insecticides with RC (December 2022). The labels and leaflets of these insecticides were neither got approved from RC nor was the licence obtained from the State Licensing Authority (Department of Agriculture and Farmers' Welfare) to manufacture these insecticides, in contravention of the provision *ibid*.

The University stated (October 2024) that they were providing these insecticides not for commercial benefit and the same were distributed to the selected farmers for demonstration and also to test its sustained efficacy as some time the strains lose its effectiveness with passage of time.

The reply was not acceptable, as sale invoices were available on record and manufacturing and sale/distribution of these insecticides without licence was prohibited as per the provisions of the Act *ibid*.

(ii) With the objective of mass production of Bioagents (insecticides) viz. Trichoderma and Pseudomonas, the Department of Plant Pathology, PAU procured⁷⁶ (March 2021) a Digital Automated Fermenter at a cost of ₹ 25 lakh. The Fermenter was installed in January 2022 and was used only once in May 2022 to produce 8-10 litres of Trichoderma. However, the equipment could not be



Photograph 4: Digital Automated Fermenter without UPS (09.08.2022)

⁷⁴ Name of the manufacturer, registration number, name of active and other ingredients, batch number and expiry date, among other mandatory items shall be printed on the label of packing. Leaflet must mandatorily contain the details like plant disease, insects and noxious animals or weeds for which the insecticide is to be applied and also the details regarding manner in which the insecticide is to be used.

⁷⁵ Trichoderma Harzianum: 5,450 kg with sale of ₹ 8,17,500/-; and Pseudomonas fluorescens: 900 kg with sale of ₹ 1,12,500/-

⁷⁶ Under the Scheme "Addressing food security through nutritionally enriched improved cultivars and technologies for Swasth Bharat under Purse Program" CSS-36 (PC-6247) under sub-head Non-Recurring Contingency.

put to use afterwards due to non-availability of uninterrupted power supply (UPS) system and Trichoderma was being produced manually since then and that too without obtaining the requisite license for the purpose.

Thus, in the absence of requisite licence to manufacture Trichoderma, the procurement of digital automated fermenter was unwarranted.

The University stated (October 2024) that it was done as per decision taken by higher authorities.

The reply was not acceptable as the University procured digital automated fermenter for manufacturing Trichoderma without obtaining requisite licence.

(iii) As per clause 8.4.3 of the ICAR Guidelines (October 2006) for Intellectual Property Management and Technology transfer/Commercialisation, normally non-exclusive licences will be executed for technologies such as inputs (e.g. bio-pesticides or bio-fertilisers) so that these can lead to their wider adoption and thereby maximise research benefits to farmers and other end users.

Audit noticed that the University entered (July 2013) into an exclusive (instead of non-exclusive) Memorandum of Understanding (MoU) with a manufacturer for further research and development, manufacture and marketing of the bio-pesticide Trichoderma Harzianum strain developed by it, in violation of the guidelines *ibid*.

Audit noticed that the vendor could not obtain the license for production. Resultantly, Trichoderma Harzianum could not be produced and sold/commercialised since 2013. Thus, entering into an exclusive MoU with a vendor/manufacturer for bio-pesticide was in violation of ICAR guidelines.

In the exit conference, the University while admitting the facts stated (June 2023) that suitable steps would be taken for requisite registration, and also assured to take a relook for a fresh MoU on non-exclusive basis.

The University reported (October 2024) that the biopesticide Trichoderma Asperellum 2 per cent WP (Trichoderma Harzianum) was registered with the Central Insecticides Board and Registration Committee (CIBRC) Faridabad on 30 May 2024, for eco-friendly management of bakanae/foot rot disease in basmati rice.

1.4.5 Operation of Fruit Nurseries without license

As per Section 3 of the Punjab Fruit Nurseries Act, 1961 (Act), no owner shall, conduct or establish a fruit nursery unless he has obtained a licence under this Act. It further provides that where an owner has more than one fruit nursery in different towns and villages, he shall obtain a separate licence in respect of each such fruit nursery.

During audit, it was noticed that the University was operating nine fruit nurseries⁷⁷ (established during the period from 1962 to 2012) in its campus, research stations and seed farm without obtaining the requisite licence for the purpose, in contravention of the provisions of the Act *ibid*.

Thus, the operation of fruit nurseries without obtaining the requisite license was violative of the provisions of the Act and may invite penal provisions under Section 13 of the Act.

The University stated (October 2024) that the Department of Fruit Science would try to obtain license within three months.

1.4.6 Quality of research publications

The National Academy of Agricultural Sciences (NAAS) initiated a process of rating/scoring of scientific research journals with the primary objective to bring uniformity in the evaluation of publications. For determining NAAS score of research journals, NAAS has classified them into the following two categories:

Category I	Those journals where Thompson Reuters Impact Factor ⁷⁸ is available, the scores are assigned as 6.00+ Impact Factor with capping on 20.00.
Category II	Those journals where Thompson Reuters Impact Factor is not available, the marks are assigned on the basis of information provided by the Publishers in a prescribed proforma and also evaluation of scientific contents of the journals.

The details of the publications of PAU printed in various research journals (with/without NAAS ratings) during the period 2017-22 are given in **Table 1.15**.

Table 1.15: Publications of PAU printed in various research journals (with/without NAAS ratings)

Total number of publications printed in various journals	5,811
Total number of publications printed in journals having NAAS ratings	5,343
Total number of publications printed in journals without NAAS rating	468
Total number of publications printed in journals having NAAS ratings above 'six'	2,396

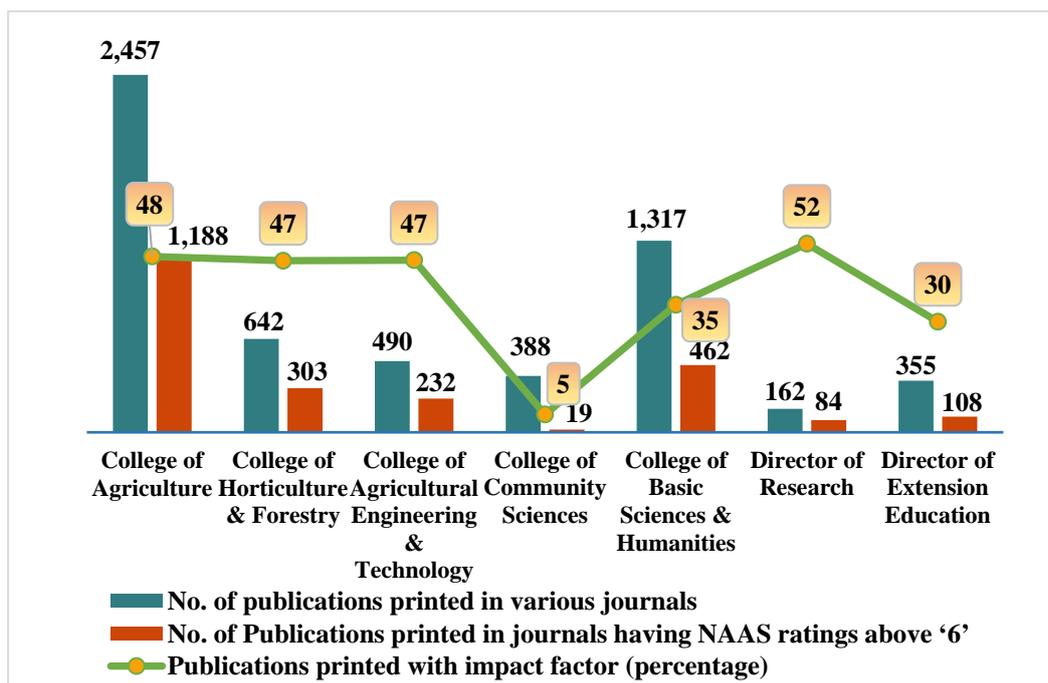
Source: Information provided by PAU

The college/office-wise details of the publications of PAU printed in various research journals during the period 2017-22 are given in **Chart 1.23**.

⁷⁷ (i) PAU, Ludhiana (1970); (ii) RS Abohar (1962); (iii) RFRS Bahadurgarh (1963); (iv) RS Ballawal Saunkhri (1990); (v) RS Bathinda (1982); (vi) RFRS Gangian (1974); (vii) RS Gurdaspur (1973); (viii) FRS Jallowal-Lesriwal (2012); and (ix) USF Ladhawal (2001).

⁷⁸ It is a globally recognised indicator for assessing journals.

Chart 1.23: College/Office-wise details publications of PAU printed in various research journals during 2017-22



Source: Information provided by PAU

Audit observed that:

- The University did not have faculty-wise details of above-mentioned research publications. In the absence of same, Audit could not verify the veracity of the assertions regarding these research publications.
- During the accreditation process (August 2019), the Peer Review Team of ICAR pointed out that the number of publications per faculty needed attention. However, the University did not fix any faculty/scientist-wise targets for submission and publication of research papers.
- The University could not provide any faculty-wise centralised database containing faculty profile, qualifications, postings so far, trainings attended, research projects executed, research papers published, citation records⁷⁹ etc despite specific request.
- The University publishes its own journal publication viz. Agricultural Research Journal (Journal of Research, PAU). The NAAS Score of the journal increased from 4.71 (2018-20) to 5.44 (2021 and 2022) but it was still less than the impact factor (6.00+).

The University stated (October 2024) that current impact rating of journal is 5.16 and it was undertaking efforts to improve the rating to (6.00+).

⁷⁹ H-index, I-10 index, UGC Consortium for Academic Research and Ethics (CARE) index.

1.4.7 Short transfer of land to PAU

In view of the orders (April 2015) of GoP, PAU, as per decisions⁸⁰ of the BoM, transferred (November 2015) 175 acre 1 *kanal* and 12 *marla* of land to the Health Department, GoP for establishment of All India Institute of Medical Sciences (AIIMS) at Bathinda. In lieu thereof, the GoP transferred (November 2015) 162 acre 2 *kanal* and 6 *marla* of land at four different locations in Punjab to PAU, as detailed in **Table 1.16**, thereby resulting in 12 acre 7 *kanal* 6 *marla* less transfer of land to PAU.

Table 1.16: Details of land transferred to PAU

Sr. No.	Station	Area Acre-Kanal-Marla
1.	Sekhupura Farm, Department of Agriculture, Bathinda	50-00-02
2.	Jiwan Singh Wala, Department of Horticulture, Bathinda	26-03-08
3.	Khanora Farm, Department of Horticulture, Hoshiarpur	36-00-16
4.	Dyal Bharang, Department of Agriculture, Amritsar	49-06-00
Total		162-02-06

Source: PAU records

Further, in the case of alternate allotted land (26 acre 3 *kanal* 8 *marla*) at Jiwan Singh Wala, Bathinda, the actual measurement of land as per records of the Horticulture Department worked out to 23 acre 4 *kanal* and 15 *marla* thereby resulting in 2 acre 6 *kanal* 13 *marla* less transfer of land to PAU.

Thus, in all, PAU received 15 acre 5 *kanal* 19 *marla* less land than the land transferred to the Health Department for establishment of AIIMS at Bathinda.

It was further noticed that though land measuring 49 acre 6 *kanal* in respect of Dyal Bharang, Amritsar was in the possession of PAU, mutation thereof had not been transferred in the name of the University (May 2023). In spite of the issue of non-updation of land records being pointed out earlier in the Report of the Comptroller and Auditor General of India (Civil) for the year ended 31 March 2006 - Government of Punjab (*paragraph 3.2.19*), the issues of mutation were persisting.

On being pointed out in audit, the University stated (October 2024) that it had taken up the matter (December 2023) with the Director, Horticulture Department Punjab on short transfer of land at Jiwan Singh Wala, Bathinda. The response of Horticulture department was awaited (October 2024). In case of land transferred at Dyal Bharang, Amritsar, the University stated (October 2024) that land of Dyal Bharang, Amritsar was in the name of President of India, thus mutation of the said land could not be done in the name of university. It further stated that necessary action would be taken for the

⁸⁰ 274th meeting (09-11-2015); 285th meeting (26-03-2018); and 287th meeting (12-10-2018).

transfer of *Girdawari*⁸¹ in the name of university as the mutation of land is not possible.

In case of short transfer of 12 acre, 7 kanal and 6 marla, the University stated (October 2024) that the land measuring 162 acre, 2 kanal, 6 Marla in lieu of 175 acre, 1 canal, 12 Marla was transferred to University as per decision of GoP/BoM.

The reply was not acceptable as the University did not take up the matter of short transfer of land with GoP at the appropriate time which ultimately resulted in short transfer of land to the University. The short transfer of land to PAU would ultimately impact the cultivable area of the University for research and seed production.

1.4.8 Joint inspection of Research Stations and Seed Farms

Joint inspection of selected RSs and two Seed Farms was conducted along with University authorities during the course of audit to ascertain various facilities.

During joint inspection, Audit observed that the following facilities were lacking:

(i) Research Stations

- In two RSs (Abohar and Bahadurgarh), first-aid facilities were not available.
- There was no firefighting equipment in any of the RSs.
- Grievance Redressal Board was not displayed in any of the RSs.
- Asset numbers on assets and furniture & fixtures were not being marked at RS, Bahadurgarh and at other two RSs, marking was partial.

(ii) Seed Farms

- Fire-fighting equipment, grievance redressal boards and first-aid boxes were not available in any of the selected Seed Farms. Asset numbers on assets and furniture & fixtures were partially marked at USF Ladhawal.

The University said in March 2023 that it had given instructions to install CCTV cameras, fire-fighting equipment, and grievance redressal boards at all RSs in the next financial year. They added (October 2024) that these items were installed at RS Ballawal Saunkhri. At RS Bahadurgarh, a first aid box and fire extinguisher were installed. No such facilities were installed at USF, Nabha.

1.4.9 Conclusion

Out of total 616 new research projects proposed by the University, only 193 research projects (31.33 *per cent*) were sanctioned by the project funding

⁸¹ Girdawari is an annual crop inspection conducted by the revenue officials in the villages of the State of Punjab.

agencies during 2017-22. The University did not evolve any mechanism to ascertain/review the reasons for non-approval of research project proposals by the funding agencies so as to bring improvement in their future project proposals. Despite availability of funds from the funding agencies, cases of termination/non-completion of the projects were also noticed due to inadequate monitoring by PAU.

The Technology Marketing and Intellectual Property Rights (TMIPR) Cell of PAU did not have any dedicated full-time staff. No Standard Operating Procedure (SOP) prescribing timelines for registration, transfer of technologies/plant varieties and mechanism for their valuation for determination of licence fee was framed by the University. There was no system of periodic reporting of the technologies/plant varieties developed, patented, registered (yet to be commercialised) to the VC and BoM so as to ensure timely dissemination of the benefits of these technologies/plant varieties to the end users.

As against 48 developed technologies applied under the Patents Act, 1970, 18 technologies were granted patent rights as of November 2022. Of these, in four cases having collaborative research of PAU and ICAR, the patent certificates were granted in the name of ICAR instead of joint registration. Five patent applications filed by PAU were refused and 25 patent applications were lying pending with Controller General of Patents, GoI as of November 2022.

Out of 97 developed plant varieties applied for registration under PPV&FR Act, 36 varieties were registered as of June 2022. Additionally, 34 varieties were registered in the name of ICAR instead of joint registration as these varieties were developed under collaborative research of PAU and ICAR. As many as 17 plant varieties were got commercialised during 2017-22 but without getting them registered under PPV&FR Act. Besides, various plant varieties having geographical indication, were not registered under the Geographical Indication of Goods Act, 1999 by the University.

There was reduction of 24.23 *per cent* and 37.37 *per cent* in cultivable area of Kharif and Rabi respectively, resultantly, the production of Kharif and Rabi seeds reduced by 20.61 *per cent* and 50.04 *per cent* during the years 2020-21 and 2021-22 respectively. The cases of short transfer of land to the University were also noticed thereby impacting cultivable area of the University for research work and seed production.

Against the yield of 1,274.77 quintal of graded seed of Bt cotton, only 25.31 quintal i.e. two *per cent* (Bt1 cotton in the year 2017) was sold as seed and the remaining 1,249.46 quintal was sold as produce during the period 2017-2021. The University suffered a loss of 7.26 crore due to sale of graded seeds as produce in respect of Kharif and Rabi crops during the period 2017-21.

Manufacturing and distribution/sale of two insecticides viz; Trichoderma Harzianum and Pseudomonas Fluorescens without obtaining mandatory licences – were noticed. Nine fruit nurseries were also being operated without obtaining mandatory licences.

Only five to 52 per cent of the total research publications in respect of seven colleges/offices could find a place in journals with Thompson Reuters Impact Factor with score of 6.00+ during the period 2017-22. Joint inspection of three selected RSs and two Seed Farms showed lack of various facilities.

1.4.10 Recommendations

The University may:

- (i) *develop a robust process for evaluating research proposals before submission to the funding agencies and for reviewing the unapproved or unsuccessful projects to identify reasons for future course correction;*
- (ii) *strengthen the Technology Marketing and Intellectual Property Rights (TMIPR) Cell to ensure timely registration and commercialisation of its own developed technologies and plant varieties; and to ensure joint ownership registration in case of collaborative projects, under the Patent Act, 1970, PPV&FR Act, 2001 and GI of Goods Act, 1999, to secure its ownership rights;*
- (iii) *take effective measures to increase the cultivable area so as to increase production of Kharif and Rabi seeds, and ensure distribution/ sale of yield as graded seeds instead of produce for providing adequate seeds to the farmers of the State to secure revenue as well as brand value of PAU seeds;*
- (iv) *obtain requisite licenses for manufacture and distribution/sale of insecticides and operation of fruit nurseries, from the concerned authorities in line with the codal provisions;*
- (v) *take effective measures for publication of quality research publications in the journals with impact factor 6.00+, and*
- (vi) *ensure providing requisite facilities at RSs and Seed Farms to facilitate effective research activities by the University.*

1.5 Extension of Agricultural Technologies

The Punjab Agricultural University (PAU) disseminates outcome of improved agricultural technologies and plant/seed varieties amongst farmers by way of trainings and field demonstrations through its 18⁸² *Krishi Vigyan Kendras*

⁸² Excluding four other KVKs in the State of Punjab - three KVKs at SAS Nagar, Tarn Taran, and Barnala under Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana; and one KVK at Fazilka under the Director, Central Institute of Post Harvest Engineering & Technology (CIPHET), Abohar.

(KVK) (as detailed in **Appendix 1.1**); 15 Farm Advisory Service Centres⁸³ (FASC) located in different districts of the State; and Plant Health Clinic located in the premises of PAU, Ludhiana later named as Agricultural Technology Information Centre (ATIC).

The KVK scheme is 100 *per cent* financed by Government of India (GoI) and KVKs are sanctioned to Agricultural Universities, ICAR institutes, related Government Departments and Non-Government Organisations (NGO) working in the agriculture field. KVKs are an integral part of the National Agricultural Research System⁸⁴ (NARS) which aims at assessment of location specific technology modules in agriculture and allied enterprises, through technology assessment, refinement and demonstrations. These have been functioning as Knowledge and Resource Centre of agricultural technology supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district and are linking NARS with extension system and farmers. To achieve the aim, KVKs transfer technologies through various extension modes like *Kisan Melas*, workshops, demonstrations, specialised trainings, exhibitions, campaigns, technical guidance, sale of farm literature and TV/radio talks.

The FASCs were established with the objective of quick transfer of technology amongst the farmers of the State and getting first hand feedback of their field problems. FASCs act as an organic link between the University research system, field functionaries and farmers.

The audit findings related to extension activities of PAU are discussed in the succeeding paragraphs.

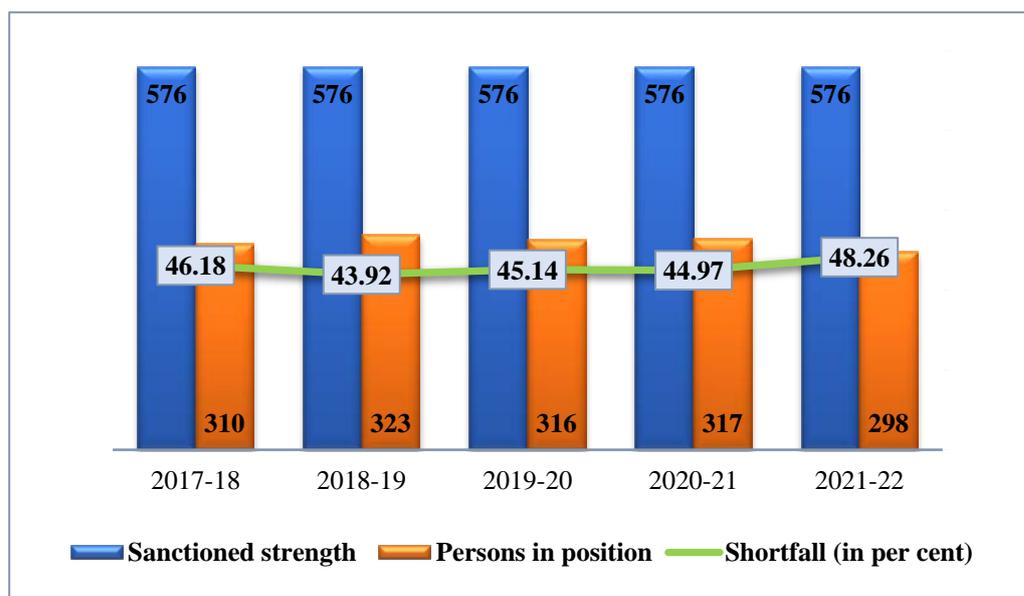
1.5.1 Position of staff deployed for extension activities

The position of staff deployed for extension activities during the period 2017-18 to 2021-22 is depicted in **Chart 1.24**.

⁸³ (i) Amritsar; (ii) Bathinda; (iii) Barnala; (iv) Faridkot; (v) Fazilka; (vi) Ferozepur; (vii) Gurdaspur; (viii) Hoshiarpur; (ix) Jalandhar; (x) Kapurthala; (xi) Patiala; (xii) Ropar; (xiii) Sangrur; (xiv) Tarn Taran; and (xv) SAS Nagar, running under the control of Director Extension Education, PAU Ludhiana.

⁸⁴ The NARS has contributed to make India self-sufficient in food production and serves the agricultural technology and information needs of the country. It has research network of 102 ICAR Institutes, 11 Agricultural Technology Application Research Institutes and 73 Agricultural Universities spread across the country. NARS is a system and continuously strengthening its Agricultural Research Activities for the benefit of Indian farming community for producing various crops.

Chart 1.24: Position of staff deployed for extension activities during 2017-22



Source: Information provided by office of the Director of Extension Education

Category/branch-wise analysis of staff showed shortage of teaching staff (27-30 per cent) and non-teaching staff (37-51 per cent) in KVKs & FASCs; and teaching staff (67-71 per cent) and non-teaching staff (63-88 per cent) in the office of Director Extension Education during the period 2017-22 (*Appendix 1.12*).

The substantial shortage of staff engaged in extension activities impacted the extension education viz. trainings, inadequate frontline demonstrations (FLD) of newly developed technologies and varieties, etc., as discussed in *paragraphs 1.5.3 and 1.5.4*.

The Director of Extension Education informed (September 2023 and October 2024) that all vacant posts had been advertised (June 2023) and PAU had recruited four Deputy Directors (Training), 22 Assistant Professors and two Assistants in different KVKs during 2024. The process of recruiting other staff was stated to be underway.

Although the University had made efforts to fill the gap between sanctioned strength and Men-in-position yet the shortage of staff was still substantial as recruitment process had been initiated for only 28 posts against the vacancy of 278 in 2021-22.

1.5.2 Landholdings of Krishi Vigyan Kendras

As of March 2022, 18 KVKs had been sanctioned to PAU by ICAR under a GoI Scheme. To establish these KVKs, ICAR executed (February 1982-September 2016) MoUs with PAU, which included *inter alia* requirement of good quality cultivable land for each KVK for imparting training/instructions through work-experience/learning by doing.

Audit noticed that out of 18 KVKs, only one KVK at Gurdaspur fulfilled the condition of minimum landholding as per the MoU. In the remaining 17 KVKs, the shortage of cultivable land ranged from 1 acre to 47.8 acre in accordance with the requirement in the respective MoUs (**Appendix 1.13**). Thus, norms fixed by ICAR for landholdings in respect of 17 KVKs were not adhered to thereby impacting the dissemination of practical training/work experience to the beneficiaries.

PAU, in exit conference (June 2023), attributed the reasons for shortfall in landholdings to the high cost of land in Punjab and stated that the matter would be looked in major land shortfall cases in KVKs.

The University responded (October 2024) that as per ICAR guidelines, 20 hectares area was to be made available free of cost for the establishment of a KVK in a district and PAU had established 18 KVKs either on panchayat land or at PAU farms. The site selection was purely approved by a committee from ICAR, New Delhi and PAU only facilitated the committee for visiting to sites to be donated by panchayat. The KVKs were established on the lands approved by the Site Selection Committee and it depends upon the land donated by the respective panchayats.

The reply may be seen in the light of the fact that land was a major source for imparting agricultural trainings. As such, shortage of land with KVKs impacted the quality of training provided.

1.5.3 Trainings imparted by Krishi Vigyan Kendras

Mandate of the KVKs include imparting need-based training to the farmers to update their knowledge and skills in modern agricultural technologies and to conduct training of extension personnel to orient them in the frontier areas of technology development. KVKs also provide vocational training⁸⁵ to progressive farmers, farmwomen and rural youth in knowledge and skills, which enables them to start small-scale enterprises⁸⁶ for self-employment or generating additional income apart from their farm income.

The Report of the Comptroller and Auditor General of India (Civil) for the year ended 31 March 2006-Government of Punjab (**paragraph 3.2.16**) had highlighted the shortfall in trainings.

(i) The overall position of targets *vis-a-vis* achievement of trainings imparted by six selected KVKs in terms of the number of courses and participants during the period 2017-22 is detailed in **Table 1.17**.

⁸⁵ Hybrid seed production; cultivation of aromatic and medical plants; dairy; poultry; bee-keeping; vermicompost; fishery; piggery; mushroom growing; integrated pest management; nursery raising (horticultural, vegetables and flower plants); food processing and value addition; repair and maintenance of farm machinery; self-employment of rural youth; etc.

⁸⁶ Stitching; embroidery; knitting; soft toy making; soap and detergent making; fruit and vegetable preservation; food and nutrition; etc.

Table 1.17: Targets *vis-a-vis* achievement of trainings imparted by six selected KVKs in terms of number of courses and participants during 2017-22

Sr. No.	Name of KVK	Number of courses		Number of participants	
		Target	Achievement	Target	Achievement
1.	Faridkot	502	467	7,000	6,790
2.	Ferozpur	450	592	9,958	11,761
3.	Langroya (SBS Nagar)	451	424	9,622	8,649
4.	Nurmahal (Jalandhar)	488	398	9,679	9,621
5.	Ropar	467	428	7,707	14,254
6.	Kheri (Sangrur)	429	352	9,930	8,849

Source: Documents of Test-checked KVKs

Table 1.17 shows that except for two KVKs at Ferozpur (achieving targets in respect of number of courses and participants) and Ropar (achieving targets in terms of participants), none of the other four selected KVKs could achieve the targets for imparting trainings to the beneficiaries during the period 2017-22.

The category-wise shortfall in terms of number of courses and participants in respect of six selected KVKs during the period 2017-22 is depicted in **Table 1.18 and Appendix 1.14 and Appendix 1.15**.

Table 1.18: Category-wise shortage in achievement of targets in terms of number of courses and participants in respect of six selected KVKs during the period 2017-22

Sr. No.	Name of KVK	Shortfall (in per cent)					
		Farmers and farmwomen		Vocational courses		In-service trainings	
		Courses	Participants	Courses	Participants	Courses	Participants
1.	Faridkot	7.19	4.16	2.5	10.3	16.67	0
2.	Ferozpur	0	0	1.52	59.36	62.12	58.36
3.	Langroya (SBS Nagar)	4.78	13.23	16.39	0	0	17.74
4.	Nurmahal (Jalandhar)	4.31	0	27.00	0	77.78	51.11
5.	Ropar	4.06	0	3.85	0	50.00	10.99
6.	Kheri (Sangrur)	16.96	7.11	15.63	14.40	29.55	28.63

Source: Test-checked KVKs

Analysis of category-wise targets *vis-a-vis* achievement in respect of the six selected districts during 2017-22 (**Table 1.18**) showed that:

- Achievement in terms of number of courses and participants in ‘Farmers and Farmwomen’ category was satisfactory except in KVK, Kheri (Sangrur), where the shortage in number of courses was found to be more than 15 per cent over a period of five years.
- In ‘Vocational Courses’ category, more than 15 per cent shortage was found in three KVKs⁸⁷ in terms of number of courses and in KVK,

⁸⁷ Langroya (SBS Nagar), Kheri (Sangrur) and Nurmahal (Jalandhar).

Ferozepur shortage in number of participants was 59 per cent over a period of five years.

- Under 'In-service Training' category, more than 15 per cent shortage was found in five KVKs⁸⁸, including three KVKs⁸⁹ having shortage of 50 per cent and above in terms of number of courses; and in terms of number of participants, more than 15 per cent shortage was found in four KVKs including two KVKs having more than 50 per cent shortage over a period of five years.

The shortfall in achievement of targets could be attributable to shortage of manpower and requisite landholdings, as discussed in *paragraphs 1.5.1 and 1.5.2* respectively.

(ii) Under the Central Sector Scheme⁹⁰, the KVKs under PAU adopt villages to carry out various extension activities and impart trainings to the farmers to reduce burning of crop residue. The adoption was done to impart PAU crop residue management techniques to farmers, adoption of crop residue management techniques among masses to reduce burning of crop residue. The details of number of villages adopted by each of the selected KVKs for the period from 2018-19⁹¹ to 2021-22, are given in **Table 1.19**.

Table 1.19: Details of number of villages adopted by the selected KVKs during the period 2018-22

Sr. No	Name of KVK	No. of blocks in the district	No. of villages adopted	Blocks covered	Blocks not covered
1.	Faridkot	3	20	Faridkot and Kotakpura	Jaiton
2.	Ferozepur	6	16	Ferozepur, Zira, Ghall Khurd, Mamdot and Makhu	Guru Harsahai
3.	Langroya (SBS Nagar)	5	22*	Banga, Saroya and SBS Nagar	Aur and Balachaur
4.	Nurmahal (Jalandhar)	11	19	Lohian, Shahkot and Nurmahal, Nakodar and Adampur	Bhogpur, Phillaur, Rurka Kalan, Mehatpur, Jalandhar East and Jalandhar West
5.	Ropar	5	16*	Chamkaur Sahib and Ropar	Sri Anandpur Sahib, Morinda and Nurpur Bedi
6.	Kheri (Sangrur)	8	18*	Sunam, Bhawanigarh, Dhuri, Sangrur, Sherpur, Andana/Moonak and Lehragaga	Dirba

Source: Test-checked KVKs and official website of concerned districts (for total number of blocks in a district)

* KVK, Ropar adopted one village twice (2019-20 and 2021-22); KVK, Kheri (Sangrur) adopted one village twice (2018-19 and 2020-21); and KVK, Langroya (SBS Nagar) adopted six villages twice and one village thrice during the period 2018-2022.

It is evident from the table that villages from only 24 blocks were selected by KVKs based on the adaptability of farmers to new technologies based on primary surveys in consultation with Sarpanches, progressive farmers,

⁸⁸ Faridkot, Ferozepur, Kheri (Sangrur), Nurmahal (Jalandhar) and Ropar.

⁸⁹ Ferozepur, Nurmahal (Jalandhar) and Ropar.

⁹⁰ Promotion of Agricultural mechanization for in-Situ management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi.

⁹¹ Adoption of villages was started from 2018-19 onwards.

Agriculture Development Officers, and Cooperative Societies. However, reasons for not covering villages from the remaining 14 blocks were not furnished to the Audit.

The University informed (October 2024) that all the blocks of Punjab had been covered. Reply was not acceptable, as only 94 blocks had been covered while there were 152 blocks in the state.

1.5.4 Frontline demonstrations

Frontline Demonstrations (FLD) are conducted by KVKs to demonstrate newly released crop production and protected technologies and its management practices in the farmers' field under different agro-climatic regions and farming situations. The FLDs are conducted in a block of two to four hectares of land in order to have better impact of the demonstrated technologies on the farmers and field level extension functionaries.

- (i) The details of selected KVKs which did not conduct any FLD on major crops during the period 2017-22 are given in **Table 1.20**.

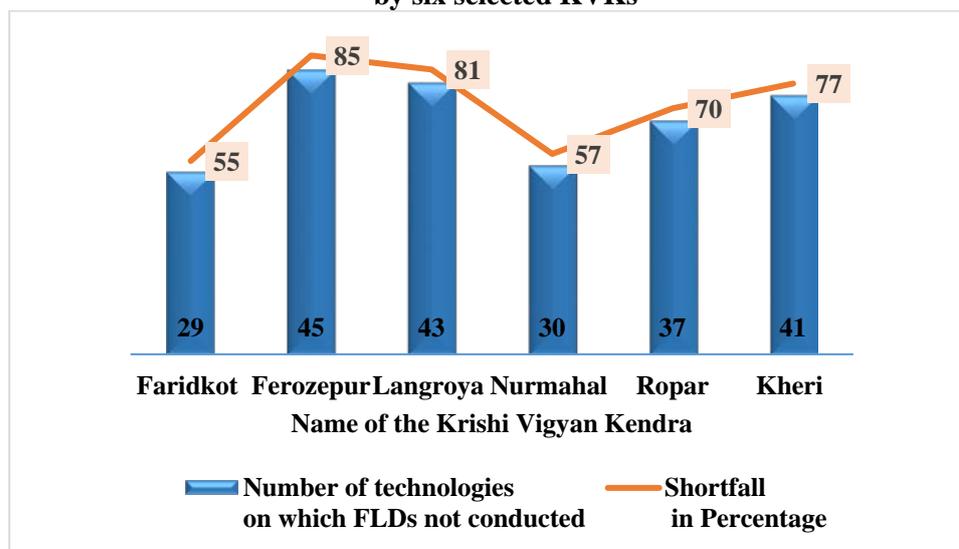
Table 1.20: Selected KVKs which did not conduct any FLD on major crops during the period 2017-22

Sr. No.	Name of crop	Name of KVK not conducted FLDs
1.	Paddy varieties	Ferozepur, Langroya (SBS Nagar), Nurmahal (Jalandhar) and Ropar
2.	Barley	Faridkot, Ferozepur, Langroya (SBS Nagar), Nurmahal (Jalandhar) and Ropar
3.	Maize	Faridkot, Ropar and Kheri (Sangrur) though many new varieties of maize crop were released by the University
4.	Forage crops like maize fodder, Shaftal, Barseem, Napier Bajra, etc.	Ferozepur, Langroya (SBS Nagar), Nurmahal (Jalandhar), and Ropar
5.	Floriculture varieties	Faridkot, Langroya (SBS Nagar), Ropar
6.	Fruit crops	Ropar and Kheri (Sangrur)

Source: Test-checked KVKs

- (ii) The University developed 53 technologies during the period 2017-18 to 2021-22. The details of technologies on which FLDs were not conducted by six selected KVKs are depicted in **Chart 1.25**.

Chart 1.25: Details of technologies on which FLDs were not conducted by six selected KVKs



Source: Test-checked KVKs

In the exit conference, the University while admitting the facts stated (June 2023) that required number of FLDs would be conducted in future. Further, the University replied (October 2024) that the target of Cluster Frontline Demonstrations (CFLDs) had been achieved by all KVKs during Kharif 2023 to Kharif 2024, however, the detailed information (KVK-wise) was not provided to the audit.

1.5.5 Soil and water testing

Soil testing is the only way to determine the fertiliser need of a crop in a particular field. The prime step in the soil-testing programme is the collection of soil sample. The analysis of soil sample is done to determine the available nutrient status and physico-chemical properties of soil. The fertiliser recommendations for the field crop are generally given based on a small amount of soil tested in the laboratories.

The Management Guidelines of KVK issued (January 2014) by ICAR provide that soil, water and plant analysis is mandatory for KVKs to support field interventions and demonstrations. The results of the analysis should be interpreted with recommendations.

Test-check of records in the selected KVKs showed that targets for soil samples collection and testing were not fixed. The testing of soil samples was being done as per requirement of the farmers. The details of soil samples collected and tested at soil testing laboratories in six selected KVKs during 2017-22 are depicted in **Table 1.21**.

Table 1.21: Details of soil samples collected and tested at soil testing laboratories in six selected KVKs/during 2017-22

Sr. No.	Name of KVK	Number of soil samples collected and tested				
		2017-18	2018-19	2019-20	2020-21	2021-22
1.	Faridkot	463	582	266	38	20
2.	Ferozepur	189	392	107	72	178
3.	Kheri (Sangrur)*	680	968	161	0	129
4.	Langroya (SBS Nagar)	118	235	263	110	110
5.	Nurmahal (Jalandhar)	254	284	155	185	172
6.	Ropar	457	60	190	151	84

Source: Test-checked KVKs

* in case of Kheri (Sangrur) Soil samples collected were got tested from PAU Soil and Water Testing Laboratory, Ludhiana from the year 2018-19 onwards.

Audit observed that in the absence of fixation of any targets by PAU, the soil samples collected and tested by six KVKs, except in 2018-19 by five KVKs, were mostly on a decreasing trend during the period 2017-18 to 2021-22. Inadequate soil and water testing would deprive the farmers of the recommendations in respect of the fertilisers to be used for a particular crop.

It was also noticed that the Soil Testing Laboratory (STL) at KVK Kheri (Sangrur) was not functional since January 2018 due to non-availability of skilled staff and lack of infrastructure.



The soil samples collected by KVK Kheri (Sangrur) during the period 2018-19 to 2021-22 were got tested from PAU Soil and Water Testing Laboratory, Ludhiana. The University replied (October 2024) that the electrical conductivity meter had been procured and the testing of irrigation water samples was being done in the soil testing lab of KVK, Sangrur. From June 2023 to September 2024 a total of 219 water samples were tested, however, the University remained silent on sample testing of soil.

Further, four out of six selected KVKs viz. Nurmahal (Jalandhar); Langroya (SBS Nagar); Kheri (Sangrur); and Ropar were not testing the soil samples for conducting FLDs, in line with Management Guidelines of KVK *ibid*.

1.5.6 Non-setting up of Community Radio Stations

As per guidelines (October 2018) of the Scheme ‘Support to State Extension Programmes for Extension Reforms’, Community Radio Stations (CRSs) were to be promoted in a big way to expand the reach of localised technologies to the farmers located within a radius of 20 to 50 kilometres. A total amount of not more than ₹ 65 lakh (including capital and recurring cost) was proposed to be provided as assistance to SAUs for CRS spread over operational period.

Audit noticed that the University did not submit any proposal under the Scheme, thus, it could not set up CRS in any of its 18 KVKs. However, State Agricultural University of the neighbouring State of Haryana had set up CRSs in its KVKs. As CRS is one of the effective means to communicate/disseminate the technologies to the farmers, non-establishment thereof deprived the farmers of the intended benefits.

Although University assured (June 2023) to set up CRSs at KVKs in Punjab, but it later stated (October 2024) that effective range of a community radio station was in the radius of 5-10 kms only which would not serve the purpose of KVKs having operational area of more than 50 kms. Moreover, a technical team of two engineers, content writers, editing person as well as radio jockey was required which was not provided by ICAR. All India Radio Jalandhar was broadcasting one-hour daily programme with the collaboration of the University for the farmers. Besides this, two daily programmes of duration five minutes and 15 minutes were broadcast in morning and afternoon sessions. The narrow broadcasting stations active in Bathinda, Patiala and Fazilka were engaging experts from the RSs of the University in sending information to the farmers. Director of Extension Education further added that PAU had developed strong extension linkages for the dissemination of the technology through All India Radio and TV. The response of the Director showed their reluctance in setting up of CRSs at KVKs as adopted by other states too. Their statement on the range of CRSs was contrary to guidelines for Support to State Extension Programmes for Extension Reforms (ATMA) scheme 2018.

1.5.7 Agricultural Technology Information Centre

The mandate and functions of the Agricultural Technology Information Centre (ATIC) set up in PAU, Ludhiana were to provide a “single-window delivery system” for agricultural products and services like sale of farm implements, bio-fertilisers, soil and water testing, seed quality testing, sale of nursery plants to the farmers, to facilitate direct access of farmers to technology advice and other services and to provide mechanism for feedback from the users to the University. The ATIC of the University is engaged in providing regular technical services⁹² to the visiting farmers, selling seeds of high yielding crop

⁹² Diagnosis of samples infected of pests/diseases/nutritional deficiencies, etc.

varieties (and small vegetable kits for kitchen gardens), and selling of farm literature for the benefit of farmers.

Audit noticed that ATIC of the University did not sell any insecticides, bio-fertilisers, farm implements, herbal nursery plants. The farmers who visited the Centre were advised to get the requisite products from the concerned departments. The University further stated that ATIC did not test samples of soil and water, but these were tested in the department of Soil Sciences. Thus, ATIC did not serve fully as a “single window delivery system” for technology products, diagnostic services and information for farmers and other end users defeating the purpose of setting up an ATIC.

The University stated (October 2024) that Bio-agents (Trichoderma) were being made available in ATIC in collaboration with Department of Entomology whereas soil and water samples were being collected in ATIC in collaboration with Department of Soil Science. However, the University did not furnish any document in support of their reply.

1.5.8 Other issues

(i) Non-maintenance of centralised database of farmers

A beneficiary database helps an organisation track the impact of its work. The database is used to store information about the specific benefits that each beneficiary receives. This data is used to measure the effectiveness of the organisation's programmes and to demonstrate the value of its work to its stakeholders. Additionally, having accurate and up-to-date information about beneficiaries helps an organisation to identify and address any potential issues or challenges in its programmes.

The University imparts trainings to the farmers, provides frontline demonstrations and supplies seeds to the farmers. To measure effectiveness of these activities, the impact assessment is to be carried out periodically, in line with the recommendations of High-Power Committee on the management of KVKs (January 2014). Audit, however, noticed that the University did not have any farmer-wise centralised database, indicating their name, identification, contact number, landholdings, type of soil, soil health card, crop varieties cultivated, trainings imparted, frontline demonstrations (FLD) given, seeds sold, etc. In the absence of which, the University was unable to track the impact of the trainings imparted, soil requirements, crop varieties cultivated, seeds sold, etc. and to assess effectiveness of its extension activities, identify their training needs and address any potential issues or challenges.

The Director of Extension Education informed (October 2024) that PAU had farmer database prepared using PAU *Kisan Mobile App* and about 98040 farmers all over Punjab were associated. However, neither the database nor any impact assessment reports to measure the effectiveness of imparting training to farmers, providing frontline demonstrations and supplying seeds to farmers,

was provided to Audit. In the absence of which, claim of PAU regarding availability of database of farmers could not be verified.

(ii) Farmers' complaints handling system

Complaints/Suggestions play an important role for the management of an organisation to be accountable to the public, as well as providing valuable prompts to review organisational performance and the conduct of people that work within and for it. Audit noticed that:

- The University had not framed any policy/guidelines for handling complaints of farmers of the State.
- There was no online portal for the farmers for registration of their grievances/complaints/suggestions.
- The University did not maintain any centralised data related to number of complaints received from the farmers and action taken there against.
- In the selected KVKs, complaint registers were not being maintained.

The University stated (October 2024) that PAU was in the process of extending Farmers' Portal for farmer complaints handling system and this would be operational within the next couple of months.

(iii) Joint Inspection of Krishi Vigyan Kendras

A joint inspection of six selected KVKs was conducted during the course of audit to ascertain availability of various facilities in KVKs. Audit noticed that:

- In KVK Ropar, there was no farmers' hostel facility. In KVK Langroya (SBS Nagar), hostel (constructed in December 2009) was being used for storage purpose due to non-availability of water and electricity facilities. In KVK Kheri (Sangrur), there were five rooms in the hostel but without any infrastructure.
- In KVK Nurmahal (Jalandhar), there was no first-aid box facility.
- In three KVKs (Ferozepur, Ropar and Faridkot), there were no fire-fighting equipment.
- In four KVKs (Ropar, Nurmahal (Jalandhar), Faridkot and Kheri (Sangrur)), there was no grievance redressal board displayed in the respective buildings, while the other two KVKs (Ferozepur and Langroya (SBS Nagar) had displayed grievance redressal board.
- In KVK Langroya (SBS Nagar), asset number on fixed assets and furniture and fixtures were not marked.

The University stated (October 2024) that-

- Trainees in Rupnagar, SBS Nagar and Sangrur being smaller districts, prefer to go back to their homes in respective districts after attending

non-residential training rather than staying at training hostel. Hence the training hostel, as temporary measures, was used for storage purpose.

- A first-aid box facility had been installed at KVK Jalandhar.
- Fire extinguisher had been installed in at KVKs Faridkot, Ferozepur and Ropar.
- Grievance redressal boards/Suggestion boxes had been installed at KVKs Faridkot, Jalandhar and Sangrur.
- Asset numbers on fixed assets, furniture and fixtures had been marked in KVK Langroya (SBS Nagar)

1.5.9 Conclusion

The shortage of staff deployed for extension activities ranged between 44 *per cent* and 48 *per cent* during 2017-22.

In 17 out of 18 KVKs, shortage of cultivable land ranged from one acre to 47.8 acre as per requirement in the respective Memorandum of Understandings (MoU) with ICAR thereby impacting dissemination of practical training/work experience to the beneficiaries.

Except for two KVKs at Ferozepur (achieving targets in respect of number of courses and participants) and Ropar (achieving targets in terms of participants), none of the other four selected KVKs could achieve the targets for imparting trainings to the beneficiaries during the period 2017-22. Besides, the frontline demonstrations (FLD) on major crops and the newly developed technologies were lacking in the selected KVKs.

The University did not fix any targets for collection and testing of soil and water samples. In the absence thereof, the soil samples collected and tested by six KVKs, except in 2018-19 by five KVKs, were mostly on a decreasing trend during the period 2017-22.

Community Radio Stations were not set up in any of the 18 KVKs, as the University did not submit any proposal for the purpose under the scheme 'Support to State Extension Programmes for Extension Reforms'.

The Agricultural Technology Information Centre (ATIC) set up in PAU did not serve fully as a single window delivery system for technology products, diagnostic services and information for farmers and other end users.

1.5.10 Recommendations

In light of the audit findings, the University may:

- take effective measures to overcome the shortage of requisite staff for extension activities;*
- impart adequate training/frontline demonstrations on newly developed crops and technologies, to the end users;*

- (iii) *ensure requisite landholdings with KVKs as per MoUs with ICAR for adequate dissemination of practical training/work experience to the beneficiaries;*
- (iv) *fix targets for collection and testing of soil and water samples;*
- (v) *consider setting up of Community Radio Stations in accordance with the guidelines of the ‘Support to State Extension Programmes for Extension Reforms’ Scheme*
- (vi) *strengthen the Agricultural Technology Information Centre (ATIC) to operate as single window supporting delivery system providing technology products, diagnostic services and information to farmers and other end users: and*
- (vii) *consider maintaining farmers’ centralised database to assess effectiveness of its extension activities, identify their training needs and address any potential issues and challenges.*

The matter was referred (March 2023) to the State Government; their replies were awaited (October 2024).

**Performance Audit on
Solid Waste Management by
Urban Local Bodies in Punjab**

2.1 Introduction

2.1.1 Background

Wastes are materials that are unwanted or unusable. Waste is any substance that is discarded after the primary product has served its purpose and is now worthless, defective or for which the generator has no further use in terms of value. Solid Waste (SW) is the unwanted or useless solid material generated by humans undertaking residential, industrial or commercial activities. They include solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste.

2.1.2 Necessity of Municipal Solid Waste Management

Municipal Solid Waste Management (MSWM) in urban areas has emerged as one of the biggest challenges that we face today, not only in terms of environmental concerns but also the potential threat to public health resulting from improper and non-scientific handling of waste. The issue has further aggravated owing to the fast pace of urbanisation. According to the Central Pollution Control Board (CPCB) Report (2021-22), in India per day generation of Solid Waste (SW) was 1,70,339 Metric Tonnes (MT), out of which 1,56,449 MT (92 *per cent*) SW was collected, of which only 91,511 MT (58 *per cent*) SW was treated. In Punjab State, per day generation of SW during 2021-22 was 4,222 MT, out of which 4,207 MT SW was collected but only 1,471 MT (35 *per cent*) was treated. Therefore, about 65 *per cent* of waste generated remained untreated which marks the gap in Solid Waste Management (SWM) that needs to be addressed by the 166 Urban Local Bodies (ULBs) in the State.

Solid waste comprises (i). **biodegradable**¹ waste (50-60 *per cent*) and (ii) **non-biodegradable**² waste {saleable 30 *per cent*, Refused Derived Fuel (RDF)³ 15 *per cent* and inert⁴ five *per cent*}. Inadequate segregation at source, along with ineffective collection, transportation, treatment and unscientific disposal of waste leads to degradation of the environment and poor quality of life. Most ULBs continue to face challenges in the areas of appropriate and advanced collection and transportation systems, technology selection and disposal methods of solid waste.

¹ **Biodegradable waste**- means any organic material that can be degraded by micro-organisms into simpler stable compounds.

² **Non-biodegradable waste**- means any waste that cannot be degraded by micro-organisms into simpler stable compounds.

³ **RDF**- means fuel derived from combustible waste fraction of solid waste.

⁴ **Inerts**- means fine earth and road sweep silt.

The poor management of SW not only leads to land and water pollution but also generates many vector and water-borne diseases like Cholera, Dysentery, Jaundice, Typhoid and Diarrhoea. Therefore, SWM is one of the major environmental areas that needs to be addressed effectively for environment concerns and improvement of social conditions.

The United Nations Member States jointly committed (September 2015) to the Sustainable Development Goal (SDG) 11.6 which seeks to reduce the adverse per capita environmental impact by paying special attention to air quality, municipal and other waste management.

