Initial Environmental Examination

Project No: 53264-001
April 2023

India: Maharashtra Agribusiness Network Project

Prepared by Maharashtra Agribusiness Network Society for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 26 April 2023)

Currency unit – Indian Rupee (₹)
₹1.00= $0.012
$1.00= ₹82.86

ABBREVIATIONS

ADB	-	Asian Development Bank
AERB	-	Atomic Energy Regulatory Board
APEDA	-	Agricultural and Processed Food Products Export Development Authority
APMC	-	Agricultural Produce Marketing Committees
BARC	-	Bhabha Atomic Research Centre
BOQ	-	Bill Of Quantities
CGWA	-	Central Ground Water Authority
COVID-19	-	Coronavirus Disease
EDDR	-	Environmental Due Diligence Report
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EPC	-	Engineering, Procurement, and Construction
FPO	-	Farmer Producer Organizations
GRM	-	Grievance Redress Mechanism
GRO	-	Grievance Redressal Officer
GSVA	-	Gross State Value Added
IEE	-	Initial Environment Examination
IFC	-	Irradiation Facility Centre
MAGNET	-	Maharashtra Agribusiness Network Project
MSAMB	-	Maharashtra State Agriculture Marketing Board
NIPHT	-	National Institute of Post- Harvest Technology
PIU	-	Project Implementation Unit
PMU	-	Project Management Unit
PPE	-	Personal Protective Equipment
SPS	-	Safeguard Policy Statement
TRTA	-	Transaction Technical Assistance
VCO	-	Value Chain Operator

NOTE

(i) In this report, "$" refers to United States dollars.

Table of Contents

EXECUTIVE SUMMARY i

I. INTRODUCTION 1
A. About MAGNET Project 1
B. Purpose of this Report 3
C. IEE Scope and Methodology 4

II. DESCRIPTION OF THE PROJECT 5
A. Project Description 5
B. Existing Facilities 7
C. Project Implementation Arrangements 20
D. Rationale 22

III. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK 23
A. Applicable National Regulatory Laws and Notifications 23
B. APEDA 32
C. ADB's Safeguard Policies and Screening and Categories 34

IV. DESCRIPTION OF THE ENVIRONMENT 36
A. Baseline 36

V. ANTICIPATED ENVIRONMENTAL IMPACTS 57

VI. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN 79

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE 105

VIII. CONCLUSION 112

LIST OF APPENDIXES 114
Appendix 1: Rapid Environmental Assessment Checklist 114
Appendix 2: Example Standard Construction Contract Environmental and Social Safeguard Clauses 116
Appendix 3: Locations of Selected Facilities 118
Appendix 4: Photographs of the Project Components Areas 91
Appendix 5: Stakeholder Consultations 100
Appendix 6: Site Plans of Selected Facilities 115
Appendix 7: Process Flow Diagrams of MSAMB Facilities 127
Appendix 8: Common Clauses Applicable for MSAMB 128
Appendix 9: Environmental Audit 129
Appendix 10: Guidance on Preparation of Muck/Debris Disposal Plan 159
Appendix 11: Format for Quarterly Report on Tracking of Grievances Redressal 160
Appendix 12: Environmental Due Diligence of IFC, Vashi 161

List of Figures

Figure 1: Illustrates the location of the sub-project sites at district level
Figure 2: Institutional Arrangement for Project Implementation
Figure 3: Seismicity Map of Maharashtra, at district level
Figure 4: Wind and Cyclone map of Maharashtra
Figure 5: GW status in Maharashtra
Figure 6: Approximate distance between Thane Creek Flamingo Sanctuary and the Facility
Figure 7: Photograph of Hanuman Langur that is common in the region
Figure 8: Proposed grievance Redress Mechanism at ARIAS Society during AACP
Figure 9: Institutional Arrangement for Project Implementation
Figure 10: Illustrates the location of the sub-project sites at district level
Figure 11: Satellite image of the IFC unit location
Figure 12: Irradiation Process Flow diagram of IFC Unit
Figure 13: Illustration of an Irradiation Chamber using Cobalt-60
Figure 14: Warning Signs and Control Panel at IFC

List of Tables

Table 1: Proposed facilities for Expansion and or Modernization
Table 2: Environment Management Plan for facilities for expansion and/or modernization
Table 3: Geographical coordinates and location of the 21 project sites
Table 4: Land requirements for Expansion
Table 5: Summary of proposed modernization per facility
Table 6: Source of water being tapped by the facilities
Table 7: Standard for Discharge of wastewater into Municipal Sewerage
Table 8: Sound level category
Table 9: Emission standard for common hazardous waste incinerators
Table 10: Permissible smoke limits
Table 11: Allowable dosage for fresh fruits and vegetables
Table 12: Seismic Zones Categorization & Induced Damage Intensities
Table 13: Seismic Zonation vis-à-vis MSAMB Facility locations
Table 14: Ambient Air Quality close to the MSAMB Locations
Table 15: Noise level in a typical food producing
Table 16: Annual mean rainfall for the concerned districts of Maharashtra
Table 17: Status of Groundwater at MSAMB facilities
Table 18: Quality of Groundwater near the MSAMB Facilities from Borewells
Table 19: Floral Species commonly occurring nearby the facilities
Table 20: Ratio of female workers in Maharashtra
Table 21: List of anticipated impacts due to scope of works and/or activities.
Table 22: Environmental Risk and Impact Matrix for Irradiation Process
Table 23: Precautions to be taken during Operation of Facilities
Table 24: Guidelines for cleaning toilets for use of Staff and Workers
Table 25: EMP for the Facilities Proposed for Expansion and or Modernization
Table 26: Corrective Actions for IFC Unit
Table 27: Environmental monitoring plan for MSAMB Facility
Table 28: Budgetary costs for implementation of EMP
Table 29: Flow of Grievances Redress through Online e-Service

EXECUTIVE SUMMARY

1. Maharashtra Agribusiness Network Project (MAGNET) is proposed for funding by the Asian Development Bank (ADB). It aims to improve the networks of post-harvest facilities and marketing management for the ten selected value chains. They are – banana, custard apple, green and red chilies, guava, okra, orange, pomegranate, sapota, strawberry, and sweet lime.

2. The project targets to support farmer producer organizations (FPOs) and achieve average agriculture sector growth rate of 5 per cent, promote agriculture produce export, and establish fair, competitive and accessible agriculture markets. ADB has engaged GrantThornton, to support the State government and ADB for designing and preparing the loan for MAGNET Project. This Initial Environmental Examination (IEE) has been prepared for activities proposed under output 3 of the project as shown below.

3. The Outputs of the MAGNET Project are:

(i) **Output 1: Institutional, technical, and marketing capacities of agribusiness institutions and FPOs strengthened** – Through this component the project will address the need for capacity building and provide advisory services on (a) policy reforms on post-harvest handling, food processing and climate resilient measures; (b) crop-specific guidelines on harvest quality, postharvest handling, climate change adaptation and relevant certification; (c) introduction of best practices to enhance productivity, quality, safety and climate compatibility to meet the market/ export requirements; (d) support on FPOs' business plan improvement and organizational/financialmanagement capacity enhancement particularly for FPOs led by women; (e) training on the latest agriculture technologies on cultivation and agribusiness marketing; and (f) leadership training and buyer-seller meets to enhance links and supply arrangement between committed buyers and FPOs.

(ii) **Output 2: Access to finance of FPOs and value chain operators (VCOs) strengthened –** This component includes the following activities: a) provision through selected PFIs of investment and working capital sub-loans to beneficiaries; and b) provision of matching grants to beneficiaries.

(iii) **Output 3: Agriculture value chain infrastructure improved and operationalfor the target horticulture crops** – The component focuses on attending the need of capacity and productivity enhancement of the existing facilities of Maharashtra State Agriculture Marketing Board (MSAMB) and National Instituteof Post-Harvest Technology as well as development of new infrastructure to meet the demand for post-harvest handling and agribusiness. The component includes – a) expansion and modernization of the seventeen (17) identified facilities across the State, b) develop three (3) new facilities as

major capacity addition (at Baramati, Pachod and Beed) cold-chain and packhouse segment and c) strengthen the existing post-harvest management training facility at Talegaon, Pune. As shown in Table 1, one of the seventeen facilities to beexpanded and modernized is a post-harvest irradiation facility in Vashi, Navi Mumbai. The entire component includes planning, designing and implementation of all civil construction work in a manner that is climate compatible and mitigates disaster risks.

4. As it is envisaged that implementation of Output 3 is likely to cause environmental impacts and raise the health and safety concerns for the people in the surroundings of the project area; it calls for a review of the impacts including the baseline assessment (for physicaland cultural environment, natural resources, biodiversity, etc.,) pollution and other impacts, mitigation measure, management and monitoring plans, feedback collection and reporting. One of the existing seventeen facilities to be improved is an irradiation facility in Vashi which involves the use of Cobalt-60 for generating gamma irradiation. Hence, there may be significant radiation related health and safety impacts during the operation of the irradiation facility.

5. There are total twenty-one (21) sites at which either modernization of the units and or expansion have been proposed including a training facility at Talegaon Pune. The table below highlights the location of the facilities as well as indicates which facilities are undergoing only modernization and which facilities are undergoing both modernization and expansion are as follow:

Table 1: Proposed facilities for Expansion and or Modernization

S. No.	Name of the Facility	State District	Works Detail
1	**Fruits & Vegetable Modern Marketing Centre, Karmad** Facility is mainly used for primary processing of variety of horticulture crops including Green chili, Pomegranate, Tomato, Mosambi from February to November.	Aurangabad	Only modernization of the processes with minor civil works along with installation of Rain Water Harvesting system and Storm Water drains
2	**Modern Marketing Centre, Ardhapur** The facility is mainly used for primary processing of Bananas from June to December.	Nanded	
3	**Export facility Centre, Latur** The facility is mainly used for primary processing of Banana, Citrus fruits and repacking of apples from August to February.	Latur	

S. No.	Name of the Facility	State District	Works Detail
4	**Irradiation Facility Centre (IFC), Vashi** The facility is mainly used for irradiation of Mangoes and Pomegranate from March to May and July to September.	Thane	Strengthening allied equipment only. There is no enhancement of radiation dosage within project investment.
5	**Vegetable Processing Facility (VPF)** The facility is mainly used for primary processing of variety of vegetables such as Okra, various types of gourds, Tomatoes and leafy vegetables.		Expansion and modernization along with installation of Rain Water Harvesting system and Storm Water drains
6	**Vapor Heat Treatment (VHT) Centre** The facility is mainly used for vapor heat treatment of Mangoes, Custard apples and Guavas from March to May and July to September.		
7	**Export facility Centre, Mohadi** The facility is mainly used for primary processing of Grapes from December to May and other fruits and vegetables such as pomegranate, chilies and okra are also packed and for exports.	Nashik	
8	**Export facility Centre, Kalvan** The facility is mainly used for primary processing of variety of horticulture crops including grapes onion, tomato, chilly and okra from September to February.		
9	**Export facility Centre, Chandwad** The facility involves in primary processing of variety of horticulture crops including grapes onion, tomato, chilly and okra from September to February.		
10	**Export facility Centre, Jalna** The facility is mainly used for primary processing of Kesar Mangoes and vegetables. Mangoes are processed from March to May. Vegetables are available for the entire year	Jalna	
11	**Export facility Centre, Savda** The facility is mainly used for primary processing of variety of horticulture crops including Banana and Maize from October to May.	Jalgaon	

S. No.	Name of the Facility	State District	Works Detail
12	**Modern facility Centre, Chandur** Primary processing for grapes onion, tomato, chilly and okra from September to February.	Amravati	
13	**Orange Export Facility Centre, Karanja Ghadge** Process oranges	Wardha	
14	**Export facility Centre, Baramati** The facility is mainly used for primary processing of Grapes, Pomegranates and Mangoes. The facility is operational all year round except a few months during monsoon season.	Pune	
15	**Export facility Centre, Talegaon** Processing horticulture crops including Grapes, Pomegranates, Mangoes during their season and onion and vegetables are processed all year round.		
16	**Export facility Centre, Atpadi** The facility is mainly used for primary processing of Grapes and Pomegranates. Grapes are available from November, December, January. Pomegranates are available all year round.	Sangli	
17	**Strengthening of training facility at National Institute of Post-Harvest Technology(NIPHT)** Primarily for training and hosting staff for technical session	Pune	Renovation of the existing building, installation of solar panel and water purification system.
18	**Additional Facility for Custard Apple, Beed** The facility will process Custard Apple during fruiting season and vegetables in rest of the year	Beed	New facility to be built adjoining to existing facility within the existing premise. No new acquisition of land required.
19	**Fruits & Vegetable Handling Facility Centre, Baramati** The facility will process grapes and pomegranate during fruiting season and vegetables during rest of the year.	Pune	New facilitiy to be built on MSAMB land. No new acquisition of land required.

S. No.	Name of the Facility	State District	Works Detail
20	**Fruits and Vegetable Handling Facility Centre, Pachod** Primarily for handing fruits and vegetable handling	Aurangabad (Pachod)	New facility on new parcel of land being leased by Agricultural Produce Marketing Committee of Aurangabad, (APMC)
21	**Export Facility Centre, Warud** The facility processes oranges during the season	Wardha	Modernization of packhouse and APEDA certification

6. As per Government of India's, Environmental Impact Assessment (EIA) Notification 2006, buildings with built-up area of more than 20,000 sq. m. are categorised as Category Bproject and should undertake detailed EIA study. All other building constructions are required to follow general rules without mandatory requirement to undertake EIA study. As the built-up area of all proposed buildings (proposed under Output 3) are way below 20,000 sq. mts., the civil works involved does not trigger the applicability of EIA Notification 2006.

7. The Initial Environmental Examination (IEE), follows the ADB's Safeguard Policy Statement, 2009 and addresses all requirements stated under Appendix 1 – Safeguard Requirements 1: Environment and Appendix 5 on requirements for prohibited list of activities.

8. Accordingly, this Initial Environmental Examination (IEE), has been prepared to address the environmental and social regulatory requirements as well as safeguard requirements of the ADB.

9. **Project Proponent:** The State of Maharashtra acting through MAGNET Society is the executing agency for this project. MAGNET Society was established on 3 November 2020 asa special purpose vehicle for the project based on a government resolution. A project management unit is established in the MAGNET Society. Project implementation units are established in MSAMB's eight regional offices and two financial intermediaries. MSAMB will implement output 3, the infrastructure component.

10. The IEE captures the environmental setting of all 21 project sites including physical, biological, and socioeconomic conditions and the national and local legal framework as well as international environmental agreements that governs the project. Based on these, the IEE further analyses the anticipated environmental impacts and, based on identified impacts suggest mitigation measures. The IEE also details out health and safety aspects including occupation and community health and safety, and impact on physical cultural resources.

11. The assessment identifies potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physicalcultural resources in context to project's area of influence. The area with a radius of 500 meterssurrounding the sites have been considered project area of influence.

12. **Methodology**: The IEE has been drafted based on findings from on-site visit and investigation, detailed discussion with MSAMB staff and other stakeholders such as third-partyfacility operators, permanent and contractual labourers appointed by the third part facility operators, and applying sectoral and subject matter expertise by the Safeguard Team. The screening checklist adopted to conduct initial screening has been presented in Appendix 1, followed by site photographs (Appendix 4) collected during site visits.

13. **Limitation**: Preliminary engineering design, proposed technology, and bill of quantities(BOQ), among others, have been provided to the safeguard team to support project description. However, actual design, technological specification and final cost estimates will be completed by EPC contractors. Thus, where applicable, the team has made assumptions based on the secondary information of the project areas gathered from site visits, consultations and review of relevant projects ongoing in the State and elsewhere in India[1], aswell as based on professional experience in similar projects.

14. The table below details out the key environmental impacts envisaged during the pre- construction, construction and operation stages of the project and the recommended mitigation measures.

Table 2: Environment Management Plan for facilities for expansion and/or modernization

Project Component/ Activity	**Environmental Components Impacted**	**Description of the Environmental Impacts**	**Mitigation Measures**
Clearing of Vegetation/ Trees	Biodiversity (both flora andfauna)	Loss of floral and faunal species such as birds (avifauna) as their habitat may be disturbed along with	Compensatory plantation at project site for development of green-belt.

[1] IEE, IND: Horticulture Cold Chain Project Prepared – 46943-014; http://www.adb.org/projects/46943-014/documents

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
		the felling of trees.	
	Soil erosion	Loss of top soil, disturbance to landscape, land degradation and visual impacts.	Grass turfing to avoid soil erosion once construction work is over
Levelling of ground surface	Fugitive emission of dust	Loss of top soil, disturbance to landscape, land degradation and visual impacts.	Regular spraying of water over the working areas to avoid fugitive dust emission
	Soil erosion		Stacking soil and other raw materials at designated places within the work site and fully covered with tarpaulin at the time
	Air pollution from vehicles		Vehicles should have pollution under control certificate
Setting up of construction camp for labour/worker	Water and land contamination	Water and land may get contaminated from sewerage disposal at the camp site.	Hiring of local labours/workers to the maximum extent possible Provision of toilets/septic tanks and adequate drainage to ensure that discharge doesn't contaminate nearby environment
	Occupational safety and health risks	COVID-19 pandemic could lead to health issues among labourers.	All COVID-19 safeguards to befollowed

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
Operation ofMachinery &Equipment	Occupational safety and health risks	Operation of heavy earth equipment and movement of dumpers pose hazards to workers.	Vehicle carry raw material should be covered with tarpaulin sheet to prevent dust generation Water sprinkling to prevent fugitive dust from working sites, haul/accessroads
	Air pollution	Vehicular emission from use of diesel.	Vehicles/ equipment used shouldhave valid Pollution Under Control (PUC) certificate
	Noise Pollution		Provision of temporary noise barrier inworking area
Raw materials Transportation	Air Quality &GHG emissions Siltation due to fine particles and choking of surface channels.	Generation of fugitive dust and exhaust gas emissions from haulage trucks. Loss of precious soil and siltation of surface channels.	Covering the trucks carrying raw materials with tarpaulins during theirmovement from source to site.
Building muck-debris generation during constructionactivities	Generation of construction and solid wastes	Debris generated from construction work may cause significant impact to the surrounding environment like contamination of waterbody, soil if not managed properly	Preparation of muck disposal plan toassess the quantitative load of wastesto be generated and reusing it during land and level filling operations for foundation preparation. Excess quantity if any may be tried tobe used in landscaping. The top soil preserved earlier shall beused in spreading a layer over

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
			the landscaped surface and in green belt development.
Diesel generator(DG) operation during construction	Hazardouswaste generation	Operation of DG sets could lead to generation of spent oil (residual oil); spillage ofdiesel.	The diesel should be stored indesignated paved area Any accidental spill should be cleaned immediately
	Noise pollution	Generation of noise	Acoustic enclosure should beprovided for the DG set DG Set should have valid PUCcertificate
	Air emission	Air emission from DG sets	Hazardous used oil generated from DG set must be temporarily stored in impermeable container before disposal through approved entity
Abstraction ofWater for construction	Water resource scarcity	Water abstraction due to construction work may lead to water scarcity inthe nearby area	Effort should be given to avoid usageof ground water to the maximum extent possible Surface water/ recycled STP watershould be used in construction In case Ground water or surface wateris tapped for the project, necessary permission from Central Ground Water Authority (CGWA) or Irrigation Department respectively The existing toilet facility shall be extended to the construction workers and

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
			the sewage or septage generatedshall be discharged into soak pits for the purpose. It shall be ensured that the bottom of the soak pits shall be always minimum 2 meters above the local ground water table in all seasons.
Handling of waste	Solid Waste Management	During construction phase there may be generation of both hazardous and non-hazardous waste which needs to be carefully handled to ensure environment safeguard	Segregation of waste (hazardous andnon-hazardous) should be properly done at source Adequate dustbin should be provided in Labour camps and other suitable areas The hazardous waste should bedisposed of through authorized vendor only Non-hazardous waste should be disposed of in a designated site or thorough authorized vendor Regular clearing/ disposal of organic waste generated from worker camp to be ensured.
Labour management	Occupational health and safety accidents and injuries	Accidents and injuries could happen to people at site during construction;	Provision of adequate personal protective equipment like safety helmets, face masks, safety shoes, safety goggles etc. for the safety of workers

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
			The excavated area should be provided with a visible boundary toensure safety at site Training shall be imparted to workers on occupational safety and technical aspects of job undertaken by them Provision of first aid kit and COVID-19kit should be made for all Workers should be given basic training on environment, hygiene and disease prevention to ensure not to cause any impact to natural resources like felling of shrubs/trees for fuel, open defecation etc.
	Child labour and forced labour	Child labour could be engaged by the contractor; Forced labour can occurwhen people are asked to work beyond the hours agreed to without additional pay. Forced labour can also occur when people are asked to work on holidays and/or weekend and are deprived of their rest (without additional pay).	No child labour/forced labour should beused Orientation on labour standards and terms of employment are made clearto workers as part of onboarding workers, along with HR briefing.
Processing operations, Packing materials,	Solid wastes pollution	Aesthetics and visuals, pungent	The biodegradable wastes may be

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
packed foodstuffs		odour generation, littering andsoil contamination Municipal solid wastes comprising of biodegradable and non-biodegradable wastes (plastic-polyethene, vegetable –food waste) Proliferation of pests and vector due to unmanaged wastes from processing, and municipal solid wastes due to workers and packing materials Generation of process waste (waste fruits, dressings), waste carton, plastic, polyethene, metallic wastes etc.	composted within the facility plot areaas per guidelines of gram panchayat or municipal body. The non-biodegradables may be segregated from the coloured bins provided and disposed to identifiedgram panchayat or municipal sites. Install separate bins to separatelycollect biodegradable waste (food waste), recyclable waste (papers, cardboards, etc.), and domestic hazardous waste such as sanitary napkins and cleaning agents. Green colour bins for collection of biodegradable waste, blue colourwaste for collection of recyclable waste and black colour waste for collection of domestic hazardous waste. The bio-degradable waste should thenbe processed in a soil pit for generation of manure, which can be used for development of green-belt around the facility premise. Wastes should be

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
			disposed of in a designated site or thorough authorized vendor
Green Belt- Digging of pits and ground preparation with manure and fertilizers	Spillage of soil and manure or fertilizers around	Soil loss and loss of natural resources.	The top soil removed shall be reused in development of green belt and spreading over landscaped surfaces within the area.
Abstraction of water from existing borewells (groundwater)in addition to existing operational requirement such as watering of green belt andfor dust suppression Measures	Groundwater resources scarcity	Potential depletion of groundwater resources during long dry periods Competition to other groundwater users in the immediate area	Use of rainwater harvesting technology Implementation of water use protocols
Machine and equipment operations	Occupational Safety and Health Aspects	Noise pollution, occupational Safety & Health Aspects are of major concern Machine and equipment use pose safety hazards to workers because of exposure to severe noise Safety hazards of beinghit by moving machinery and fall fromcabin to the ground. Also, health aspects such as exposure to fugitive dust may causeserious breathing troubles and	The workers and staff shall be provided with necessary PPE's and the operators of noise generating machinery shall be given mandatory rest of 10-15 minutes after every 1 hour of machinery operation. The operation of hot water wash facility shall be closely monitored and the workers may be provided with thermal insulation protection wears such as aprons, thermal gloves and protective goggles. Regular occupational health and safety trainings to all workers

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
		lung-related ailments.	and staff of each of the facility. Regular maintenance equipment andmachines
Operation of equipment and movement of logistics trucks and vehicles	Noise and GHG emissions due to vehicle exhaust gases.	The indoor workers may be exposed to excessive noise while the ambient noise levels in the open yard may rise due to cumulative addition of noise which may extend into the neighbourhood.	The workers shall be provided with personal protection equipment viz. ear plugs. The workers shall be given a periodic break from the work schedule should the noise levels monitored indicate excessive noise levels. The noise generating machines viz. air conditioning equipment etc. for theentire facility is located outside the working area and is housed in separate chamber insulated by a wall. The outdoor noise shall be minimizedby advising logistics vehicles to be regularly serviced. The same vehicles shall also berequired to keep certificate for compliance to exhaust emissionstandards.
Water use for processing and operations, and Sewage/Septage	Water resources Community and occupational health	Deterioration of groundwater quality and workers-community health aspects. Potential situation for	Wastewater from processing will beused for watering of green belt. Additionally, this waste

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
	and safety	breeding of water borne diseases	hot water is basically drinking water dissolved withfungicide 'sodium hypochlorite'. Coincidentally, it is also recommended by MoHFW-GOI as very effective in disinfection and sanitizing (in context of COVID-19 precautions) of external places. The septage from the toilets shall be discharged into the soak pit which shall be as per the approved design by the State Pollution Control Board.
Generation & disposal of spent isotopes	Air, soil, ground water, biology (human, flora and fauna)	Being hazardous (Radioactive waste) waste, it has potential of emitting harmful radiations which may induce injuries to humans, flora and faunal species which may be of fatal in nature	The SOP's prescribed for the purposeshall be complied with by the operating staff to be careful and vigilant all the time. The spent isotopes will be disposed through the collecting team of BhabhaAtomic Research Centre (BARC), whois authorized to handle, transport and dispose spent isotope.
Exposure to severe noise, thermal injuries, harmful radiations and body injuries	Occupationalsafety and health risks	The machinery and equipment pose safety hazards. Workers are exposed to harmful radiations, noise and thermal hazards due to various mechanized and hot	Personal protective equipment to beprovided to staff working in noise polluting environment

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
		water related aspects	
HazardousWastes involving spent batteries, waste lube oils and greases	Occupational safety and health concerning fireand contamination threats.	The disused batteries, waste oil, etc. are flammable and contain injurious acid contents also cause allergic reactions which may cause nausea and other ailments.	The waste lubes oils and disused batteries shall be disposed of to onlythe registered recyclers Register to be maintained for the record of the periodic change over asrequired under the Hazardous & other Wastes (Management & Transboundary Movement) Rules, 2016
Domestic Hazardous waste such assanitary napkins	Domestic Hazardous waste generation, handling, treatment, and disposal	As facilities hire womenlabours comprising 90% of the total strength, there could be possibility of sanitary napkins be disposed atthe facilities	One black bin should be kept at Women's toilet for collection of sanitary waste Each facility should install either a general electric incinerators or earthen/ clay pots 'Matka incinerator'used for incineration of sanitary napkins. If the waste is burnt in bulk amount (150-200 napkins/ day) then emissionstandards notified by Central Pollution Control Board (Guidelines for Management of Sanitary Waste)[2] below to be followed.If small/ clay-pot incinerators are usedthen the incinerator should be kept in open areas such as open backyard, open

[2] https://cpcb.nic.in/uploads/MSW/Final_Sanitary_Waste_Guidelines_15.05.2018.pdf

Project Component/ Activity	Environmental Components Impacted	Description of the Environmental Impacts	Mitigation Measures
			fields, and the ashes should be mixed with the soil for gardening.

15. The total budget estimate for implementation of EMP is about INR 1,31,90,000 which is equivalent to USD 180,710 (1 USD $ is equal to INR ₹72.99).

16. Four stakeholder consultations were held. Since the consultation were held during onset of COVID-19 pandemic, site specific consultation was difficult to manage, hence online consultations were carried out keeping following points in view:

(i) Consultation should be all inclusive, with women participation;

(ii) New greenfield site to be covered separately and all concerned in land acquisition and handover of ownership should be present; and

(iii) Local community should be invited at large numbers and ensure their representative be present during consultation.

17. The detail of the consultation and feedbacks have been presented as Annexure to this document, under Appendix - 5, Stakeholder Consultations.

18. MAGNET acknowledges the need for Grievance Redressal Mechanism (GRM) for inclusive participation and just decision. The GRM at MAGNET Society for MAGNET has beenproposed based on learning from World Bank Governance and Anti-Corruption Governance Policy Note-2010. Stakeholders can send/ share their grievance at:

Maharashtra Agribusiness Network Project,
386/2, 10th floor, Sharda Chambers, Shankar Sheth Road,
Pune- 411036 (Maharashtra)
Website – www.magnetadb.com
Email ID – projectadb@msamb.com

19. As per Operations Manual, OM Section F1/OP Issued on 1 October 2013, the proposed project categorizes under **Category B for Environmental Impacts**, i.e. - A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, and are reversible,and in most cases

mitigation measures have been proposed. Thus, the given IEE including an EMP has been drafted.

I. INTRODUCTION

A. About MAGNET Project

1. Maharashtra is in the western peninsular region of India. Agriculture along with its alliedsectors is the main source of rural livelihood for 80% of the State's population. Agriculture and its allied sector, when together comprise four sub-sectors: i.e. crops (horticulture and fieldcrops), livestock, forestry, and fishing that includes. During the financial year of 2017-18, the share of agriculture sector for the total Gross State Value Added (GSVA) was 11.9%, distributed among the horticulture and agriculture crops (60%), livestock (24%) and the forestryand fishing (17%)[3].

2. In Maharashtra, the horticulture and the agriculture crop segments are challenged by many developmental facts. These are the (i) reduction in average size of agricultural holdingsfrom 4.28 ha. to 1.34 ha[4], (ii) increasing number of marginal and small farmers, (iii) dependency on monsoon and weather for irrigation, and (iv) low or no penetration of micro- technologies for irrigation, post-harvest facilities among others. While reduction in average sizeof farm holdings and increasing number of marginal and small farmers are the outcome of increasing population verses lack of employment generation, lack of technological innovationsand gap in cold-chain networks are the deficiencies of the given sector.