2.1.3 Regulatory framework governing management of Solid Waste

The Solid Waste Management Rules and Construction and Demolition (C&D) Waste Management Rules framed in 2016 under the Environment (Protection) Act, 1986, provide the legal framework for disposal and management of SW and entrust responsibilities at State level, ULBs level and citizens' level. Guidelines for the preparation of a comprehensive plan for the prevention, control or abatement of pollution through scientific SWM have been issued by the Government of India (GoI) from time to time.

As per the *ibid* rules, waste generators are responsible for segregating and storing waste in three separate streams biodegradable or wet waste, non-biodegradable or dry waste and domestic hazardous waste, to be handed over to waste collectors. Biodegradable wastes are to be processed through composting/ bio-methanation, while recyclables are to be handed over separately. Further, waste generators are not allowed to burn, bury or throw waste in the open. C&D Waste is to be stored separately and disposed of in accordance with C&D Waste Management Rules, 2016.

2.1.4 Principles of Sustainable Solid Waste Management

Three fundamental internationally accepted principles of SWM are:

- 1. Affordability** or the ability of households to pay for SWM services. It is universally accepted that 1-1.5 *per cent* of average household disposable income is the limit for payment for complete SWM services.
- 2. Polluter pays principle** whereby waste generators should bear the cost of waste management.
- 3. Sustainability** in terms of countering negative environmental and economic effects of waste generation and management by imposing charges on the agents and users concerned.

2.1.5 Waste Management Hierarchy

The concept of sustainable SWM is crucial to holistic sustainable development and its essence is encapsulated in the principle of 3Rs - Reduce, Reuse and Recycle to minimise the use of natural resources. These 3Rs are also referred to as the “hierarchy of waste management”, implying a preferred order of waste management practices to be adopted rather than the largely prevalent disposal of all solid wastes in landfills.

Waste prevention and reduction are placed at the top of the hierarchy to show that the best way to deal with waste is to prevent its production and where this is not possible, to produce less of it. Despite efforts by municipal authorities to improve waste management, most countries in the world still resort to strategies at the bottom of the waste hierarchy.

Figure 2.1: Waste Management



Source: MSWM Manual

2.1.6 Solid Waste Disposal Methods

Indiscriminate disposal of waste by way of roadside dumping, open burning, open dumping near water bodies and dumping in a landfill are improper methods of disposal as these pose environmental hazards leading to ecological imbalances and land, water and air pollution. Moreover, a major limitation of this method is costly transportation of SW to distant landfill sites.

Down gradient surface water gets polluted by surface runoff in the absence of proper drainage⁵ systems and contaminate groundwater aquifers due to a lack of proper leachate collection and treatment systems. An inefficient gas recovery process emits two⁶ major greenhouse gases into the atmosphere.

Sanitary Land Filling⁷ is a necessary component of SWM, since all other options produce some residue which must be disposed of through land filling. Major improvements are required to ensure proper Sanitary Land Filling.

Urban local bodies are generally facing a major problem in finding new landfill sites. Moreover, the cost of construction, operation and maintenance of an engineered landfill is also high.

An efficient treatment of waste at every stage, i.e., from collection to disposal is essential, which includes processing through composting, incineration, bio-methanation and gasification.

⁵ A system to collect leachate generated due to natural decomposition of stockpiled solid waste.

⁶ Carbon Dioxide and Methane.

⁷ Sanitary land filling means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, etc.

This Performance Audit report brings out efforts made by ULBs for SWM in the State and also highlights the shortcomings in their efforts.

2.1.7 Ranking of the State in Solid Waste Management

The Central Pollution Control Board ranked the States and UTs in SWM services in 2019-20 and 2020-21 based on various parameters relating to SWM, such as waste processing, gaps in waste management, best practices in SWM, dumpsites reclaimed, environmental monitoring etc.

Out of 35 States and UTs, Punjab's rank was 30th and 29th during 2019-20 and 2020-21 respectively in SWM. In 2021-22, the CPCB report did not include an overall ranking, however, it provided State-wise progress on waste processing and treatment. Punjab ranked 26th out of 35 States and UTs in this category. It is, therefore, of utmost importance to take effective measures to improve SWM components such as collection, segregation and processing of solid waste to minimise the hazardous effects of waste.

2.1.7.1 Ranking of State ULBs in Swachh Survekshan

Ministry of Housing and Urban Affairs (MoHUA), releases the Swachh Survekshan (SS) ranking every year with the objective to encourage citizen participation and create awareness amongst all sections of society about the importance of working towards making towns and cities a better place to live in. The ranking considers several parameters including Service Level Progress (SLP), which accounts for 40 *per cent* of the total weightage. SLP includes segregated collection, processing and disposal of MSW and sustainable sanitation. MoHUA releases national ranking in two categories, one for Cities with a population of 1-10 lakh and one for cities with more than 10 lakh.

Out of 166 ULBs in the State, only two ULBs⁸ had a population of more than 10 lakh and both were selected in the Performance Audit. These ULBs contribute approximately 37 *per cent* of the MSW in the State.

Out of a total of 45 ULBs in the country that participated in the SS rankings in the year 2022, in the category of ULBs with more than 10 lakh population, Ludhiana and Amritsar were ranked 40th and 32nd, respectively.

Similarly, out of a total of 380 ULBs that participated in the category of ULBs with a 1-10 lakh population, 13 ULBs⁹ were from Punjab. Out of these, four ULBs (i) Ferozepur; (ii) SAS Nagar; (iii) Bathinda; and (iv) Moga were selected in the sample. They were ranked 64th, 113th, 132nd and 309th respectively.

⁸ (i) Ludhiana; and (ii) Amritsar.

⁹ (i) Ferozepur-64; (ii) SAS Nagar-113; (iii) Bathinda-132; (iv) Moga-309; (v) Abohar-78; (vi) Patiala-117; (vii) Jalandhar-154; (viii) Barnala-172; (ix) Hoshiarpur-191; (x) Pathankot-195; (xi) Muktsar-196; (xii) Malerkotla-198; and (xiii) Khanna-245.

Further, in 2023, SS rankings were issued for categories of ULBs with populations of more than one lakh and less than one lakh. In the category of ULBs with a population of more than one lakh, out of a total of 446 participating ULBs, Amritsar and Ludhiana secured 142nd and 207th ranks, respectively. The rank of other four selected ULBs was SAS Nagar 82nd, Bathinda 121st, Ferozepur 127th and Moga 246th.

The lower ranking of the State's ULBs is indicative of the need for improvement in the management of solid waste facilities in respect of collection, segregation, transportation and processing.

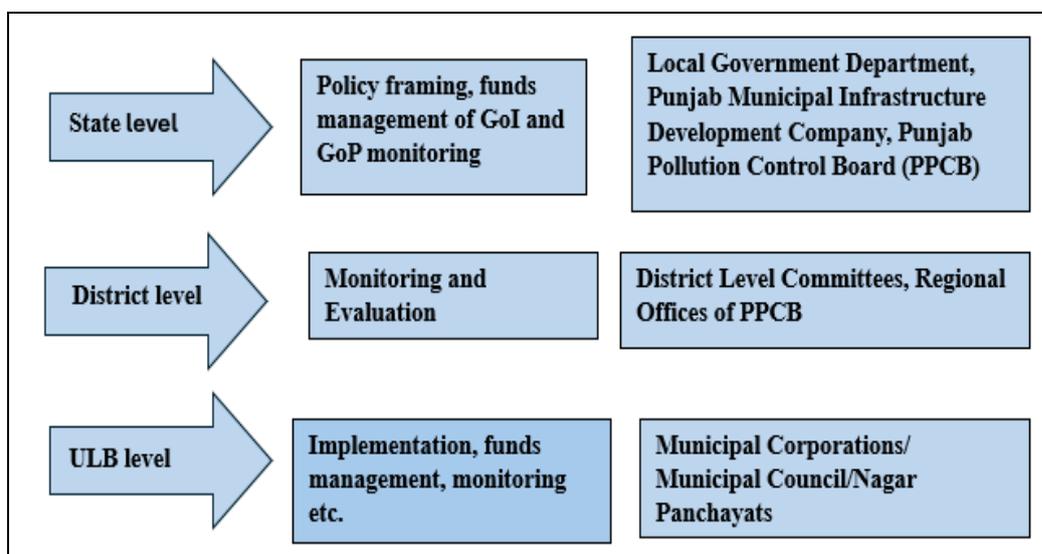
2.2 Audit Framework

2.2.1 Administrative Control and Monitoring of Solid Waste Management

With growing urbanisation and changing lifestyle, the generation of waste and its appropriate disposal poses a challenge for the State at different levels. Though SWM is a State subject, it is basically a municipal function and as such ULBs are directly responsible for performing this important activity. The 74th Amendment of the Constitution also envisages that the ULBs should shoulder this responsibility. The ULBs are, therefore, required to plan, design, operate and maintain the SWM system in their respective cities/towns.

The role of various authorities at all levels in planning, execution and monitoring of Municipal Solid Waste Management is depicted in **Figure 2.2**.

Figure 2.2: Role of various authorities

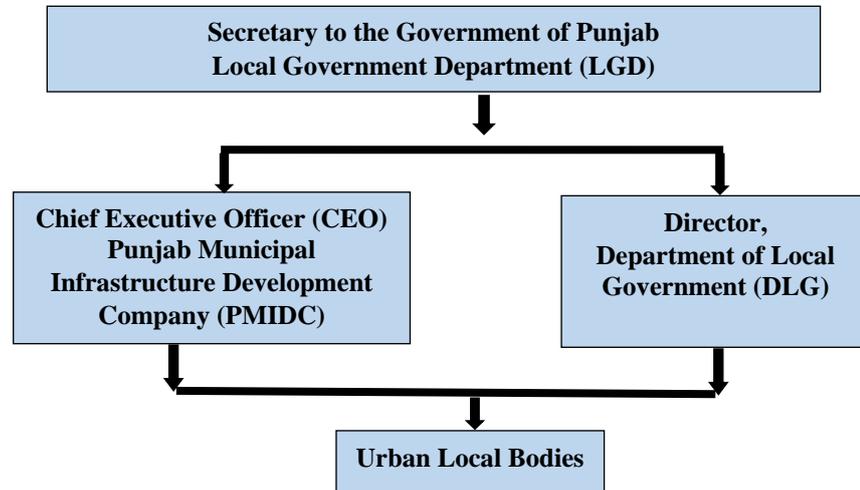


Source: Departmental data

2.2.2 Organisational Set-up

The organisational setup for SWM at different levels in Punjab is exhibited in Figure 2.3:

Figure 2.3: Organisational setup of SWM in Punjab



The Secretary, LGD, is the administrative head of the Department and also functions as Managing Director of Punjab Municipal Infrastructure Development Company (PMIDC), which had been identified as the nodal agency for implementation of SWM component of the Swachh Bharat Mission (SBM). The Municipal Commissioner and Executive Officers are the administrative heads of the Municipal Corporation and Municipal Council/ Nagar Panchayat, respectively, and are responsible for Municipal Solid Waste Management in their respective areas.

The Punjab Pollution Control Board (PPCB) is the designated agency for enforcing and reviewing of implementation of SWM Rules in coordination with LGD¹⁰.

2.2.3 Audit Objectives

The Performance Audit was conducted to assess whether:

1. Strategy and planning of SWM in ULBs is commensurate with the waste(s) generated and concurrent with the prevailing legal framework;
2. Municipal tasks associated with SWM, including collection, segregation, storage, transportation, disposal and social inclusion of informal waste workers, were effective, efficient and economical;
3. Identification, implementation, operation and maintenance of SWM projects in ULBs was effective, efficient and financially sustainable; and

¹⁰ As per rule 16 of SWM Rules, 2016.

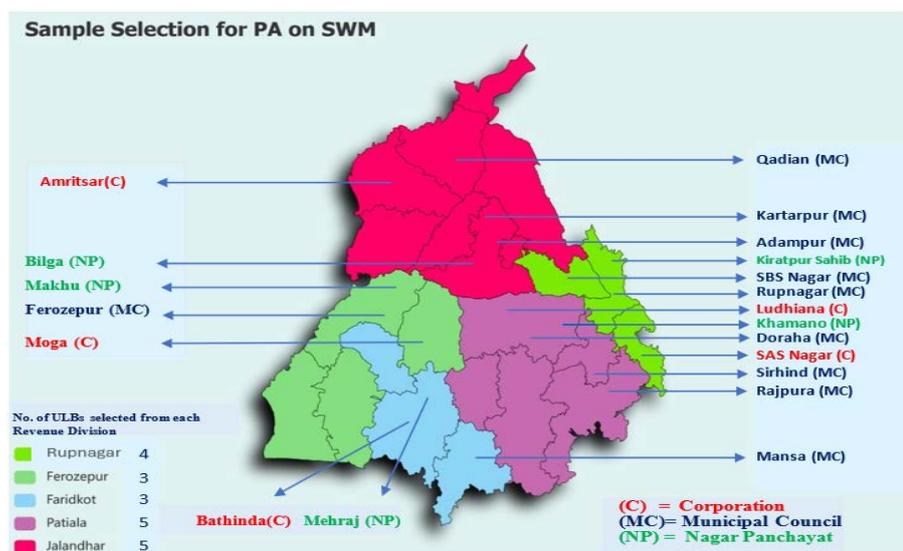
4. Monitoring and evaluation of the SWM system, including the adequacy of awareness creation, citizen engagement for effecting behavioral change, assessment of environmental impacts and implementation of the “internal control and monitoring mechanism” was adequate and effective.

2.2.4 Audit Scope and Methodology

The Performance Audit on Solid Waste Management by ULBs in Punjab, covering the period 2017-22, was conducted between August 2022 and March 2023. The focus was to analyse the data and information made available to Audit by the Director, Local Government Department (DLG), PMIDC, selected ULBs and PPCB with reference to the SWM Rules/ Manual and assess the ground-level performance.

The State has been divided into five Revenue Divisions (RDs) in which a total of 166 ULBs {13 Municipal Corporations (Corporations), 101 Municipal Councils (MCs) and 52 Nagar Panchayats (NPs)} are functioning.

Figure 2.4: Map depicting coverage of ULBs in all Revenue Divisions



To achieve the Performance Audit objectives, out of 166 ULBs, 20 ULBs {five Municipal Corporations (one from each RD), 10 MCs (10 per cent) and five NPs (10 per cent)} were selected (covering 44 per cent of the total expenditure of the State on SWM and 32 per cent revenue generated)¹¹ for detailed examination. The selection was done by adopting a random sampling method through IDEA software. Joint Physical Visit (JPV) of 25 dumpsites including waste processing facilities¹² of MSWM was also conducted with the representatives of ULBs.

¹¹ Out of total expenditure of ₹ 692.32 crore incurred in the State, selected ULBs incurred expenditure aggregating ₹ 306.87 crore (discussed in detail in Paragraph 2.4.1). In 166 ULBs ₹ 3.70 crore was generated as revenue from the SWM services out of which ₹ 1.20 crore was generated in the selected ULBs.

¹² Sanitary Land Fills (SLFs), Material Recovery Facilities (MRFs), Compost pits etc.

An entry conference for the Performance Audit was held (October 2022) with Chief Executive Officer (CEO), PMIDC during which the audit objectives, criteria, scope and methodology were discussed. The exit conference for the PA, to discuss audit findings, was held (July 2023) which was attended by Secretary, LGD and CEO, PMIDC.

2.2.5 Audit Criteria

The sources of audit criteria were:

- Manual of Municipal Solid Waste Management, 2016 and Solid Waste Management Rules, 2016;
- Construction and Demolition Waste Management Rules, 2016;
- Performance parameters set out in Service Level Benchmarking Guidelines;
- Operational Guidelines for implementation of recommendations of 14th & 15th Finance Commissions;
- Instructions/ orders of National Green Tribunal; and
- Instructions and guidelines issued by the Central Pollution Control Board, State Pollution Control Board, Government of India/State Government, PMIDC on SWM from time to time.

2.2.6 Audit constraints

There was no practice of keeping full and proper records of the collection, segregation, transportation, processing and disposal of solid waste in most of the selected ULBs. Therefore, Audit had to rely on the records and information made available by the Department as well as the ULBs.

2.2.7 Acknowledgement

We acknowledge the cooperation and support extended by the Department of Local Government, Punjab and the Urban Local Bodies during Audit.

2.3 Strategy and Planning

Municipal Solid Waste Management (MSWM) is primarily a municipal function¹³ and it is mandatory for municipal authorities to perform this service efficiently to keep the cities and towns clean by processing the waste and disposing of the residual MSW in an environmentally acceptable manner.

Municipal Solid Waste Management Manual, 2016 delineates the planning process for the MSWM services into a seven-step process to be undertaken by ULBs so as to ensure compliance with SWM Rules and other guidelines provided by GoI and Government of Punjab (GoP). Audit framed the

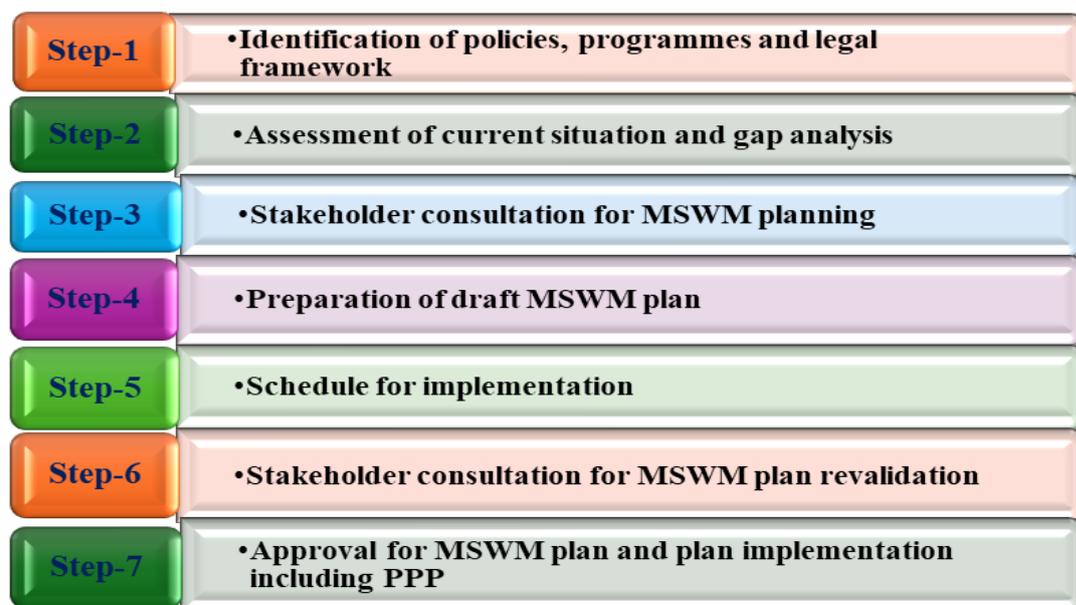
¹³ Under Section 276 of the Punjab Municipal Corporation Act, 1976 and 12th schedule of 74th Constitution Amendment Act, 1992.

following objective to assess the effectiveness of the planning process in MSWM:

“Whether Strategy and Planning of Solid Waste Management was commensurate with the wastes generated and concurrent with the prevailing legal framework.”

The seven steps of planning are given in **Figure 2.5**.

Figure 2.5: Seven-steps approach for developing SWM Plan



Source: MSWM Manual, 2016

2.3.1 Policies, Programmes and Legal Framework

2.3.1.1 Formulation of Solid Waste Management Policy

The State Governments were required to prepare their State Policy and Strategy for SWM within one year of notification of the Rules by GoI in terms of Rule 11 (1) (a) of SWM Rules¹⁴, 2016. Accordingly, the State Policy was required to be prepared by April 2017. However, GoP notified the State Policy in July 2018, with a delay of 15 months from the scheduled date.

The action plans of all the selected ULBs were prepared after the notification of the policy, between August 2018 and December 2019. Subsequently, the ULBs initiated the creation of infrastructure essential for solid waste processing including establishing Material Recovery Facilities (MRFs) for recovery of recyclables from waste, construction of compost pits for processing wet waste, procuring machinery such as trommels and mechanical separators for bio-remediation of legacy waste and construction of Sanitary Landfill Sites etc. as discussed in *paragraphs 2.4.3.3, 2.4.5.2, 2.4.5.5 and 2.4.5.6*. As a result, the percentage of waste processing, which was merely

¹⁴ Notified on 08 April 2016.

20 per cent upto 2018-19, witnessed substantial improvement in subsequent years as discussed in *paragraph 2.4.2*.

2.3.1.2 Construction and Demolition (C&D) Waste Management Policy

As per the GoI report¹⁵ on Circular Economy in Municipal Solid and Liquid Waste, the average generation of C&D waste is about 12 million tonnes per year i.e., 20-25 per cent of total MSW generated in the country. This C&D waste is usually disposed in landfills or dumped along roads or other public areas in an unauthorised manner. C&D waste from households (HHs) also found its way into nearby municipal waste bins making waste heavy and degrading its quality for treatment such as composting or energy recovery.

As per CPCB report (2021-22) on implementation of SWM Rules, 2016, the quantum of solid waste generation in Punjab was 4,222 metric ton per day (TPD) or about 15,41,030 MT per year. Thus, on a conservative estimate, C&D waste generation in the State was 3,08,206 MT during that year.

In terms of Rule 13 of SWM Rules, 2016, read with Schedule III of C&D Waste Management (CDWM) Rules, 2016, the State Government was required to frame its policy for CDWM within 12 months from the date of notification (29 March 2016) of CDWM Rules. The State, however, notified its Policy in August 2020, with a delay of more than three years from the scheduled date. The instructions for utilisation of C&D waste were issued to ULBs in November 2021.

Audit observed that C&D waste processing machinery was acquired by ULBs only after the implementation of the C&D Policy. The utilisation of C&D waste machinery and the use of processed material has been discussed in *paragraph 2.5.6*.

2.3.1.3 Delay in framing of bye-laws

Rule 15 (e) of SWM Rules, 2016 provides that all the ULBs would frame their bye-laws incorporating the provisions of these Rules within one year from the date of notification (April 2016) of rules and ensure their timely implementation.

Audit observed that the bye-laws were prepared by the selected ULBs between September 2018 and August 2020. The Local Government Department (LGD) also notified “The Punjab Solid Waste Management, Cleanliness and



¹⁵ Circular Economy in Municipal Solid and Liquid Waste by Ministry of Housing and Urban Affairs, GoI (published in June 2021).

Sanitation byelaws 2020” on 11 August 2020 to facilitate the ULBs and ensure uniform bye-laws across the State. The bye-laws were framed with delays ranging between 17 and 40 months by ULBs. This led to issues related to SWM, such as collection of user charges, littering of waste in water bodies, segregation of waste, management of existing/old dumpsites, etc. not being addressed more effectively as detailed in *paragraphs 2.4.1.7, 2.4.2.6, 2.4.3.1 and 2.4.5.4.*

PMIDC attributed (August 2022 and January 2024) the delay in formulation of SWM policy to administrative reasons for the delay in the framing of bye-laws, it was stated that the PMIDC worked out details, examined the bye-laws of other States/UTs and administrative orders/ instructions of Hon’ble National Green Tribunal leading to delay in framing of bye-laws.

2.3.2 Assessment of current situation and gap analysis

2.3.2.1 Assessment of waste generation

The Municipal Solid Waste Management Manual states that it is essential to assess quantities of waste generated to establish adequacy of existing systems and to plan for augmentation of treatment and disposal facilities. Wastes moving through the system have to be quantified at multiple locations to assess the actual quantities of wastes available for processing and direct disposal.

Towards this end, the ULBs were required to prepare their short-term as well as long-term plans for assessment of quantum of waste. To enable ULBs to prepare their short-term solid waste management plans, storage bags sufficient for three to seven days were to be distributed to 100 representative sampling locations per 1,00,000 population including all type of waste generators¹⁶. The waste collected from each category of waste generator was thereafter to be sorted category-wise and segregated component-wise and each component weighed separately to arrive at the waste composition generation in different categories of waste generators. For long-term planning, the average amount of waste disposed by a specific class of generators was to be estimated by averaging data from several samples collected continuously for seven days at multiple representative locations within the ULB’s jurisdiction in each of the three main seasons (summer, winter and rainy).

Audit observed that the procedure prescribed for assessing the quantum of waste generated was not adopted by any of the selected ULBs. However, the selected ULBs prepared their Action Plans for SWM during August 2018 to December 2019 and also submitted Annual Reports¹⁷ (ARs) on SWM to the

¹⁶ Households of low, medium and high-income levels, commercial establishments, institutional generators, hotels, function house, vegetable markets, sports complexes, places of worship etc.

¹⁷ Form-IV as per rule 24 (2) of SWM Rules 2016.

higher authorities¹⁸. In both these documents, the waste generation in terms of Grams Per Capita Per Day (GPD) was incorporated without any assessment. The waste generation incorporated in these documents was compared with the information provided to Audit by the ULBs (*Appendix 2.1*) and status of the same for the period 2017-22 is in **Table 2.1** below.

Table 2.1: Waste generation at selected ULBs in various documents/records

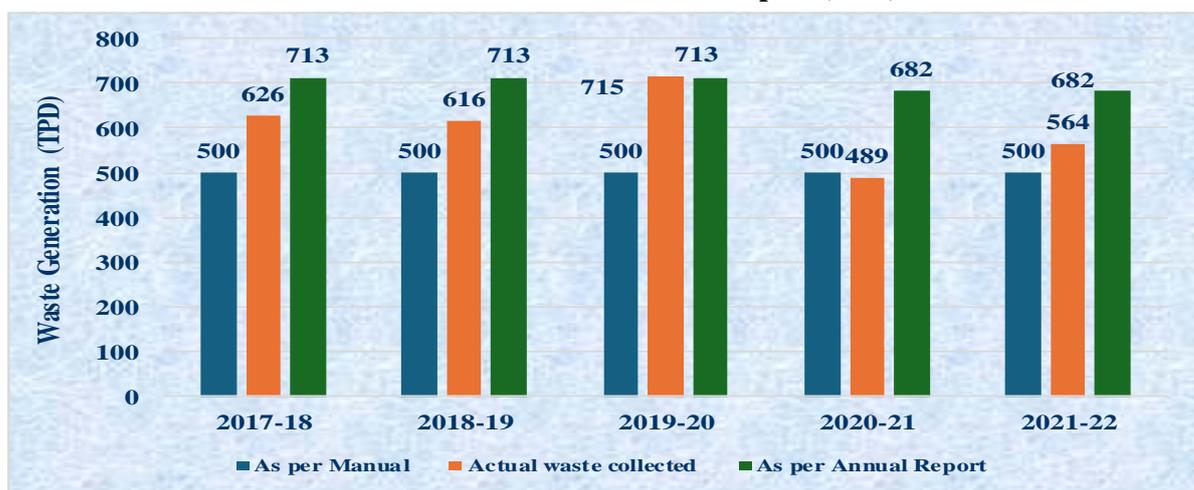
<i>Waste Range (in GPD)</i>				
Sr. No.	Category of ULBs	Estimated Waste generation as per Manual	Waste generation taken in Action Plan	Waste generation taken in Annual Report submitted to PMIDC, PPCB and DLG
1.	Corporations	250-500	323 to 585	310 to 713
2.	Municipal Councils	250	85 to 544	119 to 630
3.	Nagar Panchayats	250	12 to 462	60 to 642

Source: Compiled from data furnished by ULBs to PMIDC, DLG and PPCB.

The variations in figures incorporated in the Action Plans as well as in the ARs for the same period can be observed from above table.

Out of 20 ULBs, actual data of solid waste collected and transported was available only for Corporation Ludhiana for the period 2017-22. Audit compared the actual waste collected with the waste generation figures mentioned in the Manual and the figures included in the ARs, as depicted in **Chart 2.1**.

Chart 2.1: Comparison of actual waste generation with generation taken in the Manual and Annual Report (TPD)



Source: Ludhiana ULB data

The waste generation figures shown in the annual reports considerably varied from the actual waste generated, except during 2019-20. This can be attributed to non-observance of the procedures as given in the Manual. It was also

¹⁸ Higher authorities-PMIDC, Local Government Department and PPCB.

noticed, in some instances, that the ULB reported inflated waste generation figures to the higher authorities through the annual reports.

Corporation Amritsar stated (October 2024) that the waste assessment was done at the time of preparing Detailed Project Report (DPR) and assessment as required in MSWM Manual 2016 would be carried out in future. Corporation Bathinda stated that the methodology given in the Manual was not adopted to assess the waste generation. The remaining 18 ULBs¹⁹ stated that sampling was not done as per the method given in Manual because quantifying waste is a technical area. The replies were not acceptable, as the ULBs did not follow the procedure specified in the MSWM Manual to determine the actual quantity of waste generated.

2.3.2.2 Non-assessment of waste composition

Paragraphs 1.4.3.3 and 1.4.3.3.2 of the MSWM Manual, 2016 provide that each ULB should assess the composition of waste generated to plan and design effective MSWM systems. The composition of Municipal Solid Waste (MSW) generated in a ULB determines the collection, processing and disposal options that could be adopted. MSW composition and characteristics vary considerably, not only between cities but also within a ULB. Daily, seasonal and temporal fluctuations are usually observed. MSW is heterogeneous in nature and consists of varied waste fractions, requiring multiple samples at multiple locations.

Audit observed that in 17 out of 20 selected ULBs, the composition of waste was not assessed. Three ULBs, i.e., Amritsar²⁰, Bathinda²¹ and Ludhiana²² were the only exceptions that assessed the waste composition while preparing the DPRs prior to the implementation of the SWM Rules 2016.

Three ULBs²³ stated (October 2024) that waste composition was assessed while preparing the DPRs. MC Mansa stated that the process given in the MSWM Manual 2016 would be adopted in



Exhibit 2: Mixed waste lying at dumpsite SBS Nagar

¹⁹ (i) Moga; (ii) Adampur; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Mansa; (vii) Rajpura; (viii) SBS Nagar; (ix) Rupnagar; (x) Sirhind; (xi) Bilga; (xii) Khamanon; (xiii) Kiratpur Sahib; (xiv) Makhu; (xv) Mehraj; (xvi) SAS Nagar; (xvii) Ludhiana; and (xviii) Qadian.

²⁰ The assessment of waste composition was recorded in DPR prepared (2016) by selecting samples which were drawn on randomly selected vehicles with 500 grams of waste collected from every third vehicle. These samples were then mixed using the quartering method to create a final sample lot of 500 kilograms which was fully assessed according to standard methods.

²¹ No specific method for assessment of waste composition found adopted, only general categorisation of waste was done.

²² The assessment of waste composition was recorded in DPR prepared (February 2014) by collecting five samples each from existing MSW disposal site (Jamalpur and Jainpur) and from residential, commercial, industrial as well as market area of each zone of Ludhiana city.

²³ (i) Amritsar; (ii) Bathinda; and (iii) Ludhiana.

future. The remaining 16 ULBs²⁴ stated that the waste composition was taken in the Action Plan for SWM as per the template distributed by the PMIDC to all ULBs in Punjab.

Replies of the three ULBs referred above confirmed that the methodology adopted for assessment of waste composition was not as per the MSWM Manual 2016. Replies of the other 16 ULBs are not satisfactory as they adopted the waste composition figures from the template distributed by PMIDC instead of assessing the waste composition by observing the procedure prescribed in the Manual.

Due to non-determination of composition of solid waste, capacity of installation of waste management equipment and infrastructure could not be planned efficiently.

2.3.3 Non-consultation with stakeholders in planning and validation process

SWM Rules, 2016, read with paragraph 1.4.7 of the MSWM Manual, provide that the Urban Development Department is responsible for preparing a State policy and SWM strategy in consultation with stakeholders²⁵, followed by plan validation with the stakeholders. The State SWM Policy was notified (July 2018) without involving any internal or external stakeholders in its preparation as well as in planning. The Department had not initiated any scheme for the registration of waste pickers and waste dealers. Further, the Action Plans prepared by the ULBs during August 2018 to December 2019 were neither validated from any stakeholder to obtain their inputs nor was any stakeholder committee formed in the ULBs.

In respect of stakeholders' involvement in the planning process, seven ULBs²⁶ stated (October 2024) that internal stakeholders were involved in the district-level meeting on SWM and external stakeholders would be involved in due course and 13 ULBs²⁷ stated that the internal and external stakeholders would be involved in the preparation of the revised plan. Further, PMIDC did not provide any reply in this regard. These replies confirm that stakeholders were not involved during the planning stage.

²⁴ (i) Moga; (ii) Adampur; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Rajpura; (vii) SBS Nagar; (viii) Rupnagar; (ix) Sirhind; (x) Bilga; (xi) Khamanon; (xii) Kiratpur Sahib; (xiii) Makhu; (xiv) Mehraj; (xv) SAS Nagar; and (xvi) Qadian.

²⁵ Internal stakeholders: Representative of ULB, Town Planning Department, Water Supply and Sanitation Department and External stakeholders: Households, Informal sector, NGOs, Community Based Organisations, Women's groups, Secondary Schools, and College students.

²⁶ (i) Doraha; (ii) Ferozepur; (iii) Rajpura; (iv) Rupnagar; (v) Sirhind; (vi) Khamanon; and (vii) SAS Nagar.

²⁷ (i) Mehraj; (ii) Adampur; (iii) Kartarpur; (iv) SBS Nagar; (v) Makhu; (vi) Amritsar; (vii) Moga; (viii) Bilga; (ix) Mansa; (x) Ludhiana; (xi) Bathinda; (xii) Qadian; and (xiii) Kiratpur Sahib.

In respect of involvement in plan validation, 19 ULBs²⁸ accepted the audit observation or assured (October 2024) that in future the stakeholders would be involved for plan validation. Corporation Bathinda did not furnish a specific reply on this matter.

Inefficient planning due to non-involvement of stakeholders deprived the Department of the stakeholder's insight and perspectives. Cases in point are the Material Recovery Facilities (MRF) at Rupnagar and the Modern Carcass Management Plant at Ludhiana, which were lying inoperative due to public protests, as discussed in *paragraphs 2.4.3.3 and 2.5.4.1*.

2.3.4 6Rs Approach

Solid Waste Management is a step-wise approach in order of environmental priority for different waste management options with prevention being the most preferred option and disposal the least favoured. It is closely linked to the 3Rs (Reduce, Reuse and Recycle) approach, which helps to reduce the quantity of waste, the cost associated with its handling and its environmental impacts. It was observed that in addition to these 3Rs, the State also adopted another 3Rs i.e. Refuse, Research and Re-design.

Audit observed that none of the ULBs adopted the 6Rs approach in line with the State Policy. The ULBs had planned to adopt 4Rs (refuse, reduce, re-use and recycle) principle. However, it was observed that no steps were taken to adopt 6Rs during 2017-18, as no infrastructure was created. Further, after construction of compost pits²⁹ during 2018-22, in all selected ULBs, approach of recycle, reuse and reduce was adopted by preparing compost from wet waste and in two ULBs³⁰ the segregated plastic waste was sold to recyclers. The other 'Rs' were not adopted in any of the selected ULBs.

Eight ULBs³¹ reported partial adoption of the 6Rs by composting wet waste, recycling plastic and issuing challans, with plans to adopt the remaining Rs. 10 ULBs³² cited staff shortages and stated that strategies would be developed. Corporation Amritsar stated that continuous awareness activities and installation of waste processing facilities would be carried out in future. Corporation Ludhiana stated that the 6Rs strategy would be adopted after streamlining waste management. These replies confirm that even after more

²⁸ (i) Adampur; (ii) Amritsar; (iii) Doraha; (iv) Ferozepur; (v) Rajpura; (vi) Rupnagar; (vii) SBS Nagar; (viii) Sirhind; (ix) Bilga; (x) Ludhiana; (xi) Makhu; (xii) Mehraj; (xiii) Qadian; (xiv) Moga; (xv) Khamanon; (xvi) Kiratpur Sahib; (xvii) Kartarpur; (xviii) Mansa; and (xix) SAS Nagar.

²⁹ Construction of compost pits is essential for processing of biodegradable waste for further production/generation of compost.

³⁰ (i) Mehraj; and (ii) Rupnagar.

³¹ (i) Adampur; (ii) Kartarpur; (iii) Kiratpur Sahib; (iv) Bilga; (v) Rupnagar; (vi) SBS Nagar; (vii) Moga; and (viii) SAS Nagar.

³² (i) Doraha; (ii) Ferozepur; (iii) Rajpura; (iv) Sirhind; (v) Khamanon; (vi) Makhu; (vii) Mehraj; (viii) Bathinda; (ix) Mansa; and (x) Qadian.

than six years since the notification of the SWM policy, the ULBs had not adopted 6R approach.

Good practice

Cloth/Jute bags were distributed to encourage users to refuse/reduce the plastic bag usage in three³³ ULBs. In two³⁴ ULBs, steel utensils were purchased and given to the public as substitute of disposables.

2.3.5 Integration of informal waste collectors in waste management

SWM Rules recognise the role played by the informal waste collection sector, viz., waste pickers, waste collectors and the recycling industry. The Rules enjoin upon ULBs to establish a system to recognise organisations of waste pickers or informal waste collectors, promote and establish a system for integration³⁵ of these authorised waste-pickers and waste collectors to facilitate their participation in SWM, including door-to-door collection of waste.

The State Policy for SWM proposed to empower the ragpickers and integrate them into the SWM mainstream. In the selected ULBs, 711 ragpickers and 2,682 waste collectors (**Appendix 2.2**) were identified as per action plans, but none of the ULBs integrated the waste collectors/ragpickers by issuing identity cards, ensuring minimum wages, welfare funds and other measures even when working through contractors. No records, as mandated under Paragraph 6.1 read with Table 6.1 of MSWM Manual regarding collection, segregation, processing etc. were found to be maintained in the selected ULBs. Therefore, the benefits arising out of such integration were not passed on to the waste pickers by any ULB. In one ULB (Kiratpur Sahib), it was seen that identity cards were issued to 45 ragpickers/waste collectors.

Thirteen ULBs³⁶ stated (October 2024) that informal waste collectors were not showing any interest in integrating with the mainstream chain of SWM and three ULBs³⁷ stated that efforts would be made to provide other social benefits to the informal waste collectors. MC SBS Nagar stated that health checkups of informal waste collectors were organised, but no other social benefits were provided. Corporation Amritsar stated that it had notified 148 ragpickers as per action plan, however, no document provided by both ULBs in support of replies. MC Mansa stated that the waste collectors were engaged

³³ (i) Mehraj; (ii) SBS Nagar; and (iii) Rupnagar.

³⁴ (i) Ferozepur; and (ii) Sirhind.

³⁵ The integration process would typically result in the accrual of social benefits to waste pickers such as; providing identity cards, receipts for transactions, ensure minimum wages when they are employed by contractors or other employers, health facilities, creation of welfare funds, prohibition of child labour from the activity and the likes and also give legal recognition to, and strengthen the informal sector systems of collection and recycling of various material.

³⁶ (i) Moga; (ii) Adampur; (iii) Ferozepur; (iv) Kartarpur; (v) Rajpura; (vi) Sirhind; (vii) Khamanon; (viii) Bilga; (ix) Makhu; (x) Mehraj; (xi) SAS Nagar; (xii) Doraha; and (xiii) Qadian.

³⁷ (i) Kiratpur Sahib; (ii) Ludhiana; and (iii) Rupnagar.

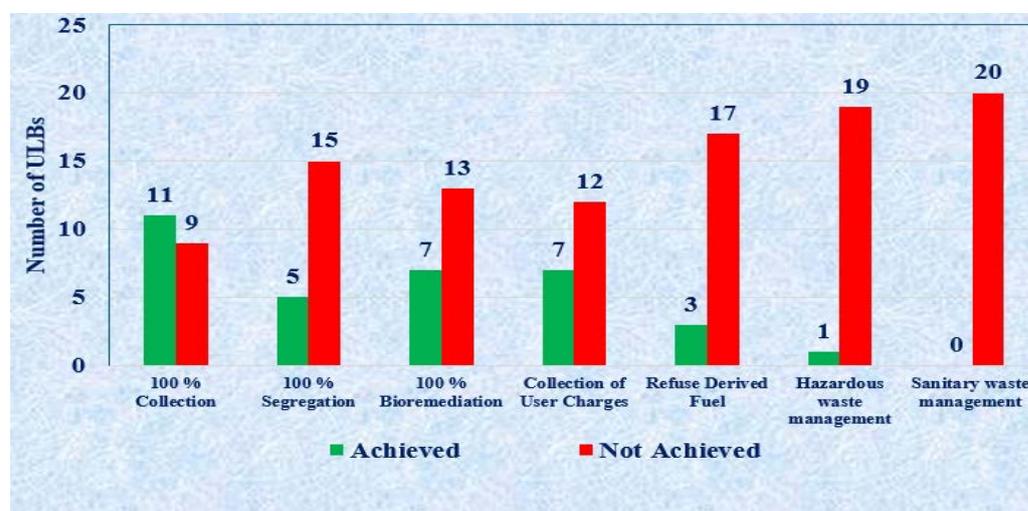
through a Society and no other efforts for integration of informal waste collectors were made. Corporation Bathinda did not furnish a specific reply on this matter.

Thus, due to lack of mechanism for integration of waste pickers, the informal waste collectors and ragpickers remained engaged in unhealthy practice of segregation of recyclable material from soiled and infected waste. Other social benefits such as legal recognition, health facilities, welfare funds etc. were also denied to them.

2.3.6 Schedule for implementation of Action Plan

Scrutiny of plans prepared by the selected ULBs showed that the schedules for implementation of various SWM activities were mentioned in the plans e.g. 100 per cent door-to-door collection, segregation of wastes, remediation of waste lying at dumpsites which were to be completed between January 2019 and December 2021. However, it was observed that the requisite records as defined in Paragraph 6.1 read with Table 6.1 of the Manual were not maintained in the ULBs to ascertain the status of implementation of activities within schedule time as depicted in the plan. Analysis of data (*Appendix 2.3*) made available to Audit is depicted in **Chart 2.2** below:

Chart 2.2: Implementation status of Action Plan activities in selected ULBs



Source: ULB data

It is further added that:

- Out of seven ULBs where 100 per cent bio-remediation was completed, in four ULBs³⁸, the bio-remediation was completed between September and December 2022 and in three ULBs³⁹, bio-remediation was completed but logbooks were not maintained.

³⁸ (i) Kiratpur Sahib; (ii) Khamanon; (iii) Makhu; and (iv) Rupnagar.

³⁹ (i) Qadian; (ii) Mehraj; and (iii) Ferozepur.

- Only the ULB of SBS Nagar was collecting and disposing hazardous waste separately and safely.
- Sanitary waste disposal was not ensured in any of the 20 selected ULBs. However, in six⁴⁰ ULBs, sanitary incinerators were found installed in public toilets rather than in the processing facilities.

Eighteen ULBs⁴¹ stated that sincere efforts were being made or would be made to implement all the aspects of the Action Plan, out of which eight ULBs added that the Action Plan could not be adhered to for one or the other reasons, e.g., shortage of staff, non-availability of trained staff as well as financial resources. Two ULBs⁴² did not furnish the reply.

Thus, the delay in implementation of SWM plans and late formulation of policy contributed to curtailed SWM activities.

2.3.7 Conclusion

State Government did not formulate its Solid Waste Management and Construction and Demolition Waste Management policies in the prescribed time due to which preparation of corresponding bye-laws was delayed by ULBs. Consequently, activities like waste segregation, prevention of waste littering in water bodies, management of legacy waste and establishment of Solid Waste Management infrastructure could not be addressed efficiently and promptly. Non-integration of informal waste collectors in the solid waste management system deprived them of legal recognition, health facilities, welfare funds and other benefits. Action Plans were deficient in addressing the adequate management of solid waste.

Assessment for waste generation and waste composition was not conducted in accordance with the Rules/Manual in any of the selected ULBs. Involvement of stakeholders in planning and validation of plans was not assured by ULBs.

2.3.8 Recommendation

The State Government/ ULBs may ensure:

- *the involvement of stakeholders in the planning process as required as per the Manual; and*
- *to prepare a policy for the integration of informal waste collectors in SWM and provide them legal recognition, health facilities and financial assistance.*

⁴⁰ (i) Ferozepur; (ii) Makhu; (iii) Mehraj; (iv) Sirhind; (v) Bathinda; and (vi) Kiratpur Sahib.

⁴¹ (i) Moga; (ii) Kartarpur; (iii) Khamanon; (iv) Mehraj; (v) Adampur; (vi) Rupnagar; (vii) Kiratpur Sahib; (viii) Bilga; (ix) Makhu; (x) SAS Nagar; (xi) SBS Nagar; (xii) Doraha; (xiii) Ferozepur; (xiv) Rajpura; (xv) Sirhind; (xvi) Ludhiana; (xvii) Amritsar; and (xviii) Qadian.

⁴² (i) Bathinda; and (ii) Mansa.

2.4 Effectiveness of Solid Waste Management Process

Municipal Solid Waste Management services have to be planned in a manner that they meet all statutory requirements. The solid waste needs to be managed by efficient collection, segregation, storage, transportation, processing and disposal to achieve the intended objectives of SWM. MSWM projects should be made viable by ensuring cost recovery through levy of user fee from the beneficiaries, sale of end products from processing of waste, allocation of funds from municipal internal resources and Government grants, viability gap funding etc.

To assess the effectiveness of financial resources in relation to collection, segregation, transportation and processing of MSW, following audit objective was framed:

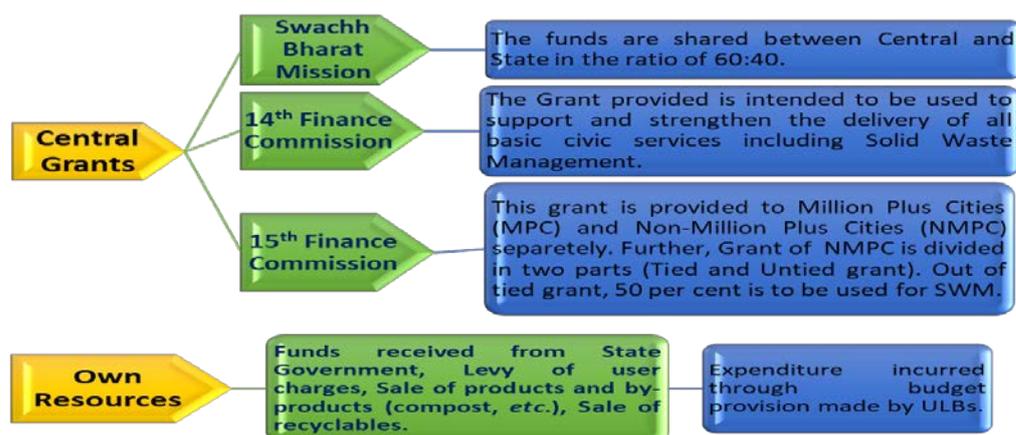
‘Whether municipal tasks associated with Solid Waste Management including collection, segregation, storage, transportation, processing, disposal and social inclusion of informal waste workers were effective, efficient and economical’.

In this regard, the audit findings are detailed below:

2.4.1 Financial Management

The Urban Local Bodies in the State were dependent on Central/State Government grants besides own resources during the period 2017-22. The sources of funds for SWM are shown in **Chart 2.3**.

Chart 2.3: Sources of funds and funding pattern of various schemes



Source: Grants, scheme guidelines and budget documents of ULBs

An amount of ₹ 1,011.33 crore⁴³ was available with the ULBs in the State for utilisation on SWM during 2017-22, against which an expenditure of ₹ 692.32 crore⁴⁴ was incurred. In the selected 20 ULBs, ₹ 306.87 crore⁴⁵

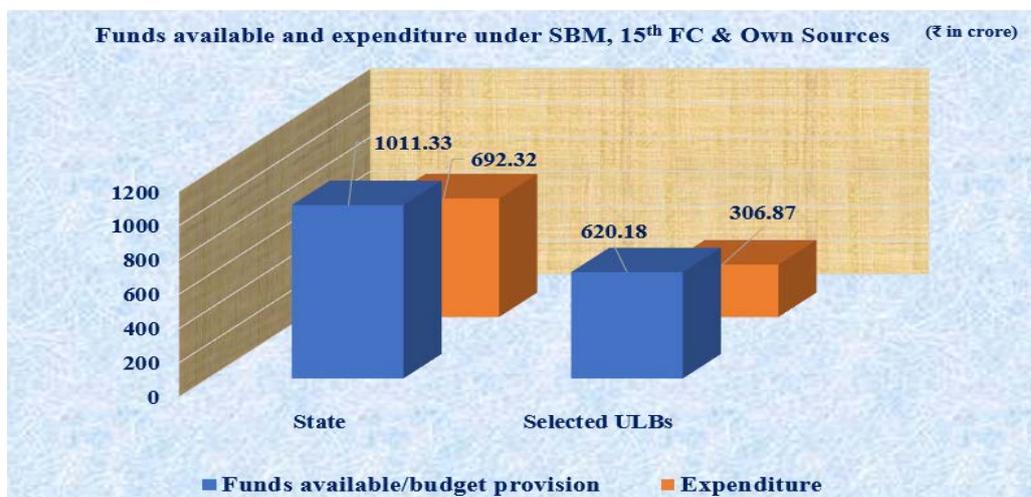
⁴³ (i) SBM - ₹ 126.94 crore; (ii) 15th FC - ₹ 223.89 crore; and (iii) Own resources - ₹ 660.50 crore.

⁴⁴ (i) SBM - ₹ 126.94 crore; (ii) 15th FC - ₹ 223.89 crore; and (iii) Own resources - ₹ 341.49 crore.

⁴⁵ (i) SBM - ₹ 41.61 crore; (ii) 15th FC - ₹ 58.79 crore; and (iii) Own resources - ₹ 206.47 crore.

(49 per cent) was spent out of available funds of ₹ 620.18 crore⁴⁶ as shown in Chart 2.4.

Chart 2.4: Details of funds available and expenditure incurred during 2017-22



Source: Departmental and ULB data

Under 14th Finance Commission (FC), ₹ 1,706.85 crore was available with the ULBs to support and strengthen the delivery of all basic civic services including SWM, out of which ₹ 115.25 crore was incurred in the State on SWM which includes ₹ 21.95 crore spent by six selected ULBs.