3. According to the report in 2015 by Indian Council of Agriculture Research (ICAR)[5] for the horticulture sector, the harvest and post-harvest losses ranges between 4.6% to 15.9% various crops[6]. While losses have been recorded at all stages of the value chain, it is remarkedthat the major losses take place due to lack of cold-chain facilities. As fruits and vegetables are highly perishable items, these require uniform cooling within their 2 hours after harvest to retain the storage life and quality[7].

4. Thus, the proposed Maharashtra Agribusiness Network Project (MAGNET, Project No. 53264-001), aims to improve the networks of post-harvest facilities and marketing management for 10 selected horticultural crops. These are – banana, custard apple, green and red chilies, guava, okra, orange, pomegranate, sapota, strawberry, and sweet lime.

5. The proposed project targets to support farmer producer organizations

[3] Economic Survey of Maharashtra 2017-18
[4] Economic Survey of India – 2019 - https://bit.ly/3aoUilg
[5] https://www.ciphet.in/upload/pdf/PHL%202022.pdf
[6] Crops included in the study were: Mango, Banana, Guava, Orange, Acid Lime, Grapes, Papaya, Strawberry,Potato, Onion, Tomato, Cauliflower, and Green Peas
[7] https://bit.ly/3alPRHH

(FPOs) and achieve average agriculture sector growth rate of 5%, promote agriculture produce export, and establish fair, competitive, and accessible agriculture markets. ADB has engaged Grant Thornton to support the State government and ADB for designing and preparing the loan for the proposed MAGNET project, which an Initial Environmental Examination (IEE) is part of the project preparation deliverable.

6. The Outputs of the MAGNET Project are:

(i) **Output 1: Institutional, technical, and marketing capacities of agribusiness institutions and FPOs strengthened** – Through this component the project will address the need for capacity building and provide advisory services on (a) policy reforms on post-harvest handling, food processing and climate resilient measures; (b) crop-specific guidelines on harvest quality, postharvest handling, climate change adaptation and relevant certification; (c) introduction of best practices to enhance productivity, quality, safety and climate compatibility to meet the market/ export requirements; (d) support on FPOs' business plan improvement and organizational/financial management capacity enhancement particularly for FPOs led by women; (e) training on the latest agriculture technologies on cultivation and agribusiness marketing; and (f) leadership training and buyer-seller meets to enhance links and supply arrangement between committed buyers and FPOs.

(ii) **Output 2: Access to finance of FPOs and value chain operators (VCOs) strengthened** – This component includes the following activities: a) provision through selected PFIs of investment and working capital sub-loans to beneficiaries; and b) provision of matching grants to beneficiaries.

(iii) **Output 3: Agriculture value chain infrastructure improved and operationalfor the target horticulture crops** – The component focuses on attending the need of capacity and productivity enhancement of the existing facilities of Maharashtra State Agriculture Marketing Board (MSAMB) and National Instituteof Post-Harvest Technology as well as development of new infrastructure to meet the demand for post-harvest handling and agribusiness. The component includes – a) expansion and modernization of the seventeen (17) identified facilities across the State, b) develop three (3) new facilities as major capacity addition (at Baramati, Pachod and Beed) cold-chain and packhouse segment and c) strengthen the existing post-harvest management training facility at Talegaon, Pune. One of the seventeen facilities to be expanded and modernized is a postharvest irradiation facility in Vashi, Navi Mumbai. The entire component includes planning, designing and implementation of all civil construction work in a manner that is climate compatible and mitigates disasterrisks.

7. As it is envisaged that implementation of Output 3 is likely to cause impacts on the environment and health and safety. The proposed project needs to document baseline information (physical and cultural environment, natural resources, biodiversity, etc.,) of the target sites, assess the disturbances such as potential pollution emissions and other impacts, environment safeguard mitigation measures, management and monitoring plans, and feedback collection and reporting schemes.

8. According to Government of India's Environmental Impact Assessment (EIA) Notification 2006, building or structures with built-up area of more than 20,000 sq. m. is categorized as Category B project and should undertake detailed EIA study, else all building and construction projects should follow general category rules. The built-up area of all proposed buildings (proposed under Output 3) are way below the 20,000 sq. m. threshold, thus,the proposed project's civil works does not trigger the EIA study requirement of EIA Notification 2006.

9. This Initial Environmental Examination (IEE) report is in compliance with the requirement of ADB's Safeguard Policy Statement (SPS) of 2009 and documents all applicable requirements stated under Appendix 1 – Safeguard Requirements 1: Environment.

10. **Project Proponent:** The State of Maharashtra acting through MAGNET Society is the executing agency for this project. MAGNET Society was established on 3 November 2020 as a special purpose vehicle for the project based on a government resolution. A project management unit is established in the MAGNET Society. Project implementation units are established in MSAMB's eight regional offices and two financial intermediaries. MSAMB will implement output 3, the infrastructure component.

B. Purpose of this Report

11. The scope of output 3 under the MAGNET Project is a category "B" (environment) based on SPS of 2009 classification system, and it is required to conduct of an IEE report andits documentation. The purpose of the IEE is to assess and document the potential environmental impacts that may arise due to proposed expansion and modernization activitiesof the proposed 21 project sites. Accordingly, the IEE report identifies and recommend mitigationmeasures to mitigate the impacts and/or reduce their magnitude. An environmental management plan (EMP) is produced covering the environmental impacts, environmental monitoring program, and the responsible entities for mitigation and monitoring.

C. IEE Scope and Methodology

12. **Scope of IEE**: The IEE captures the environmental setting of all the proposed project sites including physical, biological, and socioeconomic conditions and the national and local legal setting, as well as international environmental agreements that are relevant to the project. Based on these, the IEE further analyses the anticipated environmental impacts and, suggested mitigation measures. The IEE details out health and safety aspects including occupation and community health and safety, and impact on physical cultural resources.

13. The environmental assessment report identifies potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in context to project's area of influence. The area at the radius of 500 m. surrounding the target sites have been considered the project area of influence.

14. **Methodology**: The IEE is prepared based on findings from on-site visits and investigations, detailed discussions with MSAMB staff and other stakeholders such as third- party facility operators, permanent and contractual labourers appointed by the third part facility operators, and applying sectoral and subject matter expertise by the Safeguard Team. The screening checklist adopted to conduct initial screening has been presented in Appendix 1, supported with site photographs documentations (Appendix 4) during site visits.

15. **Limitation:** Preliminary engineering designs, the proposed technology, and bill of quantities (BOQ), among others, were provided to the safeguard team to document the sub- projects' descriptions. However, the information of the actual designs, technological specifications and final cost estimates will be completed by the engineering, procurement, and construction (EPC) contractors. Thus, where applicable, the team has utilized the secondary information of the project areas gathered from site visits, consultations, review of relevant ongoing projects in the State and elsewhere in India[8], and professional experiences in similarprojects.

[8] IEE, IND: Horticulture Cold Chain Project Prepared – 46943-014; http://www.adb.org/projects/46943-014/documents

II. DESCRIPTION OF THE PROJECT

A. Project Description

16. MSAMB owns 44 post-harvest facilities across the state. There are 21 export-oriented facilities, 20 fruit and vegetable modern market facilities and 3 flower export facilities. Some ofthese facilities are decade old and requires modernization, especially introductions of mechanization of crop handlings and system automations. This will enhance the efficiency of the facilities and quality of the horticulture products. Under Output 3 of MAGNET project, 17 existing facilities of MSAMB have been proposed to undergo modernization to meet APEDA (The Agricultural and Processed Food Products Export Development Authority) accreditation for export of fruits and vegetables. Out of the 17 facilities, about 13 facilities will also undergo minor or major expansion including building of sheds, holding room, pre-cooling units, cold storages, ripening chambers, training room, etc., rest will be modernized to meet APEDA requirements. Apart from these two brownfield expansion units and one greenfield unit will be newly built, totalling to 21 units altogether.

17. The brownfield expansion includes building new units adjoining to existing facility, within the same premise of the existing facility. Thus, does not involve acquisition of any new land. Whereas greenfield expansion involves building new unit at newly leased land provided by APMC. The detail of 21 facilities undergoing expansion and or modernization, or being newly built are as follows.

18. **Geographical location of the units** – The sites are spread across the State in 12 districts and the figure and table below describes the geographical location of 21 project areas.

Figure 1: Illustrates the location of the project areas at district level

Table 3: Geographical coordinates and location of the 21 project sites

S.NO	Name of the Facility	State District	Location	Geographical Coordinates
Existing Facilities				
1	Export facility Centre, Mohadi	Nashik	APMC, Dindori, Submarket, Mohadi area, Gate No 1286, Taluka – Dindori	20°08'23.3"N 73°53'34.0"E
2	Export facility Centre, Kalvan		At post Bhendi Taluka - Kalvan	20°29'41.9"N 74°04'31.1"E
3	Export facility Centre, Chandwad		APMC, Chandwad, A/P-Chandwad, Taluka - Chandwad,	20°19'01.0"N 74°15'22.8"E
4	Export facility Centre, Savda	Jalgaon	Survey no.329, 330, 331, 332, APMC Rawer Taluka - Raver	21°09'16.6"N 75°53'03.4"E
5	Export facility Centre, Jalna	Jalna	APMC Jalna, Market yard, Taluka – Jalna	19°52'29.5"N 75°53'45.7"E
6	Fruits & Vegetable Modern Marketing facility Centre,Karmad	Aurangabad	APMC, Aurangabad, Submarket Karmad Peth, Taluka - Karmad	19°52'03.4"N 75°32'07.7"E
7	Modern facility Centre, Ardhapur	Nanded	APMC, submarket yard Ardhapur, Taluka - Ardhapur,	19°15'38.7"N 77°21'31.2"E
8	Export facility Centre, Latur	Latur	Maharashtra Industrial Development Corporation, Latur	18°23'12.4"N 76°29'18.3"E
9	Irradiation Facility Centre (IFC)	Thane	Ground floor, Plot no 3, Sector 19 F, Vashi, Navi Mumbai	19°04'58.7"N 73°00'42.8"E
10	Vegetable Processing Facility (VPF)		1st floor, above IFC premises	
11	Vapor Heat Treatment (VHT) Centre		Niryat Bhavan, Vegetable Market, APMC Premises, Sector 19, Vashi	19°04'29.5"N 73°00'35.3"E
12	Modern facility Centre, Chandur railway	Amravati	Chandur Railway, Pragane Manjarkhed, Kasba, Taluka - Chandur Railway	

S.NO	Name of the Facility	State District	Location	Geographical Coordinates
13	Orange export facility centre, Warud	Amravati	MIDC – Warud	21°29'03.8"N 78°14'44.3"E
14	Orange Export facility Centre, Karanja Ghadge	Wardha	APMC Ashti Taluka – Ashti	21°09'51.9"N 78°25'40.6"E
15	Export facility Centre, Baramati	Pune	APMC Baramati, Jalochi, Taluka - Baramati	18°08'40.7"N 74°36'47.3"E
16	Export facility Centre, Talegaon		Adjoining to existing NIPHT, Talegaon Dabhade, Taluka – Maval	18°43'20.5"N 73°39'44.1"E
17	Export facility Centre, Atpadi	Sangli	APMC Atpadi, Taluka Atpadi	17°25'41.1"N 74°55'09.8"E
18	Strengthening of training facility at National Institute of Post- Harvest Technology (NIPHT)	Pune	NIPHT, Talegaon Dabhade, Taluka –Maval	18°43'17.0"N 73°39'45.4"E
New Proposed Facilities				
19	Additional Facility for Custard Apple	Beed	*__brownfield expansion__, adjoining to existing Export Facility Centre, APMC, Beed	19°01'07.6"; 75°46'31.2"E
20	Fruits & Vegetables Handling Facility Centre, Baramati	Pune	*__greenfield project site__, adjoining to existing Export Facility Centre, APMC, Baramati, Jalochi, Taluka – Baramati	18°08'41.8"N 74°36'45.7"E
21	Fruits and Vegetable Handling Facility Centre, Pachod	Aurangabad	*__greenfield project site__, APMC Paithan Submarket Pachod, Taluka- Paithan. (land provided by APMC)	19°34'01.3"N 75°37'40.2"E

B. Existing Facilities

19. ***Export Facility Centre, Mohadi****:* The facility was established in 2014 within a plot sizeof 8,000 sq. m., which currently utilizing an area of 1571sq. m. The Mohadi facility is leased to Nurture One Pvt. Ltd, which maintains and operates the facility. The purpose and function of this export facility is to provide

post-harvest handling and primary processing of the produce. The facility is equipped with pre-cooling chambers[9], cold storage[10] and packaging line[11]. The produce arrives at the facility in plastic crates from the farms mainly within 50kms radius. The produce is sorted and graded and then is packed. Then, the produce is subject to pre-coolingafter packaging. After pre-cooling stage, the produce is then stored in the cold storage chambers ready for dispatch. The main crop handled by the facility is grapes. These grapes from the export facility are exported to European and Gulf countries. During off seasons whengrape is not available, crops such as pomegranates, and okra and tomato are also handled in the facility.

20. ***Export Facility Centre, Kalvan*****:** This export facility is being leased to Satguru Enterprises. Ltd. The company maintains and operates the facility to provide post-harvest handling and primary processing of the produce. The facility has pre-cooling chambers, cold storage, packhouse, grading lines, onion storages and weigh bridge. On regular basis, the facility receives plastic crates and/or gunny bags from the farms. The produce is sorted and graded[12], and then packed. If there is a need, the produce will be sent for pre-cooling after packing. After pre-cooling, the produce is stored in the cold storage chambers before dispatch. The main commodities handled by the facility are grapes, onions, tomatoes, okra and green chillies. Similarly, the grapes from Kalvan export facility are exported to European and Gulf countries as well. Vegetable crops as mentioned above are sent to domestic markets

21. ***Export Facility Centre, Chandwad*****:** The centre was established in 2015 on a plot sizeof 8,000 sq. m. with current utilized area of 1,512 sq. m. Since 2019, the Chandwad export facility is not leased to any value chain operator. Currently, the facility is under the process ofleasing to a new value chain operator. The facility is equipped with pre-cooling chambers, cold storage, packhouse and onion storage.

22. ***Export facility Centre, Savda:*** This was established in 2009 within a land area of 8,000 sq. m. and currently occupying 1,403. sq. m. Satguru enterprises. Ltd is maintaining andoperating the Savda export facility. Similar to the previous facilities, Savda export facility servesto provide post-harvest handlings and primary processing of different produce. There are pre-cooling chambers, cold storage, packaging line, grading lines, ripening chamber[13] and weigh bridge in

[9] Pre-cooling chambers - quickly removes the heat from freshly harvested fruits and vegetables to reduce the loss in quality of produce once it's been harvested. Precooling increases the shelf-life of fresh produce.
[10] Cold storages – cold chambers used for storing packed produced until they are transported to desired destination.Within MSAMB facilities, the cold stores are cooled via forced air circulation systems
[11] Packaging line – comprising of steel tables and conveyor belts for manual packing of produce.
[12] Sorting and grading of fruits and vegetables is generally done on the basis of physical characteristics like weight,size, colour, shape
[13] Ripening Chambers – Are the chambers equipped with humidity, temperature controllers and air circulation systems for fruits such as banana, mangoes and vegetables, etc. to ripe through the use of ethylene gas

the facility. The main commodities handled in facility are bananas and corn. The banana is being distributed to domestic and export markets.

23. ***Export Facility Centre, Jalna*:** The facility is equipped with pre-cooling chambers, cold storage, packhouse, grading lines and ripening chamber, and being maintained and operated by APMC. The produce handling and process is similar as Mohadi, Kalvan and Savdathat includes sorting and grading and packaging. After pre-cooling the produce is kept in coldstorage chambers prior to dispatch. The main commodities being handled are Kesar mangoesand vegetables. The Kesar mangoes are supplied to both demands of the domestic and exportmarkets. The vegetables are sent to local markets in the Jalna region.

24. ***Fruits & Vegetable Modern Marketing Centre, Karmad:*** The centre was established in 2017 within a 4,000sq. m. area and currently using an area of 492. sq. m. only. This facility has been leased to Karmad Farmer Producer Company. This facility is providing post-harvest handling and primary processing of green chilli, pomegranate, tomato and sweet lime harvested in Karmad region. Similarly, the modern facility is equipped with pre-cooling chambers, cold storage anda packhouse. The produce arrives at the facility in packaged with plastic crates or gunny bagsfrom the farms. These are sorted and graded and then is packed. After pre-cooling, the produce is then stored in the cold storage chambers ready for distribution.

25. ***Modern Facility Centre, Ardhapur*:** The modern facility is being leased to Sheya Irrigation Ltd. for a period of 3 years (2017 to 2020). The facility is mainly used for primary processing of variety of horticulture crops including Bananas from June to December. There are pre-cooling chambers, cold storage and a packhouse within the facility.

26. ***Export Facility Centre, Latur*:** In 2010, the export facility was established in an area of 10,370 sq. m., but the facility only covers 2,320sq. m. RJS FPC is leasing the centre and operates post-harvest handling and primary processing horticultural crops. The main commodities handled are Kesar mangoes, sweet limes and apples. Apples that are being produced from North India are brought into the facility and are repacked. There are pre-cooling chambers, cold storage, packhouse, ripening chamber and weigh bridge.

27. ***Irradiation Facility Centre (IFC)*:** The facility is being managed and operated by MSAMB, while the value chain operators only access the irradiation treatment[14] unit and otherstorage infrastructures for their produces. The IFC is

---

generators.

[14] Irradiation treatment - Irradiation is the process by which an object is exposed to gamma rays for a specified amount of time. Food irradiation (the application of ionizing radiation to food) is a technology that improves the

receiving and handling crops for exports, and supplied to United Kingdom, United States of America (USA) and Japan. The crops received by the facility are mango, onion, grapes, guavas, pomegranates and all other crops that require irradiation of their respective markets. Ready to eat and ready to cook items areaalso treated in the IFC. Food ingredients and spices that are exported to USA and other markets are also irradiated at this facility. Currently the facility has the capacity to treat 5MT ofcrops per hour. The radiation source utilized is Cobalt-60 (60Co) of strength 300 kCi. The facility has a packhouse precooling of 5MT/batch, 4 cold storage units of 100 MT each. IFC issupplied with electricity and water by Navi Mumbai Municipal Corporation. At first, the produces for irradiation treatment are registered, and the seal boxes are subject for inspection. Those produce that fails to pass inspection norms will be rejected and collected by the municipal authority for disposal. The consignments passing plant quarantine inspections proceed for irradiation. The irradiation process is carried out in a special protected unit, operated by BARC certified operator. After Cobalt radiation, the produce is stored in a segregated cold-storage, and quarantined to maintain their hygiene and avoid contamination. Phytosanitary certificate is issued before the dispatch of the treated crop.

28. ***Vegetable Processing Facility (VPF)*:** The VPF centre is maintained and operated by Khushi International Pvt Ltd. The facility provides post-harvest handling and primary processing of different types of vegetables. Currently, the facility is equipped with pre-cooling chambers, cold storage, packhouse, hot water treatment[15] unit and processing lines for various vegetables. The main commodities handled by the is various types of gourds, Brinjals, okra and green chillies.

29. ***Vapour Heat Treatment (VHT) Centre*:** Owned and operated by MSAMB, the VHT plantis equipped with a vapour heat treatment unit[16], cold storage and precooling and a pack house.The facility is created for the treatment of mangoes that are exported to Europe and Japanesemarkets. Commodities such and Custard apples and Guavas are also treated at the facility.

30. ***Modern Facility Centre, Chandur Railway*:** The Chandur Railway facility is being operated and maintained by Eva Express Pvt Ltd to provide for post-harvest handling and primary processing. There are pre-cooling chambers, cold

---

safety and extends the shelf life of foods by reducing or eliminating microorganisms and insects. Herein Cobalt-60 is used for producing gamma rays.

[15] Hot water treatment - Hot water is commonly used to disinfect mango from fruit flies. For this purpose, the fruit is dipped in water at 48°C for 5–10 min, depending on type and weight of mango fruit. Hot water treatment is applied at the beginning of the packing or packing process.

[16] Vapour heat treatment (VHT) – Used for disinfecting fruits from the eggs and larvae of harmful insects using high temperature and high humidity saturated vapor.

storage and a packhouse in the centre. The main commodities handled in the centre is orange from the Amravati region. These oranges are sent to domestic markets.

31. ***Export facility Centre, Warud***: The facility is currently being operated and maintained by MSAMB, Amaravati division and is seasonally used by FPO (Dr Panjabrao Deshmukh Krishi Shetimaal Prakriya, Panan, Sahakari Sanstha Ltd.) for grading, sorting and waxing[17] of orange followed by precooling and cold storage facility. The unit has following post-harvest facilities – precooling (5 MT operated for 6 hours), grading (2 MT per hour) and a cold storage (25 MT) and a weigh bridge (60 MT).

32. ***Orange Export Facility Centre, Karanja Ghadge:*** This was built in 2014 covering 492 sq. m.only in an area of 4,000 sq. m. The main purpose or function of this facility is to provide for post-harvest handling and primary processing of the oranges from Wardha region. The facility is equipped with pre-cooling chambers, cold storage, packhouse, grading units with waxing units[16] and weigh bridge.

33. ***Export Facility Centre, Baramati:*** Built in 2007, the facility covers 1,003 sq. m. of land over a6,350 sq. m. plot. The Baramati facility has been leased to AMPC Baramati. The APMC maintains and operates the facility. The main purpose or function of this facility is to provide for post-harvest handling and primary processing of the produce. The main commodities handled by the facility are pomegranates and mangoes. These mangoes are from Konkan region. The Mangoes are repacked at the facility and are dispatched to urban markets. The facility is equipped with pre-cooling chambers, cold storage, packhouse and grading lines.

34. ***Export facility Centre, Talegaon*:** In 2009, the centre was established in a plot size of4,000 sq. m. covering an area of 578 sq. m. The facility is leased by Nisarg Fresh Ltd. for a period of 10 years (2017 to 2027). The facility is mainly used for the primary processing of different horticulture crops including grapes, pomegranates, mango, onion and vegetables onlyduring the season of crops.

35. ***Export Facility Centre, Atpadi*:** This centre was established in 2017 over 682 sq. m. of land within an 8,000 sq. m. plot area. The facility is leased to Satguru Enterprises Ltd. for 10 years from 2017 to 2027. The facility is mainly used for primary processing of various horticulture such as grapes and pomegranates. The grapes are only available during the months of November

[17] Wax coating - Coatings the fruit surface with wax, blocking the pores on the produce skin, reducing fruit water loss. Wax is commonly used in many fruits such citrus, tomato, bell pepper, and cucumber to improve fruit appearance and reduce transpiration.

to January, while pomegranates are available throughout the year.

36. **Proposed Expansion –** As there is significant and immediate demand for packhousefacilities in the State. To meet such demand MSAMB proposes to undertake partial expansionof its existing units depending on the need in the given region. For instance, facilities those thatreceives banana crops proposes to expand its ripening chambers, similarly wherever there isdemand for more cold storage spaces, such facilities have been proposed to expand its cold storage facility. The functions of such units i.e. pre-cooling units, cold storages, ripening chambers, holding rooms, training halls, and sheds have already been explained under existing facilities in the footnotes.

37. Following 11 existing facilities of MSAMB will undergo proposed expansion within the existing premise of MSAMB facilities.

Table 4: Land requirements for Expansion

Name of the Facility	**Proposed Expansion**	**Land required for proposed expansion (available within the existing facility) (sq. m.)**	**Total Plot Area of the MSAMB facility (sq. m.)**	**Existing Built-upArea (sq. m.)**
Export Facility Centre, Mohadi	Cold storage – 250MT Holding room – 20MT truck	Cold storage (250MT) –570sq. m. Holding Room (20MT) –100sq. m. **Total – 670sq. m.**	8000 Leased[18] to MSAMB on 20/10/2011 by APMC Dindori for 99 years	1571.80
Export Facility Centre, Kalvan	Pre - cooling – 10MT Cold storage - 50MT *2 Shed – 700 Sq. m. * 2	Precooling (10MT) –109sq. m. Cold storage (2x50MT) –349sq. m. Shed (2X700sq. m.) –1665sq. m. **Total – 2123sq. m.**	17500 Leased to MSAMB on 30/01/2009 by Farmer co-operative union, Kalvan for 30years	2042
Export Facility Centre, Chandwad	Shed – 700 Sq. m.	Shed (700sq. m.) – 700sq. m.	8000	1512.74

[18] Common lease clauses applicable to all the facilities have been presented in Appendix - 7

Name of the Facility	**Proposed Expansion**	**Land required for proposed expansion (available within the existing facility) (sq. m.)**	**Total Plot Area of the MSAMB facility (sq. m.)**	**Existing Built-upArea (sq. m.)**
Export Facility Centre, Savda	Precooling – 10MT Cold storage – 25MT*2 Shed Training Hall	Precooling (10MT) –111sq. m. Cold storage (2x25MT) –276sq. m. Shed (700sq. m.) – 720sq. m. Training Hall - 567sq. m. **Total – 1674sq. m.**	8000	1403
Fruits & Vegetable Marketing Centre, Karmad	Training hall	Training Hall – 200sq. m.	4000	492
Export Facility Centre, Latur	Training Hall	Training Hall – 650sq. m.	10370	2320.66
VHT Facility, Vashi	Cold storage – 125 MT	Cold Storage - 125sq. m.		3779 (total of two floor)
Fruits & Vegetable Marketing Facility Centre, Chandur	Cold storage - 50MT* 2	Cold storage (2x50MT) –349sq. m.	4000	492
Orange Export Facility Centre, Karanja Ghadage	Cold storage - 50MT* 2 Training Hall	Cold storage (2x50MT) –349sq. m. Training Hall – 290sq. m. **Total – 639sq. m.**	20000	2349.28
Export Facility Centre, Baramati	Ripening chambers (4x5MT)	Ripening chambers(4x5MT) – 266sq. m. Training Hall – 600sq. m. **Total – 866sq. m.** Compound wall – 160 running meter Approach road Work – 1480m (the space has been	6350	1003.33

Name of the Facility	Proposed Expansion	Land required for proposed expansion (available within the existing facility) (sq. m.)	Total Plot Area of the MSAMB facility (sq. m.)	Existing Built-upArea (sq. m.)
		allocated to MSAMB)		

38. **Proposed Modernization –** The modernisation of the following units has been proposed to upgrade the existing facility such that these facilities are able to meet the need forAPEDA accreditation that is stipulated for export facilities. APEDA accreditation of facilities aremust to export crops from such facilities. This helps in maintaining traceability of the crops and maintain adequate hygiene. Table below summarizes the detail per facility.

Table 5: Summary of proposed modernization per facility

Name of the Facility	Proposed Modernization
Export facility Centre, Mohadi	1. Plastic Pallets (for packing the harvest from the fields) - 600 2. Electric Hydraulic pallet (to move heavy pallets) – 2
Export facility Centre, Kalvan	1. Plastic pallets – 300 Nos. 2. Electric hydraulic pallet truck – 2 Nos. 3. Plastic crates – 200 Nos. 4. Packing tables – 20 Nos. Conveyer belt – 1 Mt (for enhancing the capacity of packaging lines) 5. Conveyor – 25 Mt
Export facility Centre, Chandwad	1. Conveyor belt – 1 Mt (for movement of produce from oneplace to other) 2. Plastic pallets – 200 Nos.
Export facility Centre, Savda	1. Plastic pallets – 200 Nos 2. Electric hydraulic pallet truck – 2 Nos.
Export facility Centre, Jalna	1. Partitions for unit – flow of material 2. Pre-treatment inspection room 3. Material storage room 4. Post – treatment inspection room 5. NPPOP office 6. Inspection kit 7. Dock leveller 8. Dock seal, Dock door 9. Plastic pallets – 200 Nos. 10. Electric hydraulic pallet truck – 2 Nos.
Fruits & Vegetable Modern Marketing Centre, Karmad	1. Plastic pallets – 100 Nos. 2. Electric hydraulic truck – 2 Nos.
Modern facility Centre, Ardhapur	1. Humidity and Ethylene controller (to control ethylene dosage in ripening chamber) 2. Plastic pallets – 100 Nos. 3. Electric hydraulic pallet truck – 2 Nos.
Export facility Centre, Latur	1. Modification of ripening chamber - Humidity, Ethylene controller 2. Plastic pallets – 200 Nos. 3. Electric hydraulic pallet truck – 2 Nos. 4. Upgradation of compressors of cold storage – 2 Nos. 5. Dock leveller 6. Dock seal, dock door
Irradiation Facility Centre (IFC)	1. Temperature control system in irradiation chamber – 2 Nos. 2. Additional idler conveyer system in irradiation chamber – 2Nos. 3. Personnel and Product scanning system – 2 Nos 4. Automated material handling and additional storage

Name of the Facility	Proposed Modernization
	racks –2 Nos. 5. Automated closing and opening doors at loading and unloading area – 5 Nos. 6. Auto adjustable dock levellers – 2 Nos. 7. Pack house to irradiation facility inside passage for movement of the material – 1 Nos. 8. Plastic pallets – 200 Nos. 9. Electric hydraulic pallet truck – 2 Nos.
Vegetable Processing Facility(VPF)	1. CCTV – 10 Nos. 2. Spiral staircase – 1 3. Goods lift – 2 Nos.
Vapor Heat Treatment (VHT)Centre	1. CCTV – 10 Nos. 2. Quarantine lab equipment 3. Automatic doors – 3 Nos. 4. Plastic pallets – 200 Nos. 5. Electric hydraulic pallet truck – 2 Nos. 6. Conveyer belt – 1 Nos.
Modern facility Centre, Chandur railway	1. Plastic pallets - 200 Nos
Export facility Centre, Warud	1. Pre-inspection 2. Post inspection 3. Holding room 4. Electrification, Floor, and other small repairs
Orange Export facility Centre, Karanja Ghadge	1. Partitions of unit – flow of materials 2. Pre-inspection 3. Material storage room 4. Post treatment inspection room 5. NPPO Room 6. Inspection kit 7. Dock leveller 8. Dock seal 9. Plastic pallets – 200 Nos. 10. Electric hydraulic pallet truck – 2 Nos.
Export facility Centre, Baramati	1. Plastic pallet – 200 Nos. 2. Electric hydraulic pallet truck – 2 Nos. 3. Compound wall Road work
Export facility Centre, Talegaon	1. Automatic grading sorting line 2. Plastic pallets – 200 Nos. 3. Electric hydraulic pallet trucks – Nos.
Export facility Centre, Atpadi	1. Substation and electrification 2. Plastic pallets – 200 Nos. 3. Electric hydraulic pallet truck – 2 Nos. 4. Plastic crates – 1000 Nos. 5. Conveyer – 25 Mt.