The scheme-wise receipt of funds and expenditure incurred there against on SWM are discussed in succeeding paragraphs:

2.4.1.1 Swachh Bharat Mission

(i) Position at the State Level

Swachh Bharat Mission (SBM), a Centrally Sponsored Scheme (CSS) was launched on 2nd October 2014. One of the objectives of the scheme is to manage the municipal solid waste scientifically. The sharing pattern of funds between GoI and GoP was decided in the proportion of 60:40. The position of funds sanctioned, received and released under SBM to the ULBs during 2017-22 is given in Table 2.2.

Table 2.2: Details of funding position under SBM during 2017-22

Year	Sanctioned amount		Amount released to PMDC		Total funds available	SS not released as at the end of the year	Funds released to ULBs by PMDC
	GoI Share	State Share (SS)	GoI	State			
2017-18	97.38	64.92	40.00	0.00	40.00	64.92	5.04
2018-19	0.00	0.00	0.00	20.83	20.83	44.09	46.05
2019-20	77.38	51.59	39.88	28.69	68.57	66.99	44.16
2020-21	0.00	0.00	94.88	0.00	94.88	66.99	22.66
2021-22	6.64	4.43	0.00	0.00	0.00	71.42	9.03
Total	181.40	120.94	174.76	49.52	224.28		126.94

Source: Departmental data

⁴⁶ (i) SBM - ₹ 48.57 crore; (ii) 15th FC - ₹ 122.88 crore; and (iii) Own resources - ₹ 448.73 crore.

Audit noted that:

- Only ₹ 126.94 crore (57 per cent) was released to the ULBs despite available funds of ₹ 224.28 crore with PMIDC under the scheme during 2017-22 as the SBM was a demand-based scheme and funds were released as per demand of ULBs.
- Government of India released ₹ 174.76 crore to GoP during 2017-22 under the SWM component. The GoP released these funds to the Department after delays ranging between 64 and 1406 days beyond the prescribed 30 days from date of receipt of funds.

The Government stated (August 2023) that the Finance Department (FD) released the due State share of ₹ 71.42 lakh during 2022-23. However, no reply about reasons for non-releasing of due share in time was furnished by FD to audit.

(ii) Position in Selected ULBs

As per instructions (March 2021) of GoI, each State Government had to designate a Nodal Agency for implementation of CSS and the agency would open a Single Nodal Account (SNA) for each CSS at the State Level to keep unspent balances in it by all the implementing agencies. The position of funds sanctioned, received and released to the selected ULBs during 2017-22 is given in **Table 2.3**.

Table 2.3: Funds received and expenditure incurred by selected ULBs

(₹ in crore)

Year	Opening balance	Funds received	Funds available	Expenditure	Closing balance
2017-18	10.66	5.04	15.70	10.45	5.25 (33)
2018-19	5.25	19.00	24.25	7.17	17.08 (70)
2019-20	17.08	9.17	26.25	4.82	21.43 (82)
2020-21	21.43	2.68	24.11	12.85	11.26 (47)
2021-22	11.26	2.02	13.28	6.32	6.96 (52)
Total		37.91		41.61	

Source: ULB's Data

Note: Figures in parenthesis indicate percentage of closing balance to funds available.

Audit observed that in selected ULBs, an amount of ₹ 48.57 crore was available during 2017-22 as released by PMIDC for purchase of machinery, creation of infrastructure (MRF, Compost Pits, Sanitary Landfill, Boundary Wall, Plantation etc.) for SWM. Out of this, ULBs had incurred expenditure of ₹ 41.61 crore (March 2022) (**Appendix 2.4**) and remaining unutilised funds were kept with ULBs/SNA. Only three⁴⁷ ULBs spent the entire available funds of ₹ 22.71 crore. The short utilisation of available funds ranged between 33 and 82 per cent, due to which the shortfall in creation of

⁴⁷ (i) Amritsar; (ii) Mehraj; and (iii) SBS Nagar.

infrastructure (such as MRF, compost pits) and non-purchase of machinery were noticed as discussed in *paragraphs 2.4.3.3, 2.4.5.2 and 2.5.6*.

The ULBs stated (October 2024) that the funds under SBM were being utilised through SNA account maintained at headquarters level. The replies are not acceptable as despite the operation of the SNA account, substantial funds available for SWM activities remained unutilised, leading to shortfalls in creation of infrastructure and machinery procurement.

2.4.1.2 Fourteenth Finance Commission

Under the 14th FC, the grants provided are intended to be used to support and strengthen the delivery of basic civic services i.e. water supply and sanitation including septic management, sewerage and solid waste management etc. and any other basic services within the functions assigned to ULBs under relevant legislation.

Audit observed that an amount of ₹ 1706.85 crore was released to ULBs during 2017-22 for basic civic services as given in Schedule-XII of 74th Constitution Amendment Act 1992, out of which ₹ 115.25 crore was incurred in the State on SWM services. Further, out of the total amount available, ₹ 645.31 crore were released to the selected 20 ULBs, out of which only six ULBs utilised ₹ 21.95 crore on SWM services and remaining 14 ULBs did not incur any expenditure on SWM services (*Appendix 2.4*).

Ten ULBs⁴⁸ stated (October 2024) that the funds received under 14th FC were not exclusively earmarked for SWM. Funds were not provided to ULB Kiratpur Sahib under 14th FC. Nine ULBs did not offer reply.

2.4.1.3 Fifteenth Finance Commission

The 15th Finance Commission recommended (July 2021) to release the grants (tied and untied) to the State Governments for onward transfer of funds to ULBs for improving air quality and urban drinking water supply, sanitation and SWM programmes. During 2020-22, the details of funds received and released to the ULBs for SWM (i.e. 50 *per cent* of the tied grants) are given in **Table 2.4**.

Table 2.4: Funds received and expenditure incurred under 15th FC

(₹ in crore)

Year	OB	Funds received	Total available funds	Funds released to ULBs	CB
2020-21	0	168.39	168.39	168.39	0
2021-22	0	156.00	156.00	55.50	100.50 ⁴⁹
Total		324.39	324.39	223.89	

Source: Departmental data

⁴⁸ (i) Amritsar; (ii) Bathinda; (iii) Doraha; (iv) Ferozepur; (v) Ludhiana; (vi) Mansa; (vii) Rajpura; (viii) Rupnagar; (ix) SBS Nagar; and (x) Sirhind.

⁴⁹ This amount was received from GoI on 31.03.2022 and released to ULBs during 2022-23.

An amount of ₹ 324.39 crore was released by GoI during 2020-22, out of which ₹ 223.89 crore was transferred by GoP to the ULBs as on 31 March 2022. Out of funds released to the ULBs, ₹ 122.88 crore was disbursed to selected ULBs, of which only ₹ 58.79 crore (48 per cent) (**Appendix 2.4**) was spent by the ULBs. Therefore, ULBs could not utilise ₹ 64.09 crore.

Sixteen ULBs⁵⁰ stated that efforts would be made to utilise the funds of SWM component whenever requirement arises. Two ULBs⁵¹ stated that almost all the funds received under 15th FC were utilised. Two ULBs⁵² utilised all the funds received.

2.4.1.3 (i) Avoidable burden of interest

The guidelines attached to grants released under 15th FC to ULBs instructed for their further release within ten working days of receipt, without any deduction. The State Government was required to release the funds with interest⁵³ in case of any delay beyond ten working days.

Government of India released ₹ 257.00 crore during 2020-22 under various components but the FD released the grants to the LGD for onward transfer to the ULBs after delays ranging between 12 and 83 days which led to an extra payment of interest of ₹ 2.97 crore by Government to ULBs for delayed period as detail given in **Table 2.5**.

Table 2.5: Avoidable burden of interest due to delayed release of funds

(₹ in crore)

Name of the component	Year	Funds released	Date of release by GoI	Date of release by GoP	Delay in days	Interest paid
Drinking water and Solid Waste Management (NMPC)	2020-21	122.00	05.11.2020	10.02.2021	83	2.03
Drinking water and Solid Waste Management measurement (MPC)	2020-21	45.00	05.11.2020	10.02.2021	83	0.75
1 st Installment of 2021-22 for SWM and Sanitation (MPC)	2021-22	90.00	31.03.2022	02.05.2022	12	0.19
Total		257.00				2.97⁵⁴

Source: Departmental data

Audit requested the FD (March, August 2023, February and September 2024) to give the reasons for delayed release of fund. Their reply was awaited (November 2024).

⁵⁰ (i) Adampur; (ii) Bathinda; (iii) Bilga; (iv) Doraha; (v) Ferozepur; (vi) Kartarpur; (vii) Kiratpur Sahib; (viii) Ludhiana; (ix) Makhu; (x) Mansa; (xi) Mehraj; (xii) Moga; (xiii) Qadian; (xiv) Rajpura; (xv) SBS Nagar; and (xvi) Sirhind.

⁵¹ (i) Amritsar; and (ii) Rupnagar.

⁵² (i) Khamanon; and (ii) SAS Nagar.

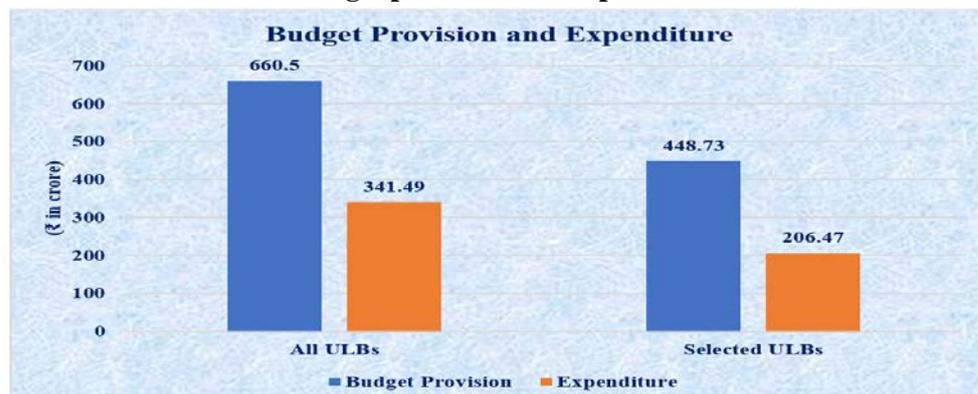
⁵³ Rate of interest on market borrowings/State Development Loans for previous year.

⁵⁴ Interest calculated on funds released upto 31.03.2022 and released during 2022-23.

2.4.1.4 Own Resources

Audit observed that the State ULBs made a budget provision of ₹ 660.50 crore during 2017-22 for SWM, against which an expenditure of ₹ 341.49 crore was incurred. The details of budget provision and expenditure in the selected ULBs viz-a-viz all ULBs of the State during the period 2017-22 are given in Chart 2.5 below:

Chart 2.5 Details of budget provision and expenditure from own sources



Source: Departmental and ULBs data

2.4.1.4 (i) Irregular Expenditure

Municipal Council, Rajpura entered into an agreement (September 2018) with the Waste Pickers Association (WPA) for door-to-door collection and segregation of MSW. As per clause 12 of the agreement, rickshaws/ carts etc. used to carry waste would be of the WPA.

However, MC, Rajpura incurred (December 2018) an expenditure of ₹ 29.46 lakh for providing 120 tricycles/carts to the WPA against the provisions of the agreement. This expenditure was irregular.

MC, Rajpura stated (October 2024) that the agreement with WPA would be revised. However, the reply did not substantiate the rationale behind the expenditure of ₹ 29.46 lakh.

2.4.1.5 Delay in payment of Environmental Compensation

Rule 22 of SWM Rules, 2016 stipulates timelines for the creation of necessary infrastructure for the implementation of provisions of SWM rules by the local bodies on their own, directly or by engaging agencies, failing which the ULBs were required to pay Environmental Compensation (EC)⁵⁵ as per the order of the NGT (January 2020).

⁵⁵ At the rate of ₹ 10 lakh per month per Local Body for population of above 10 lakh, ₹ Five lakh per month per Local Body for population between Five lakh and 10 lakh and ₹ One lakh per month per other Local Body from 01.04.2020 till compliance.

The NGT further ordered (December 2018)⁵⁶ that in case of delay in payment of EC, interest at the rate of 12 *per cent* would also be payable. The CPCB also decided to levy interest at the rate of 12 *per cent* for the pending ECs.

The NGT observed (January 2020) that most of the statutory timelines had expired and the directions of the Hon'ble Supreme Court and NGT remained unexecuted. However, NGT decided to give an extension of three months in the time span for levy of EC from April 2020 to July 2020 as a one-time relaxation arising because of the COVID-19 epidemic. On the directions of NGT, the PPCB accordingly imposed a penal EC of ₹ 67.10 crore⁵⁷ on 163⁵⁸ ULBs of the State for non-adherence to timelines for implementation of provisions of SWM rules. The LGD deposited ₹ 20.67 crore with PPCB (July 2023) against the levied EC. Out of the total EC, ₹ 14.54 crore pertained to 20 selected ULBs, which contributed ₹ 3.77 crore towards the deposited amount (July 2023) with the PPCB. The delayed payment may entail payment of interest as per the standing orders of CPCB.

ULBs⁵⁹ stated (October 2024) that efforts were being made to manage the Solid Waste as per rules to avoid penalties. The reply did not address the issue of delayed payment of Environmental Compensation.

2.4.1.6 Irregular payment of Gap Funding

SWM Rules, 2016 made the local authorities responsible for making arrangements for the door-to-door collection of segregated solid waste from all categories of waste generators. The waste generators shall also pay user fees as specified in the bye-laws of the local bodies.

ULB Mansa outsourced (April 2019) its door-to-door waste collection to a Society registered under the Societies Registration Act, 1860. The members of the Society were Deputy Commissioner, Mansa (President), Additional Deputy Commissioner, Mansa (Member), Sub Divisional Magistrate, Mansa (Vice President) besides other officers/staff of MC Mansa. As per the resolution (July 2019) of the MC house, it was agreed to fund the gap between the user charges collected and actual expenditure incurred by the Society.

Audit observed that while agreeing to fund the gap, the MC Mansa did not evolve/ specify the mechanism to verify the expenditure incurred and the income of the Society. The Society reported (July 2019 to November 2022) only its deficiency in the collection of user charges and claimed gap payments. MC paid ₹ 65.32 lakh to the Society without verification.

⁵⁶ OA No. 125/ 2017 of NGT.

⁵⁷ ₹ 31.84 crore (July 2020 to March 2021) and ₹ 35.26 crore (April 2021 to February 2022).

⁵⁸ As the remaining three were newly notified.

⁵⁹ (i) Adampur; (ii) Amritsar; (iii) Bathinda; (iv) Bilga; (v) Doraha; (vi) Ferozepur; (vii) Kartarpur; (viii) Khamanon; (ix) Kiratpur Sahib; (x) Ludhiana; (xi) Makhu; (xii) Mansa; (xiii) Mehraj; (xiv) Moga; (xv) Qadian; (xvi) Rajpura; (xvii) Rupnagar; (xviii) SAS Nagar; (xix) SBS Nagar; and (xx) Sirhind.

ULB Mansa accepted (October 2024) that the gap funding was paid to the Society as per provision of letter vide which the waste management was handed over to it and that in future, the gap funding would be made after proper scrutiny of the claims of the society by obtaining bill in shape of actual expenditure made by the society and actual collection of user charges.

2.4.1.7 Cost Recovery Management

The basic principle that polluter pays for waste generation, its collection and safe disposal has to be considered by ULBs for levying user or service fee for MSWM services. Rule 4 (3) of the SWM Rules, 2016 mandates that waste generators pay a user fee for SWM, as specified in the local body bye-laws. Further, MSWM projects can be made viable by ensuring cost recovery through levy of user fees from the beneficiaries. Punjab SWM Policy, 2018 also prescribed user charges to be mandatorily collected from waste generators to sustain the SWM projects.

Audit observed that in 19 ULBs⁶⁰ an amount of ₹ 204.84 crore⁶¹ (*Appendix 2.5*) had been projected to be collected as user charges during April 2019 to March 2022⁶². Further, an amount of ₹ 328.82 crore (*Appendix 2.4*) was spent on SWM services, against which only ₹ 1.06 crore (0.52 per cent) (*Appendix 2.5*) was recovered⁶³ as cost recovery of SWM during 2019-22 (*Appendix 2.6*) as depicted in **Table 2.6**.

Table 2.6: Efficiency in collection of user charges

(₹ in crore)

Name of ULB	Ludhiana	Moga	SAS Nagar	Mansa	Rupnagar	SBS Nagar	Adampur	Makhu	Kartarpur	Kiratpur Sahib	Bitga	Mehraj	Qadian	Rajpura	Ferozepur	Sirhind	Khamanon	Bathinda	Doraha
Projected	51.97	21.84	16.38	11.22	8.97	5.61	4.5	3.81	3.45	2.1	1.08	0.87	3.3	12.33	11.97	5.16	0.85	38.31	1.12
Collected	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.04	0.11	0.01*		0.82	0.07
Not/short Collected	51.97	21.84	16.38	11.22	8.97	5.61	4.5	3.81	3.45	2.1	1.08	0.87	3.29	12.29	11.86	6.00 (5.16 + 0.84)		37.49	1.05
Shortfall percentage	100	100	100	100	100	100	100	100	100	100	100	100	99.70	99.68	99.08	99.93	99.27	97.86	93.75

Source: Departmental data

* ₹ 0.01 crore includes 0.31 lakh of Sirhind and ₹ 0.62 lakh of Khamanon.

⁶⁰ In Amritsar, the concessionaire was involved and user charges were being collected by him.

⁶¹ The calculation of total user charges was based on the waste generators incorporated in APSWM and minimum rates taken in bye-laws passed by State as well as by ULB.

⁶² The tentative collection of user charges for the period 2017-18 and 2018-19 could not be calculated due to non-identification of waste generators for this period with ULBs.

⁶³ Total cost recovered was ₹ 1.20 crore which included: ₹ 0.10 crore as other recoveries; ₹ 1.10 crore as user charges (out of this ₹ 0.04 crore pertaining to 2017-19 and ₹ 1.06 crore pertains to 2019-22).

From the Table, it could be seen that 12 out of 19 (63 *per cent*) ULBs did not collect any user charges during 2019-22. The remaining seven ULBs collected nominal user charges ranging between one and six *per cent* of the projection, whereas in ULB Amritsar, the concessionaire was authorised to collect user charges.

Ten⁶⁴ ULBs stated that efforts were being made to collect the user charges from the waste collectors. Four ULBs⁶⁵ stated that they had started collecting user charges recently either directly or through agencies or by informal waste collectors. Two ULBs⁶⁶ stated that informal waste collectors were handling waste collection and user charge collection, with no detailed data available. Two ULBs⁶⁷ stated that user charges were collected partially by societies or waste pickers. Rajpura ULB stated that it was collecting the SWM user charges from Railways and an educational institution. Amritsar ULB stated that the collection rights had been extended to the concessionaire as per the SWM agreement.

The low recovery⁶⁸ of user charges not only puts extra financial burden on the ULBs but also is a pointer to inefficient cost recovery mechanism due to which the ULBs could not reduce the gap between expenditure and income from SWM.

2.4.2 Collection of Solid Waste

Collection of segregated municipal waste is an essential step in MSWM. Collection of wet, dry and domestic hazardous waste separately ensures maximum recovery of recyclables. Waste collection services are divided into primary and secondary collection.

In India, per day waste generation was 1,70,339 MT⁶⁹ (December 2021). The per day waste generation, collection and disposal efficiency (in MT) of Solid Waste Management in neighbouring State of Haryana when compared with Punjab during 2021-22 is given in **Chart 2.6**.

⁶⁴ (i) Bilga; (ii) Doraha; (iii) Ferozepur; (iv) Kartarpur; (v) Makhu; (vi) Mehraj; (vii) Moga; (viii) Qadian; (ix) Kiratpur Sahib; and (x) Sirhind.

⁶⁵ (i) Adampur; (ii) Bathinda; (iii) Khamanon; and (iv) Rupnagar.

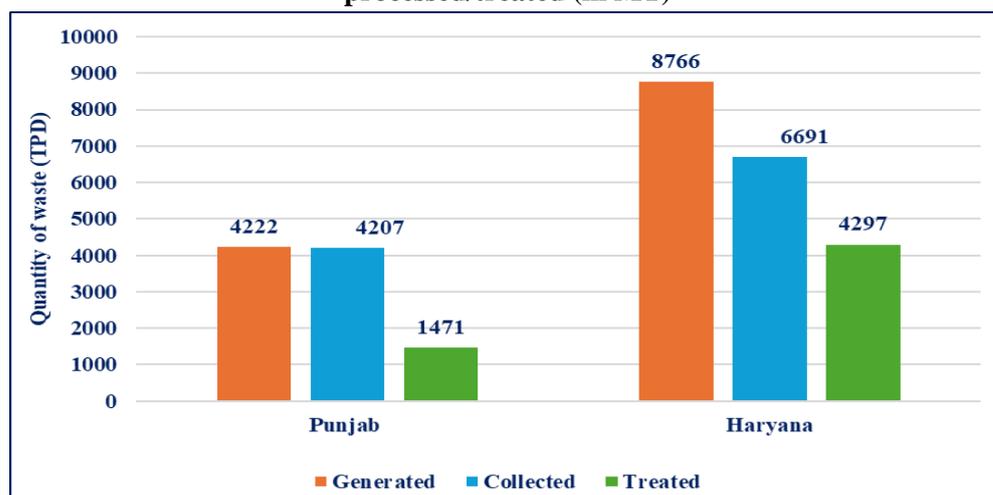
⁶⁶ (i) Ludhiana; and (ii) SAS Nagar.

⁶⁷ (i) Mansa; and (ii) SBS Nagar.

⁶⁸ ₹ 1.06 crore collected against the planned collection of ₹ 204.84 crore in 20 selected ULBs.

⁶⁹ CPCB Annual Report 2021-22.

Chart 2.6: Comparison of per day waste generated, collected and processed/treated (in MT)



Source: CPCB Annual Report 2021-22 provided by Department

The waste processing efficiency (i.e. waste processed scientifically against waste collected) in Punjab (35 per cent) was lower than that of Haryana (64 per cent), which indicates that the efficacy in processing solid waste needs to be improved.

Punjab contributes 2.48 per cent of waste (4,222 MT) per day to the total estimated waste generation (1,70,339 MT) of India. The waste generation, collection and its treatment in Punjab during 2017-22 is given in **Table 2.7**.

Table 2.7: Waste generation, collection and processing in Punjab

(Figures in MT)

Calendar year	Waste generation per day	Waste generation per year	Waste collection per year	Short collection per year	Processing of waste per year	Unprocessed waste at dump site
1	2	3	4	5	6	7
2017	4,632.27	16,90,779	16,41,978	48,801 (2.89)	2,54,185 (15.48)	13,87,793 (84.52)
2018	4,634.48	16,91,585	16,69,849	21,736 (1.28)	3,34,909 (20.06)	13,34,940 (79.94)
2019	4,477.54	16,34,303	16,11,092	23,210 (1.42)	7,71,047 (47.86)	8,40,045 (52.14)
2020	4,338.37	15,83,505	15,61,784	21,721 (1.37)	6,91,325 (44.27)	8,70,459 (55.73)
2021	4,221.60	15,40,884	15,35,446	5,438 (0.35)	5,36,842 (34.96)	9,98,604 (65.03)
Total		81,41,056	80,20,149		25,88,308 (32.27)	54,31,841 (67.73)

Source: Annual Reports of PPCB furnished to CPCB

Note-Figures in parenthesis indicate percentage.

The data of waste generation per day showed a decreasing trend over the period 2017-21 which was contrary to the studies quoted in MSWM Manual which estimated an increase of 1.3 per cent in generation of solid waste on year-to-year basis.

The Government stated (August 2023) that the ULBs had been directed to use the actual data in all their documents and reports.

2.4.2.1 Collection efficiency in selected ULBs

The local authorities are responsible to arrange door-to-door collection of segregated solid waste from all categories of waste generators. PMIDC citing the instructions issued (February 2020) by NGT instructed for maintenance of proper records of waste collection in all ULBs.

Audit observed that the concessionaires were involved in waste management in five ULBs⁷⁰. Out of these five ULBs, in four ULBs⁷¹, the concessionaires left the work midway between December 2017 and February 2021. Thereafter, the collection was made by informal waste pickers or persons involved through contractors. In two ULBs⁷², the waste was being collected by societies and informal waste collector association through agreement. In remaining 13 ULBs, the collection of waste was being carried out either by informal waste collectors or by engaging workers through contractors or by the ULBs themselves.

During 2017-22, in 19⁷³ ULBs, against generation of 36.66 lakh MT waste generated, 36.19 lakh MT was collected and 12.31 lakh MT (34.01 per cent) waste was processed (*Appendix 2.7*) as depicted in **Chart 2.7**.

Chart 2.7: Waste generated, collected and processed (MT in lakh)



Source: ULB data

Analysis of data furnished by the ULBs showed that none of them had maintained the data of collection of quantity of segregated wet waste, quantity of dry waste, quantity of compost produced, quantity of dry waste/ recyclables sold to/ sent to junk dealers etc., as specified in the format prescribed in MSWM Manual 2016 and reiterated and circulated (February 2020) by PMIDC. The data was to be maintained on a daily basis; however, no such data was maintained by the ULBs.

⁷⁰ (i) Amritsar; (ii) Bathinda; (iii) Doraha; (iv) Khamanon; and (v) Ludhiana.

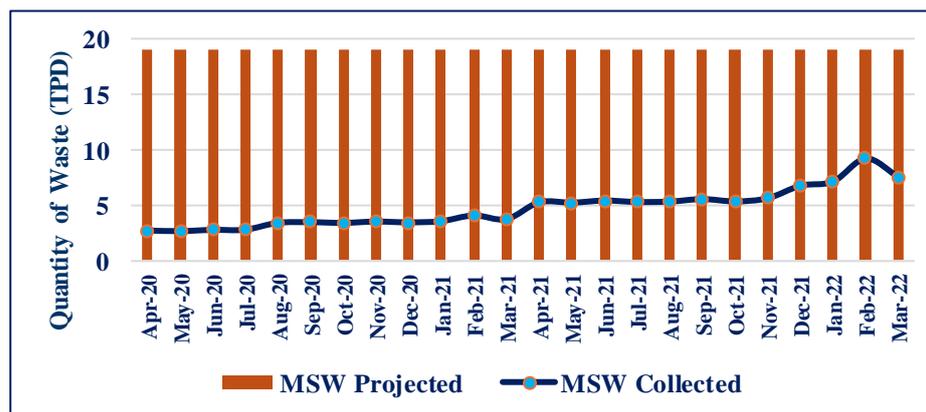
⁷¹ (i) Bathinda; (ii) Doraha; (iii) Khamanon; and (iv) Ludhiana.

⁷² (i) Mansa-by Society; and (ii) Rajpura-by Waste Collector Association.

⁷³ Data of waste generation for the year 2017-18 to 2019-20 was not provided by Corporation Bathinda. Hence, ULB Bathinda was not included in the comparison.

Collection and processing of waste was not done by ULB Kiratpur Sahib during 2017-18 and by ULB Mansa during 2017-20. However, the waste management in ULB Mansa was being done by a Society from April 2019, but requisite records of collection, segregation and disposal were not maintained during 2019-20. As per logbooks maintained by the Society, total 3,454 MT waste was collected during April 2020 to March 2022. The Status of waste collection during this period against the projected waste generation in ULB Mansa is depicted in **Chart 2.8**.

Chart 2.8: Waste collected (TPD) against the projected quantity in Mansa



Source: ULB data

As apparent from the chart, the collection rate in ULB Mansa ranged between 2.67 TPD and 9.26 TPD against the estimation of 19 TPD, which did not support the claim of 100 per cent coverage of door-to-door collections. Audit apprehends that the viability gap funding extended to the concessionaire society at Mansa was irregular (*paragraph 2.4.1.6* above refers).

Fifteen⁷⁴ ULBs stated (October 2024) that they were in the process of collecting the whole waste generated in their area. ULB Khamanon stated that it would make efforts to ensure that no waste was left unprocessed in the future. ULB Kiratpur Sahib stated that presently 100 per cent of generated waste was being collected in the ULB. The process of maintenance of the basic records had been initiated. ULB Ludhiana stated that it had no data regarding waste collection due to the involvement of concessionaire. ULB Makhu stated that the waste was being collected by the informal waste collectors. ULB Mansa admitted and replied that the Society would be instructed to maintain the record properly.

2.4.2.2 Variations in collection of waste

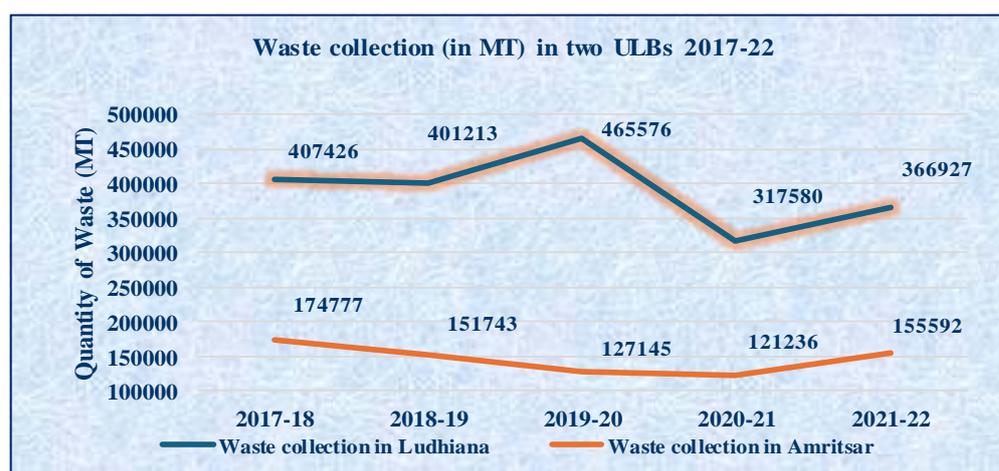
It was observed in four ULBs⁷⁵ that the payments were made to the contractors on account of waste lifted from service area to dumpsite during

⁷⁴ (i) Adampur; (ii) Amritsar; (iii) Bathinda; (iv) Bilga; (v) Doraha; (vi) Ferozepur; (vii) Kartarpur; (viii) Mehraj; (ix) Moga; (x) Qadian; (xi) Rajpura; (xii) Rupnagar; (xiii) SAS Nagar; (xiv) SBS Nagar; and (xv) Sirhind.

⁷⁵ (i) Amritsar; (ii) Doraha; (iii) Khamanon; and (iv) Ludhiana.

April 2017 to March 2022. In two⁷⁶ of these four ULBs, the lifting of waste was stopped by the concessionaire agency in January 2020 and August 2020. In the remaining two ULBs⁷⁷, the actual data of lifting of waste was available for the period 2017-22. Audit analysed this data to assess the actual collection of waste and transportation of the same from service area to dumpsite during 2017-18 to 2021-22 (Chart 2.9).

Chart 2.9: Waste collected and transported in two ULBs during 2017-22



Source: ULB data

In Ludhiana, the collection of waste showed a varying trend. It increased by 16 per cent during 2019-20 over the lifted quantity of the year 2018-19. It decreased by 31.79 per cent during 2020-21 and increased by 15.54 per cent during 2021-22 over 2020-21. This is despite the projections of the increase in the population of ULB assumed in DPR for Integrated MSW management of Ludhiana; submitted and accepted by Corporation Ludhiana.

The collection and transportation of waste in Amritsar decreased till 2020-21 as compared to 2017-18. However, it increased in 2021-22, but it was still less than 2017-18 despite the estimate of an increase in the population of Amritsar city by almost 8.5 per cent (from 13,11,026 to 14,23,114 during 2017-22⁷⁸).

The decreasing trend of waste transportation was not justifiable except for the period of 2020-21 due to COVID because the ULBs were showing almost 100 per cent collection in Form-IV which was not aligned with the actual waste collected/transported by the ULBs.

In reply, ULB Amritsar stated (October 2024) that the waste was being collected by the concessionaire on a daily basis and decreased waste collection was reported during 2020-21 due to COVID-19 and that the Corporation

⁷⁶ (i) Doraha; and (ii) Khamanon.

⁷⁷ (i) Amritsar; and (ii) Ludhiana.

⁷⁸ DPR for Integrated MSW management of Amritsar (February 2016) prepared and accepted by Corporation Amritsar.

would examine with the concessionaire the reasons for decreasing trends of waste collected. ULB Ludhiana stated (October 2024) that during 2020-21, waste collection decreased due to the COVID outbreak as the markets were closed and public movement was minimal. However, no specific reasons were given for the decreasing trend in 2021-22 compared to 2019-20.

2.4.2.3 Involvement of Self-Help Groups in SWM

Solid Waste Management Rules, 2016, provide that ULBs would facilitate the formation of Self-Help Groups (SHGs), provide identity cards and thereafter encourage their integration into SWM, including for door-to-door collection of waste.

Out of 20 selected ULBs, SHGs were involved in door-to-door waste collection only in three⁷⁹ ULBs. These SHGs engaged 119, 83 and 215 persons in these ULBs. The waste generators in Rajpura, Mansa and Moga were 26,713; 20,771; and 41,417, respectively, from which 48,660 MT; 3,454 MT; and 1,15,394 MT waste was collected (*Appendix 2.7*).

Fourteen⁸⁰ ULBs stated that in the future, SHGs would be involved in SWM. ULB Amritsar stated that the work of SWM was being executed through the Concessionaire. However, the Corporation had involved clubs/societies at different times but no records were available to corroborate the same. ULB Ludhiana stated that no SHGs approached ULB to engage in waste management and that whenever SHG comes forward, the ULB would take it immediately.

2.4.2.4 Non-removal of Garbage Vulnerable Points

One of the objectives of SBM-U (2.0) is to achieve Garbage Free Cities (GFC), which involves the elimination of Garbage Vulnerable Points (GVPs) which pose a significant roadblock for ULBs when it comes to keeping the city clean.

PMIDC identified and circulated (July 2022) a list of 494 GVPs located in Punjab. Of these, 96 GVPs were falling under the jurisdiction of 13 of the 20 selected ULBs (*Appendix 2.8*).

During visits to nine selected ULBs⁸¹, 16 GVPs were found to be still existing. Further in ULB SBS Nagar, four new GVPs were found, which did not form part of the list circulated by PMIDC.

In reply, ten⁸² ULBs stated that it was a common problem in ULBs and it was very difficult to remove all the GVPs. However, whenever it came to notice, it

⁷⁹ (i) Mansa; (ii) Moga; and (iii) Rajpura.

⁸⁰ (i) Adampur; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Khamanon; (vii) Kiratpur Sahib; (viii) Makhu; (ix) Mehraj; (x) Qadian; (xi) Rupnagar; (xii) SAS Nagar; (xiii) SBS Nagar; and (xiv) Sirhind.

⁸¹ (i) Ludhiana; (ii) Kiratpur Sahib; (iii) Khamanon; (iv) SAS Nagar; (v) Makhu; (vi) Sirhind; (vii) Rupnagar; (viii) Doraha; and (ix) Qadian.

⁸² (i) Doraha; (ii) Kiratpur Sahib; (iii) Ludhiana; (iv) Makhu; (v) Qadian; (vi) Rupnagar; (vii) SAS Nagar; (viii) SBS Nagar; (ix) Khamanon; and (x) Sirhind.

had been removed at once. The reply was not acceptable as it was the responsibility of the ULB to prevent the formation of such GVPs.

2.4.2.5 Non-synchronisation of vehicles for collection of waste

Municipal Solid Waste Management Manual, 2016 stipulates a well-synchronised primary and secondary collection and transportation system with regular and well-communicated intervals of operation (with respect to primary collection) as essential to avoid containers' overflow and waste littering. Paragraph 1.4.5.10, therefore, advises that the choice of secondary collection vehicles is to be synchronised with the design of secondary collection bins and storage containers in the transfer station. Compactors may be used to haul waste from transfer stations to the waste disposal site.

The waste, collected by the informal waste collectors using various modes of transportation such as rickshaws (rehries), e-rickshaws and other mechanised means, was unloaded at transfer stations, secondary storage points, and MRFs. Thereafter, it was loaded on tippers or tractors using machines and transported for disposal or processing.

Scrutiny of records and physical visits of various sites of 20 selected ULBs showed that compactors were used for compaction of dry as well as wet waste to avoid multiple handling of waste only in ULB Ludhiana. In this system, the waste pickers unload the waste in the compactor, which reduces the volume of waste by compressing it, and the hook loader transports the waste in a scientific manner to the dump site. During a joint physical visit (JPV) in ULB Amritsar, two synchronised vehicles were seen for the collection and transportation of waste.



Exhibit 3: Synchronised vehicles, Amritsar

In the remaining 18 ULBs, the waste was being collected by the waste pickers using various modes of transportation such as rickshaws (rehries), e-rickshaws and other mechanised means. The collected waste was then unloaded at transfer stations, secondary storage points and MRFs. Thereafter, it was loaded on tippers or tractors using machines and transported for disposal or processing.

The collection method adopted by the ULBs indicated that the synchronisation of vehicles for collection of waste to avoid multiple handling of waste was not done. The examples of multi-handling of waste are depicted in the pictures:



Exhibit 4: Transfer Station at Chhabal Road, Amritsar



Exhibit 5: Transfer Station near MC Office, SBS Nagar

In reply, seventeen⁸³ ULBs stated that efforts would be made to purchase the synchronized vehicles as required. Corporation Amritsar replied that presently, most of waste is carried into the closed compactors, there were only three tippers of open body used for the transportation of the waste and that notices would be issued to the concessionaire for transportation of waste in open body vehicle or without covering. Corporation Bathinda stated that sufficient vehicles with four compartments were available with Corporation and that synchronised vehicles would be arranged in future.

Thus, non-synchronisation of vehicles resulted in multiple handling of waste, littering and improper disposal of waste which was hazardous to the workers engaged for the transfer of waste from temporary stations to dumpsites.

2.4.2.6 Dumping of waste in water bodies

The ULB is required to direct waste generators not to throw or dispose of any waste⁸⁴ on streets, open public spaces, drains, water bodies and to segregate the waste at source as prescribed under SWM Rules, 2016 and hand over the segregated waste to waste pickers or waste collectors authorised by the local body.

Scrutiny of records as well as JPV revealed that out of 20 selected ULBs, in six ULBs⁸⁵ the waste was found deposited in or near adjoining water bodies as depicted in the pictures :



Exhibit 6: Waste deposited near the pond in Mansa



Exhibit 7: Waste lying in Sidhwan Canal, Ludhiana

⁸³ (i) Adampur; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Khamanon; (vii) Kiratpur Sahib; (viii) Makhu; (ix) Mansa; (x) Mehraj; (xi) Moga; (xii) Qadian; (xiii) Rajpura; (xiv) Rupnagar; (xv) SAS Nagar; (xvi) SBS Nagar; and (xvii) Sirhind.

⁸⁴ Such as paper, water bottles, liquor bottles, soft drink canes, tetra packs, fruit peel, wrappers, etc. or burn/bury waste.

⁸⁵ (i) Khamanon; (ii) Kiratpur Sahib; (iii) Ludhiana; (iv) Mansa; (v) Rupnagar; and (vi) Sirhind.

In reply, three⁸⁶ ULBs stated (October 2024) that efforts would be made to spread awareness regarding non-throwing waste in water bodies. Corporation Ludhiana stated that the Corporation had taken action to cover the bank of water bodies with walls or steel nets so that the public was deterred from throwing waste in water bodies. ULB Mansa stated that due to the non-availability of other land, the MC was dumping the waste near the water body. ULB Rupnagar stated that the IEC activities were also undertaken to educate the public about the hazards of throwing waste in open spaces.

2.4.3 Segregation of Solid Waste

Solid Waste Management Rules define segregation as sorting and separate storage for various components of solid waste viz; biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non-recyclable inert waste, domestic hazardous waste and construction & demolition waste.

Municipal Solid Waste Management Manual advises that segregating waste at source ensures that waste is less contaminated and can be collected and transported for further processing. Segregation of waste also optimises waste processing and treatment technologies, leading to a high proportion of segregated material that could be reused and recycled.

2.4.3.1 Inefficient segregation of waste

Rule 15 (g) of SWM Rules, 2016 provides that local authorities would direct waste generators not to litter i.e. throw or dispose of any waste such as paper waste, plastic waste etc. Paragraph 6.1 of the MSWM Manual, 2016, provides that the ULBs were required to maintain the records by weighing the quantity of waste collected on a daily basis. Further, the Handbook of Service Level Benchmark (SLB) stipulates that all the ULBs were required to achieve 100 *per cent* segregation of waste. The timeline for achieving segregation of waste was revised⁸⁷ to March 2020 by NGT in December 2016.

Audit observed that though IEC activities on segregation of waste were conducted in all the selected ULBs, the requisite effect on segregation at ground level was not seen. ULBs also had not devised any mechanism to maintain the records as required under the provisions of the MSWM Manual which would have shown the improvement achieved, if any.

Audit analysed the SLB reports (**Appendix 2.9**) for the period 2017-18 to 2018-19⁸⁸ and observed that:

⁸⁶ (i) Khamanon; (ii) Kiratpur Sahib; and (iii) Sirhind.

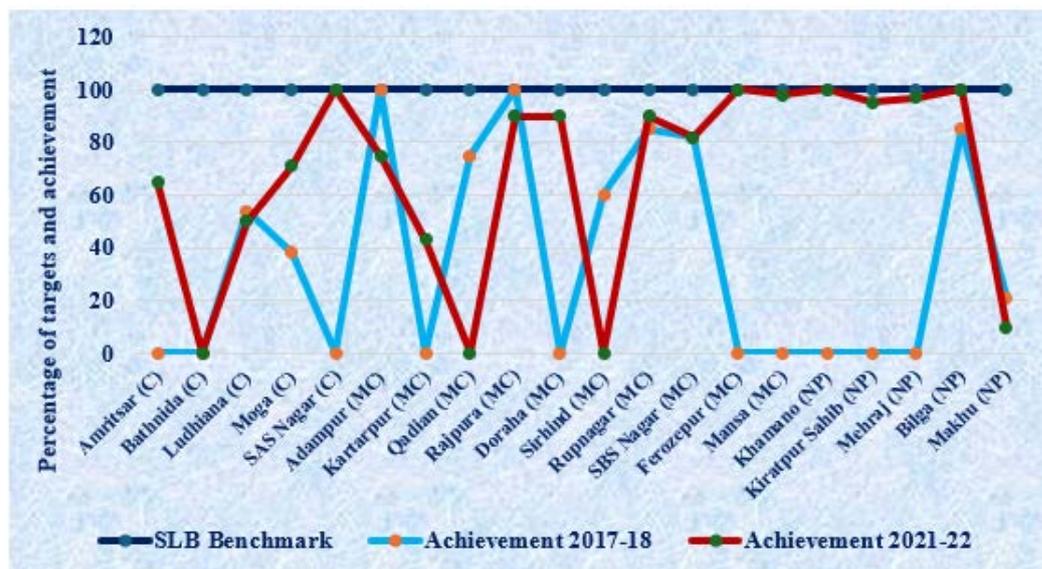
⁸⁷ As per Rule 22 of SWM Rules, the earlier timeline was March 2018.

⁸⁸ SLB reports were not provided to audit for the year 2019-20 to 2021-22.

- during 2017-18, out of 20 selected ULBs, 15 had *nil* segregation and in five ULBs⁸⁹ the segregation of waste was 20 *per cent*.
- during 2018-19, out of 20 selected ULBs, ULB Adampur had *nil* segregation, in 12 ULBs, the segregation of waste ranged between 10 and 50 *per cent* and in six ULBs⁹⁰ it ranged between 55 and 85 *per cent*, whereas in ULB Kiratpur Sahib, it was 100 *per cent*.

The selected 20 ULBs supplied data of segregation done at various⁹¹ stages during 2017-22 (**Appendix 2.10**). The extent of segregation in selected ULBs during 2017-18 and 2021-22 has been depicted in **Chart 2.10**:

Chart 2.10: Extent of segregation in selected ULBs



Source: Departmental data

In six ULBs, a decrease ranging between four and 75 *per cent* was noticed in the segregation of waste during 2021-22 as compared to 2017-18. Whereas in 12 ULBs, there was an improvement in the segregation of waste from 2017-18. The position of segregation remained static in the two ULBs.

It was also noticed that:

- during 2017-22, against the collection of 37.74 lakh MT waste, only 17.76 lakh MT (47 *per cent*) waste was segregated.
- out of 20 ULBs, eight ULBs⁹² segregated some amount of waste in all the years. Whereas 12 ULBs had not segregated the waste and a shortfall ranging between one and four years was noticed during 2017-22.
- the percentage of segregation ranged between 12 and 98 *per cent*.

⁸⁹ (i) Amritsar; (ii) Bathinda; (iii) Ludhiana; (iv) Moga; and (v) SAS Nagar.

⁹⁰ (i) Bathinda; (ii) Doraha; (iii) Qadian; (iv) Rajpura; (v) Rupnagar; and (vi) Bilga.

⁹¹ Segregation at source, secondary points/MRFs and dumpsites.

⁹² (i) Ludhiana; (ii) Moga; (iii) Adampur; (iv) Rajpura; (v) Rupnagar; (vi) SBS Nagar; (vii) Bilga; and (viii) Makhu.

- In Ludhiana, though the segregation ranging between 50 and 96 per cent was made during 2017-22, the segregated waste was being transported to the dumpsite as mixed waste, which indicated a futile exercise done by ULB Ludhiana for segregation.

Further, during the JPV of 48 secondary points/MRFs and 25 dumpsites, unsegregated waste was found lying at sites, which indicated that the claims of ULBs regarding segregation of waste at source or other places were not based on reliable facts. ULBs were neither collecting 100 per cent segregated waste from waste generators nor segregating the waste at secondary/MRF points which would result into accumulation of legacy waste at dumpsites causing hazards for environment and public as depicted in pictures below:



Exhibit 8: Unsegregated waste lying at dump site in Sirhind



Exhibit 9: Unsegregated waste lying at dumpsite of Ludhiana

In reply, seventeen⁹³ ULBs replied that they were making efforts to collect the segregated waste at source. ULB Bathinda stated that waste was being collected in segregated form through the vehicles used for door-to-door collection. However, the documentary evidence in support of the reply was not furnished. ULB Ludhiana stated that the report of the segregation was submitted by the Concessionaire. The physical records for segregation, as required under the Manual, were not maintained and the same would be maintained in future. ULB Mansa stated that the segregation of waste was being done by engaging 21 workers of 3D society.

2.4.3.2 Disposal of Sanitary and Hazardous Waste

As per CPCB guidelines (May 2018), the ULBs shall send the segregated sanitary waste to available waste management options/ incinerators for final disposal/incineration. For processing/disposal of sanitary waste, various methods such as low-cost locally made incinerators, high-temperature incinerators etc. have been described depending upon the type of sanitary waste. Further, SWM Rules, 2016 provide that the local authority would

⁹³ (i) Adampur; (ii) Amritsar; (iii) Bilga; (iv) Doraha; (v) Ferozepur; (vi) Kartarpur; (vii) Khamanon; (viii) Kiratpur Sahib; (ix) Makhu; (x) Mehranj; (xi) Moga; (xii) Qadian; (xiii) Rajpura; (xiv) Rupnagar; (xv) SAS Nagar; (xvi) SBS Nagar; and (xvii) Sirhind.

ensure safe storage and transportation of domestic hazardous waste to the waste disposal facility.

Audit observed that none of the ULBs installed the incinerator facility at the processing/Sanitary Landfill sites for safe disposal of sanitary waste. Pictorial evidence showing instances of non-segregation of sanitary waste are given below:



Exhibit 10: Sanitary waste at MRF, near Makhu Gate, Ferozepur



Exhibit 11: Hazardous waste lying at GVP in NP Kiratpur Sahib

Small sanitary waste incinerators were seen installed in public toilets in six ULBs⁹⁴. There was no system for separate collection and transportation of such waste⁹⁵ as seen during the JPV.

Further, it was also observed that none of the selected ULBs had collected the segregated hazardous waste separately except SBS Nagar, where the vehicle was found to be designed for a separate collection of hazardous waste besides wet and dry waste. In the remaining ULBs, the vehicles were not found designed for separate collection of waste. The hazardous waste was not being segregated and deposited at various sites.

In reply to disposal of sanitary waste, fifteen⁹⁶ ULBs stated (October 2024) that a processing facility for scientific disposal of sanitary waste would be installed. ULB Adampur stated (October 2024) that a waste incinerator had been installed at the waste processing site, which would be used after the segregation of sanitary waste. Corporation Amritsar stated that collection of waste was the responsibility of the concessionaire who had been directed to collect the segregated sanitary waste. Corporation Bathinda stated that efforts were being made for separate collection and transportation of sanitary waste. ULB Ferozepur stated that it had installed separate boxes on the new vehicles for separate collection of the same. ULB Rupnagar stated that two incinerators (five KG each) were installed at MRF for the scientific disposal of sanitary waste and efforts were being made to install a processing facility for the scientific disposal of sanitary waste of large capacity.

⁹⁴ (i) Makhu; (ii) Mehraj; (iii) Kiratpur Sahib; (iv) Sirhind; (v) Bathinda; and (vi) Ferozepur.

⁹⁵ Except in ULB SBS Nagar.

⁹⁶ (i) Doraha; (ii) Khamanon; (iii) Kiratpur Sahib; (iv) Ludhiana; (v) Mansa; (vi) Moga; (vii) Rajpura; (viii) SAS Nagar; (ix) SBS Nagar; (x) Sirhind; (xi) Bilga; (xii) Kartarpur; (xiii) Makhu; (xiv) Mehraj; and (xv) Qadian.

In reply to the disposal of hazardous waste, seventeen⁹⁷ ULBs stated that efforts were being made or compliance would be made in future for collection and storage of hazardous waste separately. Corporation Amritsar stated that notice would be issued to the concessionaire to start the collection of segregated hazardous waste at the earliest. Corporation Bathinda stated that the hazardous waste was collected through the vehicles designed for the same as per rules by attaching a separate box for the hazardous waste, however, no documentary evidence in support of their assertion was furnished to audit. Corporation Ludhiana stated that after the construction of all the required MRF and receiving of machinery, the processing of DHW would be strengthened and done as per the provision of the MSWM manual/rules.