39. ***Brownfield Expansion*** – These are whole new unit packhouses being built at the existing premise, adjoining to existing packhouses. Thus, there is no need for acquisition of new land. The existing premise has adequate additional land to accommodate new packhouse units.

40. ***Training facility.*** MSAMB owns and operate a training facility called National Institute of Post Harvesting Technology's Horticulture Training Centre that is located at Talegaon sub-urban of Pune district. MSAMB proposes to expand the capacity of the training facility by building additional training hall and installing various training equipment and accessories. Since this will involve civil construction work, this has also been included in IEE study.

41. ***Strengthening of training facility at National Institute of Post-Harvest Technology (NIPHT) -*** The NIPHT was established in 2002 to provide training to students and entrepreneurs on post-harvest management from across State of Maharashtra and India. The institute is providing trainings about the horticulture sector in Maharashtra. A centre of excellence has been established at the institute.

42. NIPHT is poised to play an important role in the coming year as Maharashtra aims to expand and grow its horticulture sector. The institute require strengthening to do the same. NIPHT will receive upgradations in the form of digital classrooms, renovations of the buildingsincluding the residential areas, repair and upgradations to the green house, ornamental nursery and other essential infrastructure.

43. ***Additional Facility for Custard Apple, Beed*** *(brownfield expansion).* The facility will be built on land leased by APMC. The City of Beed is renowned for growing custard apple in the region. There is a need for such a facility due to the absence of such processing units thatwill handle the custard apples. The facility is being constructed to enable greater value additionto Custard Apple produce. The facility will be equipped with 2 cold storage of 250MT each, packhouse of 500 Sq. MT, 2 Blast Freezers of 2.5T/ batch, and a pulping unit of 500Kg/Hr capacity. The blast freezers chill and freeze the produce rapidly by blowing chilled air on the surface of the produce. The facility will receive water from local administrative authority and electricity from MSEDCL (Maharashtra State Electricity Distribution Company Limited).

44. ***Fruits & Vegetable Handling Facility Centre, Baramati*** *(greenfield).* Baramati City and its surrounding areas are renowned for pomegranate production in the region. Currently, there is no processing facility in the region that can provide post-harvest handling for pomegranate. The proposed facility will be equipped with 7 cold storage units with 100MT each, 3 pre-cooling chambers of 10MT capacity for each, packaging house covering 1146 sq.m.,

aril packaging unit, frozen fruit storage unit of 25MT and blast freeze of 5Mt per batch. Thelocal administrative authority will provide the water supply, while electricity will be provided byMSEDCL. The facility is being constructed to enable greater value addition to pomegranate produce.

45. **Greenfield Facility –** MSAMB proposes to build one new ***Fruits and Vegetable Handling Facility Centre, Pachod*** in the district of Aurangabad to meet the pressing demandsfor new post-harvest facility in the region. The facility will be built on the land that has been leased for 99years by APMC Pachod to MSAMB. Land-titles, previous holdings and approach pathways have been assessed, and MSAMB has assured through proper documentation that the lands are free of any encumbrance[19]. The facility will be equipped with 4 cold storage of 25MT each, precooling chamber of 6MT capacity, a packhouse of 820 sq. m. and grading lineof 10MT/ hr. A requirement for such a facility was identified in the region for handling sweet lime produce of the regions. The facility will receive water from local administrative authority and electricity from MSEDCL.

46. **Water requirement** - The project will require water for construction activities and labouruse during the construction phase and later to be used by the facilities to run and maintain theexpanded and existing capacities, including use by staff and labourers. All the facilities except detailed below depends on ground water and taps through bore-wells system.

Table 6: Source of water being tapped by the facilities

Name of the facility	Piped water supplied by local authority
Export Facility Centre, Chandwad	Maharashtra Jeevan Pradhikaran
Export Facility Centre, Savda	From Gram Panchayat supply.
Export Facility Centre, Latur	Maharashtra Industrial Development Corporation
All the three facilities at Vashi (IFC, VPF, and VHT)	Navi Mumbai Municipal Corporation
F&V Modern Marketing Facility Centre, Chandur	APMC water supply
Orange Export Facility Centre, Warud	MIDC water supply
Orange Export Facility Centre, Karanja Ghadge	From Gram Panchayat supply
Both the existing and new units at Baramati	Municipal Corporation
Export Facility Centre, Atpadi	From Gram panchayat Supply

[19] Land titles – 7/12 have been studied

47. **Electricity requirement –** All the existing units are connected with State's power grids.The greenfield sites also have access to grid electricity and will be connected when the facilities are ready for operations. During construction, temporary connection will be procured by the EPC contractor through relevant local authority. The facilities also have diesel generator set as backup. Since the grid connectivity is highly reliable, no additional backup is required evenfor the expanded capacity.

48. **Room cooling systems:** All the existing facilities have modified forced air-cooling system to be installed at the pre-cooling and cold storage units. The facilities use either of thefollowing coolants for cooling of the air before it passes through the forced air circulating heavy duty fans. Coolants used are either R404A, R410, R449A, R448A, R513A or R450A. The installed capacities of the current room cooling system of the existing facilities are adequate to cool additional spaces. Thus, only greenfield sites (i.e. Pachod) as well as site at Baramati and Beed will require installation of new room cooling system as these sites will undertake development of new buildings comprising of pre-cooling, cold-storage and packaging lines.

49. **Ethylene:** For the export facilities in Baramati and Talegaon, new fruit ripeningchambers have been proposed. The Ethylene gas will be used for the ripening fruits. The ethylene gas (C_2H_4) cylinders available commercially will thus be purchased from the market.The cylinders will be stored separately in the designated storage space.

50. **Building construction:** Since the proposed building construction are not of significantcapacity, temporary establishment of batching plant is not expected at site. The EPC contractoris likely to either procure ready to apply cement-aggregate slurry mix or prepare in small quantities at site using small capacity mobile mixers. Such mixers are run by electricity and does not require any site preparation as compare to batching plant. All construction materials will be procured by EPC contractor as specified in engineering design that will be finalised bythe contractor in consultation with engineering team of MSAMB.

51. **Equipment:** All proposed equipment for upgrading the facilities will be procured and installed by the EPC contractor.

52. **Construction Labourers**: Construction labourers will be hired by the EPC contractors forcivil work. Some sites may require establishing labour camps during the construction period. Such details are not available at this stage. However, it is assumed that labour camps maybe established and hence all generic and specific mitigation measures have been suggested under environment management plan (EMP).

53. **Operational Labourers**: There is a likelihood that the need for operational labourers may grow in the improved facilities, due to improved capacities. However, modernization of these facilities will not have any adverse impact on the livelihood of the people associated with these facilities.

C. Project Implementation Arrangements

54. The Government of India and ADB has agreed to finance the MAGNET project with proposed loan of $100.0 million from ADB's ordinary capital resources ADB will provide loanswith a mix of project loan and FIL modalities. The government will provide $42.9 million as counterpart funding to cover tax and duties, financing charges, and recurrent costs such as government staff salary and related operational costs.

55. Since the project will be implemented in the State of Maharashtra, the State Government of Maharashtra acting through the MAGNET Society will be the Executing Agency (EA). Thus, MSAMB will be the key implementing agency or in other words the project proponent.

56. In order to institutionalize the best practices being adopted in the project and enable tocontinue to scale-up the project objectives, a MAGNET Society was established as a special purpose vehicle and is headed by the Principal Secretary Marketing. The Society will function as an apex body for implementation, monitoring and coordination for ADB's assisted MAGNET project.

57. Within the MAGNET society, a dedicated Project Management Unit (PMU) was established, headed by the MSAMB General Manager, as the Project Director (PD). The PMUwill be responsible for the overall performance, monitoring and reporting of the project. A team of core nodal officers from the engineering department will assist the PD, to manage and coordinate the project activities, including procurement, finance, safeguards (social andenvironment), value-chain, among others. In addition, there will be Nodal officers for each output of the project. The PMU will also be supported by a Project Management Agency (PMA- a project implementation support consulting firm [PISC]), which will be hired during project implementation. The PMA will provide expert support for implementation of safeguard measures in project components under Output 2 and Output 3 of the MAGNET Project.

58. A total of 8 Project Implementation Units (PIUs) are to be notified at the division level, of each division of the MSAMB. The PIUs will be headed by the concerned Divisional Deputy General Manager (DDGM) and one designated Nodal Officer in each PIU will be responsible for day-to-day coordination with

the PMU, and PMA. Each PIU will have dedicated nodal officers for each project output (1, 2, and 3), including social and environment safeguards. Each PIU will be staffed, consultants / experts hired on contract basis covering areas of agribusiness, technical, procurement, accounts, social, environmental safeguards, and one/two support staff, etc. as per need and agreed with the ADB. PIUs will be focal point for project implementation under MAGNET at divisional level.

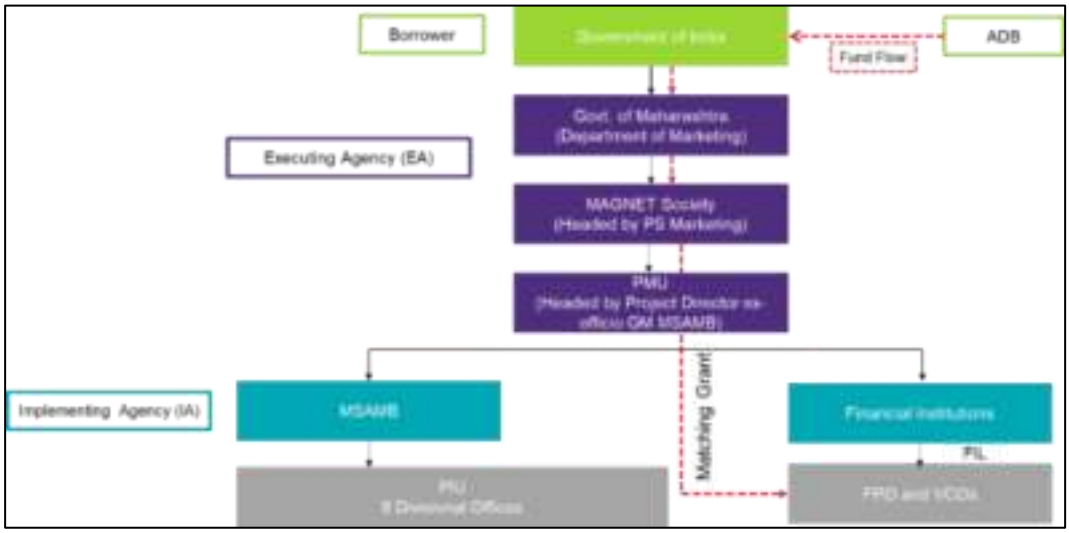


Figure 2: Institutional Arrangement for Project Implementation

59. **Training and Capacity Building:** Output 1 aims at strengthening of FPOs towards contributing to the overall objective of growth of horticulture sector with inclusive benefits for the small farmers. The project will conduct capacity building and value chain services based on comprehensive value chain growth strategy covering aspects of marketing, post-harvest and productivity, value addition prospects and environmental and social safeguards requirements. Under environmental safeguard requirements, the TRTA team will train and enhance the capacities of the MAGNET Society, MSAMB, FIs, and the PIUs on the following aspects:

(i) Need for environmental safeguards and climate change risk management;
(ii) Laws, regulations, policies including ADB's Safeguard policies those that triggers by the project activities and exclusion list;
(iii) Screening process and how to screen proposed sub-projects;
(iv) Impacts - hierarchy of impacts (avoid, reduce, and mitigate), magnitude ofimpacts, positive and adverse impacts, reversible and irreversible impacts, etc;
(v) Mitigation options, planning and budgeting;
(vi) Monitoring and reporting; and
(vii) Institutional arrangements and Grievance Redressal Mechanism.

D. Rationale

60. **No project Scenario:** Maharashtra has emerged as one of the country's largest producers of fruit and vegetable - accounting for 11% of the total fruit and 5% of the total vegetable productions of the country. However, in a global context and given production volumes, exports are rather marginal. Furthermore, the rapidly growing domestic market is yetto be adequately tapped through commodities and value-added produce. This is mainly due tothe lack of proper post-harvest facilities and management processes, resulting in food / produce wastage before reaching the consumer. It should be further noted that there are 1.36 crore farmers in the State, of which 48.9% and 29.5% are marginal and small farmers, respectively (Agriculture Census 2015-16). Thus, in absence of proposed expansion and modernization of the existing facilities, the opportunity to support FPOs by improving a network of post-harvest marketing and value chains focusing on the horticulture crops will be lost. The farmers being the ultimate beneficiaries of the project will remain in the same level of poverty, rather some may also fall back to below poverty level. Hence no project alternative is not a solution to the given challenges in the sector.

61. **In Project Scenario**: The enhancement of value chain for fruits and vegetables will improve food safety and security and decrease food losses and wastes. With the expanded capacity and modernized facilities of MSAMB, the fruits and vegetable producers of the State will benefit from:

(i) Increased access to modernized post-harvest and processing facilities;
(ii) Increased access to good agriculture and processing practices including meeting export requirements and certifications;
(iii) Increased coverage of the State with adequate capacity;
(iv) Enhanced farmer competitiveness in terms of product value, income, leading to better standard of living;
(v) Enhanced sales and profitability for value chain operators; and last but not least
(vi) Increased employment opportunities in the State, especially for women (more than 90%of the workforce in pack-houses are women).

62. Proposed project activities are the best suitable alternative in the given condition. The IEE further identifies opportunities to enhance the sustainability and resilience of the facilities by recommending measures such as rainwater harvesting in drought-prone regions, development of green-belt around the facilities to reduce GHG footprint of the facilities; etc.

III. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

63. The implementation of the project will be governed by the national laws and state's environmental rules, regulations, and standards, and social rules as well. These regulations impose restrictions on activities to minimize/mitigate likely impacts on the environment and community and setting standards to regulate the disturbances due to the proposed project. Compliance is required in all stages of the project's implementation including design, construction, and maintenance phases. The IEE report has greatly considered the ADB's Safeguards Policy Statement (SPS) 2009 requirements. Provided that the project complies with the national and ADB SPS 2009 requirements, the potential environmental and social implications and risks will be mitigated during the implementation of the project activities.

64. The Ministry of Environment and Forest, Government of India, has the overall responsibility to set policy and standards for the protection of environment along with the Central Pollution Control Board. their policies cover air, noise, and water quality standards, and the requirements for preparing environmental impact assessment statements for development projects (if applicable). These standards are of significance for the proposed project. Salient features of relevant environmental and labour laws and regulations, including their applicability to the project are detailed below.

A. Applicable National Regulatory Laws and Notifications

The Environment (Protection) Act, 1986, amended in 1991.

65. This Act is considered as an umbrella Act as it provisions the issuance of many rules and notifications, which aims for the protection and improvement of the environment. Under section 3(3), the Act empowers the Central Government to establish authorities in charged with the mandate of preventing environmental pollution in all forms and tackle specificenvironmental problems peculiar to different parts of the country. Following rules and notifications are of relevance to the project:

(i) Environmental Impact Assessment (EIA) Notification of 1994 amended in 2006
(ii) The Noise Pollution (Regulation and Control) Rules, 2000
(iii) The Municipal Solid Wastes (Management and Handling) Rules, 2016
(iv) Construction and Demolition Waste Management Rules, 2016
(v) Plastic Waste Management Rules, 2016
(vi) Diesel Generator Set – Emission and Noise Standards, 2002

Environmental Impact Assessment (EIA) Notification, 2006.

66. The notification has categorized different construction projects of various sectors to Category A and B based on the spatial extents of the potential impacts on human health, andnatural and manmade resources. These projects that falls neither of the categories follows thegeneral conditions stipulated under the notification. Category A projects must obtain Environmental Clearance (EC) from the Central Environmental Impact Assessment Authority. Category B projects are further categorized in B1 and B2. B1 projects should obtain EC from the State Environmental Impact Assessment Authority. Category B2 projects do not need ECfrom the government. All projects are required to obtain Consent to Operate and Consent to Establish from State Pollution Control Boards and relevant local authority.

67. As per EIA Notification 2006, the proposed facilities are categorized under "Building orConstruction projects or Area Development projects". According to this category, all buildingswith built-up area of more than 20,000 sq. m. are categorised as Category B project and should undertake detailed EIA study. All other building constructions are required to follow general rules without any mandatory requirement to undertake EIA study. Since the scope and scale of expansion of the existing facilities, including brownfield and greenfield projects are below threshold of 20,000 sq. m., the civil works involved under Output 3 do not require to undertakedetail EIA studies. The projects should follow rules and regulation as per categorization of theindustries under Air and Water Act given below.

Categorization of Industries under Water and Air Act.

68. As per modified directions (2016) under section 18(1)(b) of the Water (Pollution &Prevention Control) Act, 1974 and the Air, (Pollution & Prevention Control) Act, 1981 regarding harmonization of classification of industrial sectors under red/ orange/ green/ white categories. the "Food and Food Processing Units" categorizes under "Orange Category".

69. Thus, all MSAMB facilities come under the purview of "orange category", requiring Consent to Operate and follow the standard for discharge of water as shown below:

Table 7: Standard for Discharge of wastewater into Municipal Sewerage

Fruits and Vegetables Units (Concentration should not exceed)				
	pH	**Suspended Solids(mg/l)**	**Oil & Grease(mg/ l)**	**BOD at 27°C for 3 days (mg/ l)**
Above 0.4 ton/ day	6.5 –8.5	50	10	30
0.1 – 04 ton/day	Disposal via septic tank (soak pit)			

70. The consent to operate, i.e. no objection certificate (NOC) to operate should be obtained before the onset of any new operation. For the existing units, the NOC should be reapplied with mention of changes in the operation capacity/ addition of any sub-units such as pre-cooling system, cold storages, etc.

Maharashtra State Water Policy

71. The strategies envisaged for industrial water management under the policy, those thatare applicable to MSAMB facilities are:

(i) All industrial units must endeavour to reduce their water footprint over the time by optimizing the various industrial processes, modifying the equipment, recycling wastewater and creating awareness amongst their workers.
(ii) Priority will be given to agri-based industries in water deficit sub basins.
(iii) Groundwater exploitation by the industries shall be regulated in over exploited and critical watersheds.
(iv) Rain water harvesting and aquifer recharge projects to be taken up on priority.

Maharashtra Ground Water Development and Management Act, 2009

72. Following provisions to followed by MSAMB facilities under the Act:

(i) The owner of any groundwater well should ensure the registration of the well(s) both innotified and non-notified areas of the State should be done with State Ground Water Authority(SGWA)

(ii) Drilling of deep wells within the notified and non-notified areas, for agriculture or, industrial usage to be done as prescribed by SGWA

(iii) Prohibition of extraction of water from existing well for a certain period - If, any existingwell, within the area of influence, in the notified and non-notified areas or in the notified area other than an

area of influence, is found to be adversely affecting any Public Drinking Water Source, the District Authority may, after ascertaining the views of the Watershed Water Resources Committee and Panchayat, and on the technical advice of the Groundwater Surveys and Development Agency, notwithstanding anything contained in any other law for the time being in force having regard to the quantum and pattern of rainfall and any other relevant factors, and after giving its owner a reasonable opportunity of being heard, by an order, prohibit the extraction of water from such well for a reasonable period, in the manner asmay be prescribed.

Noise Pollution (Regulation and Control) Rules, 2000

73. The rules specify the regulation and control of noise producing and generating sources.The Schedule of the rule indicate the ambient air quality standards in respect of noise of different areas/ zones and mandates all activities of not exceed the given standards. An area that is not less than 100 m. around hospitals, educational institutions and courts are generallydeclared as silence zones under the provision of this rule. The state government categorizes the different areas into industrial, commercial, residential and silence zones for the purpose of implementation of noise standards at categorical areas.

74. As State government of Maharashtra, all the 21 project sites are in “Commercial Area” (either within APMC market space or at warehouse zones). Thus, all sites are required to maintain following ‘ambient air quality standards in respect of noise”:

Table 8: Sound level category

Category of Area/ Zone - Commercial area (Limits in dB(A))	
Day Time (6.00 a.m. to 10.00p.m.)	Night-time (10.00 p.m. to 6.00 a.m.)
65	55

Solid Wastes (Management) Rules, 2016

75. The rule stipulates segregation, collection, handling, and management (includingreuse, recycling, and disposal) of solid waste generated in all urban agglomerates of the country. As per the rule, MSAMB is categorised as institutional generator of wastes as most offacilities are in market areas of APMC or warehouse zones. The proposed project is also required to follow rules for market associations.

76. As per the rule the institutional generators are required to segregate and sort the waste and manage disposal practices in partnership with the local

bodies. Waste is required to be segregated into 3 streams. These are biodegradables, recycling waste (plastic, paper, metal, wood, etc.) and domestic hazardous wastes (diapers, napkins, mosquito repellents, cleaning agents etc.) before handing it over to the collector or local body.

77. As per the new rules, it has been advised that the bio-degradable waste should be processed, treated, and disposed of through composting or bio-methanation within the premises as far as possible and the residual waste shall be given to the waste collectors or agency as directed by the local authority.

78. Thus, as per rules MSAMB should establish the following:

(i) Install separate bins to separately collect biodegradable waste (food waste), recyclable waste (papers, cardboards, etc.), and domestic hazardous waste such as sanitary napkins and cleaning agents. Green colour bins for collectionof biodegradable waste, blue colour waste for collection of recyclable waste andblack colour waste for collection of domestic hazardous waste.

(ii) The bio-degradable waste should then be processed in a soil pit for generationof manure, which can be used for development of green-belt around the facilitypremise.

(iii) One black bin should be kept at Women's toilet for collection of sanitary waste

(iv) Each facility should install either a general electric incinerators or earthen/ claypots 'Matka incinerator' used for incineration of sanitary napkins. If the waste isburnt in bulk amount (150-200 napkins/ day) then emission standards given below to be followed. If small/ clay-pot incinerators are used then the incinerator should be kept in open areas such as open backyard, open fields, and the ashes should be mixed with the soil for gardening.

Table 9: Emission standard for common hazardous waste incinerators

Parameter	Emission standard	
Particulates	50 mg/Nm^3	Standard refers to half hourly average value
HCl	50 mg/Nm^3	
SO_2	200 mg/Nm^3	
CO	100 mg/Nm^3	
Total Organic Carbon	20 mg/Nm^3	
HF	4 mg/Nm^3	
NO_x (NO and NO_2 expressed as NO_x)	400 mg/Nm^3	
Total dioxins and furans	0.1 ng TEQ/Nm^3	Standard refers to 6-8 hours sampling.

Parameter	Emission standard	
Cd + Th + theircompounds	0.05 mg/Nm^3	Standard refers to sampling time anywhere between 30 minutes and 8 hours.
Hg and its compounds	0.05 mg/Nm^3	Standard refers to sampling time anywhere between 30 minutes and 8 hours.

Construction and Demolition Waste Management Rules, 2016

79. The rule applies to the generation of wastes resulting from construction, re-modelling, repair, and demolition of any civil structure of an individual, organization or authority such as building materials, debris, rubble. According to the rule, every waste generator will segregate construction and demolition wastes and deposit at collection centre or handover it to the authorised processing facilities. During construction the contractor should ensure that there is no littering or deposition to prevent obstruction of traffic, nuisance of the public or clogging of drains. Large generators (more than 20 tons or more per day or 300 tons per project per month) should submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodelling work.

80. The waste should be segregated into 4 streams such as concrete and steel, soil, woodand plastics, bricks, and mortar. For disposal, the generator should pay relevant charges to the local authorities – such as municipality or gram panchayat.

81. As the project components under Output 3 involves civil construction work all above relevant points will have to be incorporated in preparation of the environment management plan.

Plastic Waste Management Rules, 2016

82. The rule aims to stipulate quality standards for the usage of plastic, especially for foodgrade plastic, and set responsibilities for all stakeholders in segregation, sorting, collection and disposal of plastic waste. As per the rules individual and bulk generators like offices, commercial establishments, industries are to segregate the plastic waste at source, handoversegregated waste to the relevant authority, and pay user fee as per by-laws of the local bodiesfor collection and disposal of waste.

83. This rule is applicable to all the facilities of MSAMB as the packhouses generates plastic packaging waste. The facilities will be required to separate out

the plastic waste and handover to the local solid waste management authority and pay for such services.

Environment (Protection) second Amendment Rules, 2002 – Diesel Set Notification

84. The Schedule 1 of the rules details out noise and emission limits for the diesel-based generator sets (DG sets) as follow. This is applicable to all MSAMB facilities as each site haveDG sets as back-up for electricity generation.

Table 10: Permissible smoke limits

Emission Limits (g/kW-hr)			**Smoke Limit (light absorption coefficient, m^{-1}**
NOX + THC	***CO***	***PM***	
<4.0	<3.5	<0.2	<0.7
Noise limit	75 dB(A) at 1m from the enclosure surface.		

Atomic Energy (Radiation Processing of Food and Allied Products) Rules, 2012

85. This rule is applicable to only to Irradiation Facility Centre at Vashi, Navi Mumbai. Thefacility carries out radiation of fruits and vegetables using Cobalt-60. As per the rules, units having radiation facilities are required to follow the given measures. The existing facility at Vashi follows all stipulated requirements:

(i) Obtain licence to operate the facility from the Central Government under AtomicEnergy (Radiation Protection) Rules, 2004

(ii) Hold valid licence under Prevention of Food Adulteration Act, 1954

(iii) Process food and allied products within the absorbed dose limits as specified under Schedule I and II and packaging material as specified in Schedule III;

(iv) Carry out dosimetry as specified under Schedule IV;

(v) Affix label on the package after processing and indicate information for traceability including purpose of radiation, operating licence no#, batch identification detail, and date of processing;

(vi) Appoint certified person by Atomic Energy Regulatory Board to operate the radiation unit;

(vii) Maintain all product processing information and all-time security for the facility;

86. Allowable dosage for fresh fruits and vegetables (other than Class-I [20])

Table 11: Allowable dosage for fresh fruits and vegetables

Purpose	Minimum (kilogram)	Maximum (kilogram)
Delay ripening	0.2	1
Insect disinfection	0.2	1
Shelf-life extension	1	2.5
Quarantine application	0.1	1

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

87. These rules shall apply to the management of hazardous and other wastes not specified separately in other rules. Hazardous waste means any waste, which by reason of characteristics, such as physical, chemical, biological, reactive, toxic, flammable, explosive orcorrosive, causes danger to health, or environment.

88. Scientific disposal of hazardous waste through collection, storage, packaging, transportation, and treatment, in an environmentally sound manner minimises the adverse impact on human health and on the environment. The hazardous waste can be disposed at captive treatment facility installed by the individual waste generators or at Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs). There are 40 Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs) available in 17 States/UTs.

89. Under this rule, all the facilities generating hazardous waste should draw an SOP for handling, and disposal of waste and waste shall be disposed to accredited authority responsible for disposal of such waste. The facilities should connect with local authorities suchas municipality or gram-panchayat for the required information.

[20] Class I – Bulbs, stem, root tubers, and rhizomes;

Child Labour (Prohibition and Regulation) Amendment Act, 2016

90. The Act prohibits employment of children below 14 years except in family enterprises provided it does not hamper the education of children. Adolescents (14-18 years) not to be employed in hazardous employment. All facilities shall comply by the act including expansionand modernization.

The Building and Other Construction Workers (Regulation of Employment and Condition of Services) Act, 1996, Rules 1998 (BOCW Rules)

91. It was enacted for building and construction workers in India for the purpose of safeguarding them from occupational risks inherent to construction, alteration, rectification, maintenance, repair, and demolition works. This is applicable to every construction works having 10 or more workers employed or had employed on any day of the preceding 12 months.The rules standardize the service conditions of BOCW workers and to provide for their safety, health conditions, welfare measures and for other matters connected to their job work.