2.4.3.3 Availability of Material Recovery Facilities

Rule 15 (h) of SWM Rules, 2016 provides that the ULBs should set up MRFs or secondary storage facilities with sufficient space for sorting of recyclable materials (paper, plastic, metal, glass, textile etc) to enable informal and authorised waste pickers and waste collectors to separate recyclables for further segregation and processing.

Scrutiny of records of selected ULBs revealed that during the period 2017-18, no MRF was available in any ULB. According to the records of ULBs, the MRFs were constructed during 2018 and 2022. Further, the status of availability of MRFs was analysed in the selected ULBs and found that there was a shortfall in creation of MRFs for segregation of waste (*Appendix 2.11*) as given in **Table 2.8**.

Table 2.8: Availability of MRFs in selected ULBs

Name of ULB	Moga	Ludhiana	Doraha	Mansa	Amritsar	Bilga	Rupnagar	SAS Nagar	Bathinda	Adampur	Kartarpur	Qadian	Rajpura	Sirhind	Khmanon	SBS Nagar	Kiratpur Sahib	Mehraj	Makhu	Ferozepur	Total
MRF required	16	54	3	10	10	2	3	20	1	0	1	1	4	1	1	1	1	1	1	2	133
Constructed	2	12	1	4	5	1	2	14	1	0	1	1	4	1	1	1	1	1	1	2	56
Shortfall	14	42	2	6	5	1	1	6	0	0	0	0	0	0	0	0	0	0	0	0	77
Shortfall percentage	88	78	67	60	50	50	33	30	0	0	0	0	0	0	0	0	0	0	0	0	58

Source: ULBs data

From the table it can be seen that:

- in eight ULBs, against the requirement of 118 MRFs, only 41 were constructed.

⁹⁷ (i) Adampur; (ii) Kartarpur; (iii) Rupnagar; (iv) Bilga; (v) Makhu; (vi) Mansa; (vii) Mehraj; (viii) Qadian; (ix) Doraha; (x) Ferozepur; (xi) Khmanon; (xii) Kiratpur Sahib; (xiii) Moga; (xiv) Rajpura; (xv) SAS Nagar; (xvi) SBS Nagar; and (xvii) Sirhind.

- in 19 ULBs, against the requirement of 133 MRFs, only 56 MRFs were constructed during 2018-22 leading to shortfall in construction of 77 MRFs⁹⁸ (58 per cent) due to various reasons⁹⁹.
- out of 56 constructed MRFs, 13 MRFs were not in use due to various reasons¹⁰⁰.

During physical visits, the available MRFs were mostly found in use and different types of waste i.e. papers, polythene, wood, cloths etc. were being stored in covered separate compartments after segregation. As per PMIDC report (January 2023) in 26 ULBs, against the requirement of 116 MRFs, only 63 MRFs were constructed, leaving a shortfall of 53 MRFs. In these 26 ULBs a shortfall of 12 MRFs was noticed in three ULBs¹⁰¹ out of the 20 selected for audit. The Government accepted (August 2023) the facts.



Exhibit 12: Abandoned MRF in Mehraj

ULB Amritsar informed (October 2024) that one MRF at Bhagtanwala site was non-operational and would be made operational soon. However, the ULB did not offer its reply about the shortfall. Three¹⁰² ULBs stated that the remaining MRF would be constructed to fulfil the requirements. Two¹⁰³ ULBs stated that remaining MRFs were not constructed due to non-availability of land. ULB SAS Nagar stated that requisite MRFs had been constructed and were being used to segregate the waste at secondary station. ULB Mehraj stated that the one existing MRF was in operation to segregate the waste. ULB Ludhiana did not furnish any reply.

2.4.4 Transportation of solid waste

It is essential that primary collection vehicles should meet local requirements. Before selecting a vehicle for primary collection, it was advisable to assess the amount of waste generated, local climatic conditions, topography of the area and available facilities for repair and maintenance of these vehicles.

During the test check of records, the following were noticed:

⁹⁸ Amritsar: Five; Ludhiana: 42; Moga: 14; SAS Nagar: Six; Bilga: One; Doraha: Two; Mansa: Six; and Rupnagar: One.

⁹⁹ Ludhiana: site problem or objection raised by the residents and non-calling of tenders; Doraha: Non-availability of land with MC; Mansa: due to non-availability of lands; and Rupnagar: due to public protest.

¹⁰⁰ Eight in Ludhiana due to non-installation of compactors; three in Amritsar due to shortage of staff; one in Rupnagar due to public protest; and one in Mehraj due to construction near schools.

¹⁰¹ (i) Ludhiana: Six; (ii) SAS Nagar: Five; and (iii) Moga: One.

¹⁰² (i) Bilga; (ii) Moga; and (iii) Rupnagar.

¹⁰³ (i) Doraha; and (ii) Mansa.

2.4.4.1 Shortage of vehicles

Solid Waste Management requires various types of vehicles, such as tippers, hook loaders, tractors, JCBs, etc. for the collection and transportation of waste from primary source to secondary storage/MRF and for further transportation to dump or processing sites. The status of the availability of vehicles in selected ULBs is given in *Appendix 2.12*. On analysing the status, the following observations are made:

- Out of five Corporations, the requirement of vehicles was assessed by two Corporations¹⁰⁴ only. In other two Corporations¹⁰⁵, the assessment was not done and in Amritsar Corporation, the assessment was not required as the arrangement of vehicles was the responsibility of the concessionaire.
- In two Corporations¹⁰⁶, against the assessed requirement of 3,280 vehicles, only 1,209 vehicles (36.86 per cent) were available.
- Out of 10 selected MCs, four¹⁰⁷ had partially assessed the requirement of vehicles. Six MCs¹⁰⁸ had not assessed the requirement of vehicles. Thus, due to non-assessing the requirement of vehicles, the shortage of vehicles could not be ascertained in audit.
- Out of five NP¹⁰⁹, only Bilga NP had assessed the requirement of vehicles and remaining four NPs did not assess the same.

In reply, sixteen¹¹⁰ ULBs stated (October 2024) that shortage of vehicles would be assessed and new vehicles purchased against the requirement. ULB Bathinda stated that the vehicles had now been purchased with multiuse compartments required as per SWM Rules. ULB Amritsar stated that concessionaire had been directed to depute more vehicles as per micro plan.

The replies do not address the existing shortfall in assessment and availability of waste collection and transportation vehicles.

2.4.4.2 Use of un-covered vehicles for transportation

Solid Waste Management Rules provide that the transportation of waste to processing or disposal facilities has to be mandatorily done in covered vehicles. The vehicles should have segregated containers for collection of different fractions (wet, dry and domestic hazardous). At a minimum, the vehicle should have a facility to prevent spillage of waste and leachate

¹⁰⁴ (i) Ludhiana; and (ii) Bathinda.

¹⁰⁵ (i) Moga; and (ii) SAS Nagar.

¹⁰⁶ (i) Ludhiana; and (ii) Bathinda.

¹⁰⁷ (i) Doraha; (ii) Kartarpur; (iii) Rajpura; and (iv) Qadian.

¹⁰⁸ (i) Adampur; (ii) Ferozepur; (iii) Mansa; (iv) Rupnagar; (v) SBS Nagar; and (vi) Sirhind.

¹⁰⁹ (i) Bilga; (ii) Khamanon; (iii) Kiratpur Sahib; (iv) Makhu; and (v) Mehraj.

¹¹⁰ (i) Adampur; (ii) Doraha; (iii) Ferozepur; (iv) Kartarpur; (v) Khamanon; (vi) Kiratpur Sahib; (vii) Ludhiana; (viii) Makhu; (ix) Mansa; (x) Mehraj; (xi) Moga; (xii) Qadian; (xiii) Rupnagar; (xiv) SAS Nagar; (xv) SBS Nagar; and (xvi) Sirhind.

en-route to the processing or disposal facility. Further, the LGD notified (October 2020) that every local body was responsible to deploy waste collectors to collect domestic waste including hazardous/sanitary waste in separate containers installed on the waste collection vehicles.

Audit observed that out of 20 selected ULBs, in ULB SBS Nagar, vehicles were designed with four compartments in compliance with the requirements. In remaining 19 ULBs, though the vehicles had two compartments i.e. for dry and wet waste collection as per minimum criteria, but sanitary and hazardous waste was found mixed at MRF dump site.

Audit noticed that in six ULBs¹¹¹ waste was being transported in uncovered vehicles.

In reply, ULB Amritsar stated (October 2024) that notices would be issued to the concessionaire for transportation of waste in open body vehicles or without covering it. ULB Kartarpur stated that in future, covered vehicles would be used for transportation of waste. Two¹¹² ULBs stated that covered vehicles were used for transportation of waste. ULB Mansa stated that covers had been provided to the drivers for covering the waste during transportation. ULB Qadian stated that covered vehicles were used most of the times for transportation of waste. However, in future closed vehicles would be purchased or the vehicles would be covered properly.

The replies do not address the continued non-compliance with the requirement of transporting waste in fully covered and compartmentalized vehicles.

2.4.4.3 Non utilisation of vehicles provided for Solid Waste Management

Audit observed that in two ULBs¹¹³, 10 E-vehicles received (December 2019) from PMIDC and one dumper placer received as a donation for SWM were not in use and lying idle at the workshop and dumpsite of the ULBs, respectively. It was also observed that these vehicles were not included in the inventory.

In reply, ULB Amritsar stated (October 2024) that these E-vehicles were used in the walled city and due to the SWM operation and lack of durability of E-vehicles in MSW operations, these E-vehicles had been discarded, however, the reply was not supported by any documentary evidence related to durability issue and approvals to discard the vehicles. ULB Sirhind stated that efforts would be made to use the idle dumper placer after necessary repair work.

2.4.4.4 Monitoring of vehicles

The Global Positioning System (GPS) is a simple and advanced management

¹¹¹ (i) Amritsar; (ii) Kartarpur; (iii) SAS Nagar; (iv) Makhu; (v) Mansa; and (vi) Qadian.

¹¹² (i) Makhu; and (ii) SAS Nagar.

¹¹³ (i) Amritsar (10 E-vehicles); and (ii) Sirhind (one dumper placer).

information system and an important tool for ULBs to manage the collection and transport of MSW. It helps the SWM Department, as well as the head of the ULB, to be informed of the day-to-day performance of the services.

In the 20 selected ULBs, 714 motorised vehicles were engaged for collecting and transporting MSW. GPS was installed in 513 vehicles out of 714 vehicles (*Appendix 2.12*) of 16 ULBs. However, route maps fixed for vehicles were not available in the concerned ULBs. Further, the GPS data was not provided to audit. This indicated the inability of ULBs to monitor the plying of vehicles despite installing GPS devices.

In reply, ten¹¹⁴ ULBs stated (October 2024) that efforts would be made to install GPS on all vehicles, and data would be kept for monitoring and tracking the vehicles. Five¹¹⁵ ULBs replied that GPS was installed on vehicles, but GPS data was not saved or stored. ULB Amritsar stated that although GPS had been installed in all vehicles, GPS data was not available with the corporation. The periodic record was not maintained by the concessionaire, but it would be directed to comply with the provisions of the agreement in future.

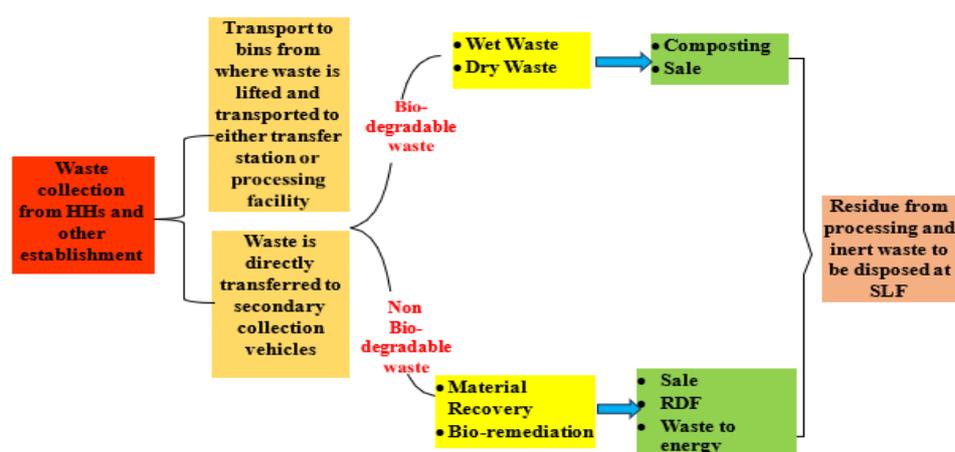
Replies confirmed that effective GPS-based monitoring of waste collection vehicles was not ensured by the ULBs during 2017-22.

2.4.5 Processing, treatment and disposal of waste

Municipal Solid Waste Management and adoption of processing technologies depend largely on the quantity and characteristics of the total waste generated in an ULB. The processing of waste includes composting, waste to energy technology and safe disposal of residual waste into landfill.

The processing of waste can be seen in the **Chart 2.11**:

Chart 2.11: Processing of waste



Source: *MSWM Manual, 2016*

¹¹⁴ (i) Ferozepur; (ii) Ludhiana; (iii) Makhu; (iv) Mansa; (v) Moga; (vi) Qadian; (vii) Rajpura; (viii) Rupnagar; (ix) SAS Nagar; and (x) Sirhind.

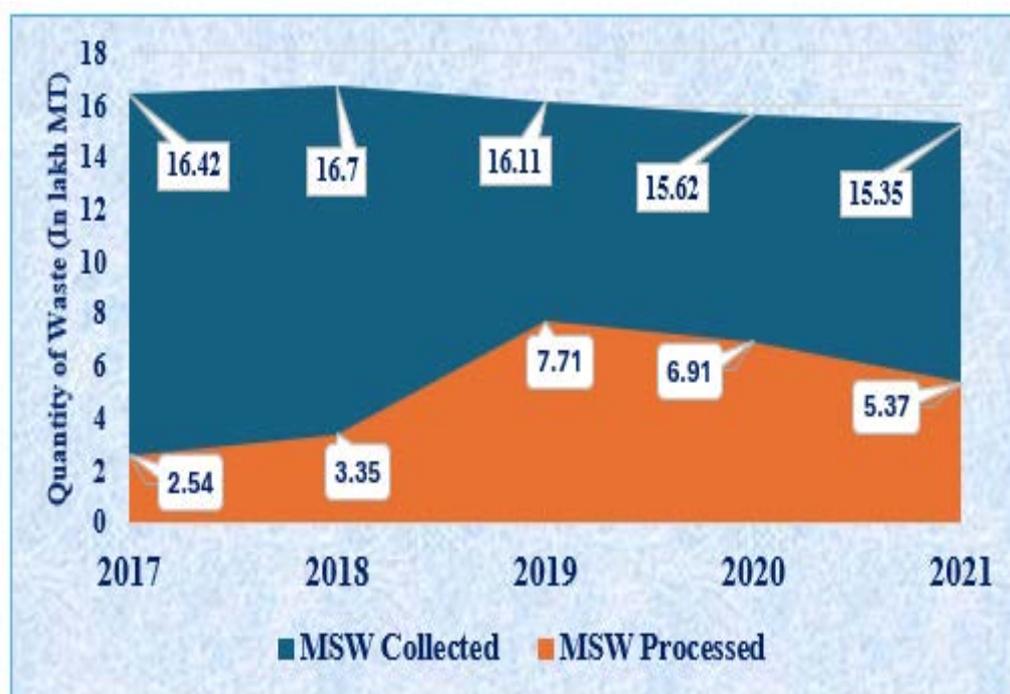
¹¹⁵ (i) Adampur; (ii) Bilga; (iii) Kartarpur; (iv) Mehraj; and (v) SBS Nagar.

2.4.5.1 Non-processing of collected waste

As per Rule 15(v) of SWM Rules, the local authorities shall facilitate the construction, operation and maintenance of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for optimum utilisation of various components of solid waste through adoption of suitable technology.

As per details of the composition of waste incorporated in Action Plans for Solid Waste Management (APSWM) in selected ULBs, there was ample scope to process upto 95 per cent waste by adopting various technologies such as composting, RDF etc. The status of waste collected and processed in the State during 2017-2021 is given in **Chart 2.12**.

Chart 2.12 Status of waste collected and processed (in lakh MT) in Punjab

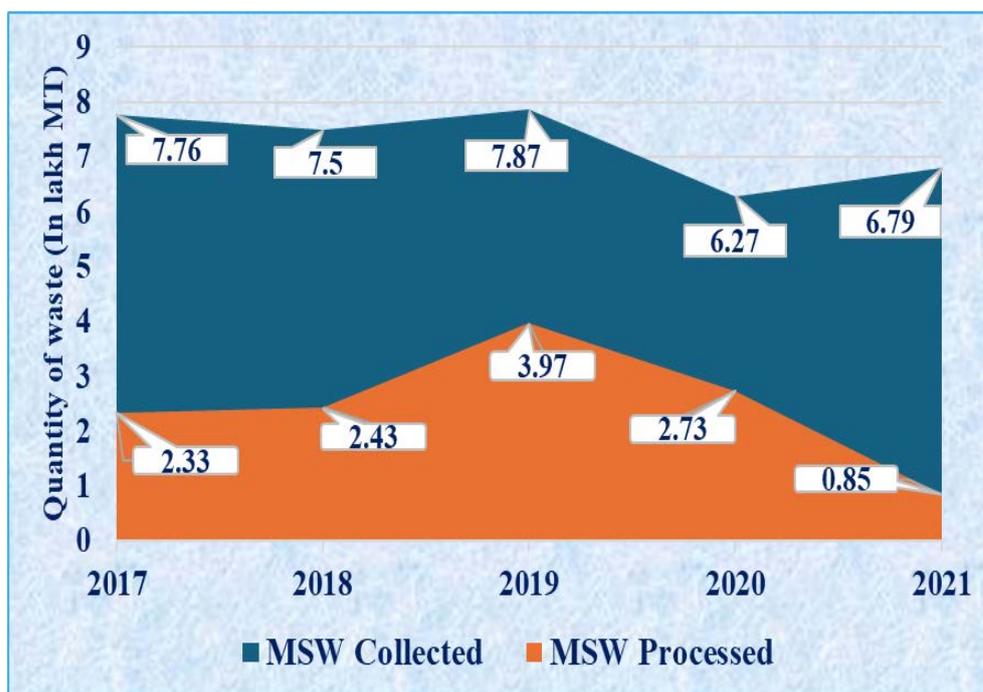


Source: PPCB Annual Reports

During January 2017 to December 2021, 80.20 lakh MT of waste was collected in the State. Of this, 25.88 lakh MT (32 per cent) was processed and 54.32 lakh MT (68 per cent) left unprocessed. The percentage of processed waste ranged from 15.48 per cent to 47.86 per cent.

In selected ULBs, the status of processed waste against the collected waste (**Appendix 2.7**) is given in **Chart 2.13**.

Chart 2.13: Status of waste collected and processed (in lakh MT) in selected ULBs



Source: ULB's data

In 19 selected¹¹⁶ ULBs, of 36.19 lakh MT of waste collected, only 12.31 lakh MT was processed and the remaining 23.88 lakh MT of waste i.e. 66 per cent was left unprocessed. The percentage of total waste processed to waste collected came down from 50.44 in 2019 to 12.52 in 2021. It was due to *nil* processing done by ULB Ludhiana as the concessionaire terminated the agreement (February 2021) of Integrated Solid Waste Management (**Appendix 2.7**).

Fourteen ULBs¹¹⁷ stated (October 2024) that the waste was being processed and would be completed in due course. ULB Amritsar stated that it collected approximately 500 MT of waste, of which 347 was managed through composting/MRF centres or by ragpickers and 153 MT of mixed waste is dumped at the dumping site. ULB Mehraj stated that it had processed all the waste lying at the dump site, however, records of waste processing were not maintained. Four ULBs¹¹⁸ stated that old waste had been processed.

Non-processing of municipal solid waste had serious repercussions on the environment and human health. The unprocessed waste, which was either left to accumulate or burnt, releases harmful pollutants, such as greenhouse gases and toxic chemicals into air, soil and water.

¹¹⁶ Data of waste generation for the year 2017-18 to 2019-20 was not provided by ULB Bathinda.

¹¹⁷ (i) SBS Nagar; (ii) Kartarpur; (iii) Bilga; (iv) Khamanon; (v) Adampur; (vi) Doraha; (vii) Rupnagar; (viii) Rajpura; (ix) Ludhiana; (x) SAS Nagar; (xi) Qadian; (xii) Mansa; (xiii) Bathinda; and (xiv) Moga.

¹¹⁸ (i) Makhu; (ii) Kiratpur Sahib; (iii) Sirhind; and (iv) Ferozepur.

The low rate of processing was due to inadequate infrastructure and under-utilisation of infrastructure, as explained in the succeeding paragraphs.

2.4.5.2 Utilisation of waste processing facilities

In the selected ULBs, apart from partial bio-remediation of legacy waste and segregation at MRFs, only the wet waste was being processed by making compost through compost pits.

(i) Two ULBs¹¹⁹ did not plan to construct the compost pits due to the involvement of the concessionaire and in ULB Ludhiana though the concessionaire was involved, the ULB planned to construct 400 compost pits. ULB Amritsar constructed 67 compost pits though these were not included in the plan.

(ii) In 17 ULBs, a total of 2,239 compost pits were required, of which only 1,310 compost pits were constructed. The ULB-wise status of compost pits constructed, compost pits in use and short construction of compost pits (*Appendix 2.13*) is as under:

- Out of 17 ULBs, only five ULBs¹²⁰ constructed 241 compost pits as required.
- In five ULBs¹²¹, against the requirement of 1,607 compost pits, only 499 compost pits were constructed, a shortage of 1,108 compost pits. In ULB Rajpura, out of 150 constructed compost pits, 80¹²² were found in dilapidated condition during JPVs, out of which 71 were got repaired. Thus, due to non-availability of required number of pits, the processing of wet waste was not done effectively.
- In seven ULBs, the compost pits were constructed in excess and these were found in use during physical visit (*Appendix 2.13*).

(iii) The status of processing of waste in three ULBs¹²³, where the concessionaire was involved showed that, in ULB Amritsar, no composting was done during 2017-20, in ULB Bathinda, no record was produced citing that an arbitration case was pending and in ULB Ludhiana, against 15.92 lakh MT collected waste, 9.85 lakh MT waste (62 per cent) was processed during 2017-21 whereas, no processing was done during 2021-22 due to termination of contract (February 2021) by the concessionaire.

In the remaining 17 ULBs, it was claimed that 13,663 MT of waste was processed during 2017-18 though no facilities for composting were available with the ULBs during this period, as the compost pits were constructed during 2018-19. Thus, claims of ULBs in respect of processing of waste were not

¹¹⁹ (i) Bathinda; and (ii) Amritsar.

¹²⁰ (i) Kartarpur; (ii) Doraha; (iii) Makhu; (iv) Bilga; and (v) Mansa.

¹²¹ (i) Adampur; (ii) Rajpura; (iii) Sirhind; (iv) SBS Nagar; and (v) SAS Nagar.

¹²² Constructed at a cost of ₹ eight lakh.

¹²³ (i) Ludhiana; (ii) Amritsar; and (iii) Bathinda.

based on facts.

In reply, six ULBs¹²⁴ stated (October 2024) that efforts would be made to construct, repair or efficiently utilise the available waste processing facilities. ULB SAS Nagar stated that as per action plan (2019) the requirement of compost pits was assessed but the requirement for more compost pits would be assessed and constructed accordingly. ULB Ludhiana stated that the plan prepared in 2019 assigned composting responsibilities to the concessionaire, leading to the non-construction of compost pits by it. ULB Amritsar stated that presently out of 67 pits, 56 pits were in use and the remaining would be used in due course. ULB Bathinda stated that it had established a 350 TDP RDF compost plant for the scientific processing of MSW. ULB Rajpura stated that out of total 80 damaged pits, 71 were got repaired.

The replies of ULBs do not address the key issues of shortfall of compost pits and poor planning as the processing/disposal facilities were inefficient as 66 per cent waste was left unprocessed in selected ULBs which could decompose in landfills leading to the generation of harmful gases like Methane, which is a potent greenhouse gas and contributes to climate change. Non-composting could also lead to the release of leachate, a toxic liquid that can contaminate groundwater and soil.

2.4.5.3 Undue benefit to the concessionaire in ULB Amritsar

The project of Integrated Management of Solid Waste was awarded to the concessionaire in March 2016 by ULB Amritsar. As per the agreement, the concessionaire was responsible for the management, collection, transportation, processing and scientific disposal of MSW.

Audit observed that the ULB constructed compost pits/MRFs at a cost of ₹ 1.59 crore from March 2020 to March 2021, even though this infrastructure was to be created by the concessionaire. This indicated that the concessionaire did not fulfil his obligations as per the agreement and the ULB had to incur the expenditure to construct the requisite infrastructure. Moreover, during JPV of Bhagtanwala, Chabbal Road and Chheharta processing facilities, it was noticed that the MRFs and compost pits were lying unused.

ULB Amritsar stated (October 2024) that the composting pits and MRF facilities had been constructed as per instructions of the Government for the purpose of decentralised waste processing. The reply is not justified as no such specific instructions were provided to audit.

The action of the ULB to construct the compost pits/MRFs by itself instead of getting them constructed by the concessionaire resulted in the extension of the undue benefit of ₹ 1.59 crore to the concessionaire.

¹²⁴ (i) Adampur; (ii) Sirhind; (iii) Mansa; (iv) Rupnagar; (v) Mehraj; and (vi) Qadian.

2.4.5.4 Bio-remediation of legacy waste

Bio-remediation is an environment-friendly technique to separate soil and recyclables from legacy waste. The CPCB noted that open dumps are becoming a source of pollution and the waste rotting in airless heaps produces leachate, killing vegetation and polluting groundwater. The heaps of garbage also produce Methane gas, thereby contaminating the air.

Further, Rule 22 (11) of the SWM Rules 2016 stipulates that local bodies would bioremediate or undertake capping of old and abandoned dump sites within five years from the date of notification of the Rules, i.e. by March 2021.

- (i) As per information supplied (August 2022) by PMIDC, 62.35 lakh MT of legacy waste was lying unprocessed at dumpsites of ULBs in Punjab. Out of this, 33.76 lakh MT waste was at the dumpsites of the selected ULBs.
- (ii) In Ludhiana, in a fire accident (April 2022) on the Jamalpur dump site, seven persons were burnt to death. The accident occurred due to the inability of the authorities concerned to bioremediate the garbage dump site on time. NGT, based on the recommendations of the monitoring committee¹²⁵, directed (July 2022) Corporation Ludhiana to deposit interim compensation of ₹ 100 crore with the Deputy Commissioner to be utilised for remedial actions as per the recommendations¹²⁶ (May 2022) besides compensation to the heirs of the deceased. Corporation Ludhiana deposited ₹ 42.86 crore from September to December 2022 by arranging funds from various sources, of which an expenditure of ₹ 5.14 crore had been incurred only on payment of tipping fees. Other recommendations of NGT's monitoring committee for SWM were not addressed till date of audit (August 2023).

Further, audit observed encroachment during JPV at Jainpur dumpsite as shown in the pictures below:

¹²⁵ The committee was setup to furnish a factual situation with regard to cause of death of seven persons in fire near Ludhiana dumpsite, persons responsible for failure, remedial action, including measure to prevent such incidents in future.

¹²⁶ Installing mechanical separator/screener, removal of garbage vulnerable points and to be beautified, operate the compactor in a scientific manner, packed wet and dry waste separately, waste deposition centres for domestic Hazardous waste, necessary agreement for lifting and management of waste generated by bulk waste generators, boundary wall and green belt, chain link fencing along the Budha Nallah, chalk out the plan for treatment of leachate generated at legacy waste dump, increase the frequency of lifting of solid waste twice in a day to remove the segregated solid waste.



Exhibit 13: Encroachment on dump site at Jainpur where legacy waste was lying

Other incidences of dumpsite fire were noticed during JPV in two ULBs¹²⁷.

Corporation Ludhiana stated (October 2024) that the work of bio-remediation is under process and will be completed soon.

Scrutiny of records of 20 selected ULBs and JPVs of processing sites showed that (**Appendix 2.14**):

- the biomining of legacy waste was not done in two ULBs¹²⁸ (March 2022).
- in 18 ULBs, no bio-remediation was carried out upto August 2020. However, bio-remediation was carried out during September 2020 to February 2023.
- in ULB Ludhiana, 21.55 lakh MT waste was accumulated at dump site Jamalpur. The work of processing was allotted (August 2022) for processing of five lakh MT waste scheduled to be completed by February 2024. Out of five lakh MT, 2.04 lakh MT legacy waste was processed (September 2023). Therefore, the ULB had no plan for disposal of remaining 16.55 lakh MT legacy waste besides accumulation of 1,100 TPD of waste.
- in ULB Doraha, 13,000 MT waste was lying at site. The work for biomining of waste was allotted (December 2021) to an agency which had processed 10,400 MT waste (June 2022). However processed waste was lying at dumpsite without its final disposal¹²⁹.
- in four ULBs¹³⁰, bio-remediation was carried out. But due to problem in constructed SLF/non-availability of SLF, the inert (residue after processing of waste) was spread over the dumpsites.

¹²⁷ (i) Amritsar; and (ii) Sirhind.

¹²⁸ (i) Moga; and (ii) Sirhind.

¹²⁹ The work was stopped as per direction of higher authority due to non-following the set procedure in allotment of tenders.

¹³⁰ (i) Kiratpur Sahib; (ii) Khamanon; (iii) Mehraj; and (iv) Qadian.

- in two ULBs¹³¹, after biomining of legacy waste, soil/inert waste and separated polythene were found lying without final disposal.
- in ULB Ferozpur, after bio-remediation of legacy waste, the inert waste was filled in the SLF. During JPV, it was noticed that pipes for gasification¹³², connection with leachate tank and covering of side walls with High Density Polyethylene (HDPE) was not found as per the specifications of SLF issued (December 2022) by PMIDC for construction of SLF. Moreover, the processed waste was spread over the dumpsite. In ULB Rupnagar, the inert waste along with clothes, sanitary napkins, diapers etc. was dumped in a temporary tranche.
- in the remaining nine ULBs¹³³, the bio-remediation was in progress.

Six ULBs¹³⁴ stated (October 2024) that the legacy waste had been remediated. Seven ULBs¹³⁵ stated that the processing of legacy waste was in progress. Five ULBs¹³⁶ stated that efforts would be made for bio-remediation of waste available in the ULB. ULB Amritsar stated that the concessionaire was responsible for bio-remediation of legacy waste, failing which the notices were being issued and penalties were also imposed. ULB Adampur stated that the legacy waste related to the Air Force station was to be bio-remediated, which would be completed shortly. However, the records related to waste bio-remediated/ bio-remediation in progress were not provided by the ULBs concerned in support of their replies.

The replies confirmed that the bio-remediation and closure of all dumpsites were not completed by March 2021, as per the SWM Rules. The ULBs could not adhere to the timelines and even faced environmental compensation due to non-compliance with the SWM Rules.

2.4.5.5 Non-utilisation of machinery for legacy waste

The SWM Rules provide that ULBs would facilitate the construction, the Operation & Maintenance (O&M) of solid waste processing facilities and associated infrastructure on their own or with private sector participation or through any agency for the optimum utilisation of various components of solid waste. PMIDC also directed (March 2022) the ULBs that available solid waste management machinery, mechanical separators and trommels should be optimally utilised for bio-remediation of legacy waste to avoid penalty.

Audit observed that out of 20 selected ULBs, the concessionaires were

¹³¹ (i) Makhu; and (ii) Mansa.

¹³² Vent gas emission from the SLF.

¹³³ (i) Amritsar; (ii) Bathinda; (iii) Ludhiana; (iv) SAS Nagar; (v) Doraha; (vi) Ferozpur; (vii) Mansa; (viii) Rajpura; and (ix) SBS Nagar.

¹³⁴ (i) Kiratpur Sahib; (ii) Makhu; (iii) Mehraj; (iv) Khamanon; (v) Ferozpur; and (vi) Sirhind.

¹³⁵ (i) Mansa; (ii) Rajpura; (iii) Doraha; (iv) Moga; (v) Bathinda; (vi) SAS Nagar; and (vii) Ludhiana.

¹³⁶ (i) Bilga; (ii) SBS Nagar; (iii) Kartarpur; (iv) Rupnagar; and (v) Qadian.

involved for managing the solid waste in three ULBs¹³⁷. Thus, the O&M of machinery was also their responsibility. The remaining 17 ULBs purchased (July 2020 and September 2021) machinery (trommels/mechanical separators for management of legacy waste) at a cost of ₹ 185.40 lakh. However, in six ULBs¹³⁸, machines purchased during July 2020 and January 2021 were lying idle. This reflected the negligence of ULBs not only in the management of legacy waste despite the availability of machines but also resulted in an ungainful expenditure of ₹ 71.39 lakh (*Appendix 2.15*) on purchase.

In reply, ULB Kartarpur stated (October 2024) that the machinery would be used in future to remediate the waste as and when required. ULB Rajpura stated that the machinery was lying idle due to theft of motor. The same had been got repaired and was being utilised for the bio-remediation of legacy waste. ULB Doraha stated that the machine was lying idle due to non-availability of staff. ULB Sirhind stated the machinery was in use, but no records were maintained. ULB Mansa stated that the machinery was lying idle as the work of processing of legacy waste had been allotted to a contractor. ULB Moga stated that one machine was transferred to ULB Batala and the remaining were lying idle.

The replies were not acceptable as the SWM Rules and PMIDC directions fixed the responsibility of ULBs for ensuring optimal utilisation of machinery.

2.4.5.6 Sanitary Landfill Sites

Solid Waste Management Rules, 2016 describe Sanitary Land Filling (SLF) as the final and safe disposal of residual solid waste and inert waste on land in a facility designed with protective measures against pollution of ground and surface water, bad odour, animal menace etc. Schedule I(E)(i) of SWM Rules, 2016 provides that before establishing any landfill site, baseline data of ground water quality in the area would be collected and kept in record for future reference. SLFs were to be established by June 2020¹³⁹. Rule 15 (w) also bound the ULBs to undertake construction, operation and maintenance of SLF and associated infrastructure. Schedule I (A) (vii) and Schedule 1(B) of the Rules also provide that the SLF would be constructed as per prescribed criteria¹⁴⁰ and the requisite facilities¹⁴¹ should be available at SLF site.

¹³⁷ (i) Ludhiana; (ii) Amritsar; and (iii) Bathinda.

¹³⁸ (i) Rajpura; (ii) Doraha; (iii) Sirhind; (iv) Moga; (v) Kartarpur; and (vi) Mansa.

¹³⁹ Rule 22 of SWM Rules-The SLF were required to be constructed upto April 2018. This timeline had been revised by NGT upto June 2020.

¹⁴⁰ 100 meters away from river, 200 meters from a pond, 200 meters from Highways, Habitations, Public Parks and water supply wells and 20 km away from Airports or Airbase.

¹⁴¹ Fenced or hedged with proper gate to monitor incoming vehicles, to prevent entry of unauthorised persons and stray animals; availability of internal roads to ensure free movement of vehicles and other machinery, waste inspection facility, provisions like weigh bridge to measure quantity of waste brought at landfill site, fire protection equipment, drinking water and sanitary facilities, lighting arrangements, facility of health inspections of workers, provisions for parking, cleaning and washing of transport vehicles carrying solid waste.

(i) Availability and utilisation of SLFs

- SLFs were constructed only in eight ULBs¹⁴² but without ensuring/collection of baseline data of ground water quality (*Appendix 2.14*).
- Out of eight ULBs, the SLFs were found in use only in three ULBs¹⁴³ and in remaining five ULBs, SLFs were not in use due to various reasons¹⁴⁴.
- In Ferozpur ULB, pipes for gasification were not available at SLF. The banks of SLF were not covered with HDPE.

(ii) Non adoption of prescribed criteria in construction of SLFs

Analysis of constructed SLF with respect to criteria in eight ULBs (*Appendix 2.16*) showed that:

- The SLF was constructed near the habitation in ULB Ludhiana.
- In SAS Nagar, SLF was constructed within 20 KMs from airport for which no approval was obtained from Airport Authority.
- SLF was constructed near the highway in ULB Rajpura.
- SLF was constructed within the boundaries of water works from where the drinking water was supplied to general public in ULB Khamanon.

(iii) Non availability of facilities at SLFs

Physical visit showed shortcomings in facilities at SLFs (*Appendix 2.17*):

- In three ULBs¹⁴⁵ the SLFs were not fenced or hedged and gated to prevent stray animals.
- In four ULBs¹⁴⁶ the internal roads were not available, out of which in ULB Rajpura the road was covered under the waste.
- Pollution monitoring equipment was not available in any ULB.
- No record regarding utilisation of SLFs was maintained in any ULB.
- Weighbridge was available only in ULB Ludhiana.
- Firefighting equipment were not available in any of the eight ULBs.

¹⁴² (i) Ludhiana; (ii) SAS Nagar; (iii) Ferozpur; (iv) Rajpura; (v) Kiratpur Sahib; (vi) Makhu; (vii) Bathinda; and (viii) Khamanon.

¹⁴³ (i) Ferozpur; (ii) SAS Nagar; and (iii) Bathinda.

¹⁴⁴ (i) Kiratpur Sahib: due to increase of water table; (ii) Rajpura: the road was obscured under the waste; (iii) Ludhiana: concessionaire left the work; (iv) Makhu: reasons were not on records; and (v) Khamanon: the SLF was under construction.

¹⁴⁵ (i) Ludhiana; (ii) Rajpura; and (iii) Makhu.

¹⁴⁶ (i) Ferozpur; (ii) Makhu; (iii) Kiratpur Sahib; and (iv) Rajpura.

- The drinking water facilities were not available in four ULBs¹⁴⁷.
- Lighting facilities were available only in three ULBs¹⁴⁸.
- Health inspection facilities of workers were not available in any ULB.

In reply, eight ULBs¹⁴⁹ stated (October 2024) that SLF would be constructed in due course. In four ULBs¹⁵⁰ the SLF was under construction. Further, eight ULBs, where the SLFs were constructed, did not furnish replies pertaining to non-utilisation of SLF, construction of SLF against rules and facilities available at SLF site.

2.4.5.7 Leachate Management

Schedule-I D (iii) of SWM Rules, 2016 provides that to prevent pollution from landfill operations, the provisions for management of leachate¹⁵¹ including its collection and treatment would be made. The treated leachate would be recycled or utilised as permitted, otherwise would be released into the sewerage line, after meeting the standards specified in Schedule-II¹⁵². In no case, leachate would be released into open environment.

Audit observed that in all the selected ULBs the legacy waste existed (March 2022). However, leachate coming out of legacy waste was not managed in any ULB. Instances of non-management of the leachate noticed during JPV are discussed below:

In Amritsar, the concessionaire processed the legacy waste during September 2020 to November 2022. But the leachate of waste was not being managed due to which the leachate was found filled around the dumpsite.



Exhibit 14: Leachate at dumpsite, Amritsar

¹⁴⁷ (i) Ferozepur; (ii) Kiratpur Sahib; (iii) Makhu; and (iv) Khamanon.

¹⁴⁸ (i) Ludhiana; (ii) SAS Nagar; and (iii) Kiratpur Sahib.

¹⁴⁹ (i) Sirhind; (ii) SBS Nagar; (iii) Kartarpur; (iv) Doraha; (v) Mansa; (vi) Amritsar; (vii) Rupnagar; and (viii) Qadian.

¹⁵⁰ (i) Moga; (ii) Mehraj; (iii) Bilga; and (iv) Adampur.

¹⁵¹ The leachate is a thick liquid with strong odour with very high biochemical oxygen demand and chemical oxygen demand.

¹⁵² State Pollution Control Board was required to monitor the environmental standards and adherence to conditions as specified under the Schedule II for waste processing and disposal sites.

<p>In Ludhiana, the processing of waste was carried out by the concessionaire upto January 2021 in the SLF constructed in 2020 which was lying unused due to arbitration case. Accordingly, the processed waste was not disposed of and was mixed with the unprocessed waste. During JPV lots of leachate was found near the dumpsite.</p>	 <p>Exhibit 15: Leachate at dumpsite, Ludhiana</p>
<p>In Ferozpur, the processed inert waste was being deposited in SLF without ensuring the connection with the tank where leachate was to be collected.</p>	 <p>Exhibit 16: Leachate at SLF, Ferozpur</p>
<p>During physical visit of NP Khamanon, it was observed that the work of construction of landfill site allotted in May 2021 for ₹ 7.67 lakh was lying incomplete (January 2023) which was to be completed by November 2021. Further, despite the provision made in estimates, the leachate collecting tank was also not constructed.</p>	 <p>Exhibit 17: Leachate at SLF, Khamanon</p>
<p>In Kiratpur Sahib, it was observed that 45.05 MT legacy waste was processed during November 2021 to September 2022. However, the landfill site was constructed during February 2021 and it was required to be used for filling the inert waste (residue of legacy waste) but the inert waste was lying at the dumping ground.</p>	 <p>Exhibit 18: Leachate at dumpsite, Kiratpur Sahib</p>

During physical visit, leachate was also noticed in Corporation SAS Nagar at dumpsites.

In remaining ULBs, due to non-construction/ non-utilisation of SLF, management of leachate could not be carried out due to which seepage of leachate in the ground could not be ruled out. In six ULBs¹⁵³, leachate was coming out from compost pits.

¹⁵³ (i) SBS Nagar; (ii) Kartarpur; (iii) Adampur; (iv) Ferozpur; (v) Sirhind; and (vi) Rajpura.

Audit further observed that the PPCB tested¹⁵⁴ leachate for analysing the pH, Total Suspended Solid (TSS), Total Dissolved Solid (TDS), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) only in two ULB¹⁵⁵. Analysis of test reports revealed that the parameters of leachate were beyond the prescribed levels as given in **Table 2.9**.

Table 2.9: Results of leachate testing at dumpsite of Corporations, Ludhiana and Amritsar.

Parameters	Prescribed standards	Outcome of results					
		1 st test	Higher as compared to standards (3-2)	Percentage (compared to standards)	2 nd test	Higher as compared to standards (6-2)	Percentage (compared to standards)
1	2	3	4	5	6	7	8
Ludhiana							
pH	5.5 to 9.0	7.8	--	--	8.2	--	--
TSS	600	2,970	2,370	395	724	124	21
TDS	2,100	15,770	13,670	651	24,372	22,272	1,061
COD	250	5,640	5,390	2,156	5,980	5,730	2,292
BOD	350	2,200	1,850	529	2,450	2,100	600
Amritsar							
COD	250	6,170	5,920	2,368	-	-	-
BOD	350	2,622	2,272	649	-	-	-

Source: PPCB data & NIT Jalandhar Report

In reply, ULB Sirhind stated (October 2024) that very less quantity of leachate was generated in the compost pits which was passing through underground pipelines and mixed in the drain near to dump site. ULB Amritsar stated that the construction of Leachate Treatment Plant was not started by the concessionaire till date. ULB Rajpura stated that the leachate coming out from the compost pits was collected in the tank and reused in the compost pits for moisture. Corporation SAS Nagar stated that an Effluent Treatment Plant (ETP) had been installed for leachate management. ULB Ferozepur stated that the SLF was constructed in 2021 and no leachate had been generated as the SLF was not in use due to theft of polythene and pipes etc. ULB Khamanon stated that now leachate tank had been completed for collection of leachates from SLF. ULB Makhu stated that leachate management would be carried out whenever, the SLF would be used by the ULB. Corporation Ludhiana stated that the SLF was not in use due to termination of agreement with the concessionaire. 11 ULBs¹⁵⁶ stated that leachate management would be carried out after construction of sanitary landfill site in the ULB. Corporation Bathinda did not provide the information due to pending arbitration case.

The replies are not acceptable as ULBs could not manage leachate despite clear SWM Rules. Leachate was found untreated at dumpsites and test results showed severe pollution indicating non-compliance.

¹⁵⁴ Two times in Ludhiana (15.04.2020 and 04.12.2020) and one time (August 2022) in Amritsar.

¹⁵⁵ (i) Ludhiana; and (ii) Amritsar.

¹⁵⁶ (i) Rupnagar; (ii) SBS Nagar; (iii) Mehraj; (iv) Bilga; (v) Adampur; (vi) Kartarpur; (vii) Doraha; (viii) Moga; (ix) Kiratpur Sahib; (x) Mansa; and (xi) Qadian.

2.4.5.8 Non-notifying of Buffer Zone

Under SWM Rules, 2016, the Secretary, Local Government Department through the Commissioner or Director of Municipal Administration or Director of local bodies has to notify buffer zone¹⁵⁷ around the solid waste processing and disposal facilities of more than five tons per day in consultation with the State Pollution Control Board. Accordingly, the CPCB issued guidelines (April 2017) regarding the creation of a buffer zone to restrict residential, commercial or any other construction activity from the outer boundary of the waste processing and disposal facilities.

Audit observed that 13 ULBs were required to notify the buffer zones since their daily processing and disposal/waste generation was more than five TPD. However, the buffer zone was notified only by Corporation Bathinda.

ULB Ferozepur stated (October 2024) that the same was not done as the dump site was on private land. ULB Amritsar stated that it was proposed that the green belt would be considered and designated as a buffer zone during the construction of the proposed waste processing facility. But till date, none of the buffer zones have been declared. Four ULBs¹⁵⁸ stated that the buffer zone would be declared after finalisation of SLF sites in the ULB. Five ULBs¹⁵⁹ stated that the same would be done in due course. Corporation Bathinda stated that the buffer zone was being maintained by the ULB. Corporation Ludhiana stated that neither the notification of buffer zone had been done nor had any buffer zone been created at the site.

The replies were not tenable as despite mandatory requirements under SWM Rules and CPCB guidelines, buffer zones were not notified by 12 out of 13 ULBs. The absence of a buffer zone could increase the risk of incidents such as fire or explosions due to hazardous waste materials, which could harm workers and neighbouring communities. Besides, contaminants and pollutants from the processing site could enter the nearby soil and water sources, polluting the environment and disrupting local ecosystems.

2.4.5.9 Dumping of waste in unauthorised spaces

As per Rule 22 of SWM Rules, 2016, the timeline for identification of suitable sites for setting up solid waste processing facilities was fixed upto April 2017. However, as per the judgement of NGT, the date was extended upto 30 September 2019 in the State Action Plan (notified on 06 March 2019) for monitoring of waste management.

Audit observed that in two out of 20 selected ULBs, the waste was being dumped at unauthorised sites:

¹⁵⁷ Buffer zone is a zone (area) where no development to be carried out around solid waste processing and disposal facility.

¹⁵⁸ (i) Rupnagar; (ii) SBS Nagar; (iii) Kartarpur; and (iv) Doraha.

¹⁵⁹ (i) Sirhind; (ii) Rajpura; (iii) Moga; (iv) Mansa; and (v) SAS Nagar.

- (i) Municipal Council Doraha was dumping waste on the land which was leased out by the State Government to Ministry of Skill Development and Entrepreneurship, GoI in 1995. The Ministry had repeatedly asked the MC to suspend waste disposal activity at the site. However, no action had been taken by it (October 2022).
- (ii) In ULB Kartarpur the suitable site for waste processing/dumping and landfill was not identified (September 2022) and solid waste of the city was being dumped on the land owned by some private person.

ULB Kartarpur stated (October 2024) that two acres of land for SWM had been purchased, and now the waste was being sent to the new dumpsite. ULB Doraha stated that the dump site had been used since 1995 by the ULB and the land pertained to GoI. Efforts were being made by the ULB to get the land on lease for the dump site and make an SLF. The reply of ULB Kartarpur was unacceptable as the legacy waste spread on the unauthorised site was not bio-remediated.

Thus, though the collection of waste was satisfactory (98.51 *per cent*), the processing/ disposal of the waste was only 32 *per cent* during 2017-22 in the State (as discussed in *paragraph 2.4.2*) against the target of 100 *per cent*.

Further, the Department could not achieve SDG 11.6.1, which provides for regular collection and adequate final discharge out of total urban solid waste generated. To achieve this goal, the Department prepared (October 2019) a strategic plan for 2019-23.

2.4.6 Conclusion

Urban Local Bodies of the State could not utilise the available funds optimally as out of ₹ 1,011.33 crore available with the ULBs in the State for utilisation on SWM during 2017-22, expenditure of only ₹ 692.32 crore was incurred. Similarly, selected 20 ULBs, utilised only ₹ 306.87 crore against the available funds of ₹ 620.18 crore. The selected ULBs collected only ₹ 1.06 crore (0.52 *per cent*) as user charges against the projection of ₹ 204.84 crore during April 2019 and March 2022. The efficiency of the collection of waste was not appropriate, as evidenced by the instances of depositing waste into water bodies, the creation of Garbage Vulnerable Points, etc. The segregation of waste was inefficient as the unsegregated waste, including hazardous waste, sanitary waste and mixed waste was found at dumpsites during physical visits.

The processing of waste including legacy waste was deficient as the requisite number of Material Recovery Facilities, Compost Pits, Sanitary Landfill facilities were not constructed due to which 68 *per cent* collected waste remained unprocessed leading to accumulation of legacy waste. This would lead to generation of harmful gases like Methane, which is a potent greenhouse gas and contributes to climate change. Due to this, cases of fire

breakouts at dumpsites were observed and in one such incidence seven persons were burnt to death and NGT levied a penalty of ₹ 100 crore in this case.

2.4.7 Recommendations

The Government/ULBs may ensure:

- *optimum and full utilisation of available funds for creating better civic facilities for SWM to lessen the adverse effects of accumulation of solid waste;*
- *the collection of due user charges from waste generators for financial sustainability of ULBs; and*
- *compliance with SWM Rules to increase the efficiency in collection, segregation, transportation and disposal of solid waste including legacy waste in scientific manner to protect the public and environment from the hazardous effects of untreated waste.*

2.5 Implementation of SWM projects

Municipal Solid Waste Management projects can be made viable by prescribing appropriate fees or tipping fees for the services rendered, sale of end products from the processing of waste, allocation of funds from municipal internal resources and Government grants, viability gap funding from the Government (if any) and introducing Public Private Partnerships (PPP) by encouraging private sector investments. To assess the SWM projects, following Audit objective has been framed:

“Whether the implementation, operation and maintenance of Solid Waste Management projects in ULBs were effective, efficient and financially sustainable”.