92. As per the rules follow health, safety, and welfare provision to be provided to the workers:

(i) Protection against harmful effects of excessive noise, the permissible noise limitshall not go beyond 90 dBA within 8 working hours

(ii) Provisions of Fire Extinguishing Equipment sufficient to extinguish any possiblefire at every construction site. There should be the availability of adequate waterthat can be used for Fire extinguishing at ample pressure as per the National building code or applicable fire safety standards

(iii) Emergency Action Plan for such construction establishments which employ labours more than 500 construction workers.

(iv) Adequate Fencing of Motors, revolving machinery etc.

(v) Lifting and carrying of excessive weight: This rule prohibits construction workerto lifts excessive weight (any material, article, tool, or appliance etc) by hands or to carry over his head, back or shoulders exceeding weight limits. The Limitis 55 Kilograms for Adult men and 30 Kilograms for Adult women.

(vi) Provide protection for eye, head and other apparel protection;

(vii) Use of Safety Helmets and Shoes

(viii) Safety precautions during demolition of walls, partition etc

(ix) Precautions during handling of explosives

(x) Medical examination of building workers

(xi) Notifiable Occupational diseases to building workers

(xii) One Safety Officer over every 500 workers

(xiii) For labour camp: Provisions of facilities related to availability of drinking water at workplace/Accommodation for workers with separate cooking place, washing, bathing and lavatory facilities/canteen wherever up to 250 workers are working/ crèche for looking after children up to age 06 years wherever 50 or more female workers are employed/ Latrines and Urinals / Suitable Provisions of First Aid measures as per BOCW Act and Rules.

B. APEDA

93. As all of the 21 proposed facilities either being upgraded or being built for export-oriented services, each will have to follow accreditation requirements notified by the Agriculturaland Processed Food Products Export Development Authority (APEDA). The authority is established by the Government of India under the Agricultural and Processed Food Products Export Development Authority Act passed by the Parliament in December 1985. The Act (2 of1986) came into effect from 13th February, 1986 by a notification issued in the Gazette of India: Extraordinary: Part-II [Sec. 3(ii): 13.2.1986). APEDA is mandated with the responsibilityof export promotion and development of Standard Operating Procedures (SOPs)[21] for operation of export oriented packhouses.

94. Following are the requirements that are relevant in regard to environmental safeguard, occupational health and safety and personal hygiene, which the proposed facilities must comply with:

95. Facility cleaning & Sanitation

(i) All the floor areas are swept, cleaned and disinfected with disinfecting solutionat the end of each working shift.

(ii) The toilets/wash basins are cleaned and disinfected with disinfecting solution daily and separate toilets for each sex of workers.

(iii) All the packing lines/production surfaces and equipment are cleaned, washed and disinfected with sanitizer such as 200 ppm Sodium Hypochlorite

[21] APEDA SOP reference - http://apeda.gov.in/apedawebsite/Announcements/8._SOPs.pdf

(NaOCl) solution (bleach) before starting of run of program fruits at the end of each working shift.

(iv) All the fruit waste, packing materials and rubbish are collected from various areas and moved to closed disposable waste bins as per segregation methodand disposed daily through local services.

(v) The desapping racks are cleaned, washed and disinfected sanitizer such as 200 ppm Sodium hypochlorite (NaOCl) solution (bleach) thoroughly at the endof each working shift.

(vi) The long-nosed scissors used for cutting the stalk of the fruits are cleaned, washed and disinfected with alcohol at the end of each working shift.

(vii) The wall surfaces, doors and window frames are dedusted and cleaned at weekly intervals.

(viii) The solid surfaces of inspection/sorting/grading tables are cleaned and disinfected with cotton swab dipped in alcohol at the end of each working shift.

(ix) The floors of pre-cooling and cold storage chambers are cleaned and disinfected at the end of each emptying and before loading fresh process load.

(x) All washing water to be collected in either soak pit or send to effluent treatmentplant as provisioned by the local authority.

96. Personal Hygiene

(i) Every person working at the pack house facility will maintain a high degree of personal cleanliness and given training in personal hygiene and facility sanitation.

(ii) The workers before entering processing area have to undergo washing and must wear disposable aprons/ gowns, caps or hairnet and gloves. The finger nails are kept short, trimmed and clean and wear clean slippers.

(iii) Toilets are kept cleaned and maintained in hygienic condition. Toilets are clearlyseparated from the processing area by a corridor and a door frame. Adequate hand washing by workers using liquid soap and drying of hands with paper towels at the end of each use of toilet.

97. Handling & Disposal of Rejected Fruits

(i) Quality supervisor to record the details of quantity of rejected fruits lot-wise in the product log book maintained at the pack house facility.

(ii) The crates carrying rejected fruits are distinctly marked “Rejected” and promptlyremoved to rejected articles storage area to prevent contamination of other products.

(iii) The collected waste to be disposed either through the local authority or burying deep in a soil pit and covering with at least 6” soil.

C. ADB’s Safeguard Policies and Screening and Categories

98. ADB’s Safeguard Policy Statement (SPS) of 2009 consist of operational policies that seek to avoid, minimize, or mitigate adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the development process.ADB’s safeguard policy framework consists of three operational policies on the environment, indigenous peoples, and involuntary resettlement.

99. As per Operations Manual, OM Section F1/OP Issued on 1 October 2013, the proposed project categorizes under **Category B for Environmental Impacts**, i.e. - A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of themare irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.Thus, the given IEE including an EMP has been drafted.

100. According to SPS of 2009, ADB will not finance projects that do not comply with its safeguard policy statement, nor those projects that do not comply with the country’s social andenvironmental policies and including Government of India’s obligations under international laws. Further, ADB will not finance activities on the prohibited investment activities list in Appendix 5[22].

101. Appendix 5 of the SPS prohibits the trade of radioactive materials under ADB financedprojects. However, it allows the purchase of equipment for use of radioactive material if the radioactive source is "trivial" and "adequately shielded". In line with this, the inclusion of the irradiation facility can be included under ADB financing provided that the radioactive source is trivial and adequately shielded.

102. The proposed project covers expansion and modernization of an

[22] p.76 https://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf

irradiation facility centre in Vashi. The facility is currently being operated for post-harvest activities to maintain the quality of horticultural crops for export through irradiation. Based on the environmental audit, this facility is compliant with Atomic Energy Rules and requirements from the Agricultural and Processed Food Products Export Development Authority (APEDA), which are discussed in subsequent sections. As part of the expansion initiatives, ADB will not cover funding for the purchase of Cobalt-60 for the additional radiation dosage capacity of the facility. The board will purchase Cobalt-60 through the procedures by the Board of Radiation and Isotope Technology (BRIT).

103. In line with point vii) and footnote 11 under appendix 5 of the SPS for radioactive materials, ADB financing is allowed where the radioactive source is trivial and adequately sourced. The discussion on the nature of Cobalt procurement is discussed in Chapter 6 of theIEE and further substantiated under detailed Environmental Due Diligence Report - Expansion and Modernization of Irradiation Facility Centre (IFC) at Thane District, appended to this IEE as Appendix 12.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Baseline

104. The “as-is” assessment of environmental settings is essential to be able to determine the intensity, frequency, and durations of expected impacts, and to monitor project impacts toair, water, land, noise, biological components (flora and fauna) and socio-economic aspects. This chapter provide details on the settings and conditions of the environment at the proposed 2l project sites in a concise manner including:

(i) Physical component- location, soil properties, geological characteristics, topography, watershed characteristics

(ii) Physio-Chemical component - water, air, noise, and soil pollution levels

(iii) Biological component -biodiversity level of the area, existing flora and fauna, species richness, species distribution, types of ecosystems, presence, or absence of endangered species and/or sensitive ecosystems

(iv) Socioeconomic aspects- demography, social structure, economic conditions, developmental capabilities, displacement of locals

(v) Cultural aspects- locations, state, and conditions of archaeological and/or religious objects.

105. Normally, development project causes impact on the environment within 500 meters to3 km radius. However, for the proposed project’s scope of works, constructions are expected to have less significant impact on the environment. Therefore, a radius of 500 meters project influence has been covered by this study to ascertain the impacts on air, water, noise, land, biology, and socio-economic environment.

PHYSICAL COMPONENT

106. The **land-use pattern** around the facilities are as follow:

107. ***Nashik Division.*** All the four existing Export Facility Centres in Mohadi, Kalvan, Chandwad and Savda are in the plains with no hills within 10km radius. The soil is predominantly black cotton and is considered fertile for agricultural activities. The soil horizonis about 3-4 meters thick and holds good moisture.

108. There are no surface water bodies nearby such as lakes, ponds, or dams. Also, there are no ecologically sensitive features viz. forest, wildlife sanctuaries migratory corridors of animals, birds etc. There are no electricity generating

power stations nearby. No presence of minerals to support mining industry or building material crushers. There are no places of cultural and heritage importance within the project influence area.

109. ***Aurangabad Division.*** The units of Jalna (Export Facility Centre) and Karmad (Fruits and Vegetables packing and marketing centres) are part of Aurangabad Division. Both, of these facilities are located at semi urban areas, which are characterized by commercial zones and marketplaces. The locations of the proposed facilities are adjacent to national highway; thus, they are easily accessible. There are no industries and manufacturing units around found during the study. The land is a moderate black cotton soil due to the predominance of basalt rock beneath the surface. The soil horizon is thin and hardly about 1-2 m. thick. The areas of the proposed facilities are busy throughout the day because the areas are close to vegetable wholesale markets that present with major vehicle movements. No identified places of cultural and heritage importance. No found forests or landcover, wildlife habitats and ecologically sensitive zones around the target facilities. No lakes and reservoirs are there in the vicinity.

110. ***New greenfield facility at Pachod*** under Aurangabad division- The proposed food and vegetable handling centre is about 50 km from Aurangabad and located at state highway going to Latur in south. The site is in the sub-market area with no significant landscape features within the project influence area. Similarly, no notified forest, wildlife sanctuaries nor migratory corridors proximate at the target location.

111. ***Latur Division***. There are 3 MSAMB proposed facilities at Ardhapur, Latur and Beed. The area is characterized by plain land, which are known for harsh tropical climate with comparatively temperatures ranging about 44^0-46^0 C during summer. Further due to harsh summer coupled with depleting ground water conditions, there is perennially scarcity of drinking water and almost every alternate year the entire region reels under drought conditions.

112. Due to lack of thick layer of fertile ground such as the Black Cotton soil, the region has vast stretches of dryland farms. The climate typically supports fruits of citrus varieties especially sweet limes and lemons. The area can support pomegranate and mangoes especially the Kesar variety, which is being exported.

113. There are no places with cultural nor heritage importance. No forests, wildlife and ecologically sensitive zones are reported around these facilities

114. ***Ratnagiri Division.*** In this division, there are 3 proposed facilities in Vashi Out of the 3, one is Irradiation Facility Centre (IFC), another is Vegetable

Processing Facility (VPF), the former is located on the Ground floor, at Plot no 3, Sector 19 F, and the latter is located in the same building on the 1st floor. The 3rd facility- Vapour Heat Treatment (VHT) Centre is located also in Vashi at Niryat Bhavan, Vegetable Market, APMC Premises, Sector 19.

115. All the facilities in Vashi fall in sector 19F land, which is for industrial and commercial establishments. The Vashi MSAMB facilities are in the buildings constructed on land leased out by APMC to MSAMB. The APMC has its own land which also supports the wholesale vegetable and fruit market yard where in daily the farm produce is brought in by farmers for sale. The proposed MSAMB facilities are in busy commercial and industrial hub.

116. The annual rainfall of the region is around 2300 mm due to its proximity to the Arabiansea. The facilities are located in plain land all around, however the lofty Sahyadri basalt mountain ranges are 3 km away at the east and south-eastern direction. Under the municipal corporation, the land use in Ratnagiri has been totally changed from rural farmlands to urban settings. The Thane Creek Flamingo sanctuary is less than 10km away from the facilities towards the west and north west where it meets Arabian sea downstream. Due to urban land use, the endemic flora and faunal composition has also changed. The existing biodiversity arediscussed in the subsequent paragraphs.

117. The soil around Vashi is brownish black and has rock fragments that indicatesweathered basalt parent rock.

118. ***Amravati Division.*** The MSAMB Chandur railway facility is located here falling under Amravati district. It is in land leased by APMC. It is semi urban in nature and located adjacentto state highway leading to Dhamangaon. Due to proximity to railway station on the trunk route from Mumbai to Calcutta it has a commercial importance for trading of agriculture and fruit commodities.

119. Amravati is characterized by plain or flat lands, and is known as the cotton growing area due to predominantly black cotton soil which is highly suitable for agriculture and horticulture. The region is also known for oranges and lemons along with few other crops suchas chillies and soybeans.

120. Nagpur is around 80 km in the eastern direction, where there is international airport and large market potential. The location of the proposed project facility does not fall under notified forests or wildlife sanctuaries or associated migratory corridors. The climate is broadlytropical in nature with harsh summers and cold winters.

121. ***Nagpur Division.*** About 45 km west of metropolitan city of Nagpur, the Karanja Ghadge MSAMB Facility is along a plain land at the busy Nagpur-Mumbai highway. The targetfacility is located at the APMC leased land to

MSAMB. This region also falls under typical tropical climate of harsh summer and cold winter and relatively high rainfall of about 1100 mm per annum.

122. The location is rural in background with no industries or commercial places. Due to peculiar deep Black Cotton soil that is high nutrients, good quality oranges grow in the area and several other crops and local fruits. No notified forests or wildlife sanctuary or migratory corridor exists nearby.

123. ***Pune Division.*** The existing Talegaon Dabhade and Baramati MSAMB facilities are located at the respective lands of APMC where being leased. Both the facilities are within urban areas, and there are commercial activities around these. The Talegaon Dabhade site islocated at the foothills of gently rising basaltic hillock to the west. This site falls on the busy old Bangalore-Pune-Mumbai national highway which has heavy traffic around it. This site being on hillock has no appreciable soil cover around it. The new or proposed NIPHT Training Centre for upgradation is also located in same land plot area as the existing Talegaon Dabhade MSAMB facility.

124. In regards with Baramati facility, it is located within the plain land of Jalochi industrial area of Baramati. The soil is moderately black cotton and grows number of fruits andagricultural crops. Pomegranate and exotic flowers are the main commodities and being processed for exports. The climate is same tropical in nature with harsh summer and cold winter. The rainfall is comparatively high and is about 1150 mm per annum.

125. The new proposed Baramati facility is located at Jolochi and under the same land premise, therefore has similar environmental condition.

126. There are no notified forests, wildlife sanctuaries nor migratory corridors near the facilities. The backwaters of Indapur reservoir (Yeshwant Sagar dam) is about 26 km east of the area. This place is located about 40 km in the west of the Mumbai-Pune-Solapur national highway and well connected through railways.

127. ***Kolhapur Division.*** There is one facility which is majorly operating as Export Facilityfor Pomegranates which are grown in the neighbourhood areas and command good export potential. The Atpadi MSAMB facility is located in a plain dry zone of Sangli district that receives mean rainfall of 600 mm per annum. The soil formation is low to moderate quality Black Cotton type and underlined with stony weathered and fractured basaltic rocks that are hard and not suitable for agriculture purpose. The location falls in the vicinity of a dam which is 4 km to the south-west of the facility. The climate is tropical, which is typical drought prone.Due to various technological interventions, the region has been transformed into major Pomegranate producing centre that has developed good export market. The local ground water has depleted over time due to

overexploitation and compounded by prevailing droughts.There is no notified forest or wildlife sanctuary or a migratory corridor crossing the area nearby.

Seismicity

128. The seismicity of the area has important consideration for safety of physical structure and people. The seismic activity that results from the earthquakes or ground movements maycause partial or substantial damage to the physical structures of the proposed project. Basedon past seismic history the Bureau of Indian Standards [IS-1893 (Part- 1): 2002], has classified the country into five seismic zones, viz. Zone-II, -III, -IV and –V. Of these, Zone V is the most seismically active region, while zone II is the least.

Table 12: Seismic Zones Categorization & Induced Damage Intensities

Seismic Zone	Category	Damage Intensity
Low intensity zone	II	Low
Moderate intensity zone	III	Moderate
Severe intensity zone	IV	Severe
Very severe intensity zone	V	Very Severe

129. **Historical event**: There are no recent events of earthquakes in the State. As per the records of IMD (India Meteorology Department) and State Disaster Management Authority (SDMA), there were two earthquake events, in history - Koyna earthquake 1967 of magnitude 6.2 Richter scale which occurred near the site of Koyna dam, raising questions about inducedseismicity, and claimed at least 177 lives and injured over 2,200.and another of Latur in 1993 of magnitude 6.4 Richter scale. Due to it 10,000 people died, whilst another 30,000 were injured and reportedly 52 villages were damaged resulting in demolishing of houses. The seismicity map of Maharashtra is given below:

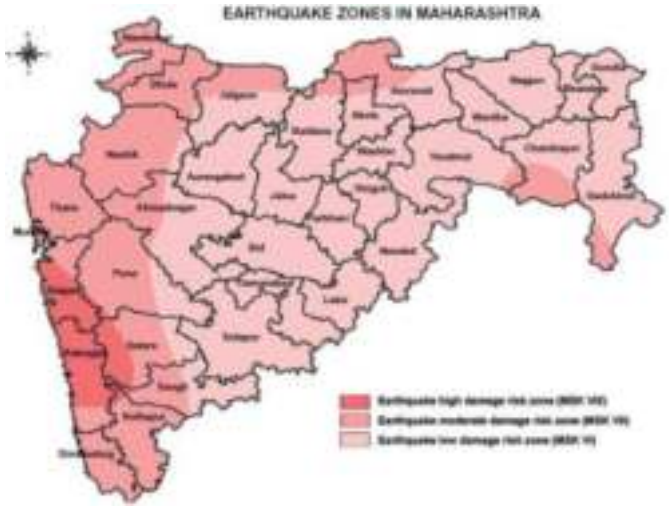


Figure 3: Seismicity Map of Maharashtra, at district level

130. **Risks Anticipated**: The table below displays the different earthquake-seismic intensity zones classified as per their damage induced as related to their corresponding existing and new MSAMB facilities proposed.

Table 13: Seismic Zonation vis-à-vis MSAMB Facility locations

Seismic Zone	MSAMB Facility	MSAMB Facility LocationsExisting and Proposed facilities	Induced damage	
			Intensity Damage	Description
III	Existing	Vashi (3), Mohadi, Kalvan,Chandwad, Savda, Talegaon Dabhade, Baramati,	Moderate	During event may cause wide cracks on ground, damage to houses and other structures which may become unsafe to occupy.
	Brownfield expansion	NIPHT–Talegaon, Baramati		
II	Existing	Karanja Ghadge (Nagpur),Chandur Bazar (Amravati),Jalna & Karmad (Aurangabad), Ardhapur & Latur (Nanded), Atpadi (Kolhapur), Beed	Low	Damage to mud and brick masonry walls, roofs with clay tiles, wooden structures, cracks in wall plaster. May induced injuries/deaths of human and cattle.
	Greenfield facility	Pachod (Aurangabad),		
IV	None	None	High	-
V	None	None	Very high	-

Source: National Disaster Management Authority-India (NDMA).

131. **Ambient Air Quality**: The ambient air quality is described in terms of the ground levelconcentrations of particulate matter PM_{10} and $PM_{2.5}$ and namely the gaseous pollutants - NO_2 SO_2 and CO as prescribed in National Ambient Air Quality Standard (NAAQ-2009). These standards are prescribed by Ministry of Environment. Forests and Climate Change (MOEFFCC). In the light of IEE requirements, the data pertaining to the Ambient Air Quality (AAQ) for the existing and proposed MSAMB units have been sourced from secondary source those that are available in public domain.

Table 14: Ambient Air Quality close to the MSAMB Locations

#	**Ambient Air Quality Monitoring Station* for which data is available**	**Parameters monitored and concentration in µg/m³**				**MSAMB facility near the air quality station**
		PM_{10}	**$PM_{2.5}$**	**NO_2**	**SO_2**	
1	Nashik	48	15	17	3	Mohadi,Chandwad and Kalvan
2	Jalgaon	53	38	13	5	Savda
3	Aurangabad	40	13	12	8	Karmad and Pachod (new)
4	Amravati	32	14	15	19	Karanja Ghadge
5	Wardha	32	14	11	16	Chandur Railway
6	Latur	41	29	12	13	Latur
7	Nanded	42	29	19	22	Ardhapur
8	Sangli	43	28	14	10	Atpadi, Sangli
9	Talegaon	49	32	16	29	Talegaon
10	Baramati **	67	23	26	24	Baramati
11	Vashi ***	208	140	44	31	Vashi-3 facilities
12	Beed	18.26	15.87	20.95	4.39	Beed
13	Paithan *	54	18	24	14	Pachod
	AAQ Standards	100	60	4	-	NAAQ-2009

Sources:

*Ambient Air Quality Monitoring Station-Maharashtra Pollution Control Board - https://mpcb.gov.in/air- quality;
** EIA Report for Pharmaceutical Co. Kurukumbh, MIDC, Maharashtra.
***TERI Environmental Status Report. This report pertains to period 2004-2007 and refers to one-time sampling results of the ambient air quality/. Periodic measurements and their respective test results arenot available on public domain

132. Except Vashi location, all other project sites are within safe permissible limits of AAQ and it may be concluded that the existing and proposed MSAMB unit shall not cause significant incremental load to the existing AAQ conditions. The units located in Vashi does not emit anyemission to the air and the DG sets are maintained, operated, and audited as per the statutory limits.

133. **Noise Levels:** The operation of the MSAMB facilities are less likely to cause any additional noise generation to the ambient air as there will be no use of heavy machinery. During civil work construction high level noise could be generated. Thus, baseline ambient noise level is important to note. Areas with high ambient noise level will require mitigation measures to be followed during construction stage.

134. During the site, as the facilities were not being operated, the noise levels could not be measured Hence public domain information on agri-processing food industry have been applied in here. The Table below summarises the noise levels during operation.

Table 15: Noise level in a typical food producing industry

Industry	Noise levels (dB) A	
	Minimum	Maximum
Food Processing	**70**	**75**
Source - https://www.noiseandhealth.org/text.asp?2008/10/39/55/40824		

135. Further to support the fact that fruits and vegetable processing unit does not generate any significant noise pollution, the report refers to Environmental Assessment and Environmental Management Framework for “India Food Processing and Value Addition Project(IFPVAP), supported by The World Bank. As per the given framework it is reported that “Fruit and vegetable processing do not create any significant air emission or noise generation. Minor emission from the process of burning of fuel (like diesel generator set) for electricity generationis observed”.

136. The MSAMB facilities under consideration for Output 3, which there are proposed 21 sites for expansion, modernization and/or greenfield development will have manageable impacts on ambient air quality and noise levels during construction works. Mitigation of these impacts to environment is discussed under the Chapter 7.

137. **Rainfall and Temperature:** Maharashtra has typical monsoon climate, with hot, rainyand cold weather seasons. Tropical conditions prevail all over the State. March, April and Mayare the hottest months. Rainfall starts normally in the first week of June. July is the wettest month in Maharashtra, while August too gets substantial rain. Monsoon starts its retreat with the coming of

September from the state. Rainfall in Maharashtra differs from region to region. Thane, Raigad, Ratnagiri and Sindhudurg districts, receive heavy rains of an average of 200 centimetres annually. But the districts of Nasik, Pune, Ahmednagar, Dhule, Jalgaon, Satara, Sangli, Solapur and parts of Kolhapur get rainfall less than 50 centimetres. Rainfall particularlyconcentrates to the Konkan and Sahyadri in Maharashtra. Central Maharashtra receives less rainfall. However, under the influence of the Bay of Bengal, eastern Vidarbha receives good rainfall in July, August and September[23].

138. The annual mean rainfall for the concerned districts of Maharashtra is given in Table below:

Table 16: Annual mean rainfall for the concerned districts of Maharashtra

DISTRICT	ANNUAL MEAN - Rainfall (millimetres)
Amravati	896.7
Aurangabad	681.5
Beed	701.6
Mumbai City	2146.1
Mumbai Suburban.	2396.7
Jalgaon	716.2
Raigad	3235.8
Kolhapur	2012.9
Nagpur	1062.3
Nanded	884.3
Nasik	1071.3
Pune	1018.2
Ratnagiri	3537.6
Sangli	624.1
Thane	2530.3
Wardha	976.4
Latur	819.6
Jalna	695.6

139. The coastal districts namely Thane, Ratnagiri gets considerable rainfall while other districts get the least rainfall and faces perpetual drought. Thus, all units of MSAMB are in drought prone districts except for units located at Vashi, Thane.

140. The coastal areas of Maharashtra also experience cyclone and storm

[23] Source: Maharashtra - State Agricultural Portal

surges. With increasing issue of climate change the events of cyclone and storm-surges are likely to increase. The most recent one was cyclone Nisarg which lashed western coast of Maharashtraon 2 June 2020. It caused 71 deaths in the state and more than 4,00,000 houses were damaged. Early economic impact was estimated at ₹1,000 crore (US$140 million). Over 18,000 hectares of horticulture land and 7,000 hectares of crop land were damaged. The units located at Vashi, in Thane districts are highly exposed to impacts of cyclone and storm-surges.However, Vashi being located near to the Thane creek and not on to the coast side, the impacts of cyclone and storm surges are likely to be medium to low. The area is likely to experience wind speed not more that 44meter per second, which is likely to cause only moderate damages. Historically, the units at Vashi have never experience impacts of cyclone and storm-surges. Figure below showcases Wind and Cyclone map of the State.

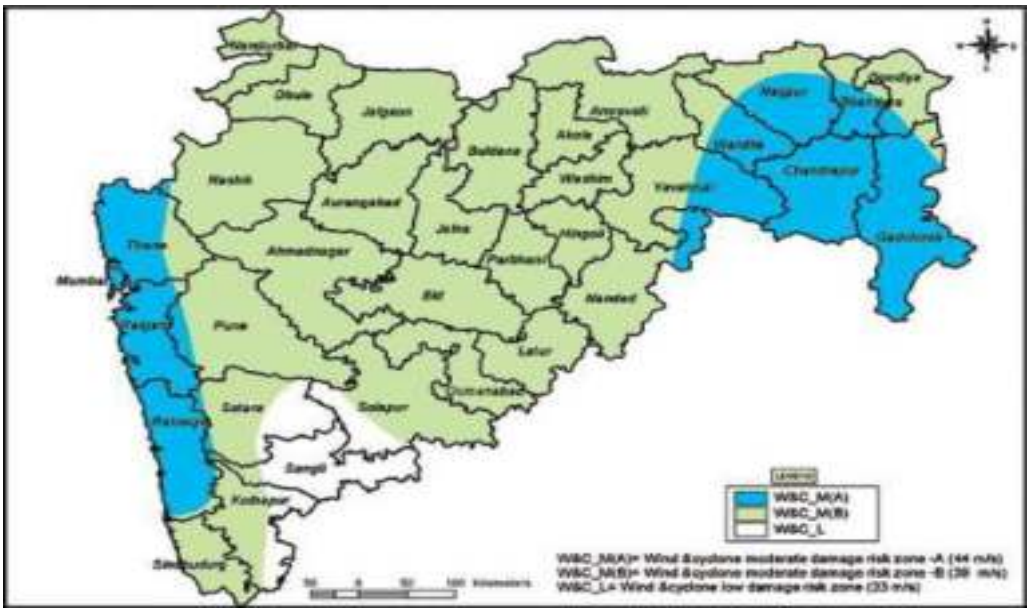


Figure 4: Wind and Cyclone map of Maharashtra

141. **Groundwater Availability and Quality:** Most if the facilities of MSAMB uses ground water as the only source of water supply to the units. Thus, groundwater availability and qualityare of utmost importance.

142. Groundwater resources in the state are rapidly declining due to overdraft. The groundwater assessments in 2011-2012, by Groundwater Surveys and Development Agency(GSDA) of the Government of Maharashtra, and Central Ground Water Board (CGWB) -Govt.of India, reveals that 76 of the 1,531-total spread up watersheds are categorized as overexploited, that is, groundwater development (adverse) is more than 100 percent rechargeand water tables are declining in these 76 no. of watersheds.