Issues related to identification and implementation of various SWM projects i.e. PPP; C&D waste management; carcass management; construction, operation and maintenance of slaughterhouses have been discussed in the succeeding paragraphs:

2.5.1 Identification of Public Private Partnership Projects

Government of Punjab, LGD prepared (January 2014) Municipal Solid Waste Management (MSWM) Plan. Scrutiny of records of PMIDC showed that the LGD adopted a cluster approach and formed eight¹⁶⁰ clusters to cover all the ULBs of the State (January 2014). LGD planned to develop these clusters on PPP basis and the Solid Waste Management was required to be carried out in all the ULBs.

¹⁶⁰ Each cluster had ULBs ranging between eight and 27.

Though PPP projects were identified in all the eight clusters, the projects could be started only in five clusters. Out of these, in four clusters, projects were under arbitration (September 2022) and only one project was in operation in ULB Amritsar.

Due to pending arbitration cases, records were not made available to Audit by two selected ULBs¹⁶¹ for the period from April 2017 to March 2022. The audit findings pertaining to SWM projects in selected ULBs are discussed further.

2.5.2 Evaluation of Integrated Solid Waste Management

Municipal Corporation Amritsar allotted (March 2016) Integrated Solid Waste Management (ISWM) project to a concessionaire for 25 years (till 2041). The concessionaire was responsible for collection of segregated waste from the waste generators, elimination of secondary points, transportation and processing of waste. Bio-remediation of legacy waste at three dump sites¹⁶² was also part of the project (to be completed by March 2017). The concessionaire was required to provide facilities of composting, RDF plant, recycling unit and development of SLF for scientific disposal of rejects generated from processing of MSW. The agreement provided for collection & transportation and processing & disposal at the rate of ₹ 1350 per MT and ₹ 375 per MT respectively. Other concessions, viz. grant of ₹ 20 crore from GoP, the collection and utilisation of user charges from waste generators, the storage and sale of by-products and the use of unutilised space available at the project facilities for displaying advertisements were also to be extended to the concessionaire.

Despite lapse of more than six years since the project began and after a payment of ₹ 107.51 crore to the concessionaire as tipping fee for collection and transportation of waste apart from a grant of ₹ eight crore, the project was still not fully operational. Corporation Amritsar issued several notices to the concessionaire for deficiencies¹⁶³ in implementation of SWM project. However, the shortcomings¹⁶⁴ in waste management persisted which are discussed in following paragraphs.

2.5.2.1 Creation of SWM facilities

The concession agreement provided for proper implementation of project and time schedule to provide the processing facilities required for proper SWM. The inability of concessionaire to adhere to the timelines in creation of processing facilities are discussed below:

¹⁶¹ (i) Bathinda (April 2017 to March 2022); and (ii) Ludhiana (April 2017 to January 2021).

¹⁶² (i) Bhagtanwala; (ii) Chabbal Road; and (iii) Chheharta (Naraingarh).

¹⁶³ Deteriorating performance, lacunae in working and non-installation of facilities.

¹⁶⁴ Processing of waste, bio-remediation of legacy waste, non-installation of waste to energy plant and Sanitary Landfill Facility, non-removal of secondary points etc.

(i) Bio-remediation of legacy waste

As per Annexure 3.1 (g) read with Annexure 14 of the agreement, bio-remediation of accumulated waste and closure of all three old dumping sites was required to be done by the concessionaire by 12 March 2017¹⁶⁵.

Scrutiny of records showed that 12.35 lakh MT legacy waste was accumulated (November 2022) at three dumping sites¹⁶⁶. However, the complete bio-remediation and closure of all the dump sites¹⁶⁷ was not done (December 2022) by the concessionaire even after lapse of more than seven years from the target date prescribed in the agreement and regular payment of tipping fees of ₹ 107.51 crore during the period August 2016 to March 2022. Examination of records revealed that only 4,96,988 MT legacy waste was bio-remediated during September 2020 to November 2022 by the concessionaire. The Environmental Engineer, PPCB, also reported during physical visit (March 2022) that no legacy waste was being bio-remediated.



Exhibit 19: Unprocessed legacy waste at Bhagtanwala dump site, Amritsar

The ULB stated (October 2024) that all bio-remediation machinery had been stopped by the concessionaire. Several notices were issued to the concessionaire to speed up the bio-remediation. Corporation Amritsar had sent one trommel for repair at the concessionaire's cost to restart the bio-remediation of legacy waste itself and will also get repaired four additional trommels and one ballistic separator to enhance bio-remediation capacity. Additionally, Corporation Amritsar was imposing a two *per cent* penalty for bio-remediation in accordance with the Concession Agreement.

The reply was not acceptable as the objective of the project was to manage MSW scientifically. Thus, due to the inability of the ULB to take timely action against the concessionaire, the legacy waste of 2.93 lakh MT (as per DPR 2016) at Bhagtanwala dumpsite increased to 11.35 lakh MT, creating environment hazards for the public despite regular payments of tipping fees. Moreover, the closure of the other two dumpsites was also not ensured by the ULB in timely manner.

(ii) Non-installation of weigh bridge

The agreement provided for mandatory installation and operation of weigh bridges by the concessionaire at the site having suitable systems to determine the quantity of MSW being received at the project/processing site.

¹⁶⁵ Bhagtanwala dump site within 180 days; and Chhabal & Chhehrata dumpsites within 360 days from the date of agreement.

¹⁶⁶ (i) Bhagtanwala: 11.10 lakh MT; (ii) Chhabal Road: 0.80 lakh MT; and (iii) Chhehrta: 0.45 lakh MT.

¹⁶⁷ Total legacy waste bio-remediated: (i) Bhagtanwala dump site: 4.97 lakh MT; and (ii) Chhabal road: 0.10 lakh MT.

During scrutiny of records and physical inspection of the waste processing site at Bhagtanwala, it was observed that the concessionaire was using a private weigh bridge due to the non-availability of an installed weighbridge.

The ULB stated (October 2024) that multiple notices were issued to the concessionaire for non-installation of the weighbridge, and the concessionaire would be directed again to install its own weighbridge as per the terms of the agreement.

Audit analysed the details of weighbridge and tipping fee records for the month of March 2022 and compared the unladen weight of the same vehicles and observed as below:

- (i) Unladen weight¹⁶⁸ of a vehicle bearing registration no. MH02 CE 8352 was 13,080 Kgs on 21.03.2022 whereas, it was 10,060 Kgs on 28.03.2022.
- (ii) Unladen weight of vehicle bearing registration no. TR-8947 was 7,520 Kgs at 1:18 PM on 26.03.2022, whereas it was 5,490 Kgs at 4:21 PM on the same day.
- (iii) Unladen weight of vehicle bearing registration no. PB02 CR 9660 was 11,400 Kgs on 08.03.2022, whereas it was 10,390 Kgs on 31.03.2022.

The ULB stated (August 2023) that sometimes leachate and remains of waste had been left in the vehicles, which might be a cause of variation. The reply was not acceptable as a significant variation up to 3.02 MT would be an unreasonable cause of leftover waste in the vehicles. This raised doubt over the actual transportation of solid waste. Audit noticed irregularities in the measurement of waste being transported. There was a need to provide adequate weighbridges at the processing facilities to ensure better monitoring and compliance.

(iii) Elimination of Secondary Collection Points

The 'scope of work' and performance parameters of the Agreement stipulated that 30 per cent, 60 per cent and 90-100 per cent secondary points¹⁶⁹ were required to be eliminated¹⁷⁰ in two, three and five years respectively from commencement of Collection and Transportation (C&T) operations. As per Annexure 18 (vii) of the Agreement it was stipulated that if the difference from target exceeds five per cent, for every decrease in elimination of these secondary points from stipulated target (mentioned month wise), the concessionaire would be penalised at the rate of two per cent of corresponding monthly fee payable against collection and transportation.

¹⁶⁸ Unladen weight is weight of the vehicle when it is not carrying any passengers, goods or other items.

¹⁶⁹ Secondary storage points refer to locations such as primary container bins or open dumping areas where waste generators dispose of the waste.

¹⁷⁰ Annexure 3.4.2 (f) of the agreement provides that the concessionaire shall ensure that elimination of Secondary Collection Points means MSW free points.

Scrutiny of records showed that out of 300 secondary points in Amritsar (March 2016), 80 secondary points (26.66 *per cent*) were eliminated upto November 2021 i.e. after lapse of more than five years from the date of agreement whereas as per schedule there should have been *cent per cent* elimination by July 2021. As per the agreement, Corporation Amritsar should have imposed a penalty of ₹ 43.32 crore for the shortfall of 73 *per cent* which was not imposed.

The ULB stated (October 2024) that initially, there were 300 secondary points, and these points were gradually reduced and replaced with secondary bins. Therefore, the penalty for the removal of secondary points was not imposed on the concessionaire. The ULB added that, presently, there were 145 secondary bins/points for which notices had been issued to the concessionaire to make the city free of secondary bins/secondary points.

The reply was not acceptable as the removal of secondary collection points, including containers, was within the scope of work of the concessionaire, which was not ensured by the ULB.

(iv) *Non-construction of Sanitary Landfill Site*

Annexure 2 of the agreement provides that SLFs would be developed for scientific disposal of rejects or inert waste.

Scrutiny of records showed that out of three dumping sites, only one was operational in the ULB Amritsar. Examination of records from September 2020 to November 2022 showed that out of a total of 12.35 lakh MT of legacy waste, only 4.97 lakh MT of waste was bio-remediated. From this bio-remediated waste, an estimated 27,423 MT inert was recovered, which was required to be sent to the landfill site. However, the landfill site for final disposal of inert waste was not constructed by the concessionaire leaving the inert waste at the dumpsite.

The ULB stated (October 2024) that SLF would be constructed after the remediation of legacy waste. The reply was not acceptable as the concessionaire had already carried out bio-remediation and due to the non-construction of SLF, the inert waste would pollute the groundwater and surface water in the absence of scientific disposal.

(v) *Non-construction of Leachate Collection and Treatment Plant*

The concessionaire had to construct facilities adequately designed to meet minimum criteria including leachate¹⁷¹ collection system and comply with instructions issued from time to time by any Government authority. The NGT issued (January 2020) instructions for disposal of leachate in a scientific and environment friendly manner.

¹⁷¹ Leachate is the contaminated liquid which is generated from water percolating through a solid waste disposal site, accumulating contaminants and moving into sub surface areas.

Audit noticed that the leachate collection and treatment plant was not constructed by the concessionaire and Corporation Amritsar had instructed (May 2022) the concessionaire to begin construction of the leachate collection and treatment plant without further delay. During JPV, it was noticed (December 2022) that a huge quantity of untreated leachate was accumulated at Bhagtanwala dump/ processing site. The work for designing of leachate treatment plant was assigned (December 2021) to NIT Jalandhar against which the status report was prepared by the NIT (August 2022).



Exhibit 20: Leachate spread at dumpsite of Bhagtanwala in Amritsar

The ULB stated (October 2024) that the design for construction of leachate treatment plant was prepared (May 2023) by NIT Jalandhar. But the construction of Leachate Treatment Plant was not started by the concessionaire till date. The point remained that the designing and construction of the leachate treatment was within the scope of work of the concessionaire. However, the design of the leachate plant was provided in May 2023, after a delay of almost seven years from the date of agreement (i.e. March 2016) which delayed the construction of leachate treatment plant and leading to accumulation of leachate. This delay not only violated the orders of NGT but also adversely affected the environment and may lead to contamination of groundwater.

2.5.2.2 Benefit to the concessionaire due to overloading of vehicles

The agreement stipulated that no payment of overloading¹⁷² would be considered. Payment of MSW transported would be governed by the maximum carrying capacity shown in the Registration Certificates (RC) of vehicles and be made on the difference of Gross Weight (subject to maximum of laden weight mentioned in RC) less tare weight¹⁷³. The RCs of all vehicles deployed for collection and transportation of waste were to be submitted to the concessioning authority and the maximum carrying capacity of the vehicle was to be determined from the gross carrying capacity specified in the RC.

Corporation Amritsar provided records of tipping fee (paid on the basis of weight of the waste transported) for the period April 2020 to March 2022¹⁷⁴. Audit cross-examined the weight of 58 vehicles in which the waste was transported with the maximum load capacity available with Ministry of Road Transport and Highways website. It was noted that the waste was transported beyond the carrying capacity by 22 vehicles ranging between 10 Kgs to as much as 7,870 Kgs. Corporation Amritsar did not make any deduction on

¹⁷² Load above the approved carrying capacity of the vehicle.

¹⁷³ Tare weight called unladen weight, is the weight of an empty vehicle.

¹⁷⁴ Records from April 2017 to March 2020 along with RCs of the vehicles were not provided.

account of overloading of waste despite issuing notices regarding overloading in October 2020 as provided in agreement due to which excess payment of tipping fees of ₹ 5.69 crore was made to the concessionaire.

The ULB stated (October 2024) that there was no appropriate mechanism of measurement of weight at the time of loading of the vehicles, however concessionaire would be directed to carry the maximum permissible weight only in the vehicles. The reply was not acceptable as there were continuous defaults by the concessionaire in transporting solid waste beyond the permissible capacity for which the ULB had made extra payment in contravention of Rules.

2.5.2.3 Undue financial benefit to the concessionaire

Clause 3.2 (3) of the Agreement provides that project facility would be adequately designed to meet minimum criteria as per applicable laws and be able to cater to scope of the project specifically including site boundaries and buffer area.

Audit observed that boundary wall of the processing site was constructed by Corporation Amritsar on three sides of the dumping/processing site after incurring an expenditure of ₹ 1.12 crore in September 2021 although the construction of boundary wall/fencing was within the scope of the work of the concessionaire. Thus, an avoidable expenditure of ₹ 1.12 crore incurred in contravention of agreement provision.

The ULB stated (October 2024) that fencing of only internal processing facilities was in the scope of work of the concessionaire and the ULB constructed outer boundary of the processing facility to provide processing facility as per provisions of the agreement.

The reply was not acceptable as site boundaries were specifically included in Clause 3.2 (3) of scope of work of the concessionaire (the site boundaries were not defined separately as internal or external). Moreover, as per clause 3.3.6 of the agreement the scope of work also included the fencing of buffer area even outside the site boundaries with a minimum height of two meters surrounding the processing facility.

2.5.2.4 Non-adherence of various monitoring mechanism

The concessionaire did not maintain a website to provide details of the project as required under the agreement obligations despite receiving regular monthly tipping fees for the collection and transportation of MSW for a period of more than six years. This resulted in lack of effective complaint redressal mechanism¹⁷⁵ as per the requirement of the agreement.

¹⁷⁵ This system (includes phones, website, written complaints, information etc.) should be established by the concessionaire within 90 days from the commencement of collection and transport (C&T) operations.

As per the insurance clause of the agreement, the concessionaire was to purchase and maintain insurance policies covering various aspects¹⁷⁶ of the project at its cost. However, the concessionaire did not maintain insurance policies as per the requirement of the agreement.

The concessionaire did not submit annual reports to the concessioning authority as required under Rule 19 of SWM Rules, 2016, during 2017-22.

The Concessioning Authority¹⁷⁷ had neither appointed the Project Engineer (PE)¹⁷⁸ nor the Independent Expert (IE)¹⁷⁹ for monitoring of solid waste activities of the concessionaire.

The ULB stated (October 2024) that the concessionaire had been directed to make the website, ensure timely submission of annual reports and furnish the insurance details. It was also stated that the Project Engineer and Independent Expert would be appointed very soon in accordance with the concession agreement.

Despite the lapse of more than six years from the start of the concession agreement and regular payments of tipping fees to the concessionaire for transportation of waste, ULB Amritsar could not ensure the closure of three dumpsites, elimination of all secondary collection points and construction of SLFs and installation of weigh bridge etc. All these lacunae lead to poor implementation of this project and hence, ineffective municipal solid waste management.

2.5.3 Issues in Tendering

The MSWM Manual states that the tender should clearly specify the technical and financial capability required to perform the task proposed to be outsourced. The qualification criteria should be standardised and should provide equal opportunities to all parties interested in undertaking the task. Audit observed the following irregularities in tendering process:

2.5.3.1 Allotment of work deviating from tendering instructions

Local Government Department issued (August 2018) instructions regarding Standard Operating Procedure (SoP) for execution of all types of development works/O&M works, hiring of machinery and procurement of goods. As per

¹⁷⁶ (a) Builders'/contractors' all risk insurance; (b) Erection insurance and/or break down insurance; (c) Public liability insurance applicable for the concession period, closure and post closure period; (d) Statutory insurances such as workmen's compensation insurance or any other insurance required by the applicable laws; (e) Comprehensive Third-Party liability insurance including injury or death to Persons who may enter the site; (f) Insurance policies related to any of the concessionaire's obligations hereunder; and (g) any other insurance that may be considered necessary by the concessioning authority.

¹⁷⁷ Clause 2.2.2.1 of article 2 read with article 4 and annexures 10 and 11 of the agreement provides that a Project Engineer (PE) and Independent Expert (IE) would be appointed by the Concessioning Authority.

¹⁷⁸ The PE would be nodal person for supervision and monitoring of the project.

¹⁷⁹ The IE was responsible for monitoring of collection and transportation plan, review, inspection and monitoring of construction works and Operation and Maintenance.

the SoP, the most preferred competitive and transparent mode of tendering was to be adopted for open/advertised tenders. Further, the comparative statement of work having cost of more than ₹ five crore should be got approved from a committee comprising of three Chief Engineers (CEs).

(i) Scrutiny of records of Corporation Ludhiana showed that the work of collection, transportation, disposal and processing of waste generated in Ludhiana city was allotted to an agency in November 2011 with a concession period of 25 years. The work was done by the concessionaire upto January 2021. The contractor terminated (February 2021) the contract due to non-payment of arrears, non-declaration of no development zone, non-creation of market for sale of RDF etc. At the time of termination of the agreement, the contractor was being paid tipping fee at the rate of ₹ 324.18 per MT for collection and transportation of MSW.

It was observed that after termination of the agreement, the work was awarded (February 2021) to another contractor at the same tipping fee rate of ₹ 324.18 per MT without inviting tenders and without a formal agreement on the plea that the lifting of waste would be done by the new contractor till finalisation of fresh tender. The tipping rates were revised to ₹ 425 per MT in August 2021. During February 2021 to March 2022, the new contractor lifted 4,21,993 MT waste for which ₹ 16.19 crore was paid to the contractor. The contractor was still engaged in the work and Corporation Ludhiana did not proceed with any fresh tender notice till April 2024. Thus, engaging the contractor without any formal tender and making payment of ₹ 16.19 crore including ₹ 2.52 crore on account of revised¹⁸⁰ rates was irregular.

The ULB stated (October 2024) that the work was allotted to the contractor to avoid inconvenience to the public. The revised rates and work were allowed to continue with the contractor after passing the same in the House (i.e. by the Corporation). The reply was not acceptable as the allotment of work without inviting tenders or a formal agreement was not only a departure from standard instructions but could also lead to legal complications.

(ii) Scrutiny of records (October 2022) revealed that the tenders for management of legacy waste were floated (December 2021) in 10 ULBs¹⁸¹ and the work was allotted (December 2021) to an agency without approval of the Committee of three CEs. Out of these, one ULB i.e. Doraha was selected in the Performance Audit. In this ULB, the agency processed 10,400 MT legacy waste out of 13,000 MT upto June 2022. However, due to non-obtaining approval from the competent authorities, the work was stopped by cancelling the agreement in August 2022. JPV revealed that the processed legacy waste along with compost and inert waste was lying at the site as

¹⁸⁰ Rates were revised from ₹ 324.18 to ₹ 425 per MT in August 2021.

¹⁸¹ (i) Khanna; (ii) Doraha; (iii) Payal; (iv) Maloud; (v) Sahnewal; (vi) Samrala; (vii) Machhiwara; (viii) Raikot; (ix) Jagraon; and (x) Mullanpur Dakha.

depicted in the pictures below:



Exhibit 21: Processed waste lying at dumpsite of MC Doraha

While admitting the facts, the ULB stated (October 2024) that due to non-following of the SoP, the Headquarters' office had cancelled the tenders for remediation of legacy waste. However, the bio-remediated material had been lifted by the contractor and tenders for remaining legacy waste had been allotted.

Thus, due to the lapse on the part of ULB to allot the work without following the procedure, the work remained incomplete resulting in accumulation of huge quantity of waste at site besides creating environmental and health hazards for public residing near the dumpsite.

2.5.3.2 Cost overrun due to delay in tendering process

(i) Government of India, Ministry of Food Processing Industries (MFPI) approved (March 2015) a project for modernisation of existing slaughterhouse in Ludhiana at a cost of ₹ 15.86 crore¹⁸² based on DPR prepared in March 2014 for ₹ 19.50 crore. Out of ₹ 15.86 crore, the GoI share was ₹ 7.93 crore and the remaining funds were to be provided by the ULB from its own sources.

Audit observed that although the project was approved in March 2015, Corporation Ludhiana appointed Project Management Consultant in August 2016 i.e. after lapse of more than 17 months from the date of approval and the Request For Proposal was sent to PMIDC in December 2016 which was returned by PMIDC in February 2017. It was observed that after a lapse of two years, the ULB called the tenders, but the same could not be finalised due to submission of single bid on four occasions. On fourth call, the single bid was submitted (December 2017) to higher authorities for approval which was approved (May 2018). However, again due to issues with the website, the tenders could not be finalised. Meanwhile, the Goods and Service Tax (GST) was introduced in July 2017. The tenders were again floated (June 2018) for ₹17.72 crore against which the bidder quoted a bid of ₹ 20.82 crore (₹ 17.65 crore *plus* additional GST of ₹ 3.17 crore) which was finalised (September 2018).

¹⁸² Against the projected cost of ₹ 19.50 crore (including ₹ 17.72 crore for cost of civil work, plant & machinery and misc. assets).

Thus, had the ULB Ludhiana initiated and completed the tendering process timely after approval of the project, the cost overrun of ₹ 3.17 crore on account of implementation of GST could have been avoided.

The ULB stated (October 2024) that the time had elapsed in adopting the procedures and formalities and GST was introduced during this time. The reply was not acceptable as it had sufficient time (i.e. 41 months), to complete all the formalities from the date of approval to allotment of work.

(ii) The estimate for construction of nine sheds for MRFs at different locations in Ludhiana was sanctioned (November 2019) for ₹ 97.39 lakh and Administrative Approval (AA) was accorded in a resolution passed in November 2019 under SBM funds. Despite AA, Corporation Ludhiana delayed the tendering process for nine months without any reasons on record. Meanwhile, the Common Schedule of Rates (CSR) was revised (August 2020) and a revised estimate for ₹ 115.07 lakh was prepared and tenders were floated in September 2020. Due to applicability of new CSR rates, the rates were increased by ₹ 17.68 lakh (18 per cent).

Audit noticed that an estimate of a similar nature of other work i.e. construction of nine sheds for MRFs was sanctioned in August 2019 for ₹ 94.78 lakh. The work was allotted in December 2019 to a contractor for ₹ 87.30 lakh and it was completed after incurring an expenditure of ₹ 87.15 lakh. Had the earlier work been started on time, additional burden of ₹ 17.68 lakh due to revision of CSR rates could have been avoided.

The Corporation Ludhiana stated (October 2024) that CSR rates were due to be revised in 2020 and no contractor was ready to execute the work on the CSR rates of 2010. Hence, Corporation Ludhiana awaited the revision of CSR rates and after revision of CSR rates in August 2020, the estimate had been revised accordingly and work was allotted to the contractor. The reply is not acceptable as there was nothing on record to support their claim that the contractor was not ready to execute the work as the tenders were not floated prior to revision of CSR. Moreover, the work of similar nature under Corporation Ludhiana, allotted in December 2019, was completed timely by the agency.

2.5.4 Carcass management in selected ULBs

As per 20th Census of livestock, India had 535.78 million livestock in 2019 and it is estimated that about 25 million cattle die of natural causes every year. The carcasses of dead cattle are usually left for carrion after removal of hide. This is not only an environmental and health hazard but also a waste of valuable resources. The carcass and its by-products can be utilised for economic and public health importance with increased thrust on pollution control.

The guidelines for carcass disposal issued (November 2020) by CPCB

stipulate that carcass should be utilised by adopting rendering process or incineration and priority should be given to carcass utilisation plant. Disposal of carcass through deep burial should be done only in those cases where facilities of carcass utilisation plant or incinerator were yet to be developed.

Scrutiny of records of 20 selected ULBs revealed that carcass management was being done by disposing of carcass through various traditional methods¹⁸³. However, only in Corporation Ludhiana, the modern carcass utilisation plant was installed and the status of carcass management in this ULB as well as in other selected ULBs is discussed below:

2.5.4.1 Ungainful expenditure on Modern Carcass Utilisation Plant

The Municipal Corporation Ludhiana proposed to establish a Carcass Utilisation Plant at village Nurpur Bet on five acres of land for the scientific disposal of dead animals. The DPR estimated the cost of the plant at ₹ 8.01 crore, which included seven years of O&M. The raw material for the proposed project was dead animals, with an expected daily intake of 100-150 small animals and 50-70 large animals.

Clause 6.2.4 of the DPR highlighted that if the project was not managed professionally, it could pose a serious threat to public health and environment and any objections from local residents could halt the construction and progress of the project.

The work was allotted (July 2019) for ₹ 7.99 crore, with a completion deadline of June 2020. However, the project was completed in May 2021 at a cost of ₹ 8.48 crore, after a delay of almost 11 months.

Audit observed that the project could not be inaugurated due to public protest as the Corporation undertook the project without securing consent from the local community despite the threat already being anticipated in the DPR. Corporation Ludhiana confirmed (October 2024) that Carcass Utilisation Plant could not be started due to public protest.

2.5.4.2 Unscientific carcass management

Audit observed that in 17 ULBs, the carcasses were being managed either by handing over the same to people of other villages engaged in this business or through tenders. In remaining two ULBs¹⁸⁴ the carcasses were being disposed of near the dumping sites. Corporation Amritsar provided the data of dead animals only for seven months (July 2021 to February 2022). As per data, 342 animals had died in the gaushalas. Dead animals were being disposed of unscientifically by burial at the existing Bhagtanwala dumping site. In addition, during JVP, dead animals' carcasses were seen abandoned at the

¹⁸³ Lifting of carcass by persons involved in this profession, disposal of carcass at identified land and carcass disposal by the people of nearby villages area outside the jurisdiction of ULBs.

¹⁸⁴ (i) Amritsar; and (ii) Rajpura.

Chhabal Road, Amritsar dumpsite. In MC Rajpura, the carcasses were also disposed of in open space near the dumpsite.



Exhibit 22: Unscientific disposal of carcass at Chhabal road site, Amritsar

Corporation Amritsar stated (October 2024) that there was no scientific plant for management of carcasses and the dead animal were lifted by the concessionaire and being buried at dumpsite or other places. Higher authorities would be approached for establishment of carcass utilisation centre. Five ULBs¹⁸⁵ stated that the issue is noted for compliance and necessary action will be made as per rule. 13 ULBs¹⁸⁶ stated that they had no site/plant for disposal of carcass waste and the dead animals were carried to the Hadda-rodhi sites by the private persons engaged in this business. However, efforts would be made for scientific management of carcasses.

The replies of ULBs were inadequate as scientific management of carcasses was mandatory under SWM Rules, 2016. Non-utilisation of modern carcass utilisation plant in Ludhiana and current practices of open disposal and burial at dumpsites pose environmental and health risks.

2.5.5 Management of slaughter waste

Paragraph 7.6 of MSWM Manual stipulates that scientific processing and disposal of slaughterhouse waste is essential to recover useful fractions and for safe disposal of residual pathogenic biological wastes. Processes undertaken in a modern slaughterhouse include slaughtering, dressing, cutting, inspection of meats, refrigeration, curing and manufacturing of by-products. Audit observed:

Out of 20 selected ULBs, no organised slaughterhouse facility was available in 17 ULBs.

16 ULBs¹⁸⁷ stated (October 2024) that they had no slaughterhouse and shopkeepers slaughter the animals at their own. One ULB (*viz.* ULB Moga)

¹⁸⁵ (i) Moga; (ii) Khamanon; (iii) Ferozepur; (iv) Sirhind; and (v) Mansa.

¹⁸⁶ (i) Rupnagar; (ii) Adampur; (iii) Kartarpur; (iv) SBS Nagar; (v) Kiratpur Sahib; (vi) Bilga; (vii) Makhu; (viii) Mehraj; (ix) Qadian; (x) Doraha; (xi) Bathinda; (xii) Rajpura; and (xiii) SAS Nagar.

¹⁸⁷ (i) Bathinda; (ii) Ferozepur; (iii) Sirhind; (iv) Rupnagar; (v) Adampur; (vi) Kartarpur; (vii) SBS Nagar; (viii) Doraha; (ix) Rajpura; (x) Mansa; (xi) Khamanon; (xii) Kiratpur Sahib; (xiii) Bilga; (xiv) Makhu; (xv) Mehraj; and (xvi) Qadian.

stated that the ULB had constructed a slaughterhouse in 2012 but necessary consents from the PPCB would be obtained as per rule.

Further in three ULBs (Amritsar, Ludhiana and SAS Nagar) either the constructed slaughterhouses were not in use or were lying incomplete due to site specific issues as detailed below.

(i) Municipal Corporation Ludhiana

Ministry of Food Processing Industries approved (March 2015) a project for ₹ 15.86¹⁸⁸ crore for modernisation of existing slaughterhouse on the basis of DPR of ₹ 19.50 crore. The abattoir with capacity of daily slaughter of 250 small animals (Halal) and 250 small animals (Jhatka) as well as 2,000 poultry per hour and 150 pigs per day also included construction of an ETP with capacity of 100 kilo litre per day.

However, scrutiny of DPR in Corporation Ludhiana showed that no survey of slaughtering in the city was conducted. The work was allotted to a contractor (September 2018) for ₹ 20.82 crore with the schedule completion time of 16 months. The work was completed (January 2020) after incurring an expenditure of ₹ 20.57 crore. Audit observed that 2,215 small animals (sheep/goat) and 1,19,949 poultry were slaughtered during July 2021 to March 2022 against the installed capacity of 1,29,000¹⁸⁹ and 5,16,000¹⁹⁰ respectively. Despite under-utilisation of the slaughterhouse and also adverse media reports (November 2021), no efforts were made to run the slaughter house to its full capacity by the ULB.

The ULB stated (October 2024) that the slaughterhouse was completed in June 2020 but could not be operated as planned due to a lack of awareness. Efforts would be made to ensure it runs at full capacity.

(ii) Municipal Corporation SAS Nagar

With a view to dispose of the slaughtering waste scientifically, MoFPI sanctioned (November 2014) ₹ 8.09 crore for modernisation of the existing slaughterhouse in Corporation SAS Nagar and released (February 2015) ₹ 33.25 lakh as first instalment. The work was allotted to a contractor in January 2016 for ₹ 7.99 crore due to be completed in January 2017. The contractor started the work in February 2016 but stopped (April 2016) it as per instructions of the Corporation due to public protest. The Corporation had made efforts (June 2017) to change the site to any other area but since the new site was available near an industrial area, PPCB refused to issue (December 2017) No Objection Certificate. The Corporation had already paid ₹ 39.95 lakh to the contractor for execution of the work. In May 2021, GoI

¹⁸⁸ The difference between DPR cost and approved cost was due to fixing the eligible cost of the project.

¹⁸⁹ Total days 304 less 46 days due to closure multiply by 500 small animals .

¹⁹⁰ Total days 304 less 46 days due to closure multiply by 2000 birds.

cancelled the project due to inordinate delay and demanded refund of the released funds. Pursuant to the directions, Corporation SAS Nagar refunded ₹ 33.25 lakh in October 2021 to GoI from its own available funds.

Thus, due to non-selection of another suitable site for modern slaughterhouse, the Corporation had not only incurred unproductive expenditure of ₹ 39.95 lakh but could also not ensure the scientific disposal of slaughtering waste.

Municipal Corporation SAS Nagar stated (October 2024) that an ETP for liquid waste had been installed in ULB. Solid waste from slaughtered animals is presently disposed of by shopkeepers at their own level. Efforts would be made for scientific disposal of this waste at the earliest.

(iii) Municipal Corporation Amritsar

In Corporation Amritsar, the slaughtering was done and liquid waste was being disposed through ETP. However, the records of disposal of solid waste were not maintained. Neither the ULBs had any data in this regard nor any license was issued to shopkeepers as required under Section 331 and 334 of Punjab Municipal Corporation Act, 1976.

ULB Amritsar stated (October 2024) that an ETP for liquid waste had been installed in ULB. Solid waste from slaughtered animals is presently disposed of by shopkeepers at their own level.

The replies of the ULBs were not satisfactory as the ULBs were responsible for ensuring scientific disposal of slaughterhouse waste. Leaving waste management to shopkeepers without regulation violates the MSWM Manual. Non-operation of completed slaughterhouses and inability to maintain solid waste records indicate lapses in environmental management.

2.5.6 Construction and Demolition Waste Management

Solid Waste Management includes management of C&D Waste which is one of the most challenging issues being faced by a rapidly developing country like India. C&D waste consists of waste that is generated during new construction, remodeling, renovation, repair and alteration of residential and commercial buildings. It is estimated that the construction industry in India generates about 10-12 million tons of C&D waste annually. The presence of C&D waste and other inert materials is significant¹⁹¹, but so far not much development has taken place for utilising this in an organised manner.

Rules 6 (2) of C&D Waste Management Rules, 2016 provides that the local authority is responsible to chalk out stages, methodology, equipment and material involved in the overall activity and final clean up after completion of the construction and demolition.

¹⁹¹ Almost one third of total MSW on an average.

Scrutiny of records of 20 selected ULBs showed that 15 ULBs purchased C&D crusher machines at a cost of ₹ 33.69 lakh. Three ULBs¹⁹² did not purchase the same and in two ULBs¹⁹³, it was not required as separate C&D Waste Management Projects were to be installed. Out of 15 ULBs, the machineries were used only in ten ULBs and in four ULBs¹⁹⁴, the machineries costing ₹ 10.46 lakh were not utilised whereas one ULB¹⁹⁵ did not provide details (*Appendix 2.18*).

Audit further observed that in nine¹⁹⁶ out of ten ULBs where the machines were in use, the processed C&D waste was lying at the places where machineries were installed and was not used for road construction.

Nine ULBs¹⁹⁷ stated (October 2024) that efforts would be made for management of C&D waste and utilisation of processed waste in the construction of road. Four ULBs¹⁹⁸ stated that plans would be made to use the C&D waste machine lying idle and the processed material would be used for road construction. ULB Moga stated that two sites for C&D waste had been identified and approved. Currently waste is being dumped at one site, a low-lying area, to fill it. Plans would be developed to utilise C&D waste. ULB Makhu stated that a crusher machine for C&D waste had been purchased and some material is being processed there. However, this processed material had not yet been used in construction. ULB Doraha stated that the C&D waste generated was being used for filling low-lying areas in the town or for creating road berms. ULB SAS Nagar stated that C&D processing plant was operational. ULB Bathinda didn't furnish reply.

The replies of the ULBs were inadequate as the ULBs were obligated to both process and utilise C&D waste. Idle machinery and non-utilisation of processed material reflect non-compliance with the C&D Waste Management Rules and Policy.

Good practice

C&D waste was used for making channels and kerbs in ULB SAS Nagar.

2.5.6.1 Non-completion/operation of C&D Waste Management Projects

In two Corporations *viz.* Ludhiana and Amritsar, the C&D waste management was to be done under Smart City Mission (SCM). Accordingly, projects for C&D waste management were prepared (August 2020) in Ludhiana and

¹⁹² (i) Mansa; (ii) Moga; and (iii) Qadian.

¹⁹³ (i) Amritsar; and (ii) Ludhiana.

¹⁹⁴ (i) Doraha - ₹ 1.50 lakh; (ii) Ferozepur - ₹ 1.99 lakh; (iii) Rajpura - ₹ 4.98 lakh; and (iv) Kiratpur Sahib - ₹ 1.99 lakh.

¹⁹⁵ Corporation Bathinda.

¹⁹⁶ (i) Adampur; (ii) Kartarpur; (iii) Rupnagar; (iv) SBS Nagar; (v) Sirhind; (vi) Bilga; (vii) Khamanon; (viii) Makhu; and (ix) Mehraj.

¹⁹⁷ (i) Rupnagar; (ii) Adampur; (iii) kartarpur; (iv) SBS Nagar; (v) Mansa; (vi) Khamanon; (vii) Bilga; (viii) Mehraj; and (ix) Qadian.

¹⁹⁸ (i) Sirhind; (ii) Ferozepur; (iii) Rajpura; and (iv) Kiratpur Sahib.

Amritsar for ₹ 7.96 crore and ₹ 8.37 crore, respectively. The estimates were prepared in two parts Component A and B. In Component 'A', the processing plant unit comprising design, engineering, supply of plant and equipment for five years were included. In Component 'B', infrastructure site development was included. For the projects, the land was identified at Dhandari Kalan in Ludhiana and Fatahpur in Amritsar.

In Ludhiana, the work of component 'A' was allotted (June 2021) for ₹ 4.41 crore to be completed within six months. Similarly, in Amritsar, the work was allotted (September 2021) for ₹ 3.64 crore along with O&M for five years with the completion period of six months i.e. by March 2022.

The work of component 'B' was allotted in December 2021/June 2021 for ₹ 2.70 crore and ₹ 2.62 crore in Ludhiana and Amritsar for completion in four months and six months, respectively.

Audit observed (December 2022) that despite the lapse of scheduled completion time for both the components in Ludhiana, the work could not be completed (October 2024) due to incorrect selection of site, dumping of garbage at the execution site, non-supply of complete architectural design and structural working drawings and non-handing over of the site etc. It was also brought to the notice of the authority by the contractor that the site was being used by the garbage collectors to dump garbage and due to unhygienic conditions, the labour refused to execute the work.

In Corporation Amritsar, the work of Component B 'creation of infrastructure' was completed in April 2022 after incurring expenditure of ₹ 2.65 crore. However, the work of component 'A' i.e. supply, installation and commissioning was completed in March 2023 after lapse of one year from the scheduled completion time and after incurring expenditure of ₹ 0.28 crore for plant and machinery. Further, it was observed (October 2024) that the C&D waste processing facility was operational, however, against the capacity of 60 MT per day for first year, only 20 MT C&D waste was being collected and processed here. All the processed C&D waste was stored at the site and not used in any road construction activities etc. The actual input and output records were not shown to audit.

Corporation Ludhiana stated (October 2024) that the site was very old and earlier it was selected for construction of houses for the poor. During execution of work, the sludge upto 10-12 feet depth was noticed and hence the work could not be started. The work had since been started and was in progress, which would be completed upto December 2024. The ULB Amritsar stated that presently only 20 MT per day waste was being collected and processed through the processing plant. C&D waste collected would be increased in future. All the waste was being stored at the site and was not being used in road construction activities.

Thus, the Corporation Ludhiana could not manage C&D waste in scientific way despite lapse of more than seven¹⁹⁹ years which would not only adversely affect the environment but also attract financial loss as given in C&D Waste Management policy, 2020²⁰⁰. Further, Corporation Amritsar also could not utilise the processed C&D waste for construction activities and the plant was operated at a much lower capacity.

2.5.7 Non-completion of work related to Portable Compactors

A project for installation of 63 portable compactors was planned (February 2020) under SCM in Ludhiana for strengthening the secondary waste collection system with effective transportation facility to make the city bin-less and enhance the efficiency of primary collection system through arresting the waste at source.

Scrutiny of records of Corporation Ludhiana showed that the tenders for civil work of 22 sites to install the requisite compactors under the project were called for (May 2020) and the work was allotted (December 2020) to an agency at a cost of ₹ 13.57 crore with the stipulated period of 11 months to complete it. It was observed that as of 31 August 2022, an expenditure of ₹ 4.64 crore was incurred and physical progress of 55 *per cent* was achieved. In December 2021, the SCM authority issued show cause notice to the contractual agency and warned it that it will impose penalty for non-completion of the work. However, no action had been taken so far.

Corporation Ludhiana stated (October 2024) that the work was incomplete due to site issues and local objections, but civil work at all 22 compactor sites had been completed. Reply was not acceptable as the machineries had not yet been installed and no document in support of physical progress was produced to audit. Thus, due to the non-completion of the work, the objective to reduce the burden of handling a large volume of MSW at a centralised location by installing the portable compactors for intermediate storage was not achieved.

2.5.8 Conclusion

The Department identified eight Solid Waste Management PPP projects but only one was operative. Corporation Amritsar could not ensure closure of all three dumpsites, elimination of all secondary collection points, construction of Sanitary Landfills and installation of weigh bridge etc. Carcass Management was inefficient as Modern Carcass Utilisation Plant in Corporation Ludhiana installed at a cost of ₹ 8.48 crore was lying idle due to public protest. Slaughtering of animals was not done scientifically in the selected ULBs. The modern slaughterhouse in Ludhiana was not operating at its installed capacity despite spending ₹ 20.57 crore. Illegal and unscientific slaughtering in the ULBs was creating threats to environment and public. Construction &

¹⁹⁹ C&D waste management was to be started by September 2017.

²⁰⁰ As per Rule 11 (c) of C&D Waste Management Policy, 2020.

Demolition waste management was not carried out in any of the selected ULBs except in Municipal Corporation SAS Nagar where C&D waste was used for construction of channels and kerbs.

2.5.9 Recommendations

The State Government/ ULBs may ensure:

- *identification of viable Public Private Partnership projects and professional management of these projects for scientific management of solid wastes in the State; and*
- *preparation of an integrated implementation plan for managing other wastes such as carcass waste, C&D waste and slaughterhouse waste as required under rules.*

2.6 Monitoring and Evaluation

Municipal Solid Waste Management system has several aspects to be monitored on daily, weekly, monthly or annual basis. The collected information should be appropriately analysed to assess service provisions and make requisite improvements. The performance of all components of MSWM system, from collection to processing and disposal, should be ensured on daily basis. A comprehensive Monitoring and Evaluation (M&E) mechanism should be adopted for proper implementation and assessing the progress of the MSWM plan.

To assess the effectiveness of M&E of MSWM, the following audit objective was framed:

“Whether the M&E of Solid Waste Management system including adequacy of awareness creation, citizen engagement for effecting behavioral change, assessment of environmental impacts and implementation of the internal control was adequate and effective.”

2.6.1 Non-maintenance of records for monitoring

Paragraph 6.1.1 of MSWM Manual provides that the first step towards implementing an effective M&E system is to acquire the requisite data²⁰¹ for assessing the performance of the MSWM system. Reports generated should contain critical information which should be effectively used for decision making, identifying gaps and implementing corrective measures at the city, zone, or ward level. Further, ward level committee should be constituted consisting of one or more wards in a municipality having a population of three lakh or more.

²⁰¹ General information regarding ULBs, Door-to-door collection, quantity of waste collected and its segregation, availability of vehicles and human resources, identification of unauthorised waste dumping point, processing data, cost of operations, average number of carcasses removed each day etc. on daily, monthly, quarterly or annual basis as per the requirement.

Scrutiny of records (August 2022 to March 2023) revealed that in the selected ULBs, the record was either not maintained at all or was inadequately maintained as detailed below.

- out of 20 ULBs, the population/household (HHs) survey was conducted only by two ULBs²⁰² during 2019. However, the population data was not updated by Kiratpur Sahib ULB in its annual report (AR) and Mansa ULB did not submit annual report after this survey. In 18 ULBs, the population and HHs figure were taken almost same for the period between 2017-22 without any survey/basic records (**Appendix 2.19**).
- out of 20 ULBs, waste management was outsourced in three ULBs²⁰³. Two ULBs²⁰⁴ did not produce the records due to pending arbitration cases. One ULB²⁰⁵ produced only the records of transportation of waste and logbooks of processing of legacy waste.
- In three ULBs²⁰⁶, the waste management was being done through waste picker association/ society. However, the logbooks of MRF for collection of waste was maintained only in one ULB²⁰⁷ from April 2020.
- In the remaining 14 ULBs, the requisite records of door-to-door collection, quantity of waste collected and its segregation, availability of vehicles and human resources, identification of unauthorised waste dumping point, waste processing data etc. on required frequency²⁰⁸ were not maintained. This resulted in lack of monitoring at the ground level.
- Three ULBs²⁰⁹ with population of above three lakh had not constituted ward level committee for monitoring the SWM as required in *ibid* provisions.

It is evident from above that the ULBs were not prioritising the maintenance of necessary records as prescribed in the Manual. This deficiency would have consequential adverse impact, such as inaccurate reporting to higher authorities without any basic data/records, difficulty in tracking progress and challenges in identifying the areas for improvement.

Further, paragraph 6.1.2 of MSWM Manual provides that the assessment of Service Level Benchmarks (SLBs) is based on the analysis of information

²⁰² (i) Kiratpur Sahib: 7545 (AR) 7565 (after survey); and (ii) Mansa.

²⁰³ (i) Amritsar; (ii) Bathinda; and (iii) Ludhiana.

²⁰⁴ (i) Bathinda; and (ii) Ludhiana except records of transportation of waste.

²⁰⁵ Amritsar.

²⁰⁶ (i) Mansa; (ii) Moga; and (iii) Rajpura.

²⁰⁷ Mansa.

²⁰⁸ Daily, monthly, quarterly or annual basis.

²⁰⁹ Municipal Corporations of Ludhiana, Bathinda and Amritsar.

collected to monitor the MSWM system on a regular basis. Thus, in the absence of records/data, it would not be possible for ULBs to ensure a proper assessment of SLBs.

Audit observed that data reported through SLBs did not match with the data available in the ULBs for the year 2018-19²¹⁰ as depicted in charts below:

Chart 2.14: Extent of segregation of MSW

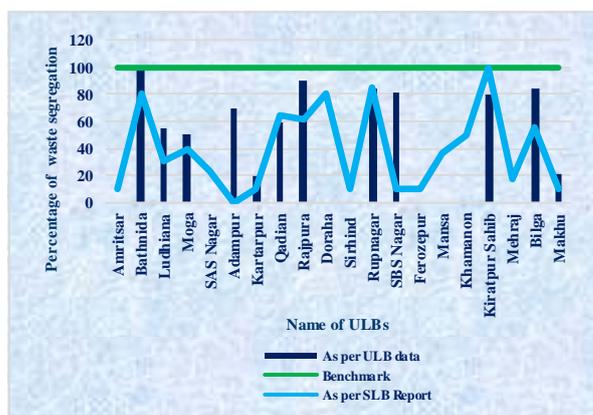
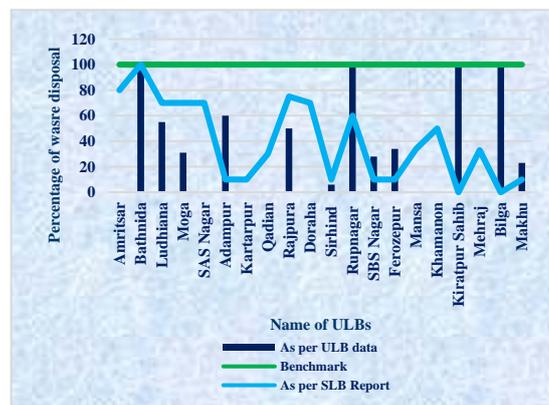


Chart 2.15: Extent of disposal of MSW



Source: Departmental data

Variations between zero to 80 per cent and zero to 100 per cent were noticed in segregation and disposal data as per ULB records and SLB figures respectively. This reflected non reliability of data depicted in SLBs.

Thirteen²¹¹ ULBs stated (October 2024) that the ULBs had started (June 2024) maintaining some basic records *e.g.* collection, segregation and processing of waste on estimation basis. However, in future efforts will be made to keep all the records as per the provisions. Ludhiana ULB stated that efforts were being made to monitor the SWM through maintenance of records. Bathinda ULB stated that the records of waste collection and segregation were maintained on daily basis and there was pending case in Arbitration Tribunal and the concessionaire was providing only the reports of data processing. Five²¹² ULBs stated that maintenance of records as per procedure given in the Manual was very challenging and trained staff was required to maintain the records.

The replies were not acceptable as reliance on estimation undermines data reliability, leading to inaccurate reporting. The audit observed that not only was the SLB reporting incorrect, but the annual reports submitted to the PPCB and subsequently by the PPCB to the CPCB were also based on estimations as discussed in *paragraph 2.6.5*.

²¹⁰ SLB reports after 2018-19 were not made available by ULBs.

²¹¹ (i) Bilga; (ii) Kartarpur; (iii) Makhu; (iv) Mehraj; (v) Rupnagar; (vi) Doraha; (vii) Moga; (viii) Amritsar; (ix) Qadian; (x) Adampur; (xi) Kiratpur Sahib; (xii) SAS Nagar; and (xiii) SBS Nagar.

²¹² (i) Ferozepur; (ii) Khamanon; (iii) Mansa; (iv) Rajpura; and (v) Sirhind.

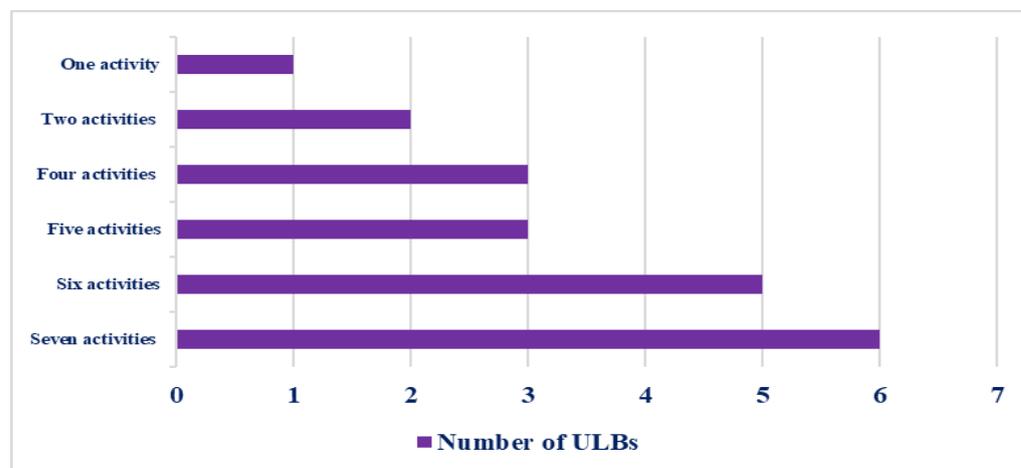
2.6.2 Effectiveness of Information, Education and Communication Mechanism

Rule 15 (zg) of SWM Rules, 2016 provides that the LGD through its designated agency²¹³ and all the ULBs were required to create public awareness through Information, Education and Communication (IEC) campaign and educate the waste generators about various components²¹⁴ of SWM. Paragraph 8.4 of SBM guidelines provides that States would prepare an annual action plan with details of State funding commitment for public awareness and IEC activities.

Audit observed that the PMIDC prepared annual IEC plans for ₹ 76.06 crore²¹⁵ under the SBM (Urban) during the period 2017-22 in which various IEC activities²¹⁶ were included to be undertaken by the ULBs in fixed frequency. Further, selected ULBs included IEC activities in their APSWM prepared during August 2018 and December 2019 without fixing frequency and targets. Moreover, expenditure against the budget as well as separate expenditure on IEC activities on SWM component and number of activities done against the plans were not made available to audit.

However, seven types of IEC activities (*Appendix 2.20*) were conducted by the selected ULBs as given in **Chart 2.16**.

Chart 2.16: IEC activities conducted by selected ULBs



Source: Data provided by ULB.

It was noticed that 14 ULBs had not conducted all the seven planned IEC activities. As a result, the SWM components such as at source segregation,

²¹³ Punjab Municipal Infrastructure Development Company.

²¹⁴ Not to litter; minimise generation of waste; reuse the waste to the extent possible; practice segregation of waste; practice home composting; wrap securely used sanitary waste; storage of segregated waste at source in different bins; handover segregated waste to waste collectors; and pay monthly user fee or charges.

²¹⁵ 2017-18: ₹ 21.04 crore; 2018-19: ₹ 11.29 crore; 2019-20: ₹ 15.25 crore; 2020-21: ₹ 13.17 crore; and 2021-22: ₹ 15.31 crore.

²¹⁶ Awareness to HHs, Schools, Bulk Waste Generators, print media, audio and wall painting etc.

segregating sanitary and hazardous waste, encouraging home composting or community composting etc. were affected.

Eighteen²¹⁷ ULBs stated (October 2024) that the IEC activities were conducted regularly. However, the basic record in this regard would be maintained in future. Ludhiana ULB stated that the IEC activities were being undertaken whenever required under SBM (Urban) and the annual plan would be prepared. SAS Nagar ULB stated that IEC activities were being undertaken by Community Facilitators²¹⁸.

Due to inability of ULBs to prepare a well-designed and effective implementation of IEC plans for creating awareness among public about the importance of waste segregation and proper disposal, significant changes in waste management practices were not noticed during the period of audit.

2.6.3 Monitoring of SWM by State Level Advisory Body

Rule 23 (1) of SWM Rules, 2016 provides that LGD of the State or Union territory administration would constitute a State Level Advisory Body (SLAB) within six months of the date of notification of SWM Rules. Further, Rule 23 (2 and 3) provides that the SLAB would meet at least once every six months to review the matters related to implementation of the Rules and the review report would be forwarded to the State Pollution Control Board or Pollution Control Committee for necessary action.

In Punjab, the SLAB was established in October 2016. However, since establishment of the Committee, only seven²¹⁹ meetings were conducted against the required 11 meetings upto March 2022. The first meeting of SLAB was conducted only in September 2017 i.e. after one year since the establishment of SLAB. During 2018-19, only one meeting was conducted in February 2019. During 2021-22, only one meeting was held in September 2021. The issues related to SWM were discussed in the SLAB meetings (*Appendix 2.21*). However, the major issues related to management of legacy waste, construction of SLF, creation of infrastructure, integration of ragpickers/waste collectors, etc., were not resolved yet and discrepancies noticed in this regard have been discussed in this Performance Audit Report.

The Government stated (August 2023) that the meetings were conducted as and when required and the State was performing very well in the management of solid waste. The reply was not acceptable as the monitoring by the SLAB was required regularly. The effect of inadequate monitoring of implementation

²¹⁷ (i) Adampur; (ii) Amritsar; (iii) Bathinda; (iv) Bilga; (v) Doraha; (vi) Ferozepur; (vii) Kartarpur; (viii) Khamanon; (ix) Kiratpur Sahib; (x) Makhu; (xi) Mansa; (xii) Mehraj; (xiii) Moga; (xiv) Rajpura; (xv) Rupnagar; (xvi) SBS Nagar; (xvii) Qadian; and (xviii) Sirhind.

²¹⁸ Community Facilitators are engaged under the Swachh Bharat Mission in engaging the community to achieve the mission's objectives.

²¹⁹ During 2019-20 and 2020-21 required two meetings each year were conducted.

of Rules was reflected in the low ranking of the State in CPCB list. Further, the reply in this regard was awaited from PMIDC (October 2024).

Regular meetings and monitoring through SLAB, as mandated, could have facilitated timely resolution of SWM issues and supported more effective implementation of the SWM Rules in the State.

2.6.4 Shortfall in meetings by District Administration

Rule 12 (b) of SWM Rules, 2016 provides that the District Magistrate or District Collector or as the case may be, would review the performance of local bodies, at least once in a quarter on waste segregation, processing, treatment and disposal and take corrective measures in consultation with the Commissioner or Director of Municipal Administration or Director of local bodies and Secretary-in-charge of the State Urban Development Department. Further, NGT revised the frequency of meetings and ordered (January 2019) that the District Level Committee under Rule 12 of SWM Rules, 2016 would meet monthly and forward the report to State Urban Development Department with a copy to the State Level Committee.

During April 2017 to December 2018, seven quarterly meetings were required to be held whereas 39 monthly meetings from January 2019 to March 2022 were to be held by the District Administration to review the SWM management in the ULBs. Audit observed that against the requirement of 920 (monthly/quarterly) meetings in 20 selected ULBs, only 72 meetings (only eight *per cent*) were held during 2017-22 (*Appendix 2.22*).

All the selected ULBs²²⁰ stated that the meetings were attended as and when called for by the District Administration and efforts would be made to collect the minutes of the meetings in future.

Audit also approached (December 2022, May 2023, April 2024 and September 2024) District Administration for which replies were awaited (October 2024). The reply of District Administration of Jalandhar was received (June 2024), from which it was evident that the meetings were conducted after the period covered in Performance Audit Report.

2.6.5 Annual Report

2.6.5.1 Non-submission/delayed submission of annual reports

Rule 24 (2) of SWM Rules provides that the local body should submit its Annual Report (AR) in Form-IV to the State Pollution Control Board and the Secretary-in-Charge of the Urban Development Department on or before the 30th day of June every year. The State Pollution Control Board would prepare and submit a consolidated annual report to the CPCB and

²²⁰ (i) Doraha; (ii) Ferozepur; (iii) Khamanon; (iv) Kiratpur Sahib; (v) Ludhiana; (vi) Makhu; (vii) Moga; (viii) Rajpura; (ix) Rupnagar; (x) SAS Nagar; (xi) Sirhind; (xii) Adampur; (xiii) Bilga; (xiv) Qadian; (xv) Kartarpur; (xvi) Mansa; (xvii) Mehraj; (xviii) SBS Nagar; (xix) Amritsar; and (xx) Bathinda.

Ministry of Urban Development regarding implementation of these rules by the 31st of July each year in Form-V.

The details of submission of AR (*Appendix 2.23*) by ULBs to PPCB showed that:

- A total of 100 ARs were required to be submitted by 20 ULBs, against which only 74 ARs were submitted to higher authorities. Out of these, 40 reports were submitted with a delay ranging between one and 1530 days.
- Ten²²¹ ULBs submitted the requisite number of ARs to the authorities concerned. The remaining ten ULBs submitted their ARs with the shortfall ranging between one and four reports i.e. 20 and 80 *per cent*.
- In one ULB (*viz.* Adampur), the reports for the period 2017-22 were sent to PPCB in September 2022.
- The PPCB was required to submit compiled reports of all the ULBs to CPCB. During the period 2017-18 to 2021-22, the PPCB submitted compiled report for 2017-18 with a delay of 167 days due to which the data of solid waste was not included in the Annual Reports of CPCB for the year 2017-18. For other years reports were submitted in time.

Thus, the monitoring mechanism did not address the delay in submission/non-submission of Annual Reports through which compliance of rules/regulations could have been monitored. The PPCB/PMIDC also did not take cognizance of non/late submission of ARs by ULBs.

Six²²² ULBs stated that the Annual Reports are now being submitted on time. Thirteen²²³ ULBs stated that in future all the ARs would be submitted on time to all the higher authorities.

2.6.5.2 Inadequate Annual Reports

Rule 24 (3) of SWM Rules stipulates that the PPCB shall consolidate the ARs based on submissions by the local authorities and forward them to the CPCB. Further, Rule 14 (g) of SWM Rules, 2016 provides that the CPCB shall prepare an AR on implementation of these rules, based on the reports received from State Pollution Control Boards and Committees, and submit it to the Ministry of Environment, Forest and Climate Change. The report is also required to be made available in public domain. Thus, the data included in the Annual Report should be authentic and reliable.

²²¹ (i) Amritsar; (ii) Ludhiana; (iii) Adampur; (iv) Ferozepur; (v) Rupnagar; (vi) SBS Nagar; (vii) Sirhind; (viii) Khamanon; (ix) Makhu; and (x) Mehraj.

²²² (i) Adampur; (ii) Kartarpur; (iii) Kiratpur Sahib; (iv) Ludhiana; (v) Makhu; and (vi) Rupnagar.

²²³ (i) Amritsar; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Khamanon; (vi) Mansa; (vii) Mehraj; (viii) Moga; (ix) Rajpura; (x) SAS Nagar; (xi) SBS Nagar; (xii) Sirhind; and (xiii) Qadian.

Scrutiny of ARs of ULBs submitted to the PPCB during the period 2017-18 to 2021-22 revealed shortcomings in the data related to HHs, population, waste generation, waste collection and its processing (*Appendix 2.19*) as discussed below:

- Six²²⁴ ULBs had taken similar population and number of HHs in the ARs during the last five years. Four²²⁵ ULBs showed the change in population, but the HHs remained constant and four²²⁶ ULBs changed the HHs, but population remained constant. Three ULBs²²⁷ submitted only one report so the analysis could not be made. In Adampur ULB, the data of HHs and population remained constant during the period 2018-21.
- As per logbook of bio-remediation of legacy waste carried out by Corporation Amritsar, the quantity of RDF was 60,602 MT during the period September 2020 to December 2021, whereas as per ARs for the period 2020-21 and 2021-22, the RDF generated was shown as 1,080 MT.
- The quantity of waste generation, collection, processing and disposal was also incorporated randomly instead of taking them on the actual basis during 2017-18 to 2021-22.

Thus, the ULBs were reporting only estimated figures of SWM which were being accepted without cross checking or analysing the data. This encouraged use of inaccurate estimates of waste and lack of accountability in the reporting process.

Seventeen²²⁸ ULBs stated that they had started maintaining the records of waste generation, segregation and processing. In future data/figures would be incorporated based on these records accurately in ARs. Amritsar ULB stated that in the filling of AR, sometimes the population of Census 2011 had been taken into the consideration and sometimes the population projection of DPR had been taken into the consideration. Therefore, there was a variation, however, in future the projection of DPR population would be taken into the consideration. Bathinda ULB stated that efforts would be made to remove the shortcomings and detailed reply would be given later. Ludhiana ULB attributed the inadequacy in reports to non-conducting any door-to-door survey of HHs.

The replies of the ULBs were inadequate, as they were required to report accurate and verified data. The use of estimated figures and inconsistencies in

²²⁴ (i) Bathinda; (ii) Ludhiana; (iii) Qadian; (iv) SBS Nagar; (v) Bilga; and (vi) Mehraj.

²²⁵ (i) Amritsar; (ii) SAS Nagar; (iii) Kartarpur; and (iv) Khamanon.

²²⁶ (i) Ferozepur; (ii) Rupnagar; (iii) Kirartpur Sahib; and (iv) Makhu.

²²⁷ (i) Mansa; (ii) Moga; and (iii) Rajpura.

²²⁸ (i) Adampur; (ii) Bilga; (iii) Kartarpur; (iv) Kiratpur Sahib; (v) Rupnagar; (vi) SAS Nagar; (vii) Qadian; (viii) SBS Nagar; (ix) Doraha; (x) Ferozepur; (xi) Khamanon; (xii) Makhu; (xiii) Mansa; (xiv) Mehraj; (xv) Moga; (xvi) Rajpura; and (xvii) Sirhind.

the ARs reflect non-compliance with SWM Rules and undermine the reliability of these reports.

2.6.6 Effectiveness of Management Information System

Paragraph 6.1.3 of MSWM Manual, 2016 provides that collection and analysis of data related to MSWM is required to assess the existing situation and propose adequate measures for improving service delivery. Management information System (MIS) is a computerised system designed to capture, store, and retrieve data or information for decision makers. The MIS was started in July 2020 in the ULBs.

Further, PMIDC issued instructions (June 2021) that the data filled by all ULBs in MIS would be considered as the single source of truth for any reporting and assessment process. This step was initiated to address the differences between the data reported by ULBs and the data provided by the State in monthly reports.

Audit observed that the data capturing in MIS began in July 2020 and the information/data such as number of households, quantity of waste generation, number of commercial establishments, segregation of waste, availability of processing facilities etc. was being incorporated into monthly progress reports from the MIS. Audit collected the monthly reports from MIS and compared them with the data provided by the selected ULBs for 2021-22 and observed the following (*Appendix 2.24*):

- Out of 20 ULBs, in eight²²⁹ ULBs, MIS indicated availability of SLFs whereas, during JPV, it was observed that they had not been constructed.
- MIS report showed collection of ₹ 24.59 crore as user charges in selected ULBs, whereas actual collection was only ₹ 0.52 crore.
- MIS report indicated that operating cost was ₹ 53.99 crore whereas actual figure of operating cost was ₹ 63.72 crore.
- There was a difference between data captured in MIS and information provided by ULBs in respect of number of HHs, details of collection of SWM and quantity of processing.

Thus, the data entered in the MIS was unreliable.

Eighteen²³⁰ ULBs stated that they had started keeping the record of waste generation, segregation and processing and in future the MIS data would be entered as per the records maintained and other discrepancies would also be

²²⁹ (i) Amritsar; (ii) Bathinda; (iii) Mansa; (iv) Rupnagar; (v) SBS Nagar; (vi) Sirhind; (vii) Bilga; and (viii) Moga.

²³⁰ (i) Adampur; (ii) Bilga; (iii) Kartarpur; (iv) Kiratpur Sahib; (v) Rupnagar; (vi) SAS Nagar; (vii) Qadian; (viii) SBS Nagar; (ix) Amritsar; (x) Doraha; (xi) Ferozepur; (xii) Khamanon; (xiii) Makhu; (xiv) Mansa; (xv) Mehraj; (xvi) Moga; (xvii) Rajpura; and (xviii) Sirhind.

corrected. Bathinda ULB stated that the figures incorporated in MIS were taken erroneously. Ludhiana ULB stated that MIS data entered in the system was tentative as the maintenance of actual records to fill the data on monthly basis was not possible due to lack of staff as well as capacity building. Efforts would be made to fill the correct figures in MIS for accurate reporting.

Thus, capturing incorrect data in MIS would not only provide misleading information regarding waste management for planning, budgeting and implementation but also provide a wrong picture of SWM to the intended users/stakeholders. Therefore, the objective to consider MIS as the single source of truth was defeated.

2.6.7 Non-monitoring of Environmental Standards

Paragraph 6.5.1 of MSWM Manual, 2016 read with Rule 16 (4) and 16 (a) of SWM Rules stipulate that environmental monitoring data²³¹ should be reported to the State Pollution Control Board (SPCB) by the ULBs on annual basis. The SPCB should monitor and review the compliance of standards for groundwater, ambient air, leachate, compost quality and incineration as specified under schedules I and II at least once in a year. ULB would conduct a study/evaluation to assess the impact on environment and health caused by improper waste management and assess the contamination of air, soil and ground water due to improper waste management.

Scrutiny of records revealed that the ULBs neither reported the monitored data in respect of groundwater, ambient air, leachate, compost quality to the PPCB nor conducted any study/evaluation to assess impact on environment and health caused by improper waste management.

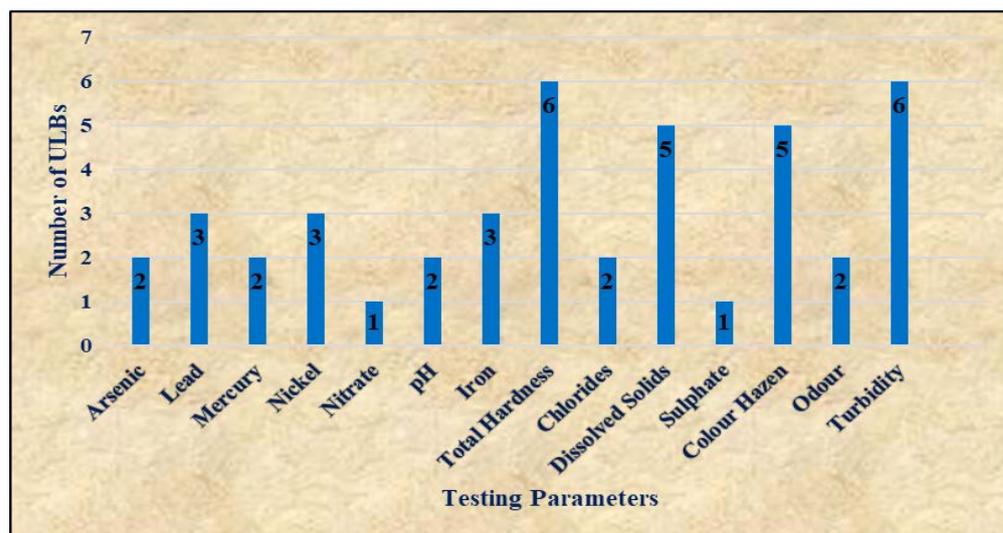
It was further observed that the PPCB did not review the performance of ULBs in implementation of SWM rules during the period 2017-18 to 2021-22. Out of 166 ULBs, the PPCB tested, the Water Quality only in 28 ULBs between 2018 and 2021, of which, six ULBs²³² were selected in the Performance Audit.

Chart 2.17 shows the number of selected ULBs where testing parameters of groundwater were found beyond prescribed limits.

²³¹ Monitoring of soil, water and air quality around the municipal waste processing, treatment and disposal facility.

²³² (i) Amritsar; (ii) Khamanon; (iii) SAS Nagar; (iv) Mansa; (v) Doraha; and (vi) Moga.

Chart 2.17: Results of ground water testing in selected ULBs



Source: PPCB data

Seventeen²³³ ULBs stated that efforts would be made to conduct testing in future as per SWM rules. Two²³⁴ ULBs stated that the monitoring of environment standard was being conducted by PPCB on regular basis. The results of the same would be obtained from PPCB and provided to audit for further scrutiny. Amritsar ULB stated that ULB installed a borewell at the dumping site and was in process of installing five Methane gas detector for monitoring the concentration of Methane in air and rest of the air quality monitoring was being done by the PPCB.

2.6.8 Conclusion

The ULBs featured in this Report did not maintain the records as required under MSWM Rules. The State Level Advisory Body did not meet as per the required frequency. The quarterly/monthly meetings were not conducted by the District Administration as required. Against the requirement of 100 annual reports to be submitted by 20 ULBs, only 74 reports were submitted to higher authorities during 2017-22. The variations between the records of ULBs and figures reported in MIS were noticed. Environmental monitoring of soil, water and air quality around municipal waste processing and disposal facilities was not carried out by the ULBs.

²³³ (i) Adampur; (ii) Bilga; (iii) Doraha; (iv) Ferozepur; (v) Kartarpur; (vi) Khamanon; (vii) Kiratpur Sahib; (viii) Makhu; (ix) Mansa; (x) Mehraj; (xi) Moga; (xii) Rajpura; (xiii) Rupnagar; (xiv) SAS Nagar; (xv) SBS Nagar; (xvi) Qadian; and (xvii) Sirhind.

²³⁴ (i) Bathinda; and (ii) Ludhiana.

2.6.9 Recommendations

The State Government/ULBs may:

- *improve maintenance of records and data so that the performance of SWM system could be assessed to prepare precise planning for future projects;*
- *ensure that meetings of monitoring Committees/Boards are conducted as per required frequency and that decisions are strictly implemented to monitor the progress of SWM as per rules and regulations;*
- *ensure that the capturing of authentic and accurate data in the MIS for planning, budgeting and implementation of SWM Projects is carried out with rigour; and*
- *ensure regular monitoring of environmental standards for groundwater, ambient air and management of leachate etc.*

Chandigarh
The 24 October 2025


(NAZLI J. SHAYIN)
Principal Accountant General (Audit), Punjab

Countersigned

New Delhi
The 12 November 2025


(K. SANJAY MURTHY)
Comptroller and Auditor General of India

Appendices

Appendix 1.1

(Referred to in paragraphs 1.1.2, 1.1.4 and 1.5)

Details of total units of Punjab Agricultural University

(A) Colleges and Departments

Sr. No.	Name of the College	Sr. No.	Name of the Department
I.	College of Basic Sciences and Humanities	1.	Agricultural Journalism, Languages & Culture
		2.	Biochemistry
		3.	Botany
		4.	Chemistry
		5.	Economics and Sociology
		6.	Maths, Stats & Physics
		7.	Microbiology
		8.	School of Business Studies
		9.	Zoology
II.	College of Community Science (Home Science)	10.	Apparel and Textiles Science
		11.	Family Resource Management
		12.	Food & Nutrition
		13.	Extension Education & Communication Management
III.	College of Agricultural Engineering and Technology	14.	Human Development & Family Studies
		15.	Civil Engineering
		16.	Electrical Engineering & Information Technology
		17.	Director School of Energy Studies (Renewable Energy)
		18.	Farm Machinery & Power Engineering
		19.	Mechanical Engineering
		20.	Processing & Food Engineering
		21.	Soil & Water Engineering
IV.	College of Agriculture	22.	Agronomy
		23.	Entomology
		24.	Extension Education Department
		25.	Food Science & Technology
		26.	Plant Breeding & Genetics (Wheat, Rice, Maize, Cotton, Forage & Millet, Pulses, Oilseed, Quality Main)
		27.	Plant Pathology
		28.	School of Agril. Biotechnology
		29.	School of Climate Change & Agril. Meteorology
		30.	Soil Science
		31.	Director School of Organic Farming
V.	College of Horticulture and Forestry	32.	Vegetable Science
		33.	Fruit Science
		34.	Floriculture & Landscaping
		35.	Forestry & Natural Resources
VI.	College of Agriculture at Ballawal Saunkhri ¹ , SBS Nagar	--	--

¹ Started functioning from the academic year 2021-22 and works under administrative control of Research Station, Ballawal Saunkhri, SBS Nagar.

(B) Regional Research Stations

Sr. No.	Name of Research Station
1.	Regional Research Station, Abohar
2.	Research Station, Dyal Bharang, Amritsar
3.	Research Station, Ballowal Saunkhri, SBS Nagar
4.	Research Station, Bathinda
5.	Research Station, Faridkot
6.	Research Station, Gurdaspur
7.	Fruit Research Station, Bahadurgarh, Patiala
8.	M.S. Randhawa Fruit Research Station, Gangian, Hoshiarpur
9.	Fruit Research Station, Jallowal/Lesriwal (Jalandhar)

(C) Seed Farms

Sr. No.	Name of Seed Farms
1.	University Seed Farm, Kapurthala
2.	University Seed Farm, Ladhowal, Ludhiana
3.	University Seed Farm, Nabha, Patiala
4.	University Seed Farm, Naraingarh, Fatehgarh Sahib
5.	Seed Farm, Faridkot (RHSSF)
6.	Seed Farm, Usman, Tarn Taran

(D) Krishi Vigyan Kendras (KVK)

Sr. No.	Name of Krishi Vigyan Kendra
1.	KVK Amritsar
2.	KVK Bathinda
3.	KVK Faridkot
4.	KVK Ferozepur
5.	KVK Fatehgarh Sahib
6.	KVK Gurdaspur
7.	KVK Bahawal, Hoshiarpur
8.	KVK Kapurthala
9.	KVK Samrala, Ludhiana
10.	KVK Sri Muktsar Sahib
11.	KVK Budhsinghwala, Moga
12.	KVK Langroya, SBS Nagar
13.	KVK Patiala
14.	KVK Pathankot
15.	KVK Ropar
16.	KVK Kheri, Sangrur
17.	KVK Nurmahal, Jalandhar
18.	KVK Khokhar Khurd, Mansa

Source: Information provided by PAU

Note: Highlighted Units viz. 12 Departments of five Colleges, three Research Stations, two Seed Farms and six KVKs were selected for the performance audit.

Appendix 1.2

(Referred to in paragraph 1.2.1.5(ii)(4))

Details of Bank Accounts kept out of books of accounts

(Amount in ₹)

Name of the College	Sr. No.	Name of Bank	Bank Account Number	Closing Balance as on 31.03.2020 ²
College of Agricultural Engineering & Technology	1.	State Bank of India	XXXXXXXX7067	20,47,088
	2.	Bank of Baroda	XXXXXXXXXX4350	15,90,478
	3.	Bank of Baroda	XXXXXXXXXX4352	40,60,899
	4.	Bank of Baroda	XXXXXXXXXX0103	5,13,619
	5.	State Bank of India	XXXXXXXX5649	3,13,094
	6.	Bank of Baroda	XXXXXXXX5605	7,83,196
College of Agriculture	7.	State Bank of India	XXXXXXXX7726	7,46,057
	8.	State Bank of India	XXXXXXXX8389	5,50,409
	9.	State Bank of India	XXXXXXXX8378	5,41,982
	10.	State Bank of India	XXXXXXXX7034	7,03,983
	11.	State Bank of India	XXXXXXXX5593	6,38,198
	12.	State Bank of India	XXXXXXXX5616	31,51,466
	13.	State Bank of India	XXXXXXXX5627	3,17,671
	14.	HDFC Bank	XXXXXXXXXX9501	1,20,760
College of Horticulture and Forestry	15.	State Bank of India	XXXXXXXX5537	6,65,750
	16.	State Bank of India	XXXXXXXX7608	3,33,500
	17.	State Bank of India	XXXXXXXX5715	1,47,000
	18.	State Bank of India	XXXXXXXX8961	92,400
	19.	State Bank of India	XXXXXXXX2623	61,600
	20.	State Bank of India	XXXXXXXX0494	522
	21.	HDFC Bank	XXXXXXXXXX4351	28,64,236
College of Community Science	22.	State Bank of India	XXXXXXXX8673	25,22,690
	23.	State Bank of India	XXXXXXXX7862	52,69,382
	24.	State Bank of India	XXXXXXXX7078	58,84,380
	25.	State Bank of India	XXXXXXXX7089	1,89,113
	26.	Bank of Baroda	XXXXXXXXXX0948	8,73,561
College of Basic Science & Humanities	27.	Bank of Baroda	XXXXXXXXXX0794	4,18,481
	28.	Bank of Baroda	XXXXXXXXXX4792	9,22,251
	29.	Bank of Baroda	XXXXXXXXXX0793	9,27,946
	30.	State Bank of India	XXXXXXXX5661	14,82,897
	31.	Bank of Baroda	XXXXXXXXXX8211	13,57,596
	32.	HDFC Bank	XXXXXXXXXX9480	23,101
	33.	State Bank of India	XXXXXXXX8800	9,972
Total				4,01,25,278

Source: PAU records

² Balance Sheets for the period 2020-21 and 2021-22 were not finalised (March 2023).

Appendix 1.3

(Referred to in paragraph 1.2.1.6)

Statement showing position of outstanding temporary advances during the year 2017-18 to 2021-22

(₹ in lakh)

Year	Opening Balance as on first day of April of the financial year	Amount of Temporary Advance given during the financial year	Total amount of Temporary Advances	Temporary Advances adjusted during the financial year	Outstanding Temporary Advances at the end of financial year
2017-18	8,455.55	1,986.88	10,442.43	2,893.12	7,549.31
2018-19	7,549.31	1,673.14	9,222.45	2,598.32	6,624.13
2019-20	6,624.13	1,811.01	8,435.14	2,826.26	5,608.88
2020-21	5,608.88	3,053.32	8,662.20	3,358.53	5,303.67
2021-22	5,303.67	1,691.00	6,994.67	533.24	6,461.43

Source: PAU records

Appendix 1.4

(Referred to in paragraph 1.3.2)

Course-wise shortage in enrolment of students during the period 2017-22

S. No.	Name of the Courses (Duration)	2017-18			2018-19			2019-20			2020-21			2021-22		
		Intake	Admitted	Shortfall in per cent												
Undergraduate courses																
1.	CET B.Sc. (Hons.) Agri. 4 year	98	98	0.00	111	107	3.60	116	116	0.00	96	94	2.08	94	91	3.19
2.	CET B.Sc. (Hons) Hort. 4 year	NA	NA	NA	NA	NA	NA	60	56	6.67	61	61	0.00	61	61	0.00
3.	CET B.Sc. (Hons.) Community Science 4 yr	62	41	33.87	59	53	10.17	59	51	13.56	60	33	45.00	59	23	61.02
4.	BSET B.Sc. (Hons.) Agri. 4-year at Ballawal Saunkhri	NA	NA	NA	60	58	3.33									
5.	AAT B.Sc. (Hons.) Agri. 6year (2+4) at Bathinda, Gurdaspur	127	127	0.00	126	126	0.00	124	124	0.00	132	132	0.00	124	124	0.00
6.	B.Tech. (Agri. Engg.) 4-year JEE Main	86	86	0.00	82	79	3.66	83	80	3.61	84	79	5.95	82	35	57.32
7.	Diploma in Agriculture 2 year at Ludhiana, Ballawal Saunkhri	60	30	50.00	120	79	34.17	90	81	10.00	90	33	63.33	90	8	91.11
8.	Diploma course in Hybrid Seed Production Technology one year	40	10	75.00	NA	NA	NA									
9.	CET B.Tech. Food Tech. 4 year	63	63	0.00	64	64	0.00	60	60	0.00	60	60	0.00	60	60	0.00
10.	CET B.Tech. (Biotech.) 4 year	62	62	0.00	62	62	0.00	60	56	6.67	60	56	6.67	60	51	15.00
11.	CET B.Sc. (Hons.) Nutrition & Dietetics 4 year	63	63	0.00	62	62	0.00	60	60	0.00	60	60	0.00	60	59	1.67
12.	CET Design B.Sc. (Hons.) Fashion Designing 4 year	63	35	44.44	NA	NA	NA									
13.	CET B.Sc. (Hons.) Agribusiness Management 4 year	NA	NA	NA	40	30	25.00									

S. No.	Name of the Courses (Duration)	2017-18			2018-19			2019-20			2020-21			2021-22		
		Intake	Admitted	Shortfall in per cent												
Postgraduate courses																
14.	M.Sc. Agriculture (Minimum 4 semester and maximum 6 semester)	203	188	7.39	182	178	2.20	172	172	0.00	178	175	1.69	175	161	8.00
15.	MSc. Horticulture & Forestry (Minimum 4 semester and maximum 6 semester)	NA	NA	NA	NA	NA	NA	57	57	0.00	58	58	0.00	62	62	0.00
16.	M. Tech. (Minimum 4 semester and maximum 6 semester)	73	24	67.12	62	34	45.16	58	21	63.79	51	28	45.10	66	24	63.64
17.	M. Sc. Basic Sciences & Humanities (Minimum 4 semester and maximum 6 semester)	165	124	24.85	140	103	26.43	139	99	28.78	136	84	38.24	143	57	60.14
18.	Business Administration (Agribusiness) (Minimum 4 semester and maximum 6 semester)	40	20	50.00	40	36	10.00	40	21	47.50	40	35	12.50	40	23	42.50
19.	Business Administration (Minimum 4 semester and maximum 6 semester)	50	38	24.00	50	39	22.00	50	32	36.00	50	29	42.00	50	13	74.00
20.	M.Sc. Home Science/Community Science (Minimum 4 semester and maximum 6 semester)	69	23	66.67	55	25	54.55	61	39	36.07	63	25	60.32	61	23	62.30
21.	CET 5 year integrated M.Sc. (Hons)	80	76	5.00	80	76	5.00	80	74	7.50	80	43	46.25	90	39	56.67
22.	MCA 3 year and MCA (Lateral entry) 2 year	60	28	53.33	40	8	80.00	40	13	67.50	NA	NA	NA	NA	NA	NA
Doctoral Programmes																
23.	Ph.D. (Minimum 5 semesters and maximum 10 semesters)	125	111	11.20	131	128	2.29	225	166	26.22	231	175	24.24	219	165	24.66

Source: Data collected from PAU

Appendix 1.5

(Referred to in paragraph 1.4.1.1)

Comments of funding agencies for not approving the proposed research projects

Sr. No.	Name of the research project proposed	Name of the funding agency	Comments of the funding agency
1.	Development of web-based platform for the annotation of Transcriptome, Genome and Coding Sequence (ATGC)	Department of Biotechnology	Lacks novelty, objectives not clear and proof of concept not in alignment with the ATGC mission objectives.
2.	Plant based liquid egg from extrusion and ultrasound modulated legume proteins	Science & Engineering Research Board	It is unlikely to be financially viable given the intensive recurring inputs required to develop the product. The labour-intensive process accompanied with wastage of seed material in extracting the protein from pulses appears pointless when pulses have been consumed as such in the country over centuries. Moreover, even in the event of success the acceptability of such a protein source over conventional pulses appears doubtful.
3.	Characterisation of sperm membrane antigens with immune contraceptive potential in lesser bandicoot rat, <i>Bandicota bengalensis</i>	Science & Engineering Research Board	The proposed study is planned to delineate the sperm membrane proteins to evaluate their immune-contraceptive potential for management of this rodent pest of agriculture importance. It is impractical idea to catch rodents and immunise from the wild. Also, there is no novelty in science.
4.	Indigenous development of a yeast encapsulated essential oil based biolarvicide formulation for the control of deadly dengue vector <i>Aedes aegypti</i>	Science & Engineering Research Board	This proposal does not have a basic scientific question. It is an applied project and lacks novelty. Does not merit consideration.
5.	ABA-regulation of GABA (γ -amino butyric acid)-shunt under mixed salinity-alkalinity stress in rice (<i>Oryza sativa</i> L.)	Science & Engineering Research Board	Study lacks novelty. Methods are not convincing and publication record of the Principal Investigator is not impressive.
6.	Biodiversity, geographical distribution and DNA barcoding of insect pests of pigeonpea from India	Ministry of Environment, Forest & Climate Change	The proposal does not fall under the thrust areas.
7.	Marker assisted selection hybrid in citrus	Department of Biotechnology	No commercial outcomes are being anticipated.
8.	Genomics assisted discovery of novel genetic variation in <i>T. durum</i> - <i>Aespeletoides</i> Chromosomal library and mobilisation of important genes/QTL to Hexaploid wheat	Department of Biotechnology	No variety deliverables, several projects are going on with Principal Investigator.

Sr. No.	Name of the research project proposed	Name of the funding agency	Comments of the funding agency
9.	Understanding the morphological, physiochemical and molecular basis of combined drought and heat tolerance in the introgression lines of Indian Mustard (<i>Brassica juncea</i> L. Czern & Coss.)	Science & Engineering Research Board	PI has proposed GWAS analysis, which will not be a good method in introgression lines with minimal genetic diversity. Methodology is not properly written.
10.	Formulation of self-help groups for upliftment of SC community in Punjab.	Department of Science & Technology	No scientific merit, fit for sociology or similar subject areas. The proposal is more focused on societal issues and not scientific. No scientific contribution expected.
11.	Developing CRISPR-Cas9 based genome editing system for pink bollworm, <i>Pectinophora gossypiella</i>	Science & Engineering Research Board	The scientific rationale for the project is not presented convincingly with strong preliminary evidence. Project lacks focus and scientific merit.
12.	New insight in understanding genomic footprints of early seedling vigour under direct seeded rice cultivation system	Science & Engineering Research Board	Some questions like - how the phenotypic traits are going to measure, what is the depth of sowing, etc. need to be clearly mentioned. In the current form, it is not mentioned. Another reason is the project activities needs heavy financial support which is not possible under SPR.
13.	Bio-hardening and growth acceleration in tissue culture raised strawberry plants	Department of Biotechnology	Routine proposal. Many private companies are doing this.
14.	Genome based mapping and development of new inter/intra-specific citrus scion hybrids with economically important quality traits	Department of Biotechnology	Already similar project funded to PI.
15.	Structural and functional characterisation of tachykinins and its receptor gene in <i>Bemisia tabaci</i> and identification of potential pseudopeptides for development of novel insecticides.	International Centre for Genetic Engineering and Biotechnology	The whole project relies on the assumption that receptor is essential but if this will not be the case, all the proposed work will lose its sense. CRISPR-Cas9 is also mentioned and foreseen for training, but no details are included in the actual proposal. The CV of the PI indicates that he spent his whole career in the same place and the publication record is not competitive.

Source: PAU records

Appendix 1.6

(Referred to in paragraph 1.4.2.1(i))

List of patented technologies of the University as of November 2022

Sr. No.	Name of the technology	Date of grant of Patent
1.	An improved field tensiometer for irrigation water management of crops	11.10.2013
2.	A hybrid combine harvester	28.02.2017
3.	A fermentation process for preparation of concentrated sugarcane vinegar	22.01.2018
4.	An improved solar dryer using packed bed natural circulation	23.01.2018
5.	An improved solar cooker	18.06.2018
6.	A Process for dyeing textile using plant sources polygonum Bistorata and Cyprus rotundus	06.09.2018
7.	Beneficiation of phosphate rock for segregation of phosphorous containing heavy metal free minerals	19.09.2018
8.	Technology Development for production of non-alcoholic naturally carbonated beverage from fruit juice	16.01.2019
9.	Nanofabrication of phosphorous on kaolin mineral receptacles	24.07.2019
10.	An improved greenhouse type solar dryer	14.08.2019
11.	Pressurised All-Glass Evacuated tube solar water heater	22.10.2019
12.	Zinc in clay-mineral receptacles in Nano forms for their use as advance mineral including novel fertilizer	26.12.2020
13.	Electric soil disinfectant	18.02.2021
14.	Nanofabrication process involving clay minerals as receptacles for manufacturing advance Nano-minerals including novel fertilizers (Process)	21.07.2021
15.	Fermentation process for enhanced glucose production from sweet sorghum bagasse using acid thermophilic fungal celluloses	01.09.2021
16.	Heel pushed dual foot operated sugarcane bud chipping apparatus	23.05.2022
17.	Method for water testing and water testing kit	13.06.2022
18.	Improved water and nutrient perforation and recirculation system for pot-based substrate hydroponics	28.10.2022

Source: Information provided by PAU

Note: Patent granted in respect of collaborative developed technologies at Sr. Nos. 4, 9, 12 & 14, in the name of ICAR.

Appendix 1.7

(Referred to in paragraph 1.4.2.1(i))

List of pending patent applications as of November 2022

Sr. No.	Name of the Technology	Date of Application	Date of Publication	Status of the application
1.	Process Technology for utilization of the Digested biogas slurry for cellulase production	14.05.2013	13.05.2015	Application in amended examination
2.	Flour composition of gluten free food grain	20.03.2015	30.09.2016	Application in amended examination
3.	A gluten free whole grain flour composition and food product	31.03.2015	07.10.2016	Application in amended examination
4.	Pollen collector cum pollinator for research and commercial use in agriculture	01.04.2015	07.10.2016	Application in amended examination
5.	Bioprocess for production and purification α -L-rhamnosidase to convert bitter rhamnose and pruning in citrus juice	14.05.2015	18.11.2016	In order for grant under section 43, awaiting NBA approval
6.	A fungal consortium for degradation of lignin and or silica, process therefore and application thereof	27.05.2015	02.12.2016	In order for grant under section 43, awaiting NBA approval
7.	Paddy straw bale combustor or gayer	06.07.2015	13.01.2017	Application in amended examination
8.	Straw cutter cum spreader	21.03.2017	28.09.2018	Application in amended examination. Commercialised on 25.6.2018
9.	A novel spraying attachment for seed drill and /or multi crop planter	04.05.2017	15.03.2019	Application in amended examination
10.	Bacteriological food testing kit (BFTK) for rapid and efficient detection of presence/absence of recurrent indicator and emerging pathogens in the food sample	12.09.2017	15.03.2019	Application in amended examination
11.	Portable Maize Dryer	18.09.2017	03.05.2019	Application in amended examination
12.	Biomass incorporators	05.10.2018	10.04.2020	Application in amended examination
13.	Molasses based microbial fertilizer and method thereof	23.10.2018	14.08.2020	FER issued; reply awaited.
14.	Conveyer belt type mechanical feeding system for axial flow (paddy thresher)	07.12.2018	21.08.2020	Application in amended examination
15.	Magnetic field assisted freezing process for horticulture produce	07.10.2019	03.09.2021	Awaiting examination
16.	A process for bioethanol production from industrial graded wheat grains using an alpha amylase	10.10.2019	16.04.2021	Application in amended examination
17.	Ready to use zinc phosphide bait for rodent management and method of preparation thereof	12.12.2019	18.06.2021	Application in amended examination
18.	Mobile thermoelectric refrigeration system	26.03.2020	01.10.2021	Awaiting request of examination

Sr. No.	Name of the Technology	Date of Application	Date of Publication	Status of the application
19.	Tractor operated seeder for mat type paddy nursery	28.04.2020	29.04.2022	Awaiting request of examination
20.	Process for preparing Red Bell Pepper Kulcha and product thereof	05.06.2020	10.12.2021	Awaiting request of examination
21.	Fermentative bioprocess for kojic acid production from kinnow waste	14.04.2021	Application not yet published	Provisional specifications filed
22.	An autonomous system for 2-wheel paddy transplanter	27.04.2021	Application not yet published	Complete specification filed
23.	Sensor based optimal rate controller for foliar spray of nitrogenous fertilizer	29.01.2022	Application not yet published	Provisional specifications filed
24.	Lacto-fermented functional metabiotic turmeric beverage and salad dressing from fermented powder	19.04.2022	Application not yet published	Complete specification filed
25.	Liquid fertilizer injector	06.07.2022	Application not yet published	Provisional specifications filed

Source: Website of Office of the Controller General of Patents, Designs and Trademarks, Ministry of Commerce and Industries, Gol

Appendix 1.8

(Referred to in paragraph 1.4.2.1(ii))

**List of plant varieties developed by PAU registered under
PPV&FR Act, 2001**

Sr. No.	Denomination of the candidate variety	Name of the crop	Date of filling	Date of issue of certificate
1.	PAU-626 H	Diploid Cotton	15.12.2008	30.09.2011
2.	F-1861	Tetraploid Cotton	15.12.2008	30.09.2011
3.	F-1378	Tetraploid Cotton	15.12.2008	21.10.2011
4.	GSC-5	Rapeseed (Gobhi Sarson)	08.03.2013	07.11.2013
5.	OCN-3	Rapeseed (Gobhi Sarson)	08.03.2013	07.11.2013
6.	ELM-079	Indian Mustard	01.04.2013	06.05.2014
7.	PBR-210	Indian Mustard	01.04.2013	12.08.2014
8.	PSH-569	Sunflower	23.04.2013	14.08.2014
9.	SML-832	Green Gram	08.01.2014	09.10.2014
10.	Mash-479 (KUG 479)	Black Gram	22.01.2014	14.10.2014
11.	Punjab Naveen	Cucumber	27.06.2016	29.05.2017
12.	Punjab Haldi-1	Turmeric	27.06.2016	29.05.2017
13.	Punjab Haldi-2	Turmeric	27.06.2016	29.05.2017
14.	LH-2076	Tetraploid Cotton	18.03.2009	29.05.2017
15.	Punjab Kareli-1	Bitter Gourd	27.06.2016	28.03.2018
16.	LL-931	Lentil	27.06.2016	28.03.2018
17.	Mash-391 (LU 391)	Black Gram	27.06.2016	28.03.2018
18.	Mash-114	Black Gram	27.06.2016	28.03.2018
19.	GSC-7 (GSC 101)	Gobhi Sarson	27.06.2016	28.03.2018
20.	PBW-550	Wheat	27.06.2016	28.03.2018
21.	PBW-502	Wheat	27.06.2016	28.03.2018
22.	PDW-291	Durum Wheat	27.06.2016	28.03.2018
23.	PBW-596	Bread Wheat	27.06.2016	28.03.2018
24.	PBW-590	Bread Wheat	27.06.2016	28.03.2018
25.	PBW-644	Wheat	27.06.2016	28.03.2018
26.	Punjab Samrat (WIR-4446)	Pumpkin	27.06.2016	28.03.2018
27.	PBR-357	Indian mustard (Sarson)	27.06.2016	28.03.2018
28.	L-555 (GLK-26155)	Chickpea	27.06.2016	28.03.2018
29.	PBG-7 (GL 26054)	Chickpea	27.06.2016	28.03.2018

Sr. No.	Denomination of the candidate variety	Name of the crop	Date of filling	Date of issue of certificate
30.	PSH-996	Sunflower	27.06.2016	28.03.2018
31.	PL-751	Barley	27.06.2016	28.03.2018
32.	Punjab Sugandh	Coriander	27.06.2016	11.09.2018
33.	MASH-1008	Black Gram	27.06.2016	02.11.2021
34.	LD-694	Diploid Cotton	15.12.2008	28.03.2022
35.	PR-123	Rice	27.02.2015	23.06.2022
36.	PR-124	Rice	27.02.2015	23.06.2022

Source: Website of Protection of Plant Varieties and Farmers' Rights Authority, Ministry of Agriculture and Farmers' Welfare, GoI

Appendix 1.9

(Referred to in paragraph 1.4.2.2)

Details of collaborative plant varieties registered in the name of ICAR

Sr. No.	Crop	Variety	Year of development
1.	Sugarcane	CoPb-92	2017-18
2.	Oats	OL-1802	2017-18
3.		OL-1769	2017-18
4.		OL-1760	2017-18
5.	Pigeonpea	PAU-881	2017-18
6.	Maize	PMH-12	2017-18
7.	Wheat	PBW-752	2018-19
8.		PBW-757	2018-19
9.	Chilli	CH-27	2018-19
10.	Pea	Matar Ageta-7	2018-19
11.	Brinjal	Punjab Raunak	2018-19
12.	Lentil	LL-1373	2018-19
13.	Wheat	PBW-771	2019-20
14.	Barley	PL-891	2019-20
15.	Bajra Napier	PBN-351	2019-20
16.	Cotton	PAU-Bt 2	2019-20
17.	Cotton	PAU-Bt 3	2019-20
18.	Chickpea	GL-13001	2019-20
19.	Oats	OL-1861	2019-20
20.		OL-1869-1	2019-20
21.	Rye grass	PBRG-2	2019-20
22.	Wheat	PBW-771	2020-21
23.		PBW-757	2020-21
24.	Chickpea	GL-13001 (PBG 9)	2020-21
25.	Oats	OL-1861	2020-21
26.		OL-1869-I (OL 13)	2020-21
27.		OL-1874	2020-21
28.		OL-1896	2020-21
29.		OL-1876-2	2020-21
30.	Rye grass	Punjab Ryegrass 2	2020-21
31.	Sugarcane	CoPb-98	2020-21
32.	American cotton	PBH-115	2020-21
33.		PBH-116	2020-21
34.		F-2662	2020-21

Source: Information provided by PAU

Appendix 1.10

(Referred to in paragraph 1.4.2.3(iii))

List of plant varieties developed and released by the University during 2017-22

S. No.	Name of Crop	Name of Variety
2017-18		
1.	Wheat	Unnat PBW-343
2.		Unnat PBW-550
3.		PBW-1 Zn
4.	Rice	PR-127
5.	Basmati rice	Pusa Basmati-1637
6.	Desi cotton	LD-1019
7.	Sugarcane	CoPb-92
8.		CoPb-93
9.		CoPb-94
10.	Oats	OL-11
11.	Berseem	BL-43
12.	Guava	Punjab Safeda
13.	Carrot	<i>PC-161 (Commercialised)</i>
14.	Sweet Orange	Early Gold
15.	New rootstock for Kinnow mandarin	Carrizo
16.	Pumpkin	PAU Magaz Kadoo-1
17.	Cucumber	<i>Punjab Kheera – 1 (Commercialised)</i>
18.	Tinda	Punjab Tinda -1
19.	Tomato	Punjab Swarna
20.	Brinjal	Punjab Raunak
21.	Flowers	Punjab Shingar
22.		Punjab Mohini
2018-19		
23.	Summer mungbean	SML-1827
24.	Maize	PMH-11
25.	Napier Bajra	PBN-342
26.	Oats	OL-12
27.	Guava	Punjab Apple Guava
28.	Tomato	PTH-2
29.	Capsicum	PSM-1
30.	Onion	<i>PRO-7 (Commercialised)</i>
31.		PWO-35
32.		PYO-102
33.	Bitter gourd	<i>Punjab Karela-15 (Commercialised)</i>
34.	Pumpkin	<i>Punjab Nawab (Commercialised)</i>
35.	Flowers	Punjab Glad-3