143. In the context of exploitation of ground water resource for especially irrigational requirement the scenario is alarming in the state of Maharashtra. Based on classification of GSDA and CGWB the status of ground water availability in areas in the neighbourhood of existing and proposed MSAMB facilities has been deduced and the same has been tabulated for understanding easily as follows:

Table 17: Status of Groundwater at MSAMB facilities

Sr.no	MSAMB Facility	Status of Ground water Exploitation	Existing/ Proposed	Remarks
1	Mohadi	Semi Critical	Existing	There is no scope for further exploitation and immediate artificial recharge at whatever locations possible should be undertaken. Including rain water harvesting measures.
2	Kalvan	Semi Critical	Existing	
3	Chandwad	Semi Critical	Existing	
4	Savda	Semi Critical	Existing	
5	Jalna	Safe	Existing	Ground water may be exploited for irrigational use through new bore wells
6	Karmad	Safe	Existing	Same as in case for other neutral areas.
7	Pachod	Semi Critical	Existing	Same as in case for other semi critical areas.
8	Ardhapur	Safe	Existing	Same as in case for other neutral areas.
9	Latur	Semi Critical	Existing	Same as in case for other semi critical areas.
10	Beed	Safe	Proposed	There is scope for further development of new bore wells for irrigational use. However good practice of artificial recharge together with rain water harvesting measures shall be preventing depletion of ground water resource.
11	Vashi		Existing	
12	Vashi		Existing	
13	Vashi		Existing	
14				
15	ChandurRailway	Semi Critical	Existing	Same as in case for other semi critical areas.
16	KaranjaGhadge	Over Exploited	Existing	The situation is alarming and further development of new bore well shall further burden the depleting resource and falling water tables. Immediate artificial recharge
17	NIPHT	Over Exploited	Existing	
18	FPC-NIPHT	Over Exploited	Existing	
19	FPC-Baramati	Over Exploited	Existing	

Sr.no	MSAMB Facility	Status of Ground water Exploitation	Existing/ Proposed	Remarks
20	Baramati	Over Exploited	Proposed	measures including rain water harvesting at all locations should be undertaken.
21	Atpadi	Over Exploited	Existing	

144. The ground water quality near the proposed MSAMB facilities are being tested by agencies such as Central Ground Water Board (CGWB) and Ground Water Surveys & Development Agency (GSDA)- Government of Maharashtra. The present study for IEE did not involve collection of physical samples of water either from surface sources or ground water sources which supply water to the respective MSAMB facility. In the absence of quality tests for the supply of water for each of existing MSAMB facility the source of water supply was identified and as per the source certain facilities have water supply from captive bore well. In order to assess the quality of water being supplied to each of the MSAMB facility the readily available secondary source for water quality test results whether- surface or ground water hasbeen referred to in public domain. In those cases where the secondary source of supply of ground water quality has been found to be the nearest observation bore well of either of CGWB or GSDA. Accordingly, the qualitative results of ground water samples from borewell location nearby existing MSAMB facilities have been collated from relevant reports and are presented in table below. The same holds true for proposed MSAMB Facilities.

Table 18: Quality of Groundwater near the MSAMB Facilities from Borewells

MSAMB Facility	Parameters				Remarks (relative locations ofobserving well from MSAMB facility)
	pH	EC, µS/cm	Total Hardness mg/l	Total Dissolved Solids mg/l	
Chandur Railway	7.9	1046	370	553	Near MSAMB facility (Source CGWB)
Karanja Ghadge	7.7	950	380	510	Analysis of Bore Wellwater 3 km away, Source CGWB)
Savda	8.0	974	360	515	-do-, 5 km away Source CGWB)
Dindori	7.6	870	450	461	Near MSAMB facility, Source CGWB)
Chandwad	7.9	1084	280	528	-do-, 10 Km away,Source CGWB)
Karmad	7.6	1301	515	691	Near MSAMB facility, Source CGWB)
Ardhapur	8.2	604	265	278	
Jalna	7.9	707	340	374	
Atpadi	7.9	3010	895	1630	

MSAMB Facility	Parameters				Remarks (relative locations ofobserving well from MSAMB facility)
	pH	EC, µS/cm	Total Hardness mg/l	Total Dissolved Solids mg/l	
Talegaon					
Baramati	6.8	1410	306	730	
Vashi 3 units	7.3	--	264	--	
Latur	6.8	--	208	730	*Research Paper
Kalvan	7.9	763	355	404	Near MSAMB facility/ Source CGWB)
Beed	7.1	--	132	1800	**Research Paper
Pachod (proposed)	7.2	--	148	386	Near Paithan, Source MPCB
Sources: * Physio-Chemical Analysis of Ground Water in Latur Tahsil, Latur District 2012, Dharashive et-al agaleamar@gmail.com, sd126185@gmail.com, ** Oriental Journal of Chemistry, www.orientjchem.org ,2011, Vol. 27, No. (3): Pg. 1273-1275; ***Journal of Environmental Research and Development Vol. 6 No.4, April-June 2012- Satish A. Bhalerao and Sonal P. Tawde., MPCB (Maharashtra Pollution Control Board)					

145. There is no surface water body near the facilities and none of the facilities are dependent on surface water for operation purpose. Thus, surface water samples are not relevant for any of the project sites.

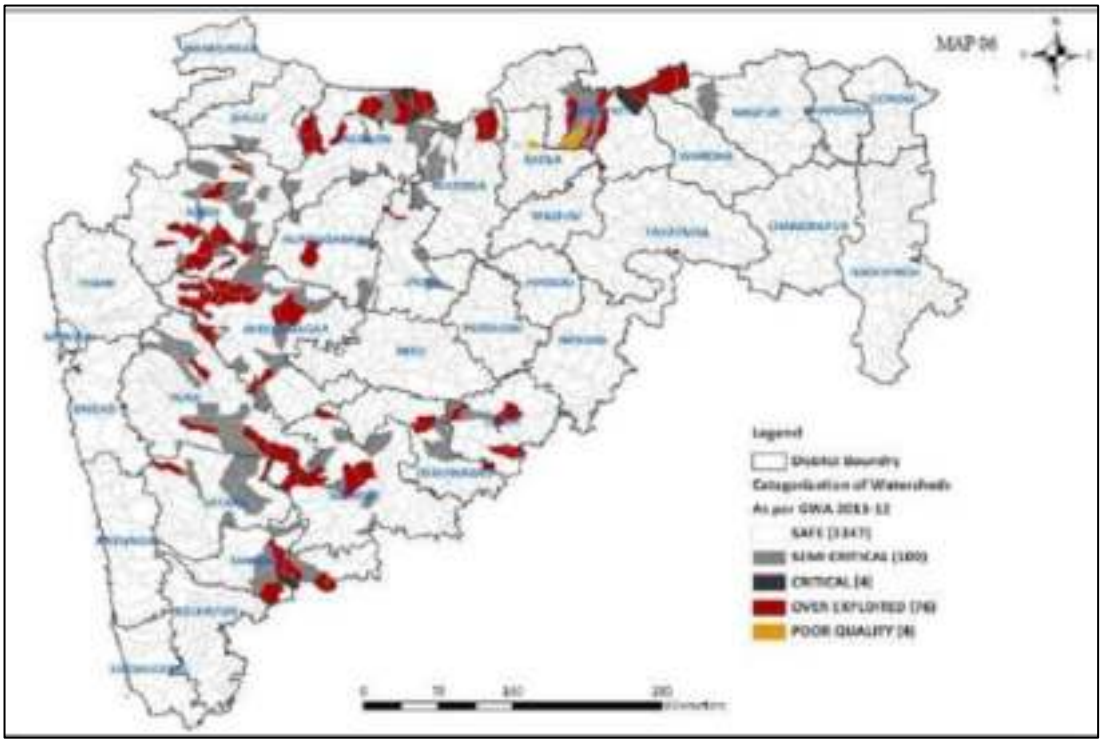


Figure 5: Groundwater status in Maharashtra

146. **Biological Environment:** The assessment of the biological environment includes the types of habitats, species of flora and fauna and analysing the conservation status (vulnerable,endangered or critically endangered), checking the IUCN list, and presence of any migratory track.

147. As most of the facilities of MSAMB are located within the market area of APMC, the areas are commercial zones and there is less likely to be any threatened, vulnerable or endangered species. As detailed under land-use information, the condition of the areas of the proposed facilities are either occupied by other commercial facilities and or are farm lands. Thus, the flora-fauna found are common in nature meaning the species of both flora and fauna are remain same and commonly occurring or endemic because the climatic and territorial features of entire state of Maharashtra is typically tropical hot and arid except during monsoon season of yearly rainfall.

148. None of the project sites are located within any eco-sensitive zones such as forest or wildlife habitats. However, Thane Creek Flamingo Sanctuary is 11km from the facilities at Vashi in Navi Mumbai. Figure below indicates as approximate distance:

Figure 6: Approximate distance between Thane Creek Flamingo Sanctuary and the Facility

149. The Thane Creek Sanctuary is a refuge for several resident and migratory birds. About 200 species of birds have been reported from this area, which include the globally threatenedspecies like the Greater Spotted Eagle (*Clanga clanga,* IUCN Category-Vulnerable) and otherslike Osprey (*Pandion halaetus,* listed in Schedule I of Wildlife Protection Act). Other bird species include namely the Pied Avocet (*Recurvirostra avosetta*), Western Reef Heron (*Egrettagularis*), Black-headed Ibis (*Pseudibis papillosa*), Common Redshank (*Tringa tetanus*), MarshSandpiper (*Tringa stagnatilis*), Common Greenshank (*Tringa nebularia*), Curlew Sandpiper (*Calidris ferruginea*), Brown-headed Gull (*Larus brunnicephalus*), Whiskered Tern (*Chlidonias hybridus*), Gull-billed Tern (*Gelochelidon nilotica*), Caspian Tern (*Sterna caspia*), Little Tern (*Sterna albifrons*), White Bellied Sea Eagle *(Haliaeetus leucogaster*),Eurasian Marsh Harrier (*Circus aeruginosus*). 'Birdlife International' has already declared Thane Creek as an Important Bird Area (IBA). **BirdLife International** is a global

partnership of non-governmental organizations that strives to conserve birds and their habitats.[1] BirdLife International's priorities include preventing extinction of bird species, identifying and safeguarding important sites for birds, maintaining and restoring key bird habitats, andempowering conservationists worldwide

150. Following are the commonly occurring flora and avifauna species in the areas close tothe facilities and displayed respectively in following Tables. None of the above floral species reported either as vulnerable or endangered.

Table 19: Floral Species commonly occurring nearby the facilities

Common name	**Scientific name**
Shirish	*Albizia lebbeck*
Neem	*Azadirachta indica*
Maharukh	*Ailanthus excels*
Nandruk	*Ficus retusa*
Satwin	*Alstonia scholaris*
Karanj	*Pongamia pinnata*
Sita Ashok	*Saraca asoca*
Katesavar	*Bombax ceib*
Kadamb	*Anthocephallus cadamba*
Bahava	*Cassia fistula*
Bakul	*Mimusops elengi*
Parijatak	*Nyctanthes arbortristis*
Tamhan	*Lagerstroemia flosregineae*
Kunti	*Murraya paniculata*
Shivan	*Gmelina arborea*
Apta	*Bauhinia racemose*
Kate sawar	*Bombax ceiba*
Son chafa	*Michelia champaca*
Pangara	*Erythrina indic*
Palas / Flame of the forest	*Butea monosperma*
Fish tail palm	*Caryota urens*
Putranjiva	*Putranjiva roxburghii*
Satwin	*Alstonia scholaris*
Curry leaf / kadipatta	*Murraya koengii*
Lemon	*Citrus limun*

Sr.no	Avi-Faunal Species		Conservation Status[24]
	Local name	Scientific name	
1	Peafowl	*Pavo cristatus*	Least concerned
2	Osprey or Fish-eatingeagle	*Pandion haliaetus*	Least concerned
3	White-bellied sea eagle	*Haliaeetus leucoquaster*	Least concerned
4	Hawks	*Accitridae*	Not vulnerable or threatened.
5	Large Falcons	*Falco biarmicus, Falco chicquera*	Least concerned Near threatened
6	Lesser Flamingos	*Phoenicopterus minor*	Near threatened
7	Greater Spotted eagle	*Aquila clanga*	Vulnerable
8	Oriental Magpie robbin	*Copsychus saularis*	Least concerned
9	Little egret	*Egretta garzetta*	Least concerned
10	Green bee eater	*Merops orientalis*	Least concerned
11	Common myna	*Gracula religiosa*	Least concerned
12	Little swift	*Apus apus*	Least concerned
13	Black drongo	*Dicrurus macrocercus*	Least concerned
14	Indian Robbin	*Saxicoloides fulicata*	Least concerned
15	Brahminy kite	*Haliastur indus*	Least concerned
16	Grey heron	*Ardea cinerea*	Least concerned
17	Shikra	*Accipitier badius*	Least concerned

151. **Mammals:** The common mammals in the area are primates such as Hanuman Langur (*Semnopithecus entellus*). None of the mammal's species have been categorised either as *threatened or vulnerable* as per the IUCN Red list. The rhesus langoor is displayed below. Since these species are not categorised as threatened or vulnerable there is no conservation required statutorily. They are commonly occurring over entire country and around inhabited areas especially which are dominantly of pilgrim and religiously important places. Their habitats are ranging from urban dense trees and forested areas and also in deeply forested jungles. They are generally friendly in nature and in search of food which is easily available inpilgrimage areas and places of worships. They are treated and believed as descendants of Lord Hanuman who himself was the most obedient and devotee of Lord Shriram in

[24] According to IUCN.

Indian Mythology-Ramayana.

Figure 7: Photograph of Hanuman Langur that is common in the region[25]

SOCIAL AND CULTURAL RESOURCES

Nearby Structures to MSAMB Facilities:

Around Vashi Facilities:

152. The Vashi MSAMB facilities are situated in the designated commercial and industrial areas by the relevant town planning authorities. Therefore, the nearby structures of the buildings also belong to the planned units of different industrial and commercial business houses. The buildings are made of RCC structures and exist in individual plots allotted to eachof them. Particularly in case of Vashi MSAMB facilities, the plots adjoining these units are vacant and remain unoccupied as on date. Therefore, there are no buildings or other structures which may have an impact during either the construction operation stage.

Around remaining existing MSAMB facilities:

153. The entire existing MSAMB facilities are established in land plots allotted to each of them by the Agricultural Produce Marketing Committees (APMC) in lease hold agreements of long-term agreements. In view of this all of the facilities

[25] https://zeenews.india.com/news/sci-tech/hanuman-langur-identity-crisis-might-finally-be-solved-study_1473471.html

exist in commercial vegetable market areas where no residential housing buildings exist in the vicinity which maybe impacted directly or indirectly due to their presence. Particularly, the Karanja Ghadge (Nagpur division MSAMB facility), Chandur Railway (Amravati division MSAMB facility), Talegaon & Baramati (Pune division MSAMB facility), Jalna & Karmad (Aurangabad division MSAMB facilities), Ardhapur & Latur (Latur division MSAMB facilities) are located firstly in the APMC market area and secondly along the National Highways which facilitates movements of commodities. In remaining facilities i.e. Dindori, Kalvan, Chandwad and Savda(under Nashik division MSAMB) are also located in respective land plots allotted by APMC under long tern lease agreements but fall in rural areas which have predominantly farms all around and therefore pose no influence to surrounding buildings or structures.

Nearby Religious-Cultural Structures:

Around Vashi Facilities:

154. As described above, the 3 Vashi MSAMB facilities are located in designated commercial and industrial areas planned by the town & country planning authorities. So, no religious or cultural buildings housing such events or activities take place in the vicinity of these facilities.

Around remaining all existing MSAMB facilities:

155. As explained above all of the remaining existing MSAMB facilities and proposed new facilities are located in their designated land plots under permitted category and do not have bearing of any kind either on the religious or cultural activities.

156. Around proposed new centres in existing MSAMB facilities: These are namely at a) Pachod (Aurangabad division), b) Baramati (adjoining to existing Baramati facility), c) new NIPHT state- of the- art-training centre (adjoining to existing Talegaon facility). As explained above all of the all of proposed new facilities shall be located in their designated land plots under permitted category and do not have bearing of any kind either on the religious or culturalactivities.

Population

157. The Rural population in the state accounts for more than 50 per cent of the total population. Still, the percentage of rural population in the total population of the state has continuously declined, from 61.31 per cent in 1991 to 54.76 per cent in 2010-11. District-wise data shows that most of the districts of Vidarbha and Marathwada region account for a comparatively higher percentage of the rural population. While most of the districts of Western Maharashtra are highly urbanised with a higher percentage of the urban population in the totalpopulation, according to the 2001 Census (Directorate of

Economics and Statistics, Government of Maharashtra, 2010).

Labour force[26]

158. The total LFPR in rural Maharashtra for both males and females taken together has decreased from 1993-94 to 2009-10. The LFPR for males has increased over the years from 558 in 1993-94 to 581 in 2009-10[27]. As per the 2011 census, the state's labour force participation rate was 437 females per 1000[28] males. The female worker population ratio (age 15+).

Table 20: Ratio of female workers in Maharashtra

Maharashtra female worker population ratio for age 15 and above	2012 – 13	2013 – 14	2015 – 16
	32.8%	34. 6%	32.8%

Main livelihood in rural areas

159. Agriculture and allied activities are the main source of rural livelihood for people in rural Maharashtra, where almost 79 per cent of the workforce is engaged in 2009-10 (National Sample Survey Office, Ministry of Statistics and Programme Implementation, 2011). Of the total number of 13.6 million farmers in the State, 48.9% and 29.5% are marginal and small farmers, respectively. In other words, an overwhelming majority (78.4% of the total) are small and marginal farmers. The state has emerged as one of India's largest producers and exporters of fruits, vegetables, pulses, cotton, and soybeans. These changes have been mainly positive, as the production of cash crops is labour intensive (horticulture and floriculture are two examples), climate-resilient (for instance, pulse-based cropping systems increase resilience, and pigeon pea intercropping sequesters more carbon in soils than monocropping systems), and responds to domestic and global market demand. Value addition is increasing in Maharashtra's dynamic food processing industry, which employs approximately 240,000 workers, about 15% of formal sector employment. Agricultural growth and structural transformation are spread unevenly across the state, however, and some areas, notably in northern and eastern Maharashtra, continue to lag.

Condition of the Education System

[26] Labour force includes all those who are employed and all those who are looking for work i.e. unemployed(employed + unemployed)
[27] 50th, 55th, 61st and 66th Rounds of NSSO on Employment and Unemployment
[28] Census 2011, Government of India

160. Though the learning in rural Maharashtra is getting better, but still short of 2008. As per the ASER[29] report, around 5% girls in Maharashtra between the age group of 15 and 16 yearswere out of school in 2018. The rate has, however, gone down from 10.1% in 2008. In the majority of areas in rural Maharashtra, educational facilities are available only up to the primarylevels of schooling. The quality of such education is often sub-par. Good quality education andhigher education are usually harder to access for the rural population as it is away from the villages in towns and cities. Migration or temporary migration to towns and cities is often costlyand beyond the means of rural populations.

Economic condition of rural people

161. The study area is rural; therefore, is socio-economically not developed and lack of economic activities. Since most of the facilities are located in rural set-up, with the market areas of APMC, the general people around the facilities are mainly traders, farmers, andfarmworkers.

162. The study areas have no historical or paleontological or archaeological site of significance.

Indigenous People

163. The current use of lands of the facilities falls under the industrial and economic zone and does not have habitations of any Indigenous People. Though, the project beneficiaries have populations from the disadvantaged community, i.e., IPs.

[29] Annual Status of Education Report (Rural), 2018

V. ANTICIPATED ENVIRONMENTAL IMPACTS

164. The proposed MAGNET project will induce different impacts in the surrounding environment. This chapter covers the nature, extent and magnitude of likely impacts in the environment and people due to the implementation of the proposed project components during pre-construction, construction and operation stages. Moreover, the chapter covers the impact assessment and risks associated with the various projects of MSAMB.

165. In this assessment proceedings the basic fact to be noted is that the project activities related to the developmental aspects such as construction and operation shall be limited to within the physical boundaries of the existing MSAMB facilities. Expansion and modernisation work are only within and additional to the existing facilities. The major impacts on the environment has been already occurred when these facilities were created or carried out afresh then in the area particularly on the land site or location where they are existing now.

166. The activities under construction and operation stage will induce changes in the environmental aspects, which may be described as physical (air, water, noise), biological (flora and fauna) and on occupation and community (health and safety). The details of the changes likely on the receptors as follows:

(i) Physical environment- air quality and greenhouse gas emissions, noise levels, and quality and quantity of water (especially groundwater as this shall be used in almost all MSAMB facilities).

(ii) Biological environment- Terrestrial vegetation, avifauna, mammals and reptiles

(iii) Human environment-private land buildings, public infrastructure, aesthetic and landscape, community and occupational health & safety

167. The assessment of potential environmental impacts needs to define the characteristics viz. intensity, duration and extent in both temporal & spatial aspects. These may be broadly classified as:

(i) *Intensity of the impact:* refers to the change induced on the baseline aspects and are further classified into 3 classes:

a) Low: minor change in the base levels and difficult to notice

b) Average: noticeable change which may be quantified but of

low magnitude

c) High: The change is noticeable and large in magnitude to be quantified.

(ii) *Duration of the impact:* measures on temporal scale induced on the baseline levels. These are further divided into 3 main components as follows:

a) Short-lived: the effect disappears promptly;

b) Temporary: the effect is felt during one project activity or, at most,throughout implementation of the project;

c) Permanent: the effect has repercussions for the life of the infrastructure.

(iii) *Scope or extent on spatial scale:* Pertains to coverage or extent of impacts as measured from the source and activities carried out. It is further categorised as:

a) Limited: the scope is limited when the action affects only oneenvironmental element located near the project:

b) Local: the scope is local when the action affects the study area;

c) Regional: the scope is regional when the action affects areas beyond the study area

(iv) *Assessment of the potential impacts*: Defined as the combination of the previous aspects leading to define the severity of impacts. These are classifiedinto 3 categories:

a) Minor: signifies that the effect is non-existent or virtually non-existent, that it does not affect the environmental component in any observable or quantifiable way and that it is related to a randomly occurring natural effect. As a rule, this would be a short-lived effect, limited in scope.

b) Medium: signifies a perceptible, temporary and/or low return effect thathas little impact on the environmental component and is not irreversible.Such an effect is short-lived and/or limited in scope.

c) Major: signifies an effect that is permanent and that affects the integrity,diversity and sustainability of the element. Such an effect

substantially or immediately alters the quality of the environment.

168. The project interventions under Output 3 of MAGNET project essentially relate to enhancing the processing capacity of the target facilities of MSAMB. While the project is not likely to have any adverse environmental impacts, all possible safeguard measures have been identified to reduce and mitigate unavoidable impacts. This chapter covers the nature, extent,and magnitude of likely impacts in the environment and people due to the civil worksconstruction proposed at 21 sites for the purpose of expansion and or modernization. The impacts are distributed across three stages – i.e. pre-construction, construction, and operation stages. The list of likely impact, mitigation measures and responsible agencies are provided intable below:

169. The table below summarises the list of likely impacts and the degree of severity to environment and people.

Table 21: List of anticipated impacts due to scope of works and/or activities

Scope of Worksand/or activities	Type of Facility*	Environmental Components	Description of the EnvironmentalImpacts	Intensity	Duration	Scope	Assessment of potential impacts
PRE-CONSTRUCTION STAGE							
Clearing of Vegetation/ Trees	Expansion with modernization Brownfield Greenfield	Biodiversity (both flora and fauna), GHG emission, soil erosion, etc.	Loss of top soil, disturbance to landscape, land degradation and visual impacts. Loss of floral and faunal species namely birds (avifauna) as their habitat may get disturbed along with the felling of trees.	*Low*	Short	Local	Minor
Levelling of ground surface	Expansion with modernization Brownfield Greenfield	Fugitive emission of dust; Soil erosion; Air pollution from vehicles	Loss of top soil, disturbance to landscape, land degradation and visual impacts.	*Moderate*	Permanent change	Local	Minor
Setting up of construction camp for labour/ worker	Modernization Expansion with modernization Brownfield Greenfield	Water and Land contamination; Occupational Safety & Health Aspects	Water and land may get contaminated from sewerage disposal at the camp site. COVID-19 pandemic could lead to health issues among labourers.	*High*	Until construction is over	Local	Major due to COVID-19 risks

Operation of Machinery & Equipment	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational Safety & Health Aspects Air pollution Noise Pollution	Operation of heavy earth equipment and movement of dumpers pose hazards to workers. Vehicular emission from use ofdiesel.	*Low*	Short	Local	Minor
Raw materials Transportation	Modernization Expansion with modernization Brownfield Greenfield	Air Quality & GHG emissions Siltation due to fine particles and choking of surface channels.	Generation of fugitive dust and exhaust gas emissions from haulage trucks. Loss of precious soil and siltation of surface channels.	*Moderate*	*Short*	*Local*	*Minor*
CONSTRUCTION STAGE							
Building Muck-Debris generation during construction activities	Expansion with modernization Brownfield Greenfield	Generation of construction and solid wastes	Debris generated from construction work may cause significant impact to the surrounding environment like contamination of waterbody, soil if not managed properly	*Moderate*	Short	Local	Mediu m
DG Operation during construction	Modernization Expansion with modernization	Hazardous waste generation Noise pollution Air emission	Operation of DG sets could lead to generation of spent oil (residual oil); spillage of diesel.	*Moderate*	Short	Local	Mediu m

	Brownfield Greenfield		Generation of noise Air emission from DG sets				
Abstraction of Water for construction	Modernization Expansion with modernization Brownfield Greenfield	Water scarcity	Water abstraction due to construction work may lead to water scarcity in the nearby area	*High*	Short	Local	Major at facilities located at drought prone region
Handling of waste	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Solid Waste Management	During construction phase there may be generation of both hazardous and non-hazardous waste which needs to be carefully handled to ensure environment safeguard	*Moderate*	Short	Local	Medium
Labour management	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational Health and Safety accidents and injuries Child labour and forced labour	Accidents and injuries could happen to people at site during construction; Child labour could be engaged by the contractor; Forced labour can occur when people are asked to work beyond the hours agreed to without additional pay. Forced labour can also	*Moderate*	*Short*	*Local*	*Medium*

			occur when people are asked to work on holidays and/or weekend and are deprived of their rest (without additional pay).				
OPERATION STAGE							
Processing operations, Packing materials, packed food stuffs	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Municipal solid wastes comprising of bio-degradable & non-biodegradable wastes (plastic-polyethene, vegetable –food waste)	*Aesthetics and visuals, odour generation and littering, soil contamination.*	*Moderate*	*Short*	Local	Minor
Green Belt-Digging of pits and ground preparation with manure and fertilisers doses and watering	Modernization Expansion with modernization Brownfield Greenfield	Spillage of soil and manure or fertilisers around	*Soil loss and loss of naturalresources.* *After the green belt is developed fully it shall act as barrier to dust particulates, suppressing noise, and shall act as habitat for avian species.* *This also shall improve aesthetics and visuals.* *The green belt shall also attract avifauna soon to adopt it as new habitat.*	*Moderate*	*Short*	Local	Minor

Water-Quantity required for drinking and preparation of cement mortar and curing purposes and drawn from existing borewells (ground water)	Modernization Expansion with modernization Brownfield Greenfield	Abstraction of water in quantity additional to existing requirement	*Spillages and generation of sewage due to workers employed in addition to existing workers and during watering of green belt and for dust suppression measures.* *The surface water sources or quantity shall not be impacted because there is no surface water body around the location.*	*Moderate*	*Short*	*Loca l*	*Minor*
Machine and equipment operations	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	The machinery and equipment pose safety hazards and also, they are exposed to severe noise and safety hazards of being hit by moving machinery and fall from cabin to the ground. Also, health aspects such as exposure to fugitive dust may cause serious breathing troubles and lung related ailments.	*Noise Pollution, occupational Safety & Health Aspects are of major concern*	*Moderate*	*Short*	Local	Minor

Operation of equipment and movement of logistics trucks and vehicles	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Noise and GHG emissions due to vehicle exhaust gases.	*The indoor workers may be exposed to excessive noise while the ambient noise levels in the open yard may rise due to cumulative addition of noise which may extend into the neighbourhood.*	*Moderate*	*Short*	Local	Minor
Solid Wastes	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Generation of process waste (waste fruits, dressings), waste carton, plastic, polyethene, metallicwastes etc.	*Littering due process waste and, municipal solid wastes due to workers and packing materials*	*Moderate*	*Short*	Local	Minor
Process waste water and Sewage/ Septage	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Generation of flushed hot wastewater from fruit washing containing dosage of fungicide 'sodium hypochlorite, sewage in addition to existing levels due to additional workers etc	*Deterioration of ground water quality and workers-community health aspects.* *Potential situation for breeding of water borne diseases*	*Moderate*	*Short*	Local	Mediu m
Generation & disposal of spentisotopes	Additional radiation dosage	Air, soil, ground water, biology (human, flora and fauna)	*Being Hazardous (Radioactive waste) waste, it has potential of emitting harmful radiations which may*	*Low*	*Short*	Local	Minor

			induce injuries to humans, flora and faunal species which may be of fatal in nature				
Exposure to severe noise, thermal injuries, harmful radiations and body injuries	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational safety and Health Aspects	*The machinery and equipment pose safety hazards and also, they are exposed to harmful radiations, noise and thermal hazards due to various mechanised and hot waterrelated aspects*	*Low*	*Short*	Local	Minor
Hazardous Wastes involving spent batteries, waste lube oils and greases	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational safety and Health concerning fire and contamination threats.	*The disused batteries, waste oil etc are flammable and contain injurious acid contents also cause allergic reactions which may cause nausea and other ailments.*	*Moderate*	*Short*	Local	Minor
Domestic Hazardous waste such as sanitary napkins	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Domestic Hazardous waste generation, handling, treatment and disposal	*As facilities hire women labours comprising 90% of the total strength, there could be possibility of sanitary napkins be disposed at the facilities*	*Moderate*	*Short*	Local	Minor

*Type of facility:

Modernization: Facility Centre in Karmad and Ardhapur, and export facility centre in Latur

Additional radiation dosage: IFC in Thane

Expansion with modernization: VPF and VHT Centres in Thane, export facility centres in Mohadi, Kalvan, Chandwad, Jalna, Savda, Karanja Ghadge, Baramati, Talegaon, Warud, Sangli and modern facility centre in Chandur railway

Brownfield: additional facility in Beed, new facility centre in Baramati and new training facility at NIPHT

Greenfield: Fruits and Vegetable Handling Facility Centre in Pachod

170. **Use of Isotopes (Cobalt-60) and associated Risk:** A detailed environmental due diligence report (EDDR) has been prepared to understand the risk of using radioactive isotope(i.e. Cobalt-60) at the IFC facility of MSAMB and as report has been prepared. As per the detailed report, following points stands factual and has been substantiated in the report. The report has been appended to this document as Appendix 12[30].

(i) It is proposed that the IFC unit will increase the Cobalt dosage for irradiating horticultural crops to achieve microbial decontamination, delaying of ripening and enhancing shelf-life of the crops. There is no other treatment carried out in the unit. The unit is completely dedicated for Irradiation of Crops and other items.

(ii) The total capacity of the irradiation facility is 500 kCi, the current installed strength is 300 kCi. MSAMB will enhance the strength by additionally procuring 300 kCi.

(iii) The facility has been established with approval from The Atomic Energy Regulatory Board (AERB) of Department of Atomic Energy (DAE) and National Plant Protection Organization (NPPO) Government of India. The United State Department of Agriculture - Animal and Plant Health Inspection Services (USDA-APHIS) has accredited the facility for export of mangoes and pomegranate to United States of America. The facility has been accredited by Authorities of Australia Government for export of mangoes to Australia in 2017 as well.

(iv) The irradiation process as described in the EDDR is fully automated, protectedwith layers of physical protection as well as performing various checks and balances.

(v) The production, transportation, installation, replacement, maintenance, dismantling, and disposal of the Cobalt-60 isotope pencils are theresponsibility of Board of Radiation & Isotope Technology (BRIT). BRIT is an Industrial Unit of Department of Atomic Energy (DAE), Government of India, and regulated by Atomic Energy Regulatory Board (AERB), Govt. of India. BRITis the only licensed unit that has the authority to produce Cobalt-60 pencils usedfor irradiation. There are only 22 such facilities in India that uses Co-60 for irradiation of food, spices, and medical articles/ items.

(vi) The IFC unit of MSAMB is only authorised to use the Co-60 pencils for

[30] Draft Environmental Due Diligence Report, Expansion and Modernization of Irradiation Facility Centre (IFC) atThane District, May 2021

irradiation of certain food articles. Thus, there involvement is only restricted to operation of the plant. Rest is all bestowed on BRIT, and BRIT performs quarterly checks across all its function as well as at the units.

(vii) Physical safety measures:

- **Safety door interlock.** Safety interlocks is fail-safe design. It is designed to avoid personnel exposure to high radiation levels either bypreventing entry to the hazardous area or by automatically shutting down the radioactive hazard. The system controls access to the radiation protection areas and monitors safety devices. Only if all the radiation safety conditions are satisfied, then the facility will be permittedto operate.

- **Shielding of Cobalt.** In the facility, irradiators source (Cobalt-60) is stored in water pool with depths of 7-8 meters of demineralize 45,000-55,000 litres of water and resistant to corrosion. The pool has automaticreplenishment of water. Appropriate controls are provided to prevent entry of any person.

(viii) Only designated personnel are allowed to enter the irradiation area and each ofthem are provided with dosimeters to record exposure if any (read in detail Chapter 2 – Description of the Facility of the EDDR). As per AERB, the irradiation facility needs to appoint Radiological Safety Officer (RSO), and Plant Operator certified by Bhabha Atomic Research Centre (BARC). MSAMB have deployed the adequate experienced staff to operate the irradiation facility.

(ix) As Occupational Health& Safety measures, quarterly reviews of personnel health are checked and reported to AERB. Apart from radioactive exposure monitoring and evaluation, AERB also assess the morbidities for common diseases such as diabetes, respiratory diseases, cardiac diseases, anaemia, skin diseases etc. for different age groups.

(x) Record Keeping. An adequate quality assurance (QA), including appropriate quality control measures, will be established for the design and manufacture, construction, operation and industrial safety of irradiators. Records of all QA procedures will be maintained for the entire life of the irradiator.

171. As per the EDDR, following are the common risk associated with operation of irradiation process:

Table 22: Environmental Risk and Impact Matrix for Irradiation Process

Environmental Risk	Impact	Severity	Likelihood of occurrence
Radioactive source rack stuck in an unshielded position	Exposure of personnel in case they unknowingly enter the chamber	High	Low. Personnel are trained and dummy run of the operation along with preventive maintenance is frequently carried out
Radioactive contamination- (detection of leaking radioactive sources),	Contamination of source storage water pool and the entire system of water flow	Low	Low. Source is double encapsulated.
Fire, explosion or gas leakages inside the accelerator equipment area, radiation cell or product storage area	Mass scale damage into the facility and exposure to radioactive material	High	Low. Continuous check and preventive maintenance are carried out by the trained staff. Additionally,there are regular third-party inspection by BARC and AERB. Apart from this the thick wall of the chamber is fire and water proofed.
Loss of source shielding (e.g. very low water level in the gamma radiation processing facility or GRAPF)	Leading to no or low shielding	Low	Low. Auto refilling system is installed and is regularly calibrated to check performance.
Malfunctioning or deliberate failure of the safety interlock systems and access control systems, breach of security.	Exposure of personnel and or loss of radioactive material	Low	Low. All operating personnel are well guarded and all locks are system operated with layers of access controls. Thus, difficult to manipulate.
Accidental radiation exposure of individual(s) in excess of dose limits	Leading exposure of personnel	Medium	Low. Each individual is aware of ill-effects, and protocols are in place.
Natural occurrences such as earthquake, flood, tornadoes, etc.	Leading exposure of personnel	Low	Low. Facility location, layout and design plans, have been approved by AERB after keeping buffer capacity.
Transportation of Cobalt-60 pencils and risk associated	Leading exposure of personnel and masses	High	Not applicable for MSAMB as the transportation does not come underthe purview of the facility. It is

Environmental Risk	Impact	Severity	Likelihood of occurrence
Disposal of Cobalt-60 pencils and risk associated			the responsibility of BRIT (the producer) and they follow the pre-set guidelines, laws and regulation without fail.

172. As it is seen above, the risk of use of radioactive isotope is considered to be Low and therefore “trivial” and “adequately shielded”. This is possible as each and every step of using radioactive material is strictly guided by country’s laws and regulations and closely monitored by relevant authorities and regulatory boards. Also, use of the Cobalt-60 for food irradiation is regular practice as per International Atomic Energy Agency (IAEA) guidelines.

173. Appendix 5 of the SPS prohibits the trade of radioactive materials under ADB financedprojects. However, it allows the purchase of equipment for use of radioactive material if the radioactive source is “trivial” and “adequately shielded”. In line with this, the inclusion of the irradiation facility can be included under ADB financing provided that the radioactive source is trivial and adequately shielded. The following paragraphs demonstrate that the irradiation facility meets both these requirements.

iii) **Radioactive source is trivial.** Criteria for fulfilling the requirement of trivial that have been considered under the project are: i) the quantities of Cobalt-60 to be procured and usedin the facility; ii) whether the use of cobalt 60 for food irradiation is novel or a regular practice; iii) existence of peer reviewed literature on the risks associated with irradiation using Cobalt- 60; and iv) demonstration that the project will follow international good practices and standards.The following paragraphs elaborate on how the project fulfils the four criteria.

(i) *The quantities of Cobalt 60 to be procured and used in the facility.* Approximately 300 kCi of Cobalt-60 will be procured from the Board of Radiation Isotope and Technology (BRIT). However, this will be financed under the government procurement and not through the ADB loan. This is a small amount of Cobalt-60 which will be used exclusively for the IFC, and its half-life is around over a period of 2-3 years[31]. The total capacity of the irradiation facility is 500 kCi.

(ii) *Whether the use of Cobalt-60 for food irradiation is novel or a regular practice.*After many years of research and the development of domestic and international standards, more than 60 countries worldwide have regulations

[31]p.50. https://mofpi.nic.in/sites/default/files/RPP-TECDOC.pdf.pdf

allowing the use of irradiation for one or more food products. The use of Cobalt-60 for food irradiation is regular practice as per IAEA guidelines. Irradiation has become widely accepted as a proven and effective post-harvest treatment to reduce bacterial contamination, slow spoilage and maintain food quality. The IFC in Vashi will increase the Cobalt dosage for irradiating horticultural crops to achieve microbial decontamination, delaying of sprouting and enhancing shelf-life. The post-harvest facility will use Cobalt-60 for gamma irradiation treatment of mangoes, spices, onions, potatoes, pet food processing and other value addition in order to meet the export requirements and of the agriculture produce.

(iii) *Existence of peer reviewed literature on the risks associated with irradiation using Cobalt-60.* There are several articles and documents that show that foodirradiation in general and food irradiation using Cobalt-60 gamma rays in particular have minimal health risks. Studies conducted on the nutrient contentand quality of radiated crops and food products show that the change in ingredients and contents of food products is negligible. The increased shelf life of the food products is known to bring substantial social and economic benefits. Weblinks to articles and documents on the safety of irradiated food products are listed below:

- https://apps.who.int/iris/bitstream/handle/10665/39463/9241561629-eng.pdf?sequence=4&isAllowed=y
- https://www.fda.gov/food/buy-store-serve-safe-food/food-irradiation-what-you-need-know
- https://www.iaea.org/topics/food-irradiation
- https://www.iaea.org/publications/10801/manual-of-good-practice-in-food-irradiation
- https://ec.europa.eu/food/safety/biosafety/irradiation/legislation_en
- https://academic.oup.com/cid/article/33/3/376/278043
- https://www.mcgill.ca/oss/article/health-you-asked/food-irradiation-dangerous
- https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/cobalt-60

(iv) *Demonstration that the project will follow international good practices and standards.* The IFC in Vashi has been accredited by a number of government agencies from export market countries such as the USDA – APHIS and the Government of Australia, NPPO's National Standard for Phytosanitary Measures (NSPM-21). It is also compliant with national policies and standards under the Government of India as shown below:

- Accreditation from USDA-APHIS.
- Accreditation from Govt. of Australia.
- NPPO's National Standard for Phytosanitary Measures (NSPM-21)
- Dosimetry and technical evaluation as per American Society for Testing

Materials (ASTM) standards.

- Food Irradiation as per DAE Food Rule 2012.
- Accredited and followed the standards Food Safety and Standards Authority of India (FSSAI)[32].
- Operation and maintenance of facility as per AERBs Safety codes with License of Operation.
- Food Irradiation as per DAE Food Rule with License of Food Irradiation.

174. **The radioactive source is adequately shielded**. Criteria for fulfilling the requirementon the radio active source being adequately "shielded" that have been considered under the project are: i) the type of packaging and shielding material used and their effectiveness in shielding handlers from radiation; ii) existence of capacity and best practice standards/ regulations within the project/government agency to safely handle the Cobalt-60 and equipment throughout the supply chain. The following paragraphs show compliance with thesetwo criteria:

(i) Type of packaging and shielding material used and their effectiveness inshielding handlers from radiation.

- *Safety interlocks*. As discussed before, is fail-safe design and used to avoid personnel exposure to high radiation levels. The system controlsaccess to the radiation protection areas and monitors safety devices.
- *Shielding of Cobalt-60*. Radioactive source is stored in water pool with depths of 7-8 meters of demineralize 45,000-55,000 litres of water and resistant to corrosion.

(ii) Existence of capacity and best practice standards/regulations within the project/government agency to safely handle the Cobalt-60 and equipment throughout the supply chain.

- *Monitoring ionization radiation exposures*. Dosimetry monitoring is the practice of wearing personal radiation measurement badges (dosimeters) to measure the amount of dose exposure. These badges provide readings about the dose of ionizing radiation an individual receives. Dose measurements and history are captured and stored. Personal monitoring is carried out by employers to evaluate the level ofexposure of their workers to hazardous materials in the workplace. It isa quantitative evaluation that consists of measuring the hazard throughpersonal monitoring and/or sampling. For this exercise, MSAMB have annual contract with AERB approved laboratory in Mumbai. The reports are generated quarterly basis and reported to the AERB with Quarterly Safety

[32] Established under the Ministry of Health & Family Welfare, the FSSAI has been established under the Food Safety and Standards Act, 2006, which is a consolidating statute related to food safety and regulation in India.

Status Report periodically.

- *Record Keeping***.** An adequate quality assurance (QA), including appropriate quality control measures, will be established for the design and manufacture, construction, operation and industrial safety of irradiators. Records of all QA procedures will be maintained for the entire life of the irradiator.
- *Trained Staff*. As per AERB, the irradiation facility needs to appoint Radiological Safety Officer (RSO), and Plant Operator certified by Bhabha Atomic Research Centre (BARC). MSAMB have deployed the adequate experienced staff to operate the irradiation facility.

175. **Environmental risks and corrective actions in the IFC facility in Vashi.** The EDDRis provided as Appendix12, and it was found that the facilities mostly comply with relevant national and international regulations and standards. However, some corrective actions and areas for improvement were identified. These are provided in the corrective actions Table 26 in chapter 7.

176. **Mitigation of COVID-19 risks in Addition to routine environmental impacts:** It is assumed that the threat due the pandemic infection of COVID-19 shall remain until the construction stage of the MSAMB. In view of this, it is of utmost importance to follow the Ministry of Health & Family Welfare Directorate General of Health Services Guidelines on preventive measures against the spread of COVID-19 infections in the workplace settings. Though the construction site will be within the MSAMB premises and limited workers, it is essential to follow the guidelines issued by the ministry. The details regarding the guidelines may be seen at the website[33] for reference and copy of it shall be made available in locallanguage at the work site and for the staff of MSAMB facilities.

177. Clauses for inclusion in Civil Works Contracts adapted from approved project byMinistry of Health and Family Welfare (MoHFW), GoI are as follow:

(i) Clauses already part of contract/bidding documents being used need not be duplicated.

(ii) The primary/main contractor will be responsible for ensuring these, even if oneor more sub-contractors are used for completing the civil works.

(iii) The contractor to put in place measures to avoid or minimize the spread of thetransmission of COVID-19 and/or any communicable diseases that may be associated with the influx of temporary or permanent contract-related labour.

---

[33] https://www.mohfw.gov.in/pdf/GuidelinesformanagementofcoinfectionofCOVID19withotherseasonalepidemicprone diseases.pdf

(iv) Any suspect case of COVID19 should be tested as per the national/state guidelines issued by the Health and Family Welfare Ministry/Departments and precautions/protocol to be followed for the infected worker and his/her co-workers.

(v) General Obligations of the Contractor

- To take all necessary precautions to maintain the health and safety of the Contractor's Personnel.

- To depute a health and safety officer at site, who will have the authorityto issue directives for the purpose of maintaining the health and safety of all personnel authorized to enter and or work on the site and to take protective measures to prevent accidents, including spread of COVID19.

- To ensure, in collaboration with local health authorities, access tomedical help, first aid and ambulance services are available for workers/labours, as and when needed.

- Provide health and safety training/orientation on COVID19 to all workers and staff and other employees of the sub-contractor (tips on cough etiquette, hand hygiene and social distancing).

- Prepare a detailed profile of the project work force, key work activities, schedule for carrying out such activities, different durations of contract and rotations, confirmed addresses of the labour and any underlying health conditions that increases the risk of severe infection, to facilitatetracking of workers in case of COVID-19 exposure.

- All labourers to be provided with photo ID cards for accessing the construction site.

- All labourers engaged at construction site to be provided with the required Personal Protection Equipment (PPE) – safety helmet and shoes, secured harness when working at heights, electrical gloves, eye protection for welding etc., without which entry to the construction site shall not be allowed.
- In relation to COVID19, masks, adequate hand washing/ sanitization, clean drinking water and sanitation facilities to be provided at construction site.

- All workers/labour to be regularly checked for symptoms before allowing entry to the work site.

- Paid leave to be mandatorily given if labour contacts COVID-19 and/or

any other contagious disease while working at the construction site or in the labour camp.

(vi) For Labour Camp

- Contractor to provide hygienic living conditions and safe drinking water.

- Separate toilets for male and females and adequate hand washing/sanitization facilities.

- Monthly/weekly health check up to be organized at the camp for all labours/family.

- Organize awareness campaign for social distancing and general health and hygiene.

(vii) Construction Management in Upgrading of Existing Facilities

- Maintain a roster of workers/staff at work site indicating their health condition and symptoms and ensure screening procedures (non- physical temperature measurement) at work sites.

- Depute and assign monitoring and reporting responsibilities on environmental management, health and personnel safety.

- Preventing a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or (if that is not possible) isolating such worker for 14 days.

- Place posters and signages at/around the site, with images and text in local languages relating to personal safety, hygiene and on COVID-19 symptoms and guidelines.

- Ensuring handwashing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout site,including at entrances/exits to work areas; where there is a toilet, canteen or food distribution, or provision of drinking water; in worker accommodation; at waste stations; at stores; and in common spaces.

- Segregate lunch hours at worksite of workers to maintain social distancing.

- Securing the construction site with entry only for authorized personnel and disinfecting of the worksite to be undertaken at close of work everyday or as

may be required.

- Any medical waste produced during the care of ill workers should be collected safely in designated containers or bags and treated and disposed of following relevant requirements (e.g., Biomedical WasteRules-2018, WHO).

Table 23: Precautions to be taken during Operation of Facilities

DO's	DON'T's
To maintain personal hygiene and physical distancing.	Shake hands
To practice frequent hand washing. Wash hands with soap and water or use alcohol-based hand rub. Wash hands evenif they are visibly clean.	Have a close contact with anyone, if you're experiencing cough andfever.
To cover your nose and mouth with handkerchief/tissue while sneezing and coughing.	Touch your eyes, nose and mouth.
To throw used tissues into closed bins immediately afteruse.	Sneeze or cough into palms of yourhands.
To maintain a safe distance from persons during interaction, especially with those having flu-like symptoms.	Spit in Public.
To sneeze in the inner side of your elbow and not to coughinto the palms of your hands.	Participate in large gatherings, including sitting in groups at canteens.
To take their temperature regularly and check for respiratorysymptoms.	
To see a doctor if you feel unwell (fever, difficulty in breathing and coughing). While visiting doctor, wear amask/cloth to cover your mouth	
For any fever/flu-like signs/symptoms, please call Statehelpline number.	
Self-monitoring of health by all and reporting any illness atthe earliest	

Table 24: Guidelines for cleaning toilets for use of Staff and Workers

Areas	Agents / Toilet cleaner	Procedure
Toilet pot/ commode	Sodium hypochlorite 1% (equivalent to 10,000 ppm)/detergent Soap powder / long handle angular brush	• Inside of toilet pot/commode: • Scrub with the recommended agents and the long handle angular brush. • Outside: clean with recommended agents;use a scrubber.
Lid/ commode	Nylon scrubber and soap powder/detergent 1% Sodium Hypochlorite	• Wet and scrub with soap powder and nylon scrubber inside and outside. • Wipe with 1% Sodium Hypochlorite

Areas	Agents / Toilet cleaner	Procedure
Toilet floor	Soap powder /detergent and scrubbing brush/ nylon broom 1% Sodium Hypochlorite	• Scrub floor with soap powder and thescrubbing brush • Wash with water • Use sodium hypochlorite1% dilution
Sink	Soap powder / detergent andnylon scrubber 1% Sodium Hypochlorite	• Scrub with the nylon scrubber. • Wipe with 1% sodium hypochlorite
Showers area / Taps and fittings	Warm water Detergent powderNylon Scrubber 1% Sodium Hypochlorite/ 70% alcohol	• Thoroughly scrub the floors/tiles with warm water and detergent • Wipe over taps and fittings with a damp cloth and detergent. • Care should be taken to clean the undersideof taps and fittings. • Wipe with 1% sodium hypochlorite/ 70% alcohol
Soap dispensers	Detergent and water	• Should be cleaned daily with detergent and water and dried.

VI. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

178. The EMP contains the arrangements on the implementation of mitigation measures,monitoring program, cost estimates, and institutional set-up to ensure that no significant adverse impacts results from the proposed projects. The plan covers the pre-construction, construction and operations stages. The basic objectives of the EMP are to:

(i) establish the roles and responsibilities of all parties involved in the project's environmental management;
(ii) ensure implementation of recommended actions aimed at environmental management and its enhancement; and
(iii) ensure that the environment and its surrounding areas are protected and developed to meet the needs of the local communities including other stakeholders and safeguard and the interests of the common people.

179. The table below is the EMP for the proposed facility

Table 25: EMP for the Facilities Proposed for Expansion and or Modernization

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
PRE-CONSTRUCTION STAGE					
Clearing ofVegetation/ Trees	Expansion with modernization Brownfield Greenfield	Biodiversity (both flora and fauna) GHG emission Soil erosion	Loss of topsoil, disturbance to landscape, land degradation and visual impacts. Loss of floral and faunal species such as birds (avifauna) as their habitat may get disturbed along with the fellingof trees.	Compensatory plantation at project site for development ofgreen-belt. Grass turfing to avoid soil erosion once construction work is over	EPC contractor toimplement PIU to monitor
Levelling ofground surface	Expansion with modernization BrownfieldGreenfield	Fugitive emission ofdust Soil erosion Air pollution from vehicles	Loss of top soil, disturbance to landscape, land degradation and visual impacts.	Ensure that the construction activity immediately starts just aftersite clearing to avoid soil erosion Regular spraying of water over the working areas to avoid fugitive dust emission Stacking soil and other raw materials at designated places within the work site and fully covered with tarpaulins all the time	EPC contractor to implement PIU to monitor

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
				Vehicles should have pollution under control (PUC) certificate	
Setting up of construction camp for labour/worker	Modernization Expansion with modernization Brownfield Greenfield	Water and land contamination Occupational safety and health risks	Water and land may get contaminated from sewerage disposal at the camp site. COVID-19 pandemic couldlead to health issues among labourers.	Hiring of local labours/workers to the maximumextent possible Provision of toilets/septic tanks and adequate drainage to ensure that discharge doesn't contaminate nearby environment All COVID-19 safeguards tobe followed	EPC contractor to implement PIU to monitor

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Operation of Machinery & Equipment	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational safety and health risks Air pollution Noise Pollution	Operation of heavy earth equipment and movement of dumpers pose hazards to workers. Vehicular emission fromuse of diesel.	Vehicle carrying raw material should be covered with tarpaulin sheet to prevent dust generation Water sprinklingto prevent fugitive dust from working sites, haul/access roads Vehicles / equipment used should have valid PUC certificate Provision of temporary noise barrier in working area	EPC contractor to implement PIU to monitor
Raw materials Transportation	Modernization Expansion with modernization BrownfieldGreenfield	Air Quality &GHG emissions Siltation due to fine particles and choking ofsurface channels.	Generation of fugitive dust andexhaust gas emissions from haulage trucks. Loss of precious soil and siltation of surfacechannels.	Covering the trucks carrying raw materials with tarpaulins during their movement from source to site.	EPC contractor to implement. PIU to monitor

Scope of Works and/or Activities	Type of Facility*	Environmental Components or Issues	Description of the Environmental Impacts	Mitigation Measures	Supervision/ Responsibility
CONSTRUCTION STAGE					
Building muck-debris generation during construction activities	Expansion with modernization Brownfield Greenfield	Generation of construction and solid wastes	Debris generated from construction work may cause significant impact to the surrounding environment like contamination of waterbody, soil if not managed properly	Preparation of **muck disposal**[34] **plan** to assess the quantitative load of wastes to be generated and reusing it during land and level filling operations for foundation preparation. Excess quantity if any may be tried to be used in landscaping. The topsoil preserved earlier shall be used in spreading a layer over the landscaped surface and in green belt development.	EPC contractor to implement PIU to monitor

[34] Please refer to Appendix 10 on Guidance for Preparation of Muck Disposal Plan

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
DG operation during construction	Modernization Expansion with modernization Brownfield Greenfield	Hazardous waste generation Noise pollution Air emission	Operation of DGsets could lead to generation of spent oil (residual oil); spillage of diesel. Generation of noise Air emission from DG sets	The diesel should be stored in designated paved area Any accidental spill should be cleaned immediately Hazardous used oil generated from DG set must be temporarily stored in impermeable container before disposal through approved entity Acoustic enclosure should be provided for the DG set DG Set should have valid PUC certificate	EPC contractor toimplement PIU to monitor

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Abstraction of Water forconstruction	Modernization Expansion with modernization Brownfield Greenfield	Water resourcescarcity	Water abstraction due to construction work may lead to water scarcityin the nearby area	Effort should be given to avoid usage of ground water to the maximum extentpossible Surface water/recycled STP water should be usedin construction In case Ground water or surface water is tapped for the project, necessary permission from Central Ground Water Authority(CGWA) or Irrigation Department respectively The existing toilet facility shall be extended to the construction workers and the sewage or septage generated shall be discharged into soak pits for the purpose. It shall be ensuredthat the bottom of the soak pits shall be always minimum 2 meters above the local ground water table in all seasons.	EPC contractor toimplement PIU to monitor

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Handling of waste	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Solid Waste Management	During construction phase there may be generation of both hazardous and non-hazardous waste which needs to be carefully handled to ensure environment safeguard	Segregation of waste (hazardous and non-hazardous) should be properly done atsource Adequate dustbin should be provided in Labour camps and other suitable areas The hazardous waste should be disposed of through authorized vendor only Non-hazardous waste should bedisposed of in a designated site or thorough authorized vendor Regular clearing/disposal of organic waste generated from worker camp to be ensured.	EPC contractor toimplement PIU to monitor

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Labour management	Additional radiation dosage Modernization Expansion with modernization BrownfieldGreenfield	Occupational health and safety accidents and injuries Child labourand forced labour	Accidents and injuries could happen to people at site during construction; Child labour could be engaged by thecontractor; Forced labour can occur whenpeople are asked to work beyond the hours agreed to without additional pay. Forced labour can also occur when people are asked to work on holidays and/or weekend and are deprived of their rest (without additional pay).	Provision of adequate personal protective equipment like safety helmets, face masks, safety shoes, safety goggles etc. for the safety ofworkers The excavated area should be provided with a visible boundary to ensure safetyat site Training shall be imparted to workers on occupational safety and technical aspects of job undertaken by them Provision of first aid kit and COVID-19 kit should be madefor all Workers should be given basic training on environment, hygiene and disease prevention to ensure not to cause any impact to natural resources like felling of shrubs/trees for fuel, open defecation etc.	EPC contractor to implement; PIU to monitor PMU to provide training

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
				No child labour/forced labour should be used Orientation on labour standards and terms of employment are made clear to workers as part of onboarding workers, along with HR briefing.	