S. No.	Name of Crop	Name of Variety
2019-20		
36.	Rice	PR-128
37.		PR-129
38.	Wheat	PBW-752
39.	Barley	PL-891
40.	Maize	JC-12
41.	Urdbean	Mash-1137
42.	Raya	RCH-1
43.		PHR-126
44.	Sunflower	PSH-2080
45.	Pearl Millet	PCB-165
46.	Fodder Maize	J-1007
47.	Onion	POH-1
48.	Brinjal	Punjab Bharpoor
49.	Sponge Gourd	Punjab Nikhar
50.	Carrot	Punjab Kiran
2020-21		
51.	Chilli	<i>CH-52 (Commercialised)</i>
52.	Cucumber	PKH-11
53.	Muskmelon	Punjab Sarda
54.	Carrot	PCP-2
55.		PCY-2
56.	Antirrhinum	Punjab Antirrhinum-1
57.		Punjab Antirrhinum-2
58.		Punjab Antirrhinum -3
59.		Punjab Antirrhinum-4
60.	Raya	RCH-1
61.	Gobhi Sarson	PGSH-1707
62.	Sunflower	PSH-2080
63.	Lentil	LL-1373
64.	Moong	ML-1808
65.	Chickpea	PBG-8
66.	Oat	OL-13
67.		OL-14
68.	Ryegrass	Punjab Ryegrass 2
69.	Sugarcane	CoPb-95
70.		CoPb-96
71.		CoPb-98
72.	Maize	<i>PMH-13 (Commercialised)</i>
73.	Wheat	Sunehri
74.		PBW-771
75.		PBW-757
76.		PBW-1 Chapati
77.	Basmati rice	Punjab Basmati-7

S. No.	Name of Crop	Name of Variety
78.	Wheat	PBW-869
79.		PBW-824
80.		PBW-803
81.		Sunehri (PBW-766)
82.		PBW-1 Chapati
83.		DBW-222
84.		DBW-187
85.		HD-3226
86.		PBW-771
87.		PBW-757
88.	Oat	OL-15
89.	Berseem	BL-44
2021-22		
90.	Rice	PR-130
91.		PR-131
92.	Cotton	PAU Bt-2
93.		PAU Bt-3
94.	Maize	Punjab Baby Corn-1
95.	Mash	Mash-883
96.	Sorghum	SL-45
97.	Bajra	PCB-166

Source: PAU records

Appendix 1.11*(Referred to in paragraphs 1.4.2.3 (iii))***List of technologies and varieties commercialised without IPR protection**

S. No.	Name of the Technology/Variety	Year of Commercialisation
Technologies developed by PAU		
1.	Lucky seed drill technology	2017
2.	Mushroom processing and its use in value addition	2017
3.	Kadhu di chutney technology	2017
4.	PAU cutter cum spreader	2017
5.	Probiotic Beverage from black carrots	2017
6.	Fermented Beverage from fruit and vegetable juices	2017
7.	PAU Super SMS	2017
8.	PAU Punjabi Mixed tadka technology	2017
9.	PAU Quinoa Bars technology	2017
10.	Bottling of Sugarcane juice technology	2018
11.	Bacteriological water testing kit technology	2018
12.	PAU Happy Seeder	2018
13.	PAU leaf colour chart	2018
14.	Apple Cider Vinegar	2018
15.	Straw chopper cum spreader/mulchar technology	2018
16.	Fruit Vinegar	2018
17.	Brewed fruit vinegar	2018
18.	Maize flour for rollable chappati	2018
19.	Advanced domestic solar dryer technology	2019
20.	Rooftop vegetable nutrition garden model using soilless media technology	2019
21.	Fermentation of fruits and vegetables with lactic acid starter culture technology	2019
22.	Evacuated tube collector solar dryer technology	2019
23.	Frozen Potato and frozen vegetables technology	2019
24.	PAU lacto fermented Functional Beverages and Pickles technology for turmeric and Indian gooseberry	2020
25.	Mosquito Repellent cotton fabric technology	2020
26.	Making and packing of saag technology	2020
27.	Beetroot powder as natural colorant technology	2020
28.	Agro industrial solar dryer technology	2020
29.	Paddy straw based biogas plant made up of mild steel sheet (above the ground)	2021
30.	Modified PAU fixed dome type janta model biogas plant having capacity from 25m ³ /day to 500m ³ /day	2021
31.	PAU fixed dome type family size biogas plant having capacity from 1m ³ /day to 25m ³ /day	2021
32.	Brewed vinegar production from sugarcane and fruits	2021
33.	Vitamin-D enriched mushroom powder technology	2021

S. No.	Name of the Technology/Variety	Year of Commercialisation
34.	Canning technology of mushroom	2021
35.	Mat type nursery Seeder	2022
36.	PAU Smart Seeder	2022
Plant Varieties developed by PAU		
37.	Chilli Hybrid-27	2017
38.	Brinjal Hybrid PBHR-42	2017
39.	Pumpkin Hybrid PPH-1	2017
40.	Pumpkin Hybrid PPH-2	2017
41.	Maize Hybrid PMH-1	2018
42.	PSM-1 (Bell Paper variety)	2018
43.	PRO-7 (Onion variety)	2018
44.	Brinjal PBH-4	2018
45.	Maize Hybrid PMH-5	2018
46.	Punjab Kheera-1	2019
47.	Punjab Karela-15	2019
48.	Punjab Nawab (Pumpkin variety)	2019
49.	PC-161 (Carrot variety)	2020
50.	Chilli Hybrid CH-52	2021
51.	PAU Bt1 cotton seeds	2021
52.	Maize Hybrid PMH-13	2021
53.	Mustard Hybrid PHR-126	2021

Source: PAU records

Appendix 1.12

(Referred to in paragraph 1.5.1)

Category/Branch-wise position of staff posted for extension activities during the period 2017-22

Sr. No.	Name of the Branch	Sanctioned Strength (2017-22)	Year-wise men in position (Shortfall in percentage)				
			2017-18	2018-19	2019-20	2020-21	2021-22
1.	KVKs & FASCs (Teaching)	193	141 (26.94)	140 (27.46)	139 (27.98)	139 (27.98)	135 (30.05)
2.	KVKs & FASCs (Non-teaching)	224	142 (36.61)	135 (39.73)	125 (44.20)	115 (48.66)	109 (51.34)
3.	Director Extension Education (Teaching)	24	8 (66.67)	8 (66.67)	7 (70.83)	7 (70.83)	7 (70.83)
4.	Director Extension Education (Non-teaching)	109	13 (88.07)	30 (72.48)	40 (63.30)	40 (63.30)	35 (67.89)
5.	Contractual	26	6 (76.92)	10 (61.54)	5 (80.77)	16 (38.46)	12 (53.85)
Total		576	310 (46.18)	323 (43.92)	316 (45.14)	317 (44.97)	298 (48.26)

Source: Information provided by PAU

Appendix 1.13
(Referred to in paragraph 1.5.2)

Details of landholdings with Krishi Vigyan Kendras (KVK)

Sr. No.	Name of KVK	Date of MoU	Minimum land requirement as per MoU	Maximum cultivable land of KVK (2017-18 to 2021-22) (in acre)	Shortfall (in Acre)	Shortfall (in per cent)
1.	Fatehgarh Sahib	20.09.2004	20 hectare or 49.42 acre	13.68	35.74	72.32
2.	Rupnagar	20.09.2004	20 hectare or 49.42 acre	20.00	29.42	59.53
3.	Faridkot	20.02.1995	20 hectare or 49.42 acre	36.75 ³	12.67	25.64
4.	Moga	03.02.2005	20 hectare or 49.42 acre	21.50	27.92	56.50
5.	Kapurthala	01.03.1991	25 hectare or 61.78 acre	25.00	36.78	59.53
6.	Samrala (Ludhiana)	09.08.2004	20 hectare or 49.42 acre	22.00	27.42	55.48
7.	Mansa	21.04.2006	21 acre	15.00	6.00	28.57
8.	Kheri (Sangrur)	20.02.1995	20 hectare or 49.42 acre	23.00	26.42	53.46
9.	Ferozepur	22.05.1990	12 hectare or 29.65 acre	24.00	5.65	19.06
10.	Gurdaspur	17.02.1982	08 hectare or 19.77 acre	24.00	Nil	---
11.	Nurmahal (Jalandhar)	09.03.2006	25 acre	20.00	5.00	20.00
12.	Amritsar	20.02.2009	14.50 acre	13.50	1.00	6.90
13.	Goniana (Sri Muktsar Sahib)	09.08.2004	20 hectare or 49.42 acre	43.80	5.62	11.37
14.	Bathinda	01.03.1991	25 hectare or 61.78 acre	14.00	47.78	77.34
15.	Hoshiarpur	01.03.1991	25 hectare or 61.78 acre	27.50	34.28	55.49
16.	Pathankot	22.09.2016	25.88 acre (25 acre and 7 kanal)	20.50	5.38	20.78
17.	Patiala	01.03.1991	25 hectare or 61.78 acre	25.00	36.78	59.53
18.	Langroya (SBS Nagar)	20.02.1995	20 hectare or 49.42 acre	30.00	19.42	39.30

Source: Information provided by PAU

³ Reduced to 9.625 acre in May 2021 due to expiry of lease deed in respect of 26 acre of land.

Appendix 1.14

(Referred to in paragraph 1.5.3)

Shortfall in achievement of targets in terms of number of courses in respect of six selected KVKs during the period 2017-22

Period	Farmers		Shortfall (in per cent)	Vocational Courses		Shortfall (in per cent)	In-service trainings		Shortfall (in per cent)	Total		Shortfall (in per cent)
	Target	Achievement		Target	Achievement		Target	Achievement		Target	Achievement	
FARIDKOT												
2017-18	56	56	0	26	26	0	8	8	0	90	90	0
2018-19	60	60	0	27	27	0	10	10	0	97	97	0
2019-20	73	73	0	23	23	0	12	12	0	108	108	0
2020-21	73	54	26	22	19	14	7	5	29	102	78	24
2021-22	72	67	7	22	22	0	11	5	55	105	94	10
Total	334	310	7.19	120	117	2.50	48	40	16.67	502	467	6.97
FEROZEPUR												
2017-18	61	78	0	10	10	0	12	6	50	83	94	0
2018-19	66	136	0	16	18	0	14	6	57	96	160	0
2019-20	64	88	0	10	10	0	14	5	64	88	103	0
2020-21	62	128	0	14	10	29	12	3	75	88	141	0
2021-22	65	72	0	16	17	0	14	5	64	95	94	1
Total	318	502	0	66	65	1.52	66	25	62.12	450	592	0
LANGROYA (SBS NAGAR)												
2017-18	71	75	0	14	14	0	3	3	0	88	92	0
2018-19	75	71	5	15	15	0	3	3	0	93	89	4
2019-20	68	58	15	16	10	38	13	13	0	97	81	16
2020-21	74	65	12	6	2	67	11	11	0	91	78	14
2021-22	68	70	0	10	10	0	4	4	0	82	84	0
Total	356	339	4.78	61	51	16.39	34	34	0	451	424	5.99

Period	Farmers		Shortfall (in per cent)	Vocational Courses		Shortfall (in per cent)	In-service trainings		Shortfall (in per cent)	Total		Shortfall (in per cent)
	Target	Achievement		Target	Achievement		Target	Achievement		Target	Achievement	
NURMAHAL (JALANDHAR)												
2017-18	56	70	0	20	11	45	13	4	69	89	85	4
2018-19	68	62	9	21	19	10	12	5	58	101	86	15
2019-20	72	57	21	20	16	20	14	1	93	106	74	30
2020-21	59	43	27	19	7	63	12	1	92	90	51	43
2021-22	70	79	0	20	20	0	12	3	75	102	102	0
Total	325	311	4.31	100	73	27	63	14	77.78	488	398	18.44
RUPNAGAR												
2017-18	67	55	18	10	11	0	13	4	69	90	70	22
2018-19	60	63	0	20	16	20	10	10	0	90	89	1
2019-20	70	73	0	9	14	0	2	2	0	81	89	0
2020-21	70	62	11	19	16	16	15	2	87	104	80	23
2021-22	78	78	0	20	18	10	4	4	0	102	100	2
Total	345	331	4.06	78	75	3.85	44	22	50.00	467	428	8.35
KHERI (SANGRUR)												
2017-18	51	43	16	18	19	0	8	5	38	77	67	13
2018-19	53	63	0	19	18	5	7	6	14	79	87	0
2019-20	59	55	7	22	20	9	8	6	25	89	81	9
2020-21	66	39	41	21	13	38	9	7	22	96	59	39
2021-22	60	40	33	16	11	31	12	7	42	88	58	34
Total	289	240	16.96	96	81	15.63	44	31	29.55	429	352	17.95

Source: Information provided by PAU

Appendix 1.15

(Referred to in paragraph 1.5.3)

Course-wise shortfall in achievement of targets in terms of number of participants in respect of six selected KVKs during the period 2017-22

Period	Farmers		Shortfall (in per cent)	Vocational Courses		Shortfall (in per cent)	In-service trainings		Shortfall (in per cent)	Total		Shortfall (in per cent)
	Target	Achievement		Target	Achievement		Target	Achievement		Target	Achievement	
FARIDKOT												
2017-18	810	841	0	290	291	0	100	146	0	1,200	1,278	0
2018-19	900	912	0	380	291	23	100	179	0	1,380	1,382	0
2019-20	1,000	1,016	0	360	255	29	150	146	3	1,510	1,417	6
2020-21	1,000	570	43	330	200	39	100	61	39	1,430	831	42
2021-22	1,000	1,175	0	330	479	0	150	228	0	1,480	1,882	0
Total	4,710	4,514	4.16	1,690	1,516	10.30	600	760	0	7,000	6,790	3.00
FEROZEPUR												
2017-18	1,256	1,588	0	320	113	65	226	102	55	1,802	1,803	0
2018-19	1,567	3,596	0	355	110	69	219	116	47	2,141	3,822	0
2019-20	1,540	1,905	0	360	174	52	230	88	62	2,130	2,167	0
2020-21	1,365	1,683	0	330	166	50	190	56	71	1,885	1,905	0
2021-22	1,410	1,832	0	360	138	62	230	94	59	2,000	2,064	0
Total	7,138	10,604	0	1,725	701	59.36	1,095	456	58.36	9,958	11,761	0
LANGROYA (SBS NAGAR)												
2017-18	1,374	1,458	0	350	350	0	58	75	0	1,782	1,883	0
2018-19	1,712	1,620	5	385	385	0	56	59	0	2,153	2,064	4
2019-20	1,620	1,425	12	370	370	0	260	282	0	2,250	2,077	8
2020-21	1,455	750	48	148	132	11	212	36	83	1,815	918	49
2021-22	1,352	1,266	6	202	355	0	68	86	0	1,622	1,707	0
Total	7,513	6,519	13.23	1,455	1,592	0	654	538	17.74	9,622	8,649	10.11

Period	Farmers		Shortfall (in per cent)	Vocational Courses		Shortfall (in per cent)	In-service trainings		Shortfall (in per cent)	Total		Shortfall (in per cent)
	Target	Achievement		Target	Achievement		Target	Achievement		Target	Achievement	
NURMAHAL (JALANDHAR)												
2017-18	1,360	1,467	0	300	318	0	195	139	29	1,855	1,924	0
2018-19	1,400	1,628	0	630	775	0	180	92	49	2,210	2,495	0
2019-20	1,481	1,936	0	300	367	0	150	20	87	1,931	2,323	0
2020-21	1,458	822	44	285	193	32	120	7	94	1,863	1,022	45
2021-22	1,400	1,264	10	300	477	0	120	116	3	1,820	1,857	0
Total	7,099	7,117	0	1,815	2,130	0	765	374	51.11	9,679	9,621	0.60
RUPNAGAR												
2017-18	1,005	1,199	0	160	1,049	0	190	95	50	1,355	2,343	0
2018-19	1,200	1,491	0	500	1,217	0	100	123	0	1,800	2,831	0
2019-20	1,400	1,937	0	180	1,543	0	20	28	0	1,600	3,508	0
2020-21	1,240	1,493	0	135	1,079	0	10	28	0	1,385	2,600	0
2021-22	1,155	1,638	0	350	1,268	0	62	66	0	1,567	2,972	0
Total	6,000	7,758	0	1,325	6,156	0	382	340	10.99	7,707	14,254	0
KHERI (SANGRUR)												
2017-18	1,020	1,302	0	450	550	0	120	96	20	1,590	1,948	0
2018-19	1,325	1,683	0	380	532	0	140	125	11	1,845	2,340	0
2019-20	1,180	1,317	0	660	674	0	120	95	21	1,960	2,086	0
2020-21	1,320	645	51	735	331	55	180	160	11	2,235	1,136	49
2021-22	1,500	947	37	560	297	47	240	95	60	2,300	1,339	42
Total	6,345	5,894	7.11	2,785	2,384	14.40	800	571	28.63	9,930	8,849	10.89

Source: Information provided by PAU

Appendix 2.1

(Referred to in Paragraph 2.3.2.1)

Statement showing assessment of solid waste generation taken by ULBs in various documents

Sr. No.	Name of ULB	Population as per action plan	Year-wise assessment of waste generation (in Gram per capita per day)														
			2017-18			2018-19			2019-20			2020-21			2021-22		
			MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM
1.	Amritsar (C)	13,38,192	500	618	NA	500	356	NA	500	486	411	500	486	NA	500	310	NA
2.	Bathinda (C)	3,35,800	325	NA	NA	325	385	NA	325	385	323	325	NA	NA	325	NA	NA
3.	Ludhiana (C)	17,83,823	500	713	NA	500	713	585	500	713	NA	500	682	NA	500	682	NA
4.	Moga (C)	1,62,320	250	NA	NA	250	400	NA	250	NA	578	250	NA	NA	250	Not submitted	NA
5.	SAS Nagar (C)	1,95,000	250	NA	NA	250	421	423	250	421	NA	250	459	NA	250	Not provided	NA
6.	Adampur (MC)	20,922	250	119	NA	250	149	177	250	149	NA	250	149	NA	250	149	NA
7.	Doraha (MC)	30,893	250	NA	NA	250	NA	544	250	630	NA	250	472	NA	250	Not submitted	NA
8.	Ferozepur (MC)	1,11,708	250	427	NA	250	427	NA	250	391	421	250	427	NA	250	336	NA
9.	Kartarpur (MC)	26,616	250	273	NA	250	225	285	250	225	NA	250	259	NA	250	259	NA
10.	Mansa (MC)	92,500	250	NA	NA	250	446	400	250	NA	NA	250	NA	NA	250	Not submitted	NA
11.	Qadian (MC)	24,590	250	NA	NA	250	NA	183	250	NA	NA	250	159	NA	250	159	NA
12.	Rajpura (MC)	1,00,000	250	NA	NA	250	NA	450	250	271	NA	250	NA	NA	250	Not submitted	NA
13.	Rupnagar (MC)	64,180	250	178	NA	250	178	376	250	178	NA	250	232	NA	250	214	NA
14.	SBS Nagar (MC)	53,700	250	261	NA	250	261	243	250	261	NA	250	326	NA	250	261	NA
15.	Sirhind (MC)	64,500	250	207	NA	250	346	85	250	346	NA	250	276	NA	250	243	NA
16.	Bilga (NP)	12,000	250	NA	NA	250	395	462	250	395	NA	250	395	NA	250	395	NA

Sr. No.	Name of ULB	Population as per action plan	Year-wise assessment of waste generation (in Gram per capita per day)														
			2017-18			2018-19			2019-20			2020-21			2021-22		
			MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM	MSWM	Annual Report*	APSWM
17.	Khamanon (NP)	11,850	250	642	NA	250	444	12	250	395	NA	250	493	NA	250	448	NA
18.	Kiratpur Sahib (NP)	7,680	250	NA	NA	250	133	130	250	133	NA	250	133	NA	250	133	NA
19.	Makhu (NP)	16,130	250	327	NA	250	327	310	250	273	NA	250	273	NA	250	280	NA
20.	Mehraj (NP)	18,462	250	60	NA	250	60	219	250	60	NA	250	60	NA	250	60	NA

Source: Data provided by ULB

C- Municipal Corporation; MC- Municipal Council and NP- Nagar Panchayat

NA- Not available

APSWM- Action Plan for Solid Waste Management, AR- Annual Reports, MSWM- Municipal Solid Waste Management

Note:* The data taken from Annual Report in respect of Population and Estimated Generation of waste for calculation of waste generation in gram. Formula to calculate waste generation is (Estimated Generation in TPD) X10,00,000/no. of population.

Appendix 2.2

(Referred to in Paragraph 2.3.5)

Statement showing integration of waste collectors and rag pickers incorporated in APSWM

Sr. No.	Name of ULBs	Rag Pickers	Waste Collectors	Total
1.	Amritsar (C)	148	240	388
2.	Bathinda (C)	93	304	397
3.	Ludhiana (C)	104	1,360	1,464
4.	Moga (C)	95	95	190
5.	SAS Nagar (C)	20	350	370
6.	Adampur (MC)	3	10	13
7.	Doraha (MC)	8	0	8
8.	Ferozepur (MC)	20	72	92
9.	Kartarpur (MC)	5	22	27
10.	Mansa (MC)	45	30	75
11.	Qadian (MC)	15	6	21
12.	Rajpura (MC)	10	119	129
13.	Rupnagar (MC)	48	15	63
14.	SBS Nagar (MC)	26	28	54
15.	Sirhind (MC)	50	18	68
16.	Bilga (NP)	4	8	12
17.	Khamanon (NP)	2	0	2
18.	Kiratpur Sahib (NP)	3	0	3
19.	Makhu (NP)	8	0	8
20.	Mehraj (NP)	4	5	9
Total		711	2,682	3,393

Source: Data provided by ULBs

APSWM- Action Plan for Solid Waste Management

Appendix 2.3

(Referred to in Paragraph 2.3.6)

Statement showing time schedule fixed for various activities to implement the MSWMP and its status during 2021-22

Sr. No.	Name of ULBs	Door to Door Collection				Segregation of waste at source				Remediation of Dumpsite			Management of Refuse Derived Fuel		Collection of User charges		Management of Domestic Hazardous Waste		Incinerator for sanitary waste	
		Time schedule fixed in APSWM	No. of HHs to be covered as per APSWM	Started	No. of HHs Actual covered as per Form IV	Time schedule fixed in APSWM	Target of 100% SS by No. of HHs as per APSWM	Started	No. of HHs doing SS as per Form IV	Time schedule fixed in APSWM	Started	Actual completed	Time schedule fixed in APSWM	Status	Time schedule fixed in APSWM	Status	Time schedule fixed in APSWM	Status	Whether planned in APSWM	Status
1.	Amritsar (C)	June-2019	2,35,751	06.09.19	2,31,636	01.09.19	2,35,751	06.09.19	1,50,841	June-2020	01.09.20	Not completed	Not fixed	Y	Not fixed	Collected by concessionaire	Not fixed	N	Yes	N
2.	Bathinda (C)	Already 100 % achieved	53,093	Already 100 % achieved	NA	Already 100 % achieved	53,093	Already 100 % achieved	NA	2 years July 2021	04/2021	Not completed	Not fixed	Y	Not fixed	Collected	Not fixed	N	Yes	Y
3.	Ludhiana (C)	31.03.19	3,82,000	04.02.19	3,15,017	30.06.19	3,82,000	04.02.19	1,57,509	30.06.20	03.08.22	Not completed	Not fixed	Y	Not fixed	Not collected	Not fixed	N	No	N
4.	Moga (C)	31.12.19	32,464	17.12.19	NA	31.03.20	32,464	17.12.19	NA	2 years (12-2021)	NA	Not completed	31.03.19	N	Not fixed	Not collected	Not fixed	N	No	N
5.	SAS Nagar (C)	Already 100 % achieved	40,135	Already 100 % achieved	NA	30.04.19	40,135	01.02.19	NA	30.06.19	08.10.21	Not completed	Not fixed	N	Not fixed	Not collected	Not fixed	Y	Yes	N
6.	Adampur (MC)	Already 100 % achieved	4,078	Already 100 % achieved	4,088	Already 100 % achieved	4,078	Already 100 % achieved	3,066	Not mentioned in action plan	Log book not maintained	Not completed	Not fixed	N	Not fixed	Not collected	Not fixed	N	No	N
7.	Doraha (MC)	30.06.19	7,700	18.02.19	NA	30.06.19	7,700	18.02.19	NA	Not mentioned in Action plan	03.01.22	Not completed	Not fixed	N	Not fixed	Collected	Not fixed	N	No	N
8.	Ferozepur (MC)	30.06.19	25,000	26.04.19	25,380	31.12.19	25,000	26.04.19	25,380 (achieved 100 %)	31.12.20	01.12.20	Completed, log book not maintained	Not fixed	N	Not fixed	Collected	Not fixed	N	No	Y

Performance Audit Report on Solid Waste Management in Punjab by Urban Local Bodies

Sr. No.	Name of ULBs	Door to Door Collection				Segregation of waste at source				Remediation of Dumpsite			Management of Refuse Derived Fuel		Collection of User charges		Management of Domestic Hazardous Waste		Incinerator for sanitary waste	
		Time schedule fixed in APSWM	No. of HHs to be covered as per APSWM	Started	No. of HHs Actual covered as per Form IV	Time schedule fixed in APSWM	Target of 100% SS by No. of HHs as per APSWM	Started	No. of HHs doing SS as per Form IV	Time schedule fixed in APSWM	Started	Actual completed	Time schedule fixed in APSWM	Status	Time schedule fixed in APSWM	Status	Time schedule fixed in APSWM	Status	Whether planned in APSWM	Status
9.	Kartarpur (MC)	Already 100 % achieved	5,810	Already 100 % achieved	5,650	30.04.19	5,810	28.01.19	1,130	30.09.19	Log book not maintained	Not completed	Not fixed	N	31.01.19	Not collected	Not fixed	N	No	N
10.	Mansa (MC)	30.04.19	16,137	14.12.18	NA	30.04.19	16,137	14.12.18	NA	30.04.19	15.10.22	Not completed	Not fixed	N	Not fixed	Not collected	Not fixed	N	Yes	N
11.	Qadian (MC)	30.04.19	4,912	21.01.19	4,889	30.04.19	4,912	21.01.19	NA	Not mentioned in action plan	01.12.20	Completed	Not fixed	N	Not fixed	Collected	Not fixed	N	Yes	N
12.	Rajpura (MC)	Shown as already 100% achieved	22,000	Shown as already 100% achieved	NA	31.03.19	22,000	12.11.18	NA	31.03.19	Log book not maintained	Not completed	Not fixed	N	Not fixed	Collected	Not fixed	N	No	N
13.	Rupnagar (MC)	31.08.19	16,045	Jan.-19	15,039	31.08.19	16,045	Jan.-19	13,535	31.12.19	02.03.21	Completed on 30.12.22	Not fixed	N	Not fixed	Not collected	Not fixed	N	No	N
14.	SBS Nagar (MC)	Already 100 % achieved	10,740	Already 100 % achieved	10,000	01.03.19	10,740	04.02.19	NA	04.02.20	01.03.21	Not completed	Not fixed	N	Not fixed	Not collected	Not fixed	N	No	N
15.	Sirhind (MC)	30.04.19	13,022	16.08.18	NA	30.06.19	13,022	16.08.18	NA	31.12.19	Log book not maintained	Not completed	Not fixed	N	Not fixed	Collected	Not fixed	N	Yes	Y
16.	Bilga (NP)	Already 100 % achieved	3,113	Already 100 % achieved	3,083	30.04.19	3,113	22.01.19	3,083 (achieved 100 %)	Not mentioned in action plan	Log book not maintained	Not completed	Not fixed	N	Not fixed	Not collected	Not fixed	N	No	N
17.	Khmanon (NP)	Shown as already 100% achieved	2,342	Shown as already 100% achieved	2,342	Not mentioned	2,342	20.03.19	2,342	30.09.19	17.02.21	21.10.22	Not fixed	N	Not fixed	Collected	Not fixed	N	No	N

Sr. No.	Name of ULBs	Door to Door Collection				Segregation of waste at source				Remediation of Dumpsite			Management of Refuse Derived Fuel		Collection of User charges		Management of Domestic Hazardous Waste		Incinerator for sanitary waste	
		Time schedule fixed in APSWM	No. of HHs to be covered as per APSWM	Started	No. of HHs Actual covered as per Form IV	Time schedule fixed in APSWM	Target of 100% SS by No. of HHs as per APSWM	Started	No. of HHs doing SS as per Form IV	Time schedule fixed in APSWM	Started	Actual completed	Time schedule fixed in APSWM	Status	Time schedule fixed in APSWM	Status	Time schedule fixed in APSWM	Status	Whether planned in APSWM	Status
18.	Kiratpur Sahib (NP)	Shown as already 100% achieved	1,732	Shown as already 100% achieved	1,732	Shown as already 100% achieved	1,732	Shown as already 100% achieved	1,645	15.02.21	01.11.21	Completed as on Sep. 2022	Not fixed	N	Not fixed	Not collected	Not fixed	N	No	Y
19.	Makhu (NP)	Already 100 % achieved	3,108	Already 100 % achieved	2,851	30.04.19	3,108	18.02.19	285	30.07.19	05.05.21	Completed on 26.11.22	30.06.19	N	15.07.19	Not collected	Not fixed	N	No	Y
20.	Mehraj (NP)	30.04.19	3,564	31.01.19	3,463	30.04.19	3,564	31.01.19	3,359	Not mentioned in action plan	Log book not maintained	Completed	Not fixed	N	Not fixed	Not collected	Not fixed	N	Yes	Y

Source: Data provided by ULBs

MSWMP- Municipal Solid Waste Management

Colour Code:

Started	
Not started	
Installed	
Not installed	

Appendix 2.4

(Referred to in paragraph 2.4.1.1 (ii), 2.4.1.2, 2.4.1.3 and 2.4.1.7)

Details of funds received and expenditure in test checked ULBs on SWM during the period from 2017-18 to 2021-22

(₹ in crore)

Sr. No.	Name of the ULBs	14th Finance Commission		15th Finance Commission				SBM (SWM)				Municipal Funds (SWM)			Total Exp.
		R	E	OB	R	E	CB	OB	R	E	CB	R	E	Short	
1.	Amritsar (C)	211.63	0.00	0.00	37.66	38.01	-0.35	9.05	12.52	21.57	0.00	6.50	4.73	1.77	64.31
2.	Bathinda (C)	46.65	0.00	0.00	5.66	0.00	5.66	1.10	5.30	6.30	0.10	24.45	30.22	-5.77	36.52
3.	Ludhiana (C)	214.15	14.31	0.00	52.00	8.55	43.45	0.00	3.47	2.51	0.96	305.80	75.20	230.60	100.57
4.	Moga (C)	23.33	0.00	0.00	5.06	0.14	4.92	0.48	1.71	1.79	0.40	0.00	2.80	-2.80	4.73
5.	SAS Nagar (C)	38.52	6.62	0.00	4.60	4.85	-0.25	0.00	2.23	1.14	1.09	89.00	77.70	11.30	90.31
6.	Adampur (MC)	4.32	0.00	0.00	0.56	0.21	0.35	0.00	0.36	0.15	0.21	0.44	0.37	0.07	0.73
7.	Doraha (MC)	3.89	0.00	0.00	1.57	0.00	1.57	0.00	0.64	0.16	0.48	2.25	0.88	1.37	1.04
8.	Ferozepur (MC)	24.32	0.00	0.00	3.71	0.84	2.87	0.00	2.27	1.55	0.72	2.44	0.62	1.82	3.01
9.	Kartarpur (MC)	5.61	0.00	0.00	0.70	0.00	0.70	0.00	0.32	0.29	0.03	0.39	0.10	0.29	0.39
10.	Mansa (MC)	18.21	0.00	0.00	2.19	2.31	-0.12	0.00	1.32	1.04	0.28	5.70	6.65	-0.95	10.00
11.	Qadian (MC)	4.90	0.03	0.00	0.62	0.56	0.06	0.00	0.32	0.18	0.14	0.37	0.03	0.34	0.80
12.	Rajpura (MC)	12.20	0.00	0.00	1.96	0.41	1.55	0.00	2.10	1.65	0.45	0.75	1.26	-0.51	3.32
13.	Rupnagar (MC)	10.48	0.00	0.00	1.79	1.78	0.01	0.00	1.98	0.74	1.24	0.53	0.31	0.22	2.83
14.	SBS Nagar (MC)	9.34	0.49	0.00	1.58	0.05	1.53	0.03	0.84	0.99	-0.12	2.70	1.53	1.17	3.06
15.	Sirhind (MC)	10.10	0.45	0.00	1.55	0.25	1.30	0.00	0.80	0.25	0.55	1.35	0.31	1.04	1.26
16.	Bilga (NP)	0.64	0.00	0.00	0.25	0.00	0.25	0.00	0.53	0.19	0.34	0.39	0.11	0.28	0.30
17.	Khamanon (NP)	1.73	0.05	0.00	0.28	0.28	0.00	0.00	0.30	0.29	0.01	1.12	0.79	0.33	1.41
18.	Kiratpur Sahib (NP)	0.00	0.00	0.00	0.25	0.16	0.09	0.00	0.26	0.21	0.05	3.82	2.78	1.04	3.15
19.	Makhu (NP)	2.75	0.00	0.00	0.40	0.16	0.24	0.00	0.37	0.34	0.03	0.23	0.08	0.15	0.58
20.	Mehraj (NP)	2.54	0.00	0.00	0.49	0.23	0.26	0.00	0.27	0.27	0.00	0.50	0.00	0.50	0.50
Total		645.31	21.95	0.00	122.88	58.79	64.09	10.66	37.91	41.61	6.96	448.73	206.47	242.26	328.82
Total Expenditure of all schemes		328.82													

Source: Departmental data

O.N.: 1. No detail of expenditure incurred on SWM by the Municipal Corporation, Amritsar from grant received under 14th FC was made available by the Corporation.

2. Excess expenditure of ₹ 0.12 crore on SWM out of SBM funds was incurred by SBS Nagar.

3. Excess expenditure of ₹ 0.25 crore on SWM out of 15th FC funds was incurred from the interest earned from bank on deposit by SAS Nagar.

Appendix 2.5

(Referred to in paragraph 2.4.1.7)

Total projected user charges and collection their against by the test checked ULBs from 2017-18 to 2021-22

(₹ in crore)

Sr No.	Name of ULBs	2017-18			2018-19			2019-20			2020-21			2021-22			G Total		
		PR	RC	SC	PR	RC	SC	PR	RC	SC	PR	RC	SC	PR	RC	SC	PR	RC	SC
1.	Amritsar (C)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.	Bathinda (C)	0.00	0.00	0.00	0.00	0.00	0.00	12.77	0.38	12.39	12.77	0.08	12.69	12.77	0.36	12.41	38.31	0.82	37.49
3.	Ludhiana (C)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.97	0.00	51.97	51.97	0.00	51.97
4.	Moga (C)	0.00	0.00	0.00	0.00	0.00	0.00	7.28	0.00	7.28	7.28	0.00	7.28	7.28	0.00	7.28	21.84	0.00	21.84
5.	SAS Nagar (C)	0.00	0.00	0.00	0.00	0.00	0.00	5.46	0.00	5.46	5.46	0.00	5.46	5.46	0.00	5.46	16.38	0.00	16.38
6.	Adampur (MC)	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.00	1.50	1.50	0.00	1.50	1.50	0.00	1.50	4.50	0.00	4.50
7.	Doraha (MC)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.03	0.53	0.56	0.04	0.52	1.12	0.07	1.05
8.	Ferozepur (MC)	0.00	0.00	0.00	0.00	0.00	0.00	3.99	0.02	3.97	3.99	0.02	3.97	3.99	0.07	3.92	11.97	0.11	11.86
9.	Kartarpur (MC)	0.00	0.00	0.00	0.00	0.00	0.00	1.15	0.00	1.15	1.15	0.00	1.15	1.15	0.00	1.15	3.45	0.00	3.45
10.	Mansa (MC)	0.00	0.00	0.00	0.00	0.00	0.00	3.74	0.00	3.74	3.74	0.00	3.74	3.74	0.00	3.74	11.22	0.00	11.22
11.	Qadian (MC)	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.00	1.10	1.10	0.00	1.10	1.10	0.01	1.09	3.30	0.01	3.29
12.	Rajpura (MC)	0.00	0.00	0.00	0.00	0.00	0.00	4.11	0.00	4.11	4.11	0.01	4.11	4.11	0.03	4.07	12.33	0.04	12.29
13.	Rupnagar (MC)	0.00	0.00	0.00	0.00	0.00	0.00	2.99	0.00	2.99	2.99	0.00	2.99	2.99	0.00	2.99	8.97	0.00	8.97
14.	SBS Nagar (MC)	0.00	0.00	0.00	0.00	0.00	0.00	1.87	0.00	1.87	1.87	0.00	1.87	1.87	0.00	1.87	5.61	0.00	5.61
15.	Sirhind (MC)	0.00	0.00	0.00	0.00	0.00	0.00	1.72	0.00	1.72	1.72	0.00	1.72	1.72	0.00	1.72	5.16	0.00	5.16
16.	Bilga (NP)	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.00	0.36	0.36	0.00	0.36	0.36	0.00	0.36	1.08	0.00	1.08
17.	Khamanon (NP)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.31	0.54	0.01	0.53	0.85	0.01	0.84
18.	Kiratpur Sahib (NP)	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.70	0.70	0.00	0.70	0.70	0.00	0.70	2.10	0.00	2.10
19.	Makhu (NP)	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	1.27	1.27	0.00	1.27	1.27	0.00	1.27	3.81	0.00	3.81
20.	Mehraj (NP)	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.29	0.29	0.00	0.29	0.29	0.00	0.29	0.87	0.00	0.87
Total																	204.84	1.06	203.78

Source: APSWM/Byelaws and Departmental data

PR-Projected Revenue

RC-Revenue Collected

SC-Short Collection

Appendix 2.6

(Referred to in paragraph 2.4.1.7)

Statement showing cost recovery and resource gap of SWM in selected ULBs during 2017-22

(₹ in lakh)

Sr. No.	Name of the ULB	Own revenue, expenditure and resource gap for SWM								
		Sale of RDF	Auction sale on SWM	Sale of Plastic	Sale of compost	Sale of other material	Collection of user charges	Receipt as fine & penalties	Total revenue receipt	Total expenditure on SWM (in crore)
1.	Amritsar (C)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	64.31
2.	Bathinda (C)	0.00000	0.00000	0.00000	0.00000	0.00000	82.51000	0.00000	82.51000	36.52
3.	Ludhiana (C)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.76600	7.76600	100.57
4.	Moga (C)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.73
5.	SAS Nagar (C)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	90.31
6.	Adampur (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.73
7.	Doraha (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	7.52290	0.20300	7.72590	1.04
8.	Ferozepur (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	14.63000	0.00000	14.63000	3.01
9.	Kartarpur (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.39
10.	Mansa (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	10.00
11.	Qadian (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.58050	0.00000	0.58050	0.80
12.	Rajpura (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	3.90000	0.03900	3.93900	3.32
13.	Rupnagar (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.83
14.	SBS Nagar (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.06
15.	Sirhind (MC)	0.00000	0.00000	0.00000	0.00000	0.00000	0.31000	0.13050	0.44050	1.26
16.	Bilga (NP)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.30
17.	Khamanon (NP)	0.00000	0.00000	0.00000	0.06000	0.00000	0.62000	1.32150	2.00150	1.41
18.	Kiratpur Sahib (NP)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.15
19.	Makhu (NP)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00900	0.00900	0.58
20.	Mehraj (NP)	0.00000	0.00000	0.01800	0.00000	0.00000	0.00000	0.00500	0.02300	0.50
Total		0.00000	0.00000	0.01800	0.06000	0.00000	110.07340	9.47400	119.62540	328.82

Source: as per information provided by the ULBs

Total cost recovered = ₹ 1.20 crore which included: ₹ 0.10 crore as other recoveries; ₹ 1.10 crore as user charges (out of this ₹ 0.04 crore pertains to 2017-19 and ₹ 1.06 crore pertains to 2019-22).

Appendix 2.7

(Referred to in paragraph 2.4.2.1, 2.4.2.3 and 2.4.5.1)

Total waste collected and processed in test checked ULBs from 2017-18 to 2021-22

(Quantity in MT)

Sr. No.	Name of the ULB	2017-18				2018-19				2019-20			
		A	AC	P	%	A	AC	P	%	A	AC	P	%
1.	Amritsar*(C)	2,47,777	2,47,777	0	0	2,24,743	2,24,743	0	0	2,00,145	2,00,145	0	0
2.	Bathinda (C)	0	0	0	0	0	0	0	0	0	0	0	0
3.	Ludhiana (C)	4,07,426	4,07,426	2,19,000	54	4,01,213	4,01,213	2,19,000	55	4,65,576	4,65,576	3,65,000	78
4.	Moga (C)	23,597	23,597	1,460	6	22,630	22,630	6,935	31	22,812	22,812	7,300	32
5.	SAS Nagar (C)	45,625	45,625	0	0	45,625	45,625	0	0	45,625	45,625	0	0
6.	Adampur (MC)	767	767	767	100	1,135	1,135	683	60	1,135	1,135	683	60
7.	Doraha (MC)	6,004	6,004	0	0	6,388	6,388	0	0	4,402	4,402	0	0
8.	Ferozepur (MC)	17,155	17,155	5,475	32	17,155	17,155	5,840	34	15,695	15,695	12,410	79
9.	Kartarpur (MC)	2,555	2,555	0	0	2,190	2,190	0	0	2,190	2,190	0	0
10.	Mansa (MC)	8,024	0	0	0	8,100	0	0	0	8,175	0	0	0
11.	Qadian (MC)	1,170	1,170	0	0	1,260	1,260	0	0	1,170	1,170	0	0
12.	Rajpura (MC)	8,430	8,430	0	0	8,767	8,767	4,380	50	9,862	9,862	4,928	50
13.	Rupnagar (MC)	3,650	3,285	3,285	100	3,650	3,285	3,285	100	3,650	3,285	3,285	100
14.	SBS Nagar (MC)	4,380	2,920	818	28	4,380	2,920	818	28	4,380	2,920	818	28
15.	Sirhind (MC)	4,380	4,380	0	0	7,300	7,300	438	6	7,300	7,300	438	6
16.	Bilga (NP)	1,460	1,460	1,460	100	1,460	1,460	1,460	100	1,460	1,460	730	50
17.	Khamanon (NP)	1,825	1,825	0	0	1,643	1,643	0	0	1,095	1,095	0	0
18.	Kiratpur Sahib (NP)	0	0	0	0	365	365	365	100	365	365	365	100
19.	Makhu (NP)	1,752	1,752	398	23	1,752	1,752	398	23	1,460	1,460	1,091	75
20.	Mehraj (NP)	365	365	0	0	365	365	0	0	365	365	0	0
Total		7,86,341	7,76,492	2,32,663	30	7,60,121	7,50,196	2,43,602	32	7,96,862	7,86,862	3,97,048	50

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(Quantity in MT)

Sr. No.	Name of the ULB	2020-21				2021-22				Total			
		A	AC	P	%	A	AC	P	%	A	AC	P	%
1.	Amritsar (C)	1,94,236	1,94,236	24,334	13	1,98,292	198292	0	0	10,65,193	10,65,193	24,334	2
2.	Bathinda (C)	0	0	0	0	0	0	0	0	0	0	0	0
3.	Ludhiana (C)	3,17,580	3,17,580	1,82,500	57	3,66,927	3,66,927	0	0	19,58,722	19,58,722	9,85,500	50
4.	Moga (C)	22,995	22,995	9,855	43	23,360	23,360	13,140	56	1,15,394	1,15,394	38,690	34
5.	SAS Nagar (C)	33,580	33,580	31,229	93	33,580	33,580	31,230	93	2,04,035	2,04,035	62,460	31
6.	Adampur (MC)	1,135	1,135	683	60	1,135	1,135	683	60	5,307	5,307	3,497	66
7.	Doraha (MC)	6,260	6,260	2,184	35	6,260	6,260	2,184	35	29,313	29,313	4,368	15
8.	Ferozepur (MC)	17,155	17,155	5,475	32	13,505	13,505	12,410	92	80,665	80,665	41,610	52
9.	Kartarpur (MC)	2,190	2,190	435	20	2,555	2,555	882	35	11,680	11,680	1,317	11
10.	Mansa (MC)	8,251	1,208	1,170	97	8,327	2,246	2,206	98	40,877	3,454	3,376	98
11.	Qadian (MC)	1,369	1,369	23	2	1,369	1,369	62	5	6,338	6,338	85	1
12.	Rajpura (MC)	10,651	10,651	5,325	50	10,950	10,950	5,475	50	48,660	48,660	20,108	41
13.	Rupnagar (MC)	4,745	4,380	3,650	83	4,380	4,380	3,650	83	20,075	1,8615	17,155	92
14.	SBS Nagar (MC)	5,475	2,920	818	28	4,380	2,920	2,627	90	22,995	14,600	5,899	40
15.	Sirhind (MC)	5,840	5,840	913	16	5,840	5,840	5,840	100	30,660	30,660	7,629	25
16.	Bilga (NP)	1,460	1,460	840	58	1,460	1,460	840	58	7,300	7,300	5,330	73
17.	Khamanon (NP)	1,825	1,825	1,825	100	1,657	1,657	1,825	110	8,045	8,045	3,650	45
18.	Kiratpur Sahib (NP)	365	365	365	100	365	365	365	100	1,460	1,460	1,460	100
19.	Makhu (NP)	1,460	1,460	1,091	75	1,497	1,497	1,497	100	7,921	7,921	4,475	56
20.	Mehraj (NP)	365	365	0	0	365	365	183	50	1,825	1,825	183	10
Total		6,36,937	6,26,974	2,72,715	43	6,86,204	6,78,663	85,099	13	36,66,465	36,19,187	12,31,126	34

Source: Departmental data

A= Actual Waste Generated; AC= Actual Waste Collected; P= Processed.

% = Percentage of processing from collected waste.

Actual waste generated data not available in MC Bathinda from 2017-18 to 2019-20.

*In Amritsar out of total waste collection, 73000 MT waste was collected by the department for inner wall during 2017-22. Balance waste was collected by the concessioner for outer wall for which tipping fee was paid.