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
OPERATION STAGE					
Processing operations, Packing materials, packed food stuffs	Additional radiation dosage Modernization Expansion with modernization BrownfieldGreenfield	Solid wastespollution	Aesthetics and visuals, pungentodour generation, littering and soil contamination Municipal solid wastes comprising of biodegradable and non-biodegradable wastes (plastic- polyethene, vegetable –foodwaste) Proliferation of pests and vectordue to unmanaged wastes from processing, and municipal solid wastes due to workers and packing materials Generation of process waste (waste fruits, dressings), waste carton, plastic, polyethene, metallic wastesetc.	The biodegradable wastes may be composted within the facility plot area as per guidelines of gram panchayat or municipal body. The non-biodegradables may be segregated from the coloured bins provided and disposed toidentified gram panchayat or municipal sites. Install separate bins to separately collect biodegradable waste (food waste), recyclable waste (papers, cardboards, etc.), and domestic hazardous waste such as sanitary napkins and cleaning agents. Green colour bins for collection of	Facility operator to implement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
				biodegradable waste, blue colour waste for collection of recyclable wasteand black colour waste for collection of domestic hazardous waste. The bio- degradable waste should then be processed in a soil pit for generation of manure, which can be used for development of green-belt around the facility premise. Wastes should be disposed of in a designated site or thoroughauthorized vendor	
Green Belt- Digging of pits and ground preparation with manure and fertilisers doses and watering	Modernization Expansion with modernization BrownfieldGreenfield	Spillage of soiland manure orfertilisers around	Soil loss and loss of naturalresources.	The top soil removed shall be reused in development of green belt and spreading over landscaped surfaces withinthe area.	Facility operator toimplement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Abstraction of water fromexisting borewells (groundwater) in addition to existing operational requirement such as watering of green belt and for dust suppression measures	Modernization Expansion with modernization Brownfield Greenfield	Groundwater resources scarcity	Potential depletion of groundwater resources during long dryperiods Competition to other groundwater users in the immediate area	Use of rainwater harvesting technology Implementation of water use protocols	Facility operator toimplement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Machine and equipment operations	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational Safety and Health Aspects	Noise pollution, occupational Safety & Health Aspects are of major concern Machine and equipment use pose safety hazards to workers because of exposure to severe, noise Safety hazards of being hit by moving machinery and fall from cabin tothe ground. Also, health aspects such as exposure to fugitive dust may cause serious breathing troubles and lung related ailments.	The workers and staff shall be provided with necessary PPE's and the operators of noise generating machinery shallbe given mandatory restof 10-15 minutes after every 1 hour of machinery operation. The operation of hot water wash facility shall be closely monitored and the workers may be provided with thermal insulation protection wears such as aprons, thermal gloves and protective goggles. Regular occupational health and safety trainings to all workers and staff of each of the facility. Regular maintenance equipment and machines	Facility operator toimplement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Operation of equipment and movement of logistics trucks and vehicles	Additional radiation dosage Modernization Expansion with modernization BrownfieldGreenfield	Noise andGHG emissions due to vehicle exhaust gases.	The indoor workers may be exposed to excessive noise while the ambient noise levels in the open yard may rise due to cumulative addition of noise which may extend into the neighbourhood.	The workers shall be provided with personal protection equipment viz. ear plugs. The workers shall be given a periodic break from the work schedule should the noise levels monitored indicate excessive noiselevels. The noise generating machines viz. air conditioning equipment etc. for the entire facility is located outside the working area and is housed in separate chamber insulated by a wall. The outdoor noise shall beminimised by advising logistics vehicles to be regularly serviced. The same vehicles shall also be requiredto keep	Facility operator toimplement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
				certificate for compliance to exhaust emission standards.	
Water use for processing and operations, and Sewage/Septage	Additional radiation dosage Modernization Expansion with modernization BrownfieldGreenfield	Water resources Community and occupational health and safety	Deterioration of ground water quality and workers-community health aspects. Potential situation for breeding of water borne diseases	Wastewater from processing will be used for watering of green belt. Additionally, this waste hot water is basically drinking water dissolved with fungicide 'sodium hypochlorite'. Coincidently it is also recommended by MoHFW –GOI as very effective in disinfection and sanitising (in context of COVID-19 precautions) of external places. The septage from the toilets shall be discharged intothe soak pit which shall be as per the approved design by the State Pollution Control Board.	Facility operator to implement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/or Activities	Type of Facility*	Environmental Components or Issues	Description of the Environmental Impacts	Mitigation Measures	Supervision/ Responsibility
Generation & disposal of spent isotopes	Additional radiation dosage	Air, soil, ground water, biology (human, flora, and fauna)	Being Hazardous (Radioactive waste) waste, it has potential of emitting harmful radiations which may induce injuries to humans, flora and faunal species which may be of fatal in nature	The SOP's prescribed for the purpose shall be complied with by the operating staff to be careful and vigilant all the time. The spent isotopes will be disposed through the collecting team of Bhabha Atomic Research Centre (BARC), who is authorized to handle, transport, and dispose spent isotope	Facility operator to implement PIU to monitor PMU to train on safeguard requirements
Exposure to severe noise, thermal injuries, harmful radiations and body injuries	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Occupational safety and health risks	The machinery and equipment pose safety hazards. Workers are exposed to harmful radiations, noise, and thermal hazards due to various mechanised and hot water related aspects	Personal protective equipment to be provided to staff working in noise polluting environment	Facility operator to implement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
Hazardous Wastes involving spent batteries, waste lube oils and greases	Additional radiation dosage Modernization Expansion with modernization BrownfieldGreenfield	Occupational safety and health concerning fire and contamination threats.	The disused batteries, waste oil, etc are flammable and contain injurious acid contents also cause allergic reactions which may cause nausea and other ailments.	The waste lubesoils and disused batteries shall be disposed of to only the registered recyclers Register to be maintained for the record of the periodic change over as required under the Hazardous & other Wastes (Management & Transboundary Movement) Rules, 2016.	Facility operator to implement PIU to monitor PMU to train on safeguard requirements
Domestic Hazardous waste suchas sanitary napkins	Additional radiation dosage Modernization Expansion with modernization Brownfield Greenfield	Domestic Hazardous waste generation, handling, treatment and disposal	As facilities hire women labours comprising 90%of the total strength, there could be possibility of sanitary napkins be disposed at the facilities	One black bin should be keptat Women's toilet for collection of sanitary waste Each facility should install either a general electric incinerators or earthen/ clay pots 'Matka incinerator' used for incineration of sanitary napkins. If the waste is burnt in bulk amount (150-200 napkins/ day) then	Facility operator toimplement PIU to monitor PMU to train on safeguard requirements

Scope of Works and/orActivities	Type of Facility*	Environmental Components orIssues	Description of the Environmental Impacts	MitigationMeasures	Supervision/ Responsibility
				emission standards given below to be followed. If small/ clay-pot incinerators are used then the incinerator should be kept in open areas such as open backyard, open fields, and the ashes should be mixed with the soil for gardening.	

*Type of facility:
Modernization: Facility Centre in Karmad and Ardhapur, and export facility centre in LaturAdditional radiation dosage: IFC in Thane
Expansion with modernization: VPF and VHT Centres in Thane, export facility centres in Mohadi, Kalvan, Chandwad, Jalna, Savda, Karanja Ghadge, Baramati, Talegaon, Sangli and modern facilitycentre in Chandur railway
Brownfield: additional facility in Beed, new facility centre in Baramati and new training facility at NIPHTGreenfield: Fruits and Vegetable Handling Facility Centre in Pachod

180. Based on the gaps and gap filling measures identified in chapter 4 of the EDDR, the following table summarizes the key gap filling measures to be taken.

Table 26: Corrective Actions for IFC Unit

Environmental Risk	**Gap FillingMeasure**	**Responsibility**	**Budget needed**	**Timeline**
Emergency Event leading to radioactive exposure	Two mock drills per year on handling emergency/ event	MSAMB along withBRIT	INR 50,000	Twice in a year
Occupational Health and Safety and general health of Staff	To organise health awareness programs including general physical and mental health	MSAMB	INR 100,00	Once in a year
Environmental conservation	Green-belt development	MSAMB	INR 150,000	To be completed in a year's time
Solid Waste Disposal – Waste segregated at source	Provision of colour-coded waste collection bins (3 colours x 3 sets; 1 set at processing hall, 1 set at sorting/receiving point, 1 set at the workers rest place outside the processing hall) say INR. 3000/- per set x3= INR.9000/≈ say INR.10000/=	MSAMB	INR 100,00	To be completed in a year's time

181. The progress on implementation of these measures will be monitored by the PMU andincluded in the environmental monitoring reports to be prepared for the project and submitted to ADB.

Table 27: Environmental monitoring plan for MSAMB Facility

Environmental Aspect	**Monitoring Location**	**Monitoring Parameters**	**Frequency**	**Responsibility**	**Cost**	**Source of fund**	**Testing Standard to be Followed**
Noise Level both (ambient conditions and indoors near workers position)	1) At each facility, out door, in open space adjoining to construction site and existing building. 2) At nearby houses-2 locations which are at least 500 meters apart 3) At any other sensitive locations, which may have impact such as schools, places of religious worship, etc.	Ambient Noise Level decibels, dB(A) and indoor noise levels	once every quarter during pre-construction, construction and operation stages	EPC Contractor during construction period Facility Operator during operational phase	To be borne by EPC and facility operator	Inclusive in Bidding Cost Operational costs	(National Ambient Air Quality Standards (NAAQ) standards 2009
Air Quality	4) Near premises gatelocation 5) At nearby houses-2 locations which are at least 500 meters apart 6) At any other location which may have impact such as school, places of religious worship, etc	particulate Matter-(PM_{10} $PM_{2.5}$ SO_2 NO_x, and CO)	once every quarter during pre-construction, construction, and operation stages	EPC Contractor during construction period Facility Operator during operational phase	To be borne by EPC and facility operator	Inclusive in Bidding Cost Operational costs	NAAQ standards 2009

Environmental Aspect	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Cost	Source of fund	Testing Standard to be Followed
Fugitive Dust	Hauling Trucks and Dumpers	Cover of Tarpaulin or similar Sheet extending over entire back load of Hauling trucks and Dumpers carrying raw materials and debris	Once every month during pre-construction and construction stage	EPC Contractor	To be borne by EPC	Inclusive in Bidding Cost	As prescribed by Road Transport Authority (RTO) and checked by local traffic police for compliance to avoiding over loading and speeding and avoiding blowing of pressure horns in habituated patches. Also, compliance applicable PUC (Pollution Under Control Certificate) validated throughout the activities.
Discharged water from soak pit	At the outlet of soak pit from where the water is being discharged	Outdoor water may be used for bathing (class B) Total Coliforms Organism MPN/100ml shall be500 or less pH - between 6.5	once every quarter at operation stages	Facility Operator	To be borne by facility operator	To be included in operational budget	Designated Best Use Water QualityCriteria by Central Pollution Control Board

Environmental Aspect	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Cost	Source of fund	Testing Standard to be Followed
		and 8.5 Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20C3mg/l or less					
Drinking Water	At drinking Water sourcesuch as Public Tap, Bore well or individual source	Drinking water Quality Parameters	once every quarter during pre-construction, construction, and operation stages	EPC Contractor during construction period and Facility Operator during operational phase	To be borne byEPC	Inclusive in Bidding Cost	Drinking Water - Bureau of Indian Standards (BIS) - 10500

A. Budgetary Cost Provision of EMP Implementation

182. The budgetary cost for the implementation of EMP is as follows:

Table 28: Budgetary costs for implementation of EMP

Sr. no.	Element	Environmental Management Measure	Cost/Expenditure INR, 000' per individual facility	
			Recurring/per annum	One (Initial) Time
1	Solid Waste Disposal – Waste segregated at source	Provision of color-coded waste collection bins (3 colours x 3 sets; 1 set at processing hall, 1 set at sorting/receiving point, 1 set at the workers rest place outside the processing hall) say INR. 3000/- per set x3= INR.9000/≈ sayINR.10000/=	20	100
2	Biology-Flora –Green-belt development	Development of tree lining or Green Belt along Periphery with recommended (or CPCB) floral species, for dust suppressing and noise abetment characteristics quantity of manure etc. on lumpsum basis etc. The belt can be watered using wastewater from the facilities of appropriate quality.	10	40
3	HealthSafety and	Provision of Personal Protective Equipment(PPE)- *to be provided by the contractor*	10	
4	Training	Annual training	10	
5	Incinerator	Installation of incinerator for disposal ofsanitary napkins		10
6	Environmental Monotiling Cost		100	
7	Disposal of Hazardous waste		10	

Sr. no.	Element	Environmental Management Measure	Cost/Expenditure INR, 000' per individual facility	
			Recurring/per annum	One (Initial) Time
8	Maintenance of soak pit		10	
9	Rainwater Harvesting			100
10	Stormwater drainage system			100
11	Public awareness	7 of IEC material- posters,	-	50
12	Awareness on HIV/AIDS in construction site	Training and awareness at construction site through posters, film screening, peer group education	20	-
13	Workshops ongender sensitization	For the staff of PIU and facility	20	-
14	Training of FPOs on gender sensitization	To be done either by external gender expertsor by the training agency	30	-
15	Grievance Redressal Mechanism	A dedicated phone number (in addition to the hotline), at the division level	2	-
16		Complaint boxes at the facility		10
17		Sub Total for individual facilities	242	410
18		Grand Total for all 21 facilities	INR 5082	INR 8610
Corrective actions for IFC, Vashi				
19	Mock drills atIFC Unit only	Two mock drills per year on handling emergency/ event in presence of BRIT and other relevant authorities		INR 50

Sr. no.	Element	Environmental Management Measure	Cost/Expenditure INR, 000' per individual facility	
			Recurring/per annum	One (Initial) Time
20	Health awareness programs	For all MSAMB staff across the units and HQ		INR 100

IEE Budget for MAGNET Project	=INR 1,31,90,652

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

183. MSAMB, in consultation with the respective PIUs, has organised public consultation forall stakeholders' groups, which included i) people near the target areas; ii) affected persons ifany; iii) concerned FPO/CMRCs; iv) MSAMB staff. Due to COVID-19 situation, consultations were held using online platforms such as Microsoft Meet. The relevant stakeholders were informed well before the actual date of consultation, via email and other verbal means, using both vernacular and official language. In the State of Maharashtra, Marathi is considered as the language of the State (as it is spoken by the native people of the State) and Hindi and English are the official languages for communication. The consultation notices were also put up at the respective project sites, regional offices and at main office of MSAMB at Pune. All participants joined via phone and broadband services and presentations were made in Marathi and Hindi.

184. Broadly, the consultations workshop covered the following topic of discussion:

(i) Purpose, design, and social benefits of the projects

(ii) Proposed construction work and envisaged environmental and social impacts;

(iii) Mitigation measures proposed and monitoring plan thereof;

(iv) Collection of stakeholder feedback through discussion and deliberation.

185. Four consultations were held. One each for greenfield project sites, that is Pachod andBhiwandi, and among rest of the two consultation, the other project sites were clubbed. The detail of the consultation and feedbacks have been presented as Annexure to this document, under Appendix – 5, Stakeholder Consultations.

186. The environmental and social concerns and suggestions made by the participants hasbeen noted (recorded) and discussed, and suggestions were incorporated into design of the project.

20. Disclosure IEE Findings / Safeguard document

187. The findings of the IEE and safeguard documents have been disclosed to all the relevant stakeholders, in a form, place, and languages accessible to

them, prior to project appraisal[35] The final IEE will be disclosed on the websites of ADB and MSAMB for informationand wider circulation. In the case of revision, the revised document will again be disclosed onADB and MSAMB's website.

Grievance Redress Mechanism

188. The Grievance Redress Mechanism (GRM) is a critical tool that will promote both transparency and accountability in project implementation and operations. From the safeguard's perspective, the project recognizes the role of the GRM as critical to receive and facilitate resolution of the affected people's concerns and grievances regarding the project performance. This is alongside providing multiple channels such as offline and online approaches; rich affected people can provide feedback. Citizens, including women, ethnic minorities, and the other stakeholders will be informed to use project's GRM. In this manner, the project can strengthen the implementation and operational objectives and deter miscellaneous practices while underscoring the project foundation as one that is accountable,transparent and responsive to beneficiaries.

189. MAGNET acknowledges that an effective GRM is built on organizational commitment both in terms of recognizing the role of the GRM, as well as supporting its operationalization. It also embodies fairness in handling grievances confidentially, impartially, and transparently. The project recognizes that procedures to file grievances and seeking action need to be easily understandable and accessible for the project beneficiaries to make the GRM effective. Quickresponse and adequate training increase the efficiency of GRM. An effective GRM also considers the principles of participation and social inclusion. The GRM at MAGNET Society for MAGNET has been proposed based on learning from World Bank Governance and Anti- Corruption Governance Policy Note-2010.

A. GRM at MAGNET Society for MAGNET

190. MSAMB has an informal grievance redress mechanism, however for MAGNET, a dedicated multiple tier GRM will be established to receive, evaluate and facilitate concerns ofcomplaints and grievances of the affected concerning

[35] When the borrower/client submits [an IEE or a safeguard document of certain other types to ADB], the operationsdepartment reviews [it] to confirm that (i) relevant information on potential project impacts and mitigation measures…has been made available, in a timely manner and before project appraisal, in an accessible place, and in a form and language(s) understandable to project-affected people and other stakeholders…" ADB. (2013). Safeguard Review Procedures F1/OP, para. 17. Operations Manual. Retrieved from http://www.adb.org/sites/default/files/OM-F1-20131001.pdf

project's social, and environmental performances.

191. At the PMU, a Centralized Control and Monitoring System (CCMS) will be establishedat the Department level that will provide the adequate platform for the GRM and will be streamlined to address issues of all the relevant stakeholders of the project (i.e. FPOs, local community, contractors, and other members in the value chain).

192. This system will ensure that all the grievance of the stakeholders and indigenous people's community is addressed within a time-bound and effective manner. This will underscore the operationalization of the process including service standards alongside the implementation modality extending to assigning designated "Grievance Redressal Officer" (GRO) at respective PIUs, and IAs to handle specifically all matters related to public grievances/ complaints flagged to their respective offices. The list of GROs will be displayed at all levels. Every office should display at a prominent place/ notice board the name of GRO with location, contact numbers/ mailing IDs, and address along with the specific visiting hoursfor hearing/receiving the grievance/complaints of the public. The process articulated in the workflow below will be adopted for MAGNET.

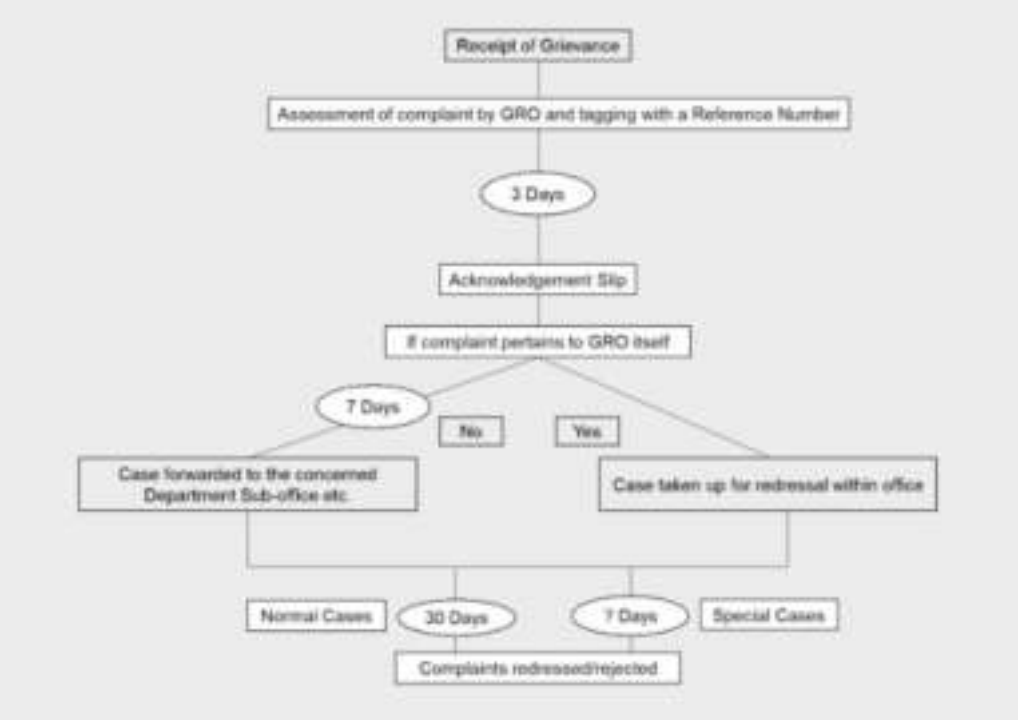


Figure 8: Proposed grievance Redress Mechanism at ARIAS Society during AACP

193. MAGNET will establish multiple channels by which grievances can be received by theproject. These can be broadly classified as – Online-Services (e.g., Toll-Free Helpline and viathe Project web-platform) and Offline/ Manual (e.g., Mail, In-Person and Drop-Boxes). For all grievances submitted through online mode, PMU will be reviewing for sensitivity/confidentiality, before such complaints being channelled to the GRO at the PIU and IAs levels. In the processing of all grievances, GRO, PIU, and IAs will follow international best practices, including the adoption of necessary procedures including acknowledging all grievances/complaints, assigning a central tracking number/ID for all grievances alongside basic service standards for the response. MAGNET will also establish an operating procedure for the handling of unresolved grievances/complaints through a process of escalation – where unresolved grievances will be transmitted to the next higher level –to PMU and then ADB. The PMU will aggregate all grievances to a single consolidated database to monitor the performance of PIUs/ IA's and generate aggregate statistics on performance to be publicly disclosed on the project's web-platform. The format for tracking of grievances is given in Appendix 11.

194. Awareness of grievance redress procedures will be created through the Public Awareness Campaign, if required, with the help of print and electronic media and radio.

195. MAGNET has assigned PO at the PMU level as the Grievance Redressal Officer (GRO), and APD as the Appellate Authority (AA), whereas, the Manager, will be the GRO at thePIU and DGM will be the Appellate Authority. Similarly, the IAs will also designate dedicated GRO, who will also be assigned responsibility to monitor the GRM and co-ordinate with the PMU. The GROs, PIU will be supported by support staff to assist in the grievance recording.

B. Grievance Redressal Procedure

196. Every application/complaint received shall be tagged with a specific reference number(irrespective of the mode of complaint). The grievance system will be continuous and regularlymonitored by the PMU staff.

197. Every application or petition shall be acknowledged through standard acknowledgmentslips or a copy of the receipt, which will be dispatched to the complainant within three days of receipt of complaint or handed over to the person at the time of receipt for complaints submitted in person.

198. Every application shall carry such a slip for future reference, indicating the name, designation, and telephone number of the official who is processing the case. The period in which a reply will be sent should also be indicated (the ideal time suggested is seven days andshall not be more than ten days).

199. The complainant shall be quickly informed of the action taken by way of redressal within the proposed response time suggested at each level.

200. A record of all complaints received, and action taken till disposal shall be maintained at each level (complaint registers and /or online).

201. A reply to any grievance must cover all points raised and not address the grievance partially. If there is any follow- up action, it must be pursued.

202. No grievance is to be rejected without having been independently examined. At a minimum, this means that the Appellate Authority should examine the case as well as the reply,intended to be sent to the complainant. If a complaint is rejected, the reasons for such rejection must be made explicit and shall be intimated to the complainant within the time frame.

203. The Complaints related to PMU will be dealt with directly by the GRO of the PMU, andredressal will be done as per a fixed period. The decision of the PMU will be final and will be abided. However, in all cases, the complainant will be free to exercise his/her rights to approach the judicial system.

204. Grievance redressal mechanisms will consider the vulnerability of gender, SC/ST, andother vulnerable populations.

C. Roles and Responsibilities of GRO and Appellate Authority

205. GRO: Responsible for monitoring of all the grievances submitted manually through a drop box and ensuring timely registration in the GRM register, and on the portal (with the helpof the support staff) with a reference number in the following format: (Department -Name of implementing agencies/ ATMA/ DLCC)/District/Year/Serial number). Addressing the grievances following the detailed procedures within the stipulated service delivery time, as outlined in Figure above. Ensure the completion of monthly reporting on grievances to the ADB, as per the format given in Table 11 above.

206. Appellate Authority:

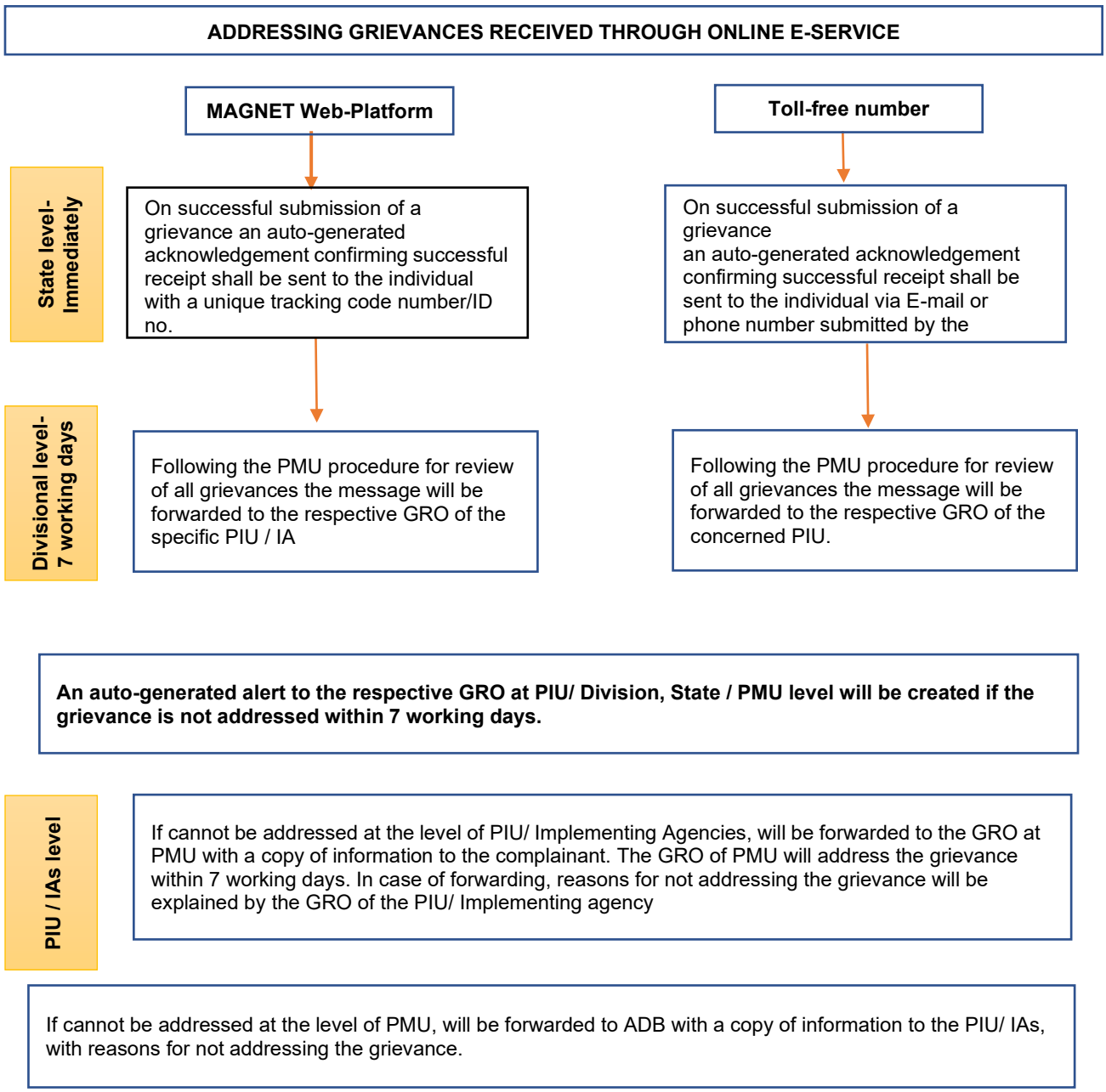
- Monitor the timely redressal of all grievances by the GRO.
- Monitor grievances related to conflict of interest and arbitration submittedthrough manual mode and forward to PMU.
- Review the monthly report on the performance of grievances.

D. Flow of Grievances received through Online e-Services

207. MAGNET will adopt a multi-mode mechanism by which beneficiaries and

other stakeholders shall provide grievances on the project. The Online e-Services (e.g., Toll-Free Helpline, and via the Project web-platform) will provide an innovative platform to several GRM, thereby extending the reach, accessibility, and efficiency (e.g., transaction cost) of such modalities. A flow-chart for this process is highlighted in **Figure 3**. The MAGNET Society will establish a web-platform that will incorporate the online GRM web-form that will permit citizens to submit their grievances online. This will also serve as a communication platform displayingrelevant information on the GRM process, including the Toll-Free number.

Table 29. Flow of Grievance Redress through Online e-Services



E. Confidentiality

208. In the case of online mode, if any beneficiary or citizen seeks confidentiality, the nameand address of the person will not be accessible to anyone. There will be an option for maintaining secrecy in the design of the electronic GRM. Only E-mail ID and contact number of the person can be viewed.

F. Accountability Mechanism

209. To ensure transparency and accountability in its operations, ADB's Accountability Mechanism allows people affected by ADB-supported Projects to submit complaints to ADB. This is a separate resolution mechanism from the GRM described above. The Accountability Mechanism provides an independent forum that allows people to voice their problems and seek resolution, and report alleged violations of ADB's operational policies and procedures.

210. The Accountability Mechanism has two separate, but related phases. First is problem-solving, led by ADB's Special Project Facilitator (OSPF), to assist Project-affected people in finding solutions to their problems. Second is Compliance Review Panel (OCRP), led independent investigators / panellist that investigates alleged violations of ADB's operational policies and procedures, including safeguard policies, that have already resulted in, or are likely to result in, direct adverse and material harm to Project-affected people. It recommends how to ensure Project compliance with these policies and procedures.

VIII. CONCLUSION

211. The IEE study of the proposed infrastructural interventions under Output 3 of MAGNETProject has minimal environmental impact with respect to air, water, land, biodiversity, waste management. Most of the adverse impacts predicted are of low significance, short term and localized. All expected adverse impacts could be mitigated with appropriate measures suggested in this report.

212. It is expected that there will be an overall positive cumulative environmental effect of the project if it succeeds in creating efficient value chain linkages between the agricultural commodity producer and the consumer the beneficial impacts will be manifold. Following are the overall long-term impacts from the project:

(i) There will be reduction in losses that occur due to poor infrastructure facilities.

(ii) There will be improvement in the overall environment of production areas andhandling of harvested produce.

(iii) The employment opportunities of both temporary and permanent nature will getgenerated for local population.

213. Due to increase in employment opportunities, trade, business and agricultural income,considerable amount of money may be channelled in to the local economy in the area. This will increase the income level of the individual household and the local community of the area.

214. The expansion and modernization of the irradiation facility in Vashi can be included under ADB financing because the radioactive source is trivial and adequately shielded. Approximately 300 kCi of Cobalt-60 will be procured from BRIT by MSAMB, that will be utilized for around 2-3 years. Irradiation has become widely accepted as a proven and effective post-harvest treatment to reduce bacterial contamination, slow spoilage and maintain food quality.The IFC in Vashi has been accredited by a number of government agencies from export marketcountries such as the USDA – APHIS and the Government of Australia, NPPO's National Standard for Phytosanitary Measures (NSPM-21). It is also compliant with national policies and standards under the Government of India. The IFC has fail-safe design to avoid personnelexposure to high radiation levels, and the radioactive source is stored in water pool with depthsof 7-8 meters. Personal monitoring is carried out by employers to evaluate the level of exposure of their workers to hazardous materials in the workplace. As per requirement of AERB, the irradiation facility have adequate experienced staff to operate the irradiation facility.