Appendix 2.8

(Referred to in paragraph 2.4.2.4)

List of ULBs having GVPs as in August 2022

Municipal Corporation	
Bathinda	22
Batala	17
Hoshiarpur	9
Jalandhar	91
Phagwara	11
Kapurthala	37
Ludhiana	41
Moga	3
SAS Nagar	13
Pathankot	8
Patiala	59
Municipal Councils/Nagar Panchayat	
Ajnala	4
Jandiala Guru	5
Majitha	4
Ramdas	2
Rayya	1
Barnala	1
Bhai Roopa	1
Goniana	1
Raman	1
Talwandi Sabo	1
Faridkot	11
Jaito	5
Kotkapura	5
Amloh	4
Bassi Pathana	1
Khamanon	1
Mandi Gobindgarh	2
Sirhind	4
Arniwala	3
Fazilka	8
Jalalabad	1
Ferozepur	1
Guru Harsahai	3
Makhu	1
Mamdot	3
Mudki	4
Talwandi Bhai	1
Zira	1
Dhariwal	2
Dina Nagar	2
Fatehgarh Churian	1
Gurdaspur	2
Qadian	3
Begowal	2
Bholath	2
Dhilwan	3
Nadala	1
Sultanpur Lodhi	8
Doraha	1

Jagraon	2
Khanna	5
Machiwara	1
Maloud	2
Payal	1
Raikot	1
Sahnewal	2
Mansa	2
Dharamkot	2
Fatehgarh Panjtoor	1
Dera Bassi	6
Kharar	6
Zirakpur	3
Gidderbaha	1
Malout	1
Muktsar	4
Banga	1
Narot Jaimal Singh	1
Sujanpur	2
Bhadson	1
Ghagga	1
Nahba	5
Anandpur Sahib	1
Chamkaur Sahib	1
Kiratpur Sahib	2
Morinda	2
Nangal	2
Rupnagar	2
Dhuri	2
Lehragaga	5
Ahmedgarh	1
Amargarh	1
Malerkotla	1
Bhikhi Wind	1
Khemkaran	1
Patti	1
Tarn Taran	2
Total	494

Source: Departmental data

GVPs in selected 13 ULBs	
Bathinda	22
Ludhiana	41
Moga	3
SAS Nagar	13
Khamanon	1
Ferozepur	1
Makhu	1
Sirhind	4
Qadian	3
Doraha	1
Mansa	2
Kiratpur	2
Rupnagar	2
Total	96

Appendix 2.9

(Referred to in paragraph 2.4.3.1)

Targets and achievement (SLB) in respect of segregation of waste in selected ULBs

Sr. No.	Name of the ULB	Year			
		2017-18		2018-19	
		Target	Achievement	Target	Achievement
1.	Amritsar (C)	100	20	40	10
2.	Bathinda (C)	100	20	40	80
3.	Ludhiana (C)	100	20	40	30
4.	Moga (C)	10	20	40	40
5.	SAS Nagar (C)	100	20	40	24
6.	Adampur (MC)	90	0	0	0
7.	Doraha (MC)	100	0	10	80
8.	Ferozepur (MC)	100	0	10	10
9.	Kartarpur (MC)	100	0	10	10
10.	Mansa (MC)	100	0	10	37
11.	Qadian (MC)	100	0	10	65
12.	Rajpura (MC)	90	0	10	62
13.	Rupnagar (MC)	95	0	10	85
14.	SBS Nagar (MC)	100	0	10	10
15.	Sirhind (MC)	40	0	10	10
16.	Bilga (NP)	90	0	10	55
17.	Khamanon (NP)	100	0	10	50
18.	Kiratpur Sahib (NP)	90	0	10	100
19.	Makhu (NP)	100	0	10	10
20.	Mehraj (NP)	100	0	10	17

Source: Departmental data

Appendix 2.10

(Referred to in paragraph 2.4.3.1)

Details of Waste Collected and Segregated by the ULBs

(Qty. in Tons)

Sr. No.	Name of ULB	2017-18			2018-19			2019-20			2020-21			2021-22			Total		
		AC	S	P	AC	S	P												
1.	Amritsar (C)	2,47,777	0	0	2,24,743	0	0	2,00,145	0	0	1,94,236	0	0	1,98,292	1,28,890	65	10,65,193	1,28,890	12
2.	Bathinda (C)	0	0	0	38,325	38,325	100	38,325	38,325	100	35,040	0	0	42,628	0	0	1,54,318	76,650	50
3.	Ludhiana (C)	4,07,426	2,19,000	54	4,01,213	2,19,000	55	4,65,576	4,46,953	96	3,17,580	2,31,834	73	3,66,927	1,83,463	50	19,58,722	13,00,250	66
4.	Moga (C)	23,597	9,052	38	22,630	11,315	50	22,812	11,132	49	22,995	13,250	58	23,360	16,615	71	1,15,394	61,364	53
5.	SAS Nagar (C)	45,625	0	0	45,625	0	0	45,625	0	0	33,580	33,580	100	33,580	33,581	100	2,04,035	67,161	33
6.	Adampur (MC)	767	767	100	1,135	795	70	1,135	829	73	1,135	851	75	1,135	851	75	5,307	4,092	77
7.	Doraha (MC)	6,004	0	0	6,388	0	0	4,402	0	0	6,260	5,634	90	6,260	5,634	90	29,313	11,268	38
8.	Ferozepur(MC)	17,155	0	0	17,155	0	0	15,695	12,556	80	17,155	0	0	13,505	13,505	100	80,665	26,061	32
9.	Kartarpur(MC)	2,555	0	0	2,190	438	20	2,190	438	20	2,190	735	34	2,555	1,097	43	11,680	2,708	23
10.	Mansa (MC)	0	0	0	0	0	0	0	0	0	1,208	1,170	97	2,246	2,206	98	3,454	3,376	98
11.	Qadian (MC)	1,170	880	75	1,260	760	60	1,170	880	75	1,369	0	0	1,369	0	0	6,338	2,520	40
12.	Rajpura (MC)	8,430	8,395	100	8,767	7,890	90	9,862	8,876	90	10,651	9,586	90	10,950	9,855	90	48,660	44,602	92
13.	Rupnagar (MC)	3,285	2,792	85	3,285	2,792	85	3,285	2,792	85	4,380	3,723	85	4,380	3,942	90	18,615	16,041	86
14.	SBS Nagar (MC)	2,920	2,384	82	2,920	2,384	82	2,920	2,384	82	2,920	2,384	82	2,920	2,384	82	14,600	11,920	82
15.	Sirhind (MC)	4,380	2,628	60	7,300	0	0	7,300	2,920	40	5,840	0	0	5,840	0	0	30,660	5,548	18
16.	Bilga (NP)	1,460	1,241	85	1,460	1,241	85	1,460	1,314	90	1,460	1,460	100	1,460	1,460	100	7,300	6,716	92
17.	Khamanon (NP)	1,825	0	0	1,643	0	0	1,095	0	0	1,825	1,825	100	1,657	1,657	100	8,045	3,482	43
18.	Kiratpur Sahib (NP)	0	0	0	365	292	80	365	292	80	365	347	95	365	347	95	1,460	1,278	88
19.	Makhu (NP)	1,752	368	21	1,752	368	21	1,460	307	21	1,460	321	22	1,497	150	10	7,921	1,514	19
20.	Mehraj (NP)	365	0	0	365	0	0	365	0	0	365	354	97	365	354	97	1,825	708	39
	Total	7,76,492	2,47,507	32	7,88,521	2,85,600	36	8,25,187	5,29,997	64	6,62,014	3,07,054	46	7,21,291	4,05,991	56	37,73,505	17,76,149	47

Source: Departmental data

AC= Actual Waste Collected; S = Segregated; P = Percentage of segregation

Appendix 2.11

(Referred to in paragraph 2.4.3.3)

Availability of Material Recovery Facility in the selected ULBs

Sr. No.	Name of ULBs	Total MRF required	Works allotted	Constructed	MRF in use	MRF not in use	Shortfall
1.	Amritsar (C)	10	5	5	2	3	5
2.	Bathinda (C)	1	1	1	1	0	0
3.	Ludhiana (C)	54	18	12	4	8	42
4.	Moga (C)	16	2	2	2	0	14
5.	SAS Nagar (C)	20	14	14	14	0	6
6.	Adampur (MC)	0	0	0	0	0	0
7.	Doraha (MC)	3	1	1	1	0	2
8.	Ferozepur (MC)	2	2	2	2	0	0
9.	Kartarpur (MC)	1	1	1	1	0	0
10.	Mansa (MC)	10	4	4	4	0	6
11.	Qadian (MC)	1	1	1	1	0	0
12.	Rajpura (MC)	4	4	4	4	0	0
13.	Rupnagar (MC)	3	2	2	1	1	1
14.	SBS Nagar (MC)	1	1	1	1	0	0
15.	Sirhind (MC)	1	1	1	1	0	0
16.	Bilga (NP)	2	1	1	1	0	1
17.	Khamanon (NP)	1	1	1	1	0	0
18.	Kiratpur Sahib (NP)	1	1	1	1	0	0
19.	Makhu (NP)	1	1	1	1	0	0
20.	Mehraj (NP)	1	1	1	0	1	0
Total		133	62	56	43	13	77

Source: Departmental data

Appendix 2.12

(Referred to in paragraph 2.4.4.1 and 2.4.4.4)

Statement showing availability of various type of vehicle (as of March 2022) in the selected ULBs

Name of ULBs	Owned by	Category of vehicles																																												
		Tate ace				Compactor				Rikshaw Rehries			Tractor trolley				JCB				E-rikshaw*			Poclain machine*			Tipper				Hook loader/Dumper placer				Total vehicles			Availability of vehicles								
		R	A	S	GPS	R	A	S	GPS	R	A	S	R	A	S	GPS	R	A	S	GPS	R	A	S	R	A	S	R	A	S	GPS	R	A	S	GPS	R	A	S	Total vehicles	Total	GPS	S-GPS					
Amritsar (C)	ULB	0	0	0	0	0	0	0	0	0	0	0	0	31	-31	0	1	8	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	-5	0	0	3	-3	0	1	47	-46	47	0	47
	Concessionaire	275	294	-19	294	22	21	1	21	20	56	-36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	3	0	0	0	0	320	374	-54	318	318	0				
Bathinda (C)	ULB	97	60	37	60	1	1	0	1	2	2	0	19	19	0	19	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	121	84	37	82	82	0				
Ludhiana (C)	ULB	232	32	200	0	104	33	71	0	2,368	1,050	1,318	50	0	50	0	17	1	16	0	350	0	350	1	0	1	2	0	2	0	2	0	35	9	26	9	3,159	1,125	2,034	75	9	66				
	Concessionaire	0	0	0	0	0	2	-2	2	0	0	0	0	0	0	0	0	9	-9	9	0	0	0	0	0	0	0	0	0	31	-31	31	0	0	0	0	0	42	-42	42	42	0				
Moga (C)	ULB	0	10	-10	0	0	0	0	0	0	200	-200	0	11	-11	0	0	2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-1	0	0	224	-224	24	0	24				
SAS Nagar (C)	ULB	0	0	0	0	4	0	4	0	0	0	0	4	2	2	2	5	3	2	0	0	0	0	0	0	0	0	0	9	4	5	4	0	2	-2	2	22	11	11	11	8	3				
Adampur (MC)	ULB	0	5	-5	0	0	0	0	0	0	19	-19	0	2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	-26	7	0	7				
Doraha (MC)	ULB	6	2	4	2	0	0	0	0	0	24	-24	2	2	0	2	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-1	1	8	30	-22	6	6	0				
Ferozpur (MC)	ULB	0	0	0	0	0	0	0	0	0	150	-150	0	10	-10	0	0	1	-1	1	0	10	-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	-171	21	1	20				
Kartarpur (MC)	ULB	0	1	-1	0	0	0	0	0	30	20	10	0	2	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	23	7	3	0	3				
Mansa (MC)	ULB	0	1	-1	0	0	0	0	0	0	52	-52	0	4	-4	0	1	0	1	0	0	5	-5	0	0	0	0	0	0	0	0	0	0	1	62	-61	10	0	10							
Qadian (MC)	ULB	1	1	0	1	0	0	0	0	40	20	20	3	3	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	45	25	20	5	3	2							
Rajpura (MC)	ULB	0	0	0	0	19	0	19	0	115	270	-155	5	7	-2	7	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-1	0	141	280	-139	10	9	1				
Rupnagar (MC)	ULB	0	6	-6	1	0	0	0	0	0	70	-70	0	4	-4	2	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	-2	0	0	83	-83	13	4	9				
SBS Nagar (MC)	ULB	0	6	-6	6	0	0	0	0	0	60	-60	0	3	-3	3	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	-70	10	10	0				
Sirhind (MC)	ULB	0	12	-12	4	0	0	0	0	0	40	-40	0	3	-3	3	0	1	-1	1	0	0	0	0	0	0	0	0	0	1	-1	1	0	57	-57	17	9	8								
Bilga (NP)	ULB	1	1	0	1	0	0	0	0	47	47	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49	0	2	2	0							
Khamaon (NP)	ULB	0	0	0	0	0	0	0	0	0	16	-16	0	2	-2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	-3	3	0	0	0	0	0	21	-21	5	5	0				
Kiratpur Sahib (NP)	ULB	0	1	-1	1	0	0	0	0	0	7	-7	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	-9	2	2	0							
Makhu (NP)	ULB	0	0	0	0	0	0	0	0	0	14	-14	0	1	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	-15	1	1	0							
Mehraj (NP)	ULB	0	1	-1	1	0	0	0	0	0	34	-34	0	2	-2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	-37	3	2	1							
Total		612	433	179	371	150	57	93	24	2,622	2,151	471	84	110	-26	45	29	33	-4	19	350	15	335	1	0	1	14	46	-32	41	35	20	15	13	3,897	2,865	1,032	714	513	201						

Source: Departmental data

R=Required, A=Available, NA= Not Assessed, GPS= GPS Installed, S= Shortage, S-GPS = Shortage in GPS.

*: In E-Rickshaw and poclain machine, no GPS was installed.

Appendix 2.13

(Referred to in paragraph 2.4.5.2)

Statement showing availability of compost pits to process the wet waste

Sr. No.	Name of the ULBs	2017-18		2018-19		2019-20		2020-21		2021-22		Grand Total		
		Pits required	Pits constructed	extra or short constructed										
1.	Amritsar (C)	0	0	0	0	0	0	0	67	0	0	0	67	67
2.	Bathinda (C)	0	0	0	0	0	0	0	0	0	0	0	0	0
3.	Ludhiana (C)	0	0	400	0	400	0	400	0	400	0	400	0	400
4.	Moga (C)	0	0	0	0	149	192	0	0	0	0	149	192	43
5.	SAS Nagar (C)	0	0	0	0	1,150	200	0	0	0	0	1,150	200	950
6.	Adampur (MC)	0	0	32	24**	8	0	8	0	8	0	32	24	8
7.	Doraha (MC)	0	0	39	0	39	39	0	0	0	0	39	39	0
8.	Ferozepur (MC)	0	0	0	30	50	50	0	50	0	0	50	130	80
9.	Kartarpur (MC)	0	0	39	0	39	39	0	0	0	0	39	39	0
10.	Mansa (MC)	0	0	125	0	125	125	0	0	0	0	125	125	0
11.	Qadian (MC)	0	0	32	0	32	36	0	10	0	0	32	46	14
12.	Rajpura (MC)	0	0	250	0	250	150	100	0	100	0	250	150	100
13.	Rupnagar (MC)	0	0	99	20	79	0	79	95	0	0	99	115	16
14.	SBS Nagar (MC)	0	0	100	75	25	0	25	0	25	0	100	75	25
15.	Sirhind (NP)	0	0	75	0	75	0	75	50	25	0	75	50	25
16.	Bilga (NP)	0	0	16	16	0	0	0	0	0	0	16	16	0
17.	Khamanon (NP)	0	0	26	40	0	0	0	0	0	0	26	40	14
18.	Kiratpur Sahib (NP)	0	0	10	0	10	10	0	4	0	0	10	14	4
19.	Makhu (NP)	0	0	22	22	0	0	0	0	0	0	22	22	0
20.	Mehraj (NP)	0	0	25	25	0	0	0	0	0	8	25	33	8
Total												2,639*	1,377*	

Source: Departmental data

Note: - *2,639-it includes 400 compost pits of Ludhiana and in 1,377-it includes 67 compost pits of Amritsar.

** Already constructed in the year 2005.

	This colour denotes shortage
	This colour denotes excess – the excess compost pits were being used by the ULBs as found during physical visit

Appendix 2.14

(Referred to in paragraph 2.4.5.4 (ii) and 2.4.5.6 (i))

Status of construction of SLF and Bio-remediation of Legacy waste in test checked ULBs

Sr. No	Name of the ULBs	Total waste generation per day (in MT)	Total legacy waste at dump site (in MT)	Processed legacy waste (in MT) as of 03/2022	Period of processing	Position of legacy waste as of 10/2024	SLF constructed	SLF used for inert waste	Remarks
1.	Amritsar (C)	450	12,35,000	4,96,988	01.09.2020 to 30.11.2022	Total legacy waste 11,35,000 MT. No bio-remediation carried out after November 2022.	No	NA	-
2.	Bathinda (C)	110	2,90,000	16,116	04/2021 to 02/2022	Out of 2,22,017 MT legacy waste (allotted for bio-remediation), 86 percent was processed.	Yes	Yes	-
3.	Ludhiana (C)	1,100	21,54,880	90,000	03.08.2022 to 20.02.2023	Out of 25,00,000 MT legacy waste, 2.04 lakh MT was processed.	Yes	Not in use	The SLF was constructed by the concessionaire but due to arbitration case the SLF was not used for inert waste.
4.	Moga (C)	65	1,20,000	0	NA	Out of 1,60,000 MT Legacy waste, 1,27,000 MT processed through contractor.	No	NA	Work order of bio-remediation issued in January 2023.
5.	SAS Nagar (C)	93	4,13,444	1,96,875	08.10.2021 to 13.06.2024	Total 1,41,657 MT waste laying at dumpsite for which bio-remediation is under process.	Yes	Yes	Work of bio-remediation was being done by ULB itself.
6.	Adampur (MC)	3.11	590	155	Logbook not maintained	All legacy waste bio-remediated. Approx 10,320 MT waste belonging to Air Force Station pending to be processed.	No	NA	SLF was under construction
7.	Doraha (MC)	12	13,000	10,400	03.01.2022 to 21.06.2022	19,723 MT legacy waste processed. Work order issued for processing of remaining 8,500 MT legacy waste.	No	NA	The processed waste was lying at dump site and final disposal awaited.
8.	Ferozepur (MC)	37	6,500	6,341	1.12.2020 to 17.6.2022	All legacy waste processed upto June 2022.	Yes	Yes	The processed inert waste was deposited in the SLF. However, the specification i.e. layer of HDPE was not found at site which affected the ground water due to leachate.
9.	Kartarpur (MC)	7	4,320	86	Logbook not maintained	All legacy waste processed at old dump site but no records maintained.	No	NA	-

Sr. No	Name of the ULBs	Total waste generation per day (in MT)	Total legacy waste at dump site (in MT)	Processed legacy waste (in MT) as of 03/2022	Period of processing	Position of legacy waste as of 10/2024	SLF constructed	SLF used for inert waste	Remarks
10.	Mansa (MC)	37	81,203	1,163 (61 + 1102)	15.10.2022 to 06.11.2022 & 07.11.2022 to 20.12.2022	1,057 MT legacy waste processed by ULB itself and out of total 80,000 MT legacy waste 63,000 MT processed through contractor.	No	NA	The processed waste along with inert waste was lying at dump site.
11.	Qadian (MC)	3.75	NA	794	01.12.2020 to 31.03.2022	No bio-remediation carried out after 03/2022.	No	NA	As on 01/2023 all legacy waste was removed from dumpsite.
12.	Rajpura (MC)	25	74,000	54,000	Logbook not maintained	Bio-remediation started.	Yes	Not in use	Inert waste was used in parks.
13.	Rupnagar (MC)	12	650	650	02.03.2021 to 30.12.2022	Total 17,000 MT legacy waste at dumpsite. Tender floated for processing.	No	NA	-
14.	SBS Nagar (MC)	12	28,500	17,520	Partially log book maintained from 01.03.2021 to 31.12.2022	Bio-remediation under process. 6,000 MT legacy waste at dumpsite.	No	NA	SLF was under construction.
15.	Sirhind (MC)	16	NA	NA	NA	Total 2,300 MT legacy waste processed. No records maintained.	No	NA	Data of legacy waste quantity was not available but legacy waste was found at dumpsite during physical visit.
16.	Bilga (NP)	4	1. 200	200	One dumpsite (Out of Two) remediated but Logbook was not maintained	Efforts will be made to bio-remediated of waste.	No	NA	SLF was under construction.
			2. NA	NA					
17.	Khamanon (NP)	4.54	410	410	17.02.2021 to 21.10.2022	Total 410 MT legacy waste processed.	Yes	Not in use	The inert was spread over the dump site whereas it was required to be filled in the SLF which was under construction.
18.	Kiratpur Sahib (NP)	1	45	45	01.11.2021 to 09.09.2022	Total 45 MT legacy waste processed.	Yes	Not in use	Due to non-testing of water table the SLF was filled with water due to increase in water table. The inert waste was spread over the dump site.
19.	Makhu (NP)	4.1	1,850	1,850	05.05.2021 to 26.11.2022	All legacy waste remediated.	Yes	Not in use	Reason not available.
20.	Mehraj (NP)	1	100	100	Logbook not maintained	All legacy waste remediated.	No	NA	-

Source: Departmental data

Appendix 2.15*(Referred to in paragraph 2.4.5.5)***Statement showing Bio-remediation machineries lying idle in selected ULBs***(₹ in lakh)*

Sr. No.	Name of the ULBs	Mechanical Separator				
		Date of purchase	Cost of Machinery	Cost of machinery not in use (as on 03/2022)	Position as of 10/2024	Cost of machinery in Use
1.	Amritsar (C)	Not Required				
2.	Bathinda (C)	Not Required				
3.	Ludhiana (C)	Not Required				
4.	Moga (C)	July-2020 to December-2020	19.80	14.85	Out of four, one machinery, transferred to ULB Batala and remaining lying idle.	4.95
5.	SAS Nagar (C)	September-2021	41.00	0.00	-	41.00
6.	Adampur (MC)	November-2020	5.00	0.00	-	5.00
7.	Doraha (MC)	October-2020	5.00	5.00	Machinery lying idle due to non-availability of staff.	0.00
8.	Ferozpur (MC)	April-2021	29.10	0.00	-	29.10
9.	Kartarpur (MC)	September-2021	4.99	4.99	The machinery will be utilised in future.	0.00
10.	Mansa (MC)	November-2020	4.52	4.52	The machineries were lying idle due to involvement of contractor for bio-remediation.	0.00
		October-2021	29.72	29.72		0.00
11.	Qadian (MC)	Not Purchased	Not Purchased	0.00	-	0.00
12.	Rajpura (MC)	January-2021	8.00	8.00	The machinery was lying idle till now.	0.00
13.	Rupnagar (MC)	February-2021	4.93	0.00	-	4.93
14.	SBS Nagar (MC)	March-2021	4.98	0.00	-	4.98
15.	Sirhind (MC)	November-2020	4.31	4.31	The machinery was used for processing of legacy waste but the record was not maintained.	0.00
16.	Bilga (NP)	March-2021	4.98	0.00	-	4.98
17.	Khamanon (NP)	September-2020	4.15	0.00	-	4.15
18.	Kiratpur Sahib (NP)	October-2020	5.00	0.00	-	5.00
19.	Makhu (NP)	December-2020	5.00	0.00	-	5.00
20.	Mehraj (NP)	February-2021	4.92	0.00	-	4.92
Total			185.40	71.39		114.01

Source: Departmental data

Not Required - concessionaire were engaged in SWM

Appendix 2.16

(Referred to in paragraph 2.4.5.6(ii))

Details showing compliance of provision in respect of Sanitary Landfill Facility

Sr. No.	Name of the ULBs	100 m away from river	200 m away from pond	200 m away from highways	200 m away from habitations	200 m away from public park	200 m away from water supply wells	20 km away from airport/air base	Buffer Zone declared	Volume of Waste (in TPD)	Whether site authorisation obtained
1.	Bathinda (C)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	110	Yes
2.	Ludhiana (C)	Yes	Yes	Yes	No	Yes	Yes	No (10.5 KM)*	No	1,005	Expired
3.	SAS Nagar (C)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	92	No
4.	Ferozepur (MC)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	37	No
5.	Rajpura (MC)	Yes	Yes	No	Yes	Yes	Yes	Yes	No	30	No
6.	Khamanon (NP)	Yes	No	Yes	Yes	Yes	Yes	Yes	No	4.54	No
7.	Kiratpur Sahib (NP)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No***	1	NR**
8.	Makhu (NP)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No***	4.10	NR**

Source: Departmental data

*Permission obtained from Airport authority

** Not Required

*** Buffer Zone at serial No. 5 and 6 was not required as per rule 11 (K) of SWM rules, 2016.

Appendix 2.17

(Referred to in paragraph 2.4.5.6(iii))

Basic facilities at Sanitary Landfill Sites

Sr. No.	Name of the ULBs	fenced or hedged	Gated to prevent stray animals	Availability of internal roads	Availability of waste inspection facilities	Office facility for record keeping	Availability of pollution monitoring equipment	Availability of weighbridge	Firefighting equipment	Drinking water	Light Facilities	Health inspection facilities of workers
1.	Bathinda (C)	Concerned facilities were to be developed by the concessionaire but due to arbitration case the records were not produced to audit.										
2.	Ludhiana (C)	No	No	Yes	No	No	No	Yes	No	Yes	Yes	No
3.	SAS Nagar (C)	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	No
4.	Ferozepur (MC)	Yes	No	No	No	No	No	No	No	No	No	No
5.	Rajpura (MC)	No	No	No	No	No	No	No	No	Yes	No	No
6.	Khamanon (NP)	Yes	Yes	Yes	No	No	No	No	No	No	No	No
7.	Kiratpur Sahib (NP)	Yes	Yes	No	No	No	No	No	No	No	Yes	No
8.	Makhu (NP)	No	No	No	No	No	No	No	No	No	No	No

Source: Departmental data

Appendix 2.18

(Referred to in paragraph 2.5.6)

Statement showing C&D machineries lying idle in selected ULBs

(₹ in lakh)

Sr. No.	Name of the ULBs	C&D management machine		
		Date of purchase	Cost	Use or not
1.	Amritsar (C)	Not required		
2.	Ludhiana (C)	Not required		
3.	Bathinda (C)	Machinery purchased but detail not made available		
4.	Moga (C)	Not purchased	Not purchased	Not purchased
5.	SAS Nagar (C)	March-2021	4.13	In use
6.	Adampur (MC)	December-2020	2.00	In use
7.	Doraha (MC)	October-2020	1.50	Not in use
8.	Ferozepur (MC)	November-2020	1.99	Not in use
9.	Kartarpur (MC)	June -2021	2.00	In use
10.	Mansa (MC)	Not purchased	Not purchased	Not purchased
11.	Qadian (MC)	Not purchased	Not purchased	Not purchased
12.	Rajpura (MC)	January-2021	4.98	Not in use
13.	Rupnagar (MC)	October-2020	1.99	In use
14.	SBS Nagar (MC)	February-2021	1.99	In use
15.	Sirhind (MC)	December-2020	1.97	In use
16.	Bilga (NP)	March-2021	2.00	In use
17.	Khamanon (NP)	May-2021	1.35	In use
18.	Kiratpur Sahib (NP)	November-2020	1.99	Not in use
19.	Makhu (NP)	January-2021	3.55	In use
20.	Mehraj (NP)	January-2021	2.25	In use

Source: Departmental data

Appendix 2.19

(Referred to in paragraph 2.6.1 and 2.6.5.2)

Statement showing deficiency in the annual reports submitted to the PPCB

Sr. No.	Name of ULBs	Year	Population	HHs	Generation (TPD)	Collection (TPD)	Processing (TPD)	Disposed at dumpsite/ landfill site
1.	Amritsar (C)	2017-18	11,32,383	2,31,636	700	700	0	600
		2018-19	13,94,224	2,31,636	496	450	0	496
		2019-20	11,32,383	2,31,636	550	550	0	550
		2020-21	11,32,383	2,31,636	550	550	0	550
		2021-22	14,52,603	2,31,636	450	450	0	450
2.	Bathinda (C)	2017-18	NA	NA	NA	NA	NA	NA
		2018-19	2,85,788	59,000	110	105	105	20-25
		2019-20	2,85,788	59,000	110	105	105	25
		2020-21	NA	NA	NA	NA	NA	NA
		2021-22	NA	NA	NA	NA	NA	NA
3.	Ludhiana (C)	2017-18	16,13,878	3,20,000	1,150	1,150	600	0
		2018-19	16,13,878	3,20,000	1,150	1,150	600	0
		2019-20	16,13,878	3,20,000	1,150	1,150	1,000	100
		2020-21	16,13,878	3,20,000	1,100	1,100	500	600
		2021-22	16,13,878	3,20,000	1,100	1,100	0	1,100
4.	Moga (C)	2017-18	report not submitted					
		2018-19	1,62,320	32,464	65	62	19	43
		2019-20	report not submitted					
		2020-21	report not submitted					
		2021-22	report not submitted					
5.	SAS Nagar (C)	2017-18	NA	NA	NA	NA	NA	NA
		2018-19	1,96,000	40,289	82.50	82.50	5.80	54
		2019-20	1,96,000	40,289	82.50	82.50	62.50	20
		2020-21	2,02,820	40,289	93	93	73	20
		2021-22	NA	NA	NA	NA	NA	NA
6.	Adampur (MC)	2017-18	17,693	3,537	2.10	2.10	2.10	2.10
		2018-19	20,922	4,078	3.11	3.11	1.87	1.87
		2019-20	20,922	4,078	3.11	3.11	1.87	1.87
		2020-21	20,922	4,078	3.11	3.11	1.87	1.87
		2021-22	20,922	4,088	3.11	3.11	1.87	1.87
7.	Doraha (MC)	2017-18	NA	NA	NA	NA	NA	NA
		2018-19	NA	NA	NA	NA	NA	NA
		2019-20	25,385	7,750	15-17	13-14	NA	13-14
		2020-21	25,424	7,750	12	12	4	8
		2021-22	NA	NA	NA	NA	NA	NA
8.	Ferozepur (MC)	2017-18	1,10,091	24,662	47	47	15	22
		2018-19	1,10,091	24,662	47	47	16	20
		2019-20	1,10,091	24,662	43	43	34	9
		2020-21	1,10,091	24,662	47	47	15	21
		2021-22	1,10,091	25,380	37	37	34	4
9.	Kartarpur (MC)	2017-18	25,670	NA	7	7	7	NA
		2018-19	26,616	5,650	6	6	6	NA
		2019-20	26,616	5,650	6	6	6	6

Sr. No.	Name of ULBs	Year	Population	HHs	Generation (TPD)	Collection (TPD)	Processing (TPD)	Disposed at dumpsite/ landfill site	
		2020-21	27,000	5,650	7	7	7	7	
		2021-22	27,000	5,650	7	7	7	7	
10.	Mansa (MC)	2017-18	NA	NA	NA	NA	NA	NA	
		2018-19	82,956	16,852	37	37	14	23	
		2019-20	NA	NA	NA	NA	NA	NA	
		2020-21	NA	NA	NA	NA	NA	NA	
		2021-22	NA	NA	NA	NA	NA	NA	
11.	Qadian (MC)	2017-18	NA	NA	NA	NA	NA	NA	
		2018-19	NA	NA	NA	NA	NA	NA	
		2019-20	NA	NA	NA	NA	NA	NA	
		2020-21	23,630	4,889	3.75	3.75	2.55	1.23	
		2021-22	23,630	4,889	3.75	3.75	2.55	1.23	
12.	Rajpura (MC)	2017-18	NA	NA	NA	NA	NA	NA	
		2018-19	NA	NA	NA	NA	NA	NA	
		2019-20	92,283	22,000	25	25	25	3	
		2020-21	NA	NA	NA	NA	NA	NA	
		2021-22	NA	NA	NA	NA	NA	NA	
13.	Rupnagar (MC)	2017-18	56,039	16,056	10	9	0	9	
		2018-19	56,039	16,056	10	9	0	9	
		2019-20	56,039	16,056	10	9	9	1.5	
		2020-21	56,039	16,086	13	12	10	2	
		2021-22	56,039	16,086	12	12	10	2	
14.	SBS Nagar (MC)	2017-18	46,024	10,000	12	8	2.24	NA	
		2018-19	46,024	10,000	12	8	2.24	NA	
		2019-20	46,024	10,000	12	8	2.24	NA	
		2020-21	46,024	10,000	15	8	2.24	NA	
		2021-22	46,024	10,000	12	8	2.24	NA	
15.	Sirhind (MC)	2017-18	57,874	11,020	12	12	NA	NA	
		2018-19	57,874	13,022	20	20	1.20	NA	
		2019-20	57,874	13,022	20	20	1.20	18.80	
		2020-21	57,874	13,022	16	16	2.50	13.50	
		2021-22	65,800	13,022	16	16	16	1.50	
16.	Bilga (NP)	2017-18	Form IV not prepared for the year 2017-18						
		2018-19	10,125	3,083	4	4	4	4	
		2019-20	10,125	3,083	4	4	2	2	
		2020-21	10,125	3,083	4	4	2.30	1.70	
		2021-22	10,125	3,083	4	4	2.30	1.70	
17.	Khamanon (NP)	2017-18	10,128	2,342	6.50	5	0	0	
		2018-19	10,128	2,342	4.50	4	0	0	
		2019-20	10,128	2,342	4.00	3	0	0	
		2020-21	10,135	2,342	5	5	5	0	
		2021-22	10,135	2,342	4.54	4.54	5	0	
18.	Kiratpur Sahib (NP)	2017-18	NA	NA	NA	NA	NA	NA	
		2018-19	7,545	1,582	1	1	0	1	
		2019-20	7,545	1,732	1	1	1	1	
		2020-21	7,545	1,732	1	1	1	0.57	

Sr. No.	Name of ULBs	Year	Population	HHs	Generation (TPD)	Collection (TPD)	Processing (TPD)	Disposed at dumpsite/ landfill site
		2021-22	7,545	1,732	1	1	1	0.60
19.	Makhu (NP)	2017-18	14,664	2,826	4.80	4.80	1.09	2.99
		2018-19	14,664	2,826	4.80	4.80	1.09	2.99
		2019-20	14,664	2,851	4	4	2.99	1.01
		2020-21	14,664	2,851	4	4	2.99	1.01
		2021-22	14,664	2,851	4.10	4.10	4.10	0.65
20.	Mehraj (NP)	2017-18	16,783	3,564	1	1	0	0
		2018-19	16,783	3,564	1	1	0	0
		2019-20	16,783	3,564	1	1	0	0
		2020-21	16,783	3,564	1	1	0	0
		2021-22	16,783	3,564	1	1	0	0

Source: Annual Reports submitted to PPCB and higher authorities

NA: Not Available

Appendix 2.20

(Referred to in paragraph 2.6.2)

Statement showing Information, Education & Communication (IEC) Activities conducted during 2017-22

Sr. No.	Name of ULBs	Plan prepared	Nature of activities							Total activities
			Video/audio	Mass communication	Wall painting	Hoardings	Pamphlets	School	Other mode of communication	
1.	Amritsar (C)	No	35	188	0	1	9	132	1,515	6
2.	Bathinda (C)	No	2	2	21	17	0	0	3	5
3.	Ludhiana (C)	No	425	2,651	89	917	64,800	200	2,008	7
4.	Moga (C)	No	22	13	62	105	11	95	11	7
5.	SAS Nagar (C)	No	94	865	37	292	33,000	550	400	7
6.	Adampur (MC)	No	85	0	13	0	0	248	114	4
7.	Doraha (MC)	No	0	0	0	0	0	0	Yes	1
8.	Ferozepur (MC)	No	0	Yes	38	453	34,000	Yes	0	5
9.	Kartarpur (MC)	No	1	49	15	0	1	11	45	6
10.	Mansa (MC)	No	0	Yes	Yes	0	0	0	0	2
11.	Qadian (MC)	No	10	155	22	5	1,700	56	2	7
12.	Rajpura (MC)	No	1	8	21	0	0	56	0	4
13.	Rupnagar (MC)	No	28	101	17	23	5	110	14	7
14.	SBS Nagar (MC)	No	97	76	11	6	1	26	0	6
15.	Sirhind (MC)	No	Nil	3	21	7	0	0	2	4
16.	Bilga (NP)	No	3	20	2	3	4	20	0	6
17.	Khamanon (NP)	No	Nil	292	32	12	3	12	Nil	5
18.	Kiratpur Sahib (NP)	No	0	0	6	2	0	0	0	2
19.	Makhu (NP)	No	3	77	93	59	118	61	0	6
20.	Mehraj (NP)	No	30	162	50	12	61	30	8	7

Source: Departmental data

Appendix 2.21

(Referred to in paragraph 2.6.3)

Statement showing assessment of minutes of meeting of SLAB and its implementation.

Sr. No.	Meeting 1 (5 September 2017)	Meeting 2 (14 February 2019)	Meeting 3 (14 August 2019)	Meeting 4 (18 March 2020)	Meeting 5 (17 September 2020)	Meeting 6 (17 March 2021)	Meeting 7 (23 September 2021)
1.	Duties to be performed by different agencies	Discussion on action taken reports on the decision taken in the 1 st meeting of State Level Advisory Body (SLAB) of SWM rules, 2016.	Confirmation of the minutes of the 2 nd meeting of State Level Advisory Body held on 14.02.2019.	Confirmation of the proceedings of the 3 rd meeting of State Level Advisory Body held on 14.08.2019.	Confirmation of the proceedings of 4 th meeting of State Level Advisory Body held on 18.03.2020 regarding management of legacy waste and ensuring of implementation of SWM Rules 2016.	Confirmation of the proceedings of 5 th meeting of State Level Advisory Body held on 17.09.2020 for the issues segregation, D2D collection, processing of waste, beautification of GVPs.	Confirmation of the proceedings of 6 th meeting of State Level Advisory Body held on 17.03.2021 and exploration the possibility for use of RDF.
2.	Punjab State SWM policy	Submission of individual SWM action Plan and notification of bye laws.	Discussion on technological option for handling of legacy waste, utilisation of SCF and composting of wet waste.	Horticulture waste management in Park/green belts etc.	Door to door collections.	Setting-up a dedicated cell in all the ULBs to coordinate the compliance of SWM rules and reporting of collected data.	Review of action taken on the decisions taken in the 6 th meeting regarding source segregation, bailing, remediation of legacy waste, door-to-door collection, processing of waste, beautification of GVPs etc.
3.	Land identification for processing facilities	Stopping entry of solid waste in water bodies/drain/ river etc.	--	Collection of user fee officially to sustain the SWM.	--	--	--
4.	Adoption of decentralised SWM approach	Notification of Byelaws and prepare byelaws for managing the RDF.	--	--	--	--	Compliance of Rule 17 of SWM Rules 2016 by manufacturers or brand owners of disposable products and sanitary napkins and diapers.
5.	Financial condition of ULBs – adequate separate fund provision in annual budget	Management of C&D waste.	--	--	Horticulture waste management in parks/ green belt/ lawns etc.	Horticulture waste management in parks/ green belt/ lawns etc.	--

Sr. No.	Meeting 1 (5 September 2017)	Meeting 2 (14 February 2019)	Meeting 3 (14 August 2019)	Meeting 4 (18 March 2020)	Meeting 5 (17 September 2020)	Meeting 6 (17 March 2021)	Meeting 7 (23 September 2021)
6.	Creation of separate SWM Cadre	Remediation of existing dump site by planning of legacy waste.	--	Compliance of SWM Rules by Vegetable/ Fruit/Grain Markets under the control of State Mandi Board.	Compliance by Bulk Waste Generators.	Compliance by Bulk Waste Generators.	C&D waste management.
7.	Secondary collection points	Developing SWM model in the ULB having population more than 50000.	--	--	Compliance of SWM Rules by Vegetable/ Fruit/ Grain Markets under the control of State Mandi Board.	Compliance of SWM Rules by Vegetable/ Fruit/ Grain Markets under the control of State Mandi Board.	Measuring production of compost and elimination of GVPs and deployment of Nodal Officers ward wise.
8.	Integration of informal sector	--	--	Rag Pickers should be identified by the ULBs and integrated into SWM by them.	--	--	--
9.	Source segregation of MSW	Source segregation of waste, Door to Door collection in segregated manner, Arrangements of composting of wet waste and MRF.	--	--	--	--	--
10.	Release of SBM grant	--	--	--	--	--	--
11.	Bulk generators - exceeding 100 kg per day	In-situ composting by BWG.	--	Compliance by BWGs.	--	--	--
12.	Education strategy to achieve goal of clean-green-pollution free Punjab	--	The Punjab school Education Board has informed that the topic of waste management including sanitation has already been made part of Environmental studies subject from Class 1 to V.	--	--	--	--
13.	Technologies for processing of waste	--	--	--	--	--	--

Performance Audit Report on Solid Waste Management in Punjab by Urban Local Bodies

Sr. No.	Meeting 1 (5 September 2017)	Meeting 2 (14 February 2019)	Meeting 3 (14 August 2019)	Meeting 4 (18 March 2020)	Meeting 5 (17 September 2020)	Meeting 6 (17 March 2021)	Meeting 7 (23 September 2021)
14.	Incentivize the Model Ward	--	--	--	--	--	--
15.	Strategy to achieve the goal of SBM-U and guidelines for IEC and Capacity Building activities	--	--	--	--	--	--

Source: Minutes of meetings of SLAB

Appendix 2.22

(Referred to in paragraph 2.6.4)

Statement showing shortfall in meetings to be conducted by the District Administration

Sr. No.	Name of ULBs	2017-18			2018-19 (Upto December 2018)			2018-19 (January to March 2019)			2019-20			2020-21			2021-22			Total meetings conducted
		QR	QC	SF (in per cent)	QR	QC	SF (in per cent)	MR	MC	SF (in per cent)	MR	MC	SF (in per cent)	MR	MC	SF (in per cent)	MR	MC	SF (in per cent)	
1.	Amritsar (C)	4	0	100	3	0	100	3	0	100	12	1	92	12	7	42	12	2	83	10
2.	Bathinda (C)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	1	92	1
3.	Ludhiana (C)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
4.	Moga (C)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
5.	SAS Nagar (C)	4	0	100	3	0	100	3	0	100	12	0	100	12	2	83	12	0	100	2
6.	Adampur (MC)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
7.	Doraha (MC)	4	0	100	3	0	100	3	0	100	12	5	58	12	9	25	12	7	42	21
8.	Ferozepur (MC)	4	1	75	3	2	33	3	0	100	12	0	100	12	0	100	12	2	83	5
9.	Kartarpur (MC)	4	0	100	3	0	100	3	0	100	12	0	100	12	1	92	12	1	92	2
10.	Mansa (MC)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
11.	Qadian (MC)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
12.	Rajpura (MC)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
13.	Rupnagar (MC)	4	0	100	3	0	100	3	0	100	12	1	92	12	1	92	12	0	100	2
14.	SBS Nagar (MC)	4	0	100	3	0	100	3	0	100	12	0	100	12	1	92	12	4	67	5
15.	Sirhind (MC)	4	0	100	3	0	100	3	0	100	12	2	83	12	0	100	12	0	100	2
16.	Bilga (NP)	4	0	100	3	0	100	3	0	100	12	0	100	12	0	100	12	0	100	0
17.	Khamanon (NP)	4	0	100	3	0	100	3	0	100	12	1	92	12	1	92	12	1	92	3
18.	Kiratpur Sahib (NP)	4	0	100	3	0	100	3	0	100	12	2	83	12	3	75	12	5	58	10
19.	Makhu (NP)	4	1	75	3	2	33	3	0	100	12	0	100	12	0	100	12	2	83	5
20.	Mehraj (NP)	4	0	100	3	0	100	3	0	100	12	0	100	12	2	83	12	2	83	4
Total		80	2	98	60	4	93	60	0	100	240	12	95	240	27	89	240	27	89	72

Source: Records provided by ULB

QR-Quarterly Meetings Required; QC-Quarterly Meetings Conducted; MR- Monthly Meetings Required; MC-Monthly Meetings Conducted; and SF-Shortfall.

Appendix 2.23

(Referred to in paragraph 2.6.5.1)

Statement showing Status of Annual Report submitted to PPCB

Sr. No.	Name of ULBs	Years	Due Date of submission	Submitted to PPCB/Dept.	Delay in submission to PPCB (in days)
1.	Amritsar (C)	2017-18	30.06.2018	16.07.2018	16
		2018-19	30.06.2019	29.08.2019	60
		2019-20	30.06.2020	22.06.2020	No Delay
		2020-21	30.06.2021	06.09.2021	68
		2021-22	30.06.2022	12.12.2022	165
2.	Bathinda (C)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	26.06.2019	No Delay
		2019-20	30.06.2020	28.06.2020	No Delay
		2020-21	30.06.2021	Not submitted	NA
		2021-22	30.06.2022	Not submitted	NA
3.	Ludhiana (C)	2017-18	30.06.2018	01.10.2018	93
		2018-19	30.06.2019	08.07.2019	8
		2019-20	30.06.2020	23.06.2020	No Delay
		2020-21	30.06.2021	30.06.2021	No Delay
		2021-22	30.06.2022	10.06.2022	No Delay
4.	Moga (C)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	10.07.2019	10
		2019-20	30.06.2020	Not submitted	NA
		2020-21	30.06.2021	Not submitted	NA
		2021-22	30.06.2022	Not submitted	NA
5.	SAS Nagar (C)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	03.07.2019	3
		2019-20	30.06.2020	30.06.2020	No Delay
		2020-21	30.06.2021	30.07.2021	30
		2021-22	30.06.2022	Not Submitted	NA
6.	Adampur (MC)	2017-18	30.06.2018	08.09.2022	1,530
		2018-19	30.06.2019	08.09.2022	1,165
		2019-20	30.06.2020	08.09.2022	800
		2020-21	30.06.2021	08.09.2022	435
		2021-22	30.06.2022	08.09.2022	70
7.	Doraha (MC)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	Not submitted	NA
		2019-20	30.06.2020	07.01.2020	1
		2020-21	30.06.2021	29.06.2021	No Delay
		2021-22	30.06.2022	Not submitted	NA
8.	Ferozepur (MC)	2017-18	30.06.2018	21.06.2018	No Delay
		2018-19	30.06.2019	16.07.2019	16
		2019-20	30.06.2020	27.07.2020	27
		2020-21	30.06.2021	16.06.2021	No Delay
		2021-22	30.06.2022	23.07.2022	23

Sr. No.	Name of ULBs	Years	Due Date of submission	Submitted to PPCB/Dept.	Delay in submission to PPCB (in days)
9.	Kartarpur (MC)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	17.07.2019	17
		2019-20	30.06.2020	07.07.2020	7
		2020-21	30.06.2021	01.07.2021	No Delay
		2021-22	30.06.2022	23.09.2022	85
10.	Mansa (MC)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	19.07.2019	19
		2019-20	30.06.2020	Not submitted	NA
		2020-21	30.06.2021	Not submitted	NA
		2021-22	30.06.2022	Not submitted	NA
11.	Qadian (MC)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	Not submitted	NA
		2019-20	30.06.2020	Not submitted	NA
		2020-21	30.06.2021	01.05.2021	No Delay
		2021-22	30.06.2022	30.04.2022	No Delay
12.	Rajpura (MC)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	Not submitted	NA
		2019-20	30.06.2020	22.07.2020	22
		2020-21	30.06.2021	Not submitted	NA
		2021-22	30.06.2022	Not submitted	NA
13.	Rupnagar (MC)	2017-18	30.06.2018	01.07.2018	1
		2018-19	30.06.2019	11.07.2019	11
		2019-20	30.06.2020	26.06.2020	No Delay
		2020-21	30.06.2021	25.07.2021	25
		2021-22	30.06.2022	19.07.2022	19
14.	SBS Nagar (MC)	2017-18	30.06.2018	23.05.2018	No Delay
		2018-19	30.06.2019	23.05.2019	No Delay
		2019-20	30.06.2020	23.05.2020	No Delay
		2020-21	30.06.2021	29.07.2021	29
		2021-22	30.06.2022	27.05.2022	No Delay
15.	Sirhind (MC)	2017-18	30.06.2018	20.07.2018	20
		2018-19	30.06.2019	03.06.2019	No Delay
		2019-20	30.06.2020	30.06.2020	No Delay
		2020-21	30.06.2021	31.05.2021	No Delay
		2021-22	30.06.2022	27.05.2022	No Delay
16.	Bilga (NP)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	16.05.2019	No Delay
		2019-20	30.06.2020	10.07.2020	10
		2020-21	30.06.2021	03.08.2021	34
		2021-22	30.06.2022	05.09.2022	67
17.	Khamanon (NP)	2017-18	30.06.2018	29.07.2018	29
		2018-19	30.06.2019	11.07.2019	11
		2019-20	30.06.2020	02.07.2020	2
		2020-21	30.06.2021	17.05.2021	No Delay
		2021-22	30.06.2022	27.05.2022	No Delay
18.	Kiratpur Sahib (NP)	2017-18	30.06.2018	Not submitted	NA
		2018-19	30.06.2019	29.03.2019	No Delay
		2019-20	30.06.2020	27.07.2020	27
		2020-21	30.06.2021	22.06.2021	No Delay
		2021-22	30.06.2022	18.07.2022	18

Sr. No.	Name of ULBs	Years	Due Date of submission	Submitted to PPCB/Dept.	Delay in submission to PPCB (in days)
19.	Makhu (NP)	2017-18	30.06.2018	11.05.2018	No Delay
		2018-19	30.06.2019	24.05.2019	No Delay
		2019-20	30.06.2020	29.06.2020	No Delay
		2020-21	30.06.2021	02.08.2021	33
		2021-22	30.06.2022	22.07.2022	22
20.	Mehraj (NP)	2017-18	30.06.2018	29.06.2018	No Delay
		2018-19	30.06.2019	01.07.2019	1
		2019-20	30.06.2020	29.06.2020	No Delay
		2020-21	30.06.2021	22.06.2021	No Delay
		2021-22	30.06.2022	22.06.2022	No Delay

Source: Departmental data

NA: Not Available

Appendix 2.24

(Referred to in paragraph 2.6.6)

Statement showing comparison of data taken in MIS with information provided by ULBs

Sr. No.	Name of ULBs	Year	HHs		Collection		Processing		SLF		User charges (₹)		Operating cost (₹)	
			MIS	Actual *	MIS	Actual **	MIS	Actual **	MIS	Actual	MIS	Actual	MIS	Actual
1.	Amritsar (C)	2021-22	1,62,477	2,31,636	1,63,838	1,98,292	3,60,181	0	1	0	5,77,54,146	0	20,90,72,724	20,91,88,364
2.	Bathinda (C)	2021-22	52,465	78,777	42,059	42,628	42,755	33,899	1	0	80,20,229	36,14,000	7,06,22,579	10,35,00,000
3.	Ludhiana (C)	2021-22	3,65,153	3,20,000	3,66,932	3,66,927	0	0	1	1	1,84,200	0	13,44,86,382	14,41,02,309
4.	Moga (C)	2021-22	35,055	32,464	14,794	23,360	18,624	13,140	1	0	12,54,86,874	0	44,87,510	43,59,000
5.	SAS Nagar (C)	2021-22	40,289	40,289	34,656	33,580	85,513	31,230	1	1	0	0	88,52,000	8,22,36,000
6.	Adampur (MC)	2021-22	4,078	4,078	1,073	1,135	1,080	683	0	0	2,78,900	0	34,65,996	44,03,252
7.	Doraha (MC)	2021-22	7,520	7,750	2,773	6,260	2,778	2,184	0	0	5,14,400	4,06,340	25,00,000	1,55,27,388
8.	Ferozepur (MC)	2021-22	23,878	25,380	11,408	13,505	14,743	12,410	1	1	91,05,000	7,05,000	77,43,000	48,11,000
9.	Kartarpur (MC)	2021-22	7,620	5,650	2,345	2,555	2,080	882	0	0	30,95,932	0	2,60,500	92,95,171
10.	Mansa (MC)	2021-22	3,371	16,852	4,679	2,246	2,774	2,206	1	0	76,72,106	0	4,32,00,000	15,65,600
11.	Qadian (MC)	2021-22	4,921	4,889	1,244	1,369	1,203	62	0	0	1,64,550	51,450	25,79,664	37,93,000
12.	Rajpura (MC)	2021-22	21,185	23,100	9,429	10,950	9,409	5,475	1	1	82,82,200	3,05,000	29,65,000	83,59,000
13.	Rupnagar (MC)	2021-22	17,386	16,086	4,830	4,380	3,249	3,650	1	0	15,38,000	0	43,00,000	1,67,00,000
14.	SBS Nagar (MC)	2021-22	8,400	10,000	4,231	2,920	4,991	2,627	1	under construction	1,92,43,200	0	26,15,000	46,52,000
15.	Sirhind (MC)	2021-22	23,008	13,022	4,996	5,840	4,576	5,840	1	0	4,48,350	30,000	1,97,96,500	21,36,000
16.	Bilga (NP)	2021-22	3,083	3,083	1,379	1,460	1,472	840	1	under construction	11,63,607	0	17,99,441	47,99,161
17.	Khamanon (NP)	2021-22	4,590	2,342	1,800	1,657	1,630	1,825	0	under construction	1,51,960	62,000	70,71,500	59,61,000
18.	Kiratpur Sahib (NP)	2021-22	1,732	1,732	349	365	349	365	1	1	10,00,700	0	96,00,000	45,21,000
19.	Makhu (NP)	2021-22	2,851	2,851	1,439	1,497	1,443	1,497	1	1	9,80,964	0	43,79,000	22,76,289
20.	Mehraj (NP)	2021-22	2,861	3,564	302	365	302	183	0	under construction	8,30,000	0	1,30,000	50,28,000
Total									14	6	24,59,15,318	51,73,790	53,99,26,796	63,72,13,534

Source: MIS reports and data/information provided by ULBs

* Annexure-1B

** Annexure-1A

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