215. The EDDR is prepared for the IFC in Vashi, and found compliant to most national and international regulations and standards. However, some corrective actions and areas for improvement were identified.

216. This IEE and EMP may need to be further updated by MAGNET Society during the implementation stage. However, all the recommended mitigation measures and environmental monitoring plan should be followed.

LIST OF APPENDIXES

Appendix 1: Rapid Environmental Assessment Checklist

IEE Questionnaire guidelines

Organisation details:

Name of the facility	
Entity type	e.g. private sector, FPO
Commodities	
Description of services	e.g. storage, drying, sorting, processing
Years of Operation	
Governance structure (Organogram)–including gender	
Number of employees (F/M)	
Capacity of the facility	e.g. MT
Commodity flow	Source from, sell to, other services
Transportation	

Terms of employment and working conditions:

Operations Related

- Please explain us the operations carried out in the facility.
- What are the crops processed here?
- Do you have required NOC to operate?
- What are the mandatory requirements to ensure continues operation of the facility?
- What do you do with the waste created during crop processing including packagingwaste?
- What are the wastes that comes out from your process? (solid, liquid, and gaseous)
- Do you separate waste at the source of generation?

- How do you discharge liquid waste? Do you treat before discharging?
- How do you manage sewage generated from the use of toilets?
- What mechanism/ technology is used for pre-cooling and cold storage system?
- What is the capacity of the system?
- How do you monitor the performance of the system in terms of cooling per unit ofenergy consumed?
- Are you dependent on grid connected to electricity supply? Or do you have any Resource?
- What types of coolant is used in the air-cooling system?
- Whether the facility is ISO compliance – Quality, Environment, Social/ Food SafetyCertifications/ HACCP?
- Fire Safety, PPEs, Safety of the facility, etc.
- Waste Handling Procedures and Management – including emissions, discharges andsolid
- What is the power load of your facility? What is your annual consumption? Have youobserved changes in consumption pattern due to more changes in weather/ climate?
- Do you have any power back-up? If yes, what is the type of fuel being used? Annualamount
- Is there any noise production during the processing and what are the mitigationmeasures?
- Do you manage any transport fleet? If not, who transports the produce?
- What is the source of water? Have you faced any shortage in past?
- Whether there has been any impact on the facility due to extreme events – flood.drought, extreme temperature, etc.
- Did your facility face any operation disruption due to impact of climate on the producersor in the transport route?
- Do you think that climate change has indirectly impacted the optimum usage of yourfacility?
- Are you using more cold storage facility then before due to a greater number of hotdays?

Indigenous communities

- Are there any indigenous communities in the facility area?
- Are the activities of the facilities having adverse effects on indigenous peoples' rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (tangible and intangible)?

Impact on communities

- How does the facility impact local communities?
- Screen for negative (water availability/contamination, pollution, displacement) andpositive (improved livelihoods, access to infrastructure)

Appendix 2: Example Standard Construction Contract Environmental and SocialSafeguard Clauses

Environmental clauses to be included in the bid document are delineated in the subsequent subsections.

- Contractor shall be responsible for implementation of Environmental Management Plan (EMP) in addition to adhering to relevant statutory environmental requirements to all engineering works as a part of good engineering practices.

- All works undertaken towards protection of environmental resources as part ofthe EMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and noseparate payment will be made unless otherwise specified explicitly. The cost towards environmental management as per EMP unless otherwise provided as a separate head, will be deemed to be part of Bill of Quantity of the project. The Scope of Work (SoW) of the Contractor towards implementation of environmental provision shall be as follows:

- Abide by all existing environmental regulation and requirements of the Government of India and State Government of Maharashtra during proposed construction and implementation.

- Comply with all mitigation measure and monitoring requirements set out in the EMP

- Submission of methodology stating how EMP will be complied including method and schedule of monitoring.

- Monitoring of project environmental performance and periodic submission of monitoring report.

- Compliance with all measures required for construction activities in sensitive areas (if any), in line with the regulatory requirements adopted by MoEF & CC,GoI.

- Compliance of all safety rules at work, and provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities and rest shelters.

- The Contractor should procure construction materials from the licensed/ authorized agents/ dealers. Procurement of materials from the unauthorized sources shall be considered as illegal and appropriate measures shall be taken.

- Construction and Demolition waste shall be handled as per the provisions laid down in the C&D Waste Management Rules 2016.

- The Contractor shall ensure that construction activities do not cause contamination of water and dispose of solid wastes, resulting from construction related activities, anywhere on the premises but dispose of as per the C&D Waste Management Rules 2016.

Appendix 3: Locations of Selected Facilities

Location of facilities in Nashik division

Figure 3.1: Nashik District

Figure 3.2: Export Facility Centre, Chandwad

Figure 3.3: Export Facility Centre, Mohadi

Figure 3.4: Export Facility Centre, Kalvan

Location of facilities in Aurangabad Division

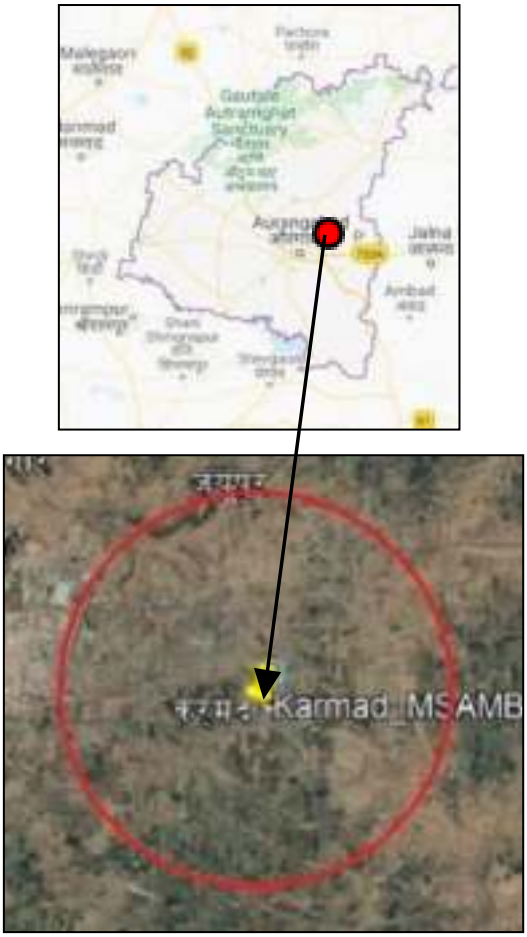


Figure 3.5: Export Facility Centre, Karmad

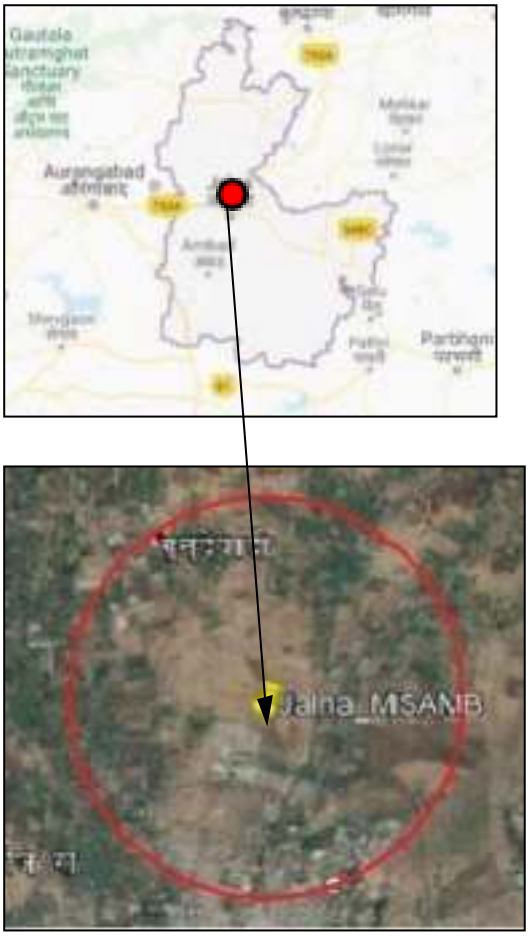


Figure 3.6: Export Facility Centre, Jalna

Location of facilities in Latur division

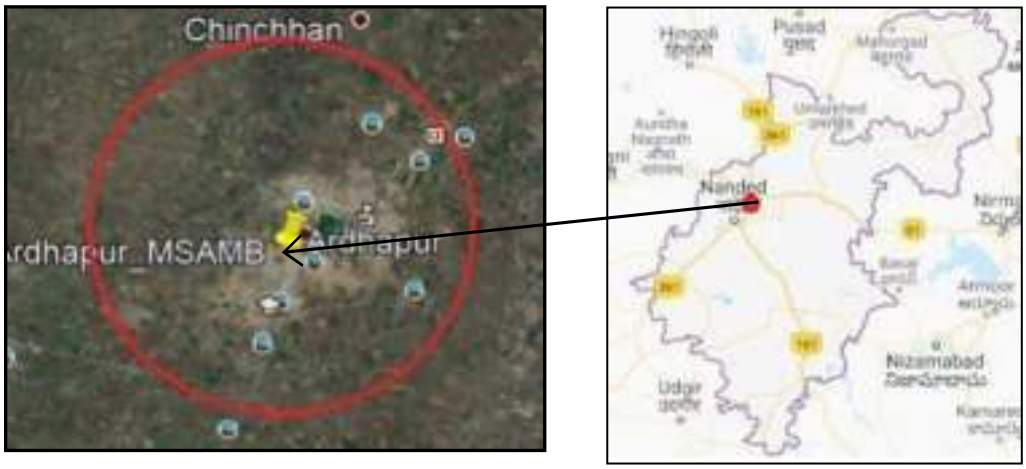


Figure 3.7: Export Facility Centre, Ardhapur

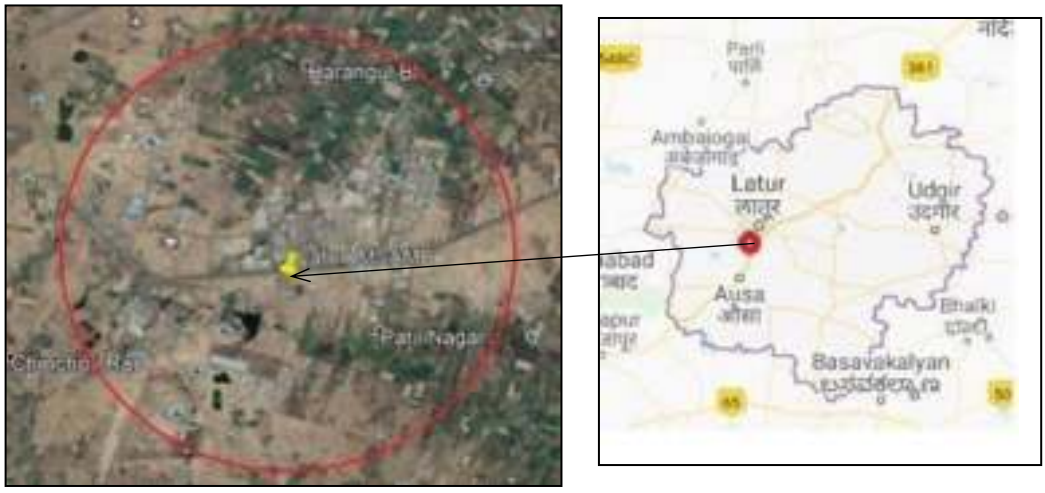


Figure 3.8: Export Facility Centre, Latur

Facilities located in Ratnagiri division

Figure 3.9: Ratnagiri division

Figure 3.10: Showing locations of Irradiation facility centre (IFC) & Vegetable processing facility (VPC), Vapour heat treatment (VHT) centre, Vashi

Facilities located in Kolhapur division

Figure 3.11: Export Facility Centre, Atpadi

Facilities located in Amravati Division

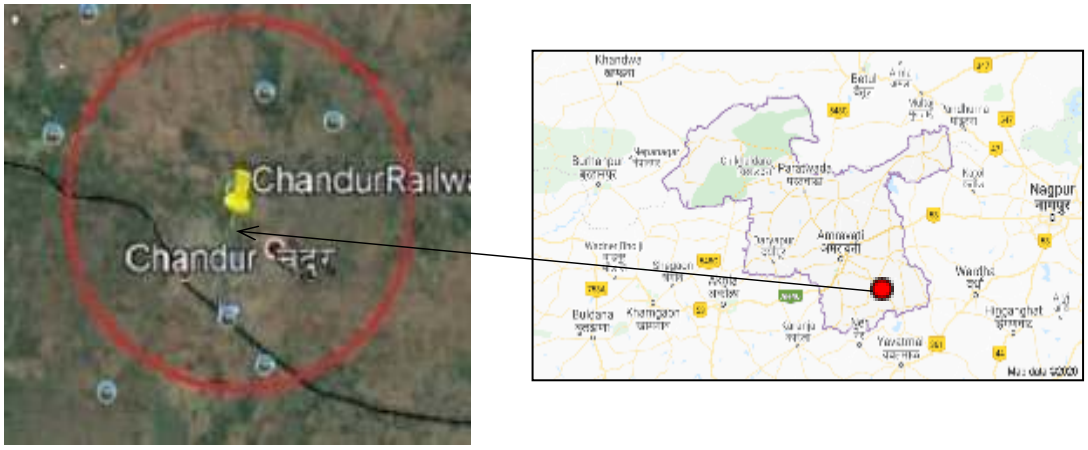


Figure 3.12: Export Facility Centre, Chandur Railway

Figure 3.13: Orange Export Facility Centre, Warud

Facilities located in Nagpur division

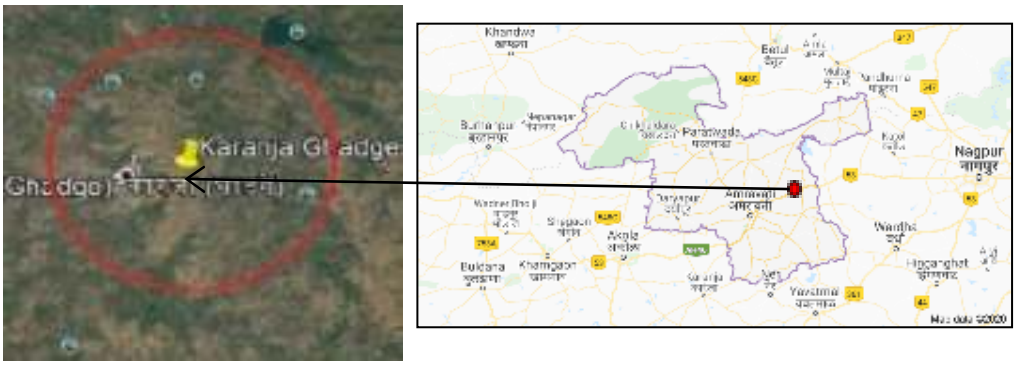


Figure 3.14: Export facility Centre, Karanja Ghadge

Facilities located in Pune division

Figure 3.15: Export Facility Centre, Talegaon

Figure 3.16: Export Facility Centre, Baramati

Appendix 4: Photographs of the Project Components Areas

Nashik division

Mohadi facility

Figure 4.1.1: Packhouse, Export Facility Centre, Mohadi

Figure 4.1.2: Cold storage, Export Facility Centre, Mohadi

Kalvan facility

Figure 4.2.1: Export Facility Centre, Kalvan

Figure 4.2.2: Onion storage, Export facility center, Kalvan

Chandwad facility

Figure 4.3.1: Export facility centre, Chandwad

Figure 4.3.2: Grading lines, Export facility centre, Chandwad

Savda facility

Figure 4.4.1: Export facility centre, Savda

Figure 4.4.2: Weigh bridge, Export facility centre, Savda

Aurangabad division

Karmad facility and Jalna export facility centre photographs

Export facility centre, Karmad

Cold storage, Export facility centre, Karmad

Export facility centre, Jalna

Grading lines
Export facility centre, Jalna

Latur division

Latur export facility Centre

Export facility centre, Latur

Grading lines, Export facility centre,

Ardhapur export facility Centre

Export facility centre, Ardhapur

Cold storage
Export facility centre, Ardhapur

Nagpur division

Export facility centre Karanja Ghadge

Ratnagiri division

Vashi facility photographs

Vapor heat treatment facility,

Personnel entry door, Irradiation facility

Water tanks, Vashi

USDA office, IFC

Radiation chamber signal

Control panel, Irradiation facility

Pune division

Export facility Centre, Pune

Export facility centre,
Talegaon Dabhade

Cold storage,
Export facility centre, Talegaon Dabhade

Ripening chamber controller,
Export facility centre,
Talegaon Dabhade

Export facility Centre, Baramati

Export facility centre, Baramati

Grading line
Export facility centre, Baramati

Kolhapur division

Export facility Centre, Atpadi

Export facility centre, Atpadi

Pre-cooling
Export facility centre, Atpadi

Cold storage
Export facility centre, Atpadi

Appendix 5: Stakeholder Consultations

Meeting – 1

Minutes of the Public Consultation Workshops with Stakeholders

Objective:	Public Consultation for the Initial Environmental Examination report on 21 Fruit & Vegetable Processing Facilities of Maharashtra State Agricultural Marketing Board (MSAMB)		
Date:	03rd July, 2020	Location:	Online
Time:	11:00 AM	Meeting Type:	Meeting with Stakeholders
Organized by:	Grant Thornton India LLP and MSAMB Pune	Project Name:	**Maharashtra Agribusiness Network (MAGNET)**

Agenda of the meeting:

- To share project details, benefits and collect feedback and suggestion
- To discuss the implementation plans, temporary impacts that may cause to thesurroundings, and seek approval for the same

Overview:

Grant Thornton India is appointed by Asian Development Bank (ADB) and Government of Maharashtra in preparing the Maharashtra Agribusiness Network (MAGNET) project. The broader contours of the project are to support value addition in post-harvest segments of targeted horticulture value chains, facilitate agribusiness investment, stimulate FPOs/FPCs and value chain operators within the value chain, support resilient horticulture production systems and enhance private sector participation.

Topics covered during the presentation:

- Maharashtra Horticulture scenario and need for the project
- Introduction to MAGNET
- MAGNET three Outputs, its objective and impact
- Details on Output 3 – which focuses on rehabilitation and upgradation of 17existing facilities, development of 4 new facilities and strengthening of NIPHT
- Environmental safeguards
  - Anticipated environmental impacts during pre-construction, construction and operation stage
  - Mitigation measures for deal with the above-mentioned environmental impacts

- Social Safeguards
  - About Social safeguards policy of ADB and its objectives
  - Brief overview on indigenous people in Maharashtra
  - Is there a need to trigger policy on Indigenous people?
  - Tribal Inclusion approach
  - Involuntary resettlement
- Gender Safeguards
  - Role of gender and its implementation in the project design
- Grievance Redressal Mechanism (GRM)
  - Structure and process of GRM
- Open discussion and feedback

Key discussions:

- Environmental, social and gender safeguard policies report will be available on theMSAMB website

- Are these facilities being designed as per the APEDA or IFS Global standards of Food Safety, which are mandatory for exporting to European Market, which is themajor export destination for this produce? Can we get to see these designs so thatwe can provide some suggestions on the same?

- All the facilities are being upgraded based on global standards in order to meet theexport compliances

- Regarding the irradiation facility in Bapgaon what are the mitigation measure? Howthe categorization has to be done for this facility?

- As this project focusses on environmental and social safeguard, it is important thatthe MSAMB facility operators to understand and follow these policies. Request fortraining or capacity building on safeguard norms can be submitted to MSAMB

- There are some green technologies such as solar rooftop etc. that this project willsupport. If there is any need for skill development training on handling or operationplease feel free to put your request to MSAMB

- All the operators and support staff need to follow the ADB safeguard policy even during the operational period

List of Attendees:

S. No.	Name	Company	Designation
1	Aditi Paul	TRTA team GT	Expert on environment and climate change
2	Surbhi Dhingra Singh	TRTA team GT	Expert on Social and Gender
3	Pankaj Gaikwad		
5	Sailesh Wankhade	Maha Orange	Manager
6	Sushil Chavan	MSAMB, Irradiation Facility Vashi	Plant in charge
7	Nilesh Deshmukh		
8	Ganesh Patil	MSAMB	Engineer
9	Abhimanyu Mane	MSAMB, VHT	Plant in charge
10	Arun Rudrake		
11	Arvind Jagtap	APMC, Baramati	Secretary
12	Vishwapal	Satguru Enterprises	Manager
13	Sudhir Kosalge	MSAMB	Manager
14	Shailendra Jadhav	MSAMB	Horticulture Development Officer
15	Niteen Patil	MSAMB	AGM
16	Dr Bhaskar Patil	MSAMB	DGM
17	Nilesh Deshmukh		
18	Hemant Atarde	MSAMB	Engineer
19	Pranjali Narkar	Agribusiness	

S. No.	Name	Company	Designation
		entrepreneur	
20	Mohan Bhagwat	TRTA team GT	Expert on environment and climate change
21	Chetan Bhakkad	TRTA team GT	Associate Director
22	Vihang Jain	GT	Assistant Manager
23	Rishabh D	GT	Assistant Manager
24	Madhur Gandhi	GT	Consultant

Meeting – 2

Minutes of the Public Consultation Workshops with Stake Holders

Objective:	Public Consultation for the Initial Environmental Examination report on 21 Fruit & Vegetable Processing Facilities of Maharashtra State Agricultural Marketing Board (MSAMB)		
Date:	09th July 2020	Location:	Online
Time:	11:00 AM	Meeting Type:	Meeting with Stakeholders
Organized by:	Grant Thornton India LLP and MSAMB Pune	Project Name:	**Maharashtra Agribusiness Network (MAGNET)**

Agenda of the meeting:

- To share project details, benefits and collect feedback and suggestion
- To discuss the implementation plans, temporary impacts that may cause to thesurroundings, and seek approval for the same

Overview:

Grant Thornton India is appointed by Asian Development Bank (ADB) and Government of Maharashtra in preparing the Maharashtra Agribusiness Network (MAGNET) project. The broadercontours of the project are to support value addition in post-harvest segments of targeted horticulture value chains, facilitate agribusiness investment, stimulate FPOs/FPCs and value chain operators within the value chain, support resilient horticulture production systems and enhance private sector participation.

Topics covered during the presentation:

- Maharashtra Horticulture scenario and need for the project
- Introduction to MAGNET
- MAGNET three Outputs, its objective and impact
- Details on Output 3 – which focuses on rehabilitation and upgradation of 16existing facilities, development of 4 new facilities and strengthening of NIPHT
- Environmental safeguards
  - Anticipated environmental impacts during pre-construction, construction and operation stage
  - Mitigation measures for deal with the above-mentioned environmentalimpacts
- Social Safeguards

- About Social safeguards policy of ADB and its objectives
- Brief overview on indigenous people in Maharashtra
- Is there a need to trigger policy on Indigenous people?
- Tribal Inclusion approach
- Involuntary resettlement
- Gender Safeguards
- Role of gender and its implementation in the project design
- Grievance Redressal Mechanism (GRM)
- Structure and process of GRM
- Open discussion and feedback

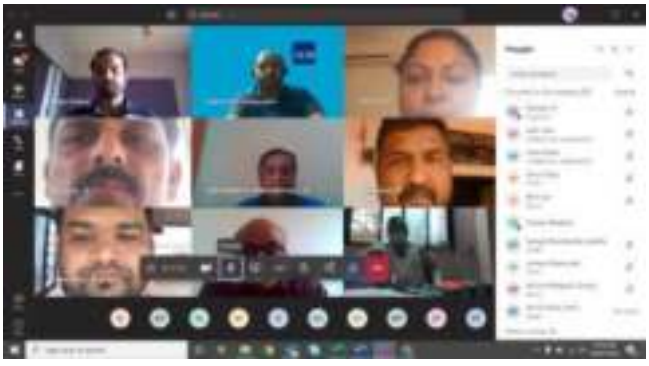
Key discussions:

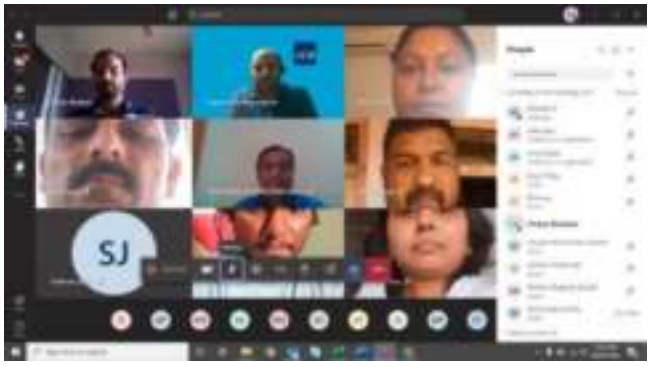
The participants understood the information and had no questions relating to Environmental andSocial safeguards.

Participants asked question relating to access to finance and restrictions put in place onmovement of goods because of the CoVID19 pandemic.

The points discussed were:

- Location of the new projects and whether these new projects be constructed on FPC land?
- Need for better involvement of financial institutions such as banks at different levels. Banks are usually uninformed about the various central and state government schemes.
- Minimum requirement of number of farmers in an FPC to participate in project.
- Role of value chain accelerator.
- Improving working capital availability.
- Bureaucratic hindrances from banks in issuance of subsidy and loans
- Availability of certificates and passes for vehicles delivering F&V to consumers.





List of Attendees:

S. No.	Name	Company	Designation
1	Aditi Paul	TRTA Team GT	Expert on environment and climate change
2	Mohan Bhagwat	TRTA Team GT	Expert on environment and climate change
3	Vikas Gaikwad	Shri Varna FPC, Washim	Chairman
5	Shamkant Chaudari		Farmer
6	Sonal Ghavarekkar	SDF Productions	Director
7	Nilesh Dhonde	Atma Sharam FPC	Director
8	Hrishikesh Dandwate	Agrico FPC	Director
9	AMPC Nanded		
10	Ajit Korde	Mirewadi, Phaltan Dist. - Satara	Farmer
11	Amol Gade	GPS FPC	Member
12	Dattarey More	Reliance retail DTC FPC, Jalna	General Manager Director
13	Janhavi Deshmukh	IPA Agro fresh Pvt. Ltd.	Exporter
14	Uday Karhat	Consultant, Self Employed	Food Safety Consultant
15	Gokul Patil	Sant Chandeo FPC	Director
14	Shailendra Jadhav	MSAMB	Manager
15	Niteen Patil	MSAMB	AGM
16	Vijay Jagtap	MSAMB	Magnet Project Co-coordinator

S. No.	Name	Company	Designation
17	Sachin Kharmale	MSAMB	Horticulture development officer, Export Department
16	Chetan Bhakkad	GT	Associate Director
17	Vihang Jain	GT	Assistant Manager
18	Rishabh D	GT	Assistant Manager
19	Madhur Gandhi	GT	Consultant
20	Sarang Tambhale	GT	Senior Associate
21	Raghavendra Naduvinamani	ADB	Social Safeguards Expert

Meeting – 3

Minutes of the Public Consultation Workshops with Stake Holders

Objective :	Public Consultation for the Initial Environmental Examination report on 21 Fruit & Vegetable Processing Facilities of Maharashtra State Agricultural Marketing Board (MSAMB)		
Date:	22nd July, 2020	Location:	Online
Time:	11:00 AM	Meeting Type:	Meeting with Stakeholders
Organized by:	Grant Thornton India LLP and MSAMB Pune	Project Name:	**Maharashtra Agribusiness Network (MAGNET)**

Agenda of the meeting:

- To share project details, benefits and collect feedback and suggestion
- To discuss the implementation plans, temporary impacts that the projectinfrastructure may cause to the surroundings, and seek approval for the same

Overview:

Grant Thornton India is appointed by Asian Development Bank (ADB) and Government of Maharashtra in preparing the Maharashtra Agribusiness Network (MAGNET) project. The broadercontours of the project are to support value addition in post-harvest segments of targeted horticulture value chains, facilitate agribusiness investment, stimulate FPOs/FPCs and value chain operators within the value chain, support resilient horticulture production systems and enhance private sector participation.

Topics covered during the presentation:

- Maharashtra Horticulture scenario and need for the project
- Introduction to MAGNET
- MAGNET three Outputs, its objective and impact

- Details on Output 3 – which focuses on rehabilitation and upgradation of 17existing facilities, development of 4 new facilities and strengthening of NIPHT

- Environmental safeguards

  - Anticipated environmental impacts during pre-construction, construction and operation stage
  - Mitigation measures for deal with the above-mentioned environmentalimpacts

- Social Safeguards

  - About Social safeguards policy of ADB and its objectives
  - Brief overview on indigenous people in Maharashtra
  - Is there a need to trigger policy on Indigenous people?
  - Tribal Inclusion approach
  - Involuntary resettlement
- Gender Safeguards

  - Role of gender and its implementation in the project design
  - Grievance Redressal Mechanism (GRM)
  - Structure and process of GRM
- Open discussion and feedback

Key discussions:

- The participants understood the information and had no questions relating toEnvironmental and Social safeguards.

- Participants asked question relating to access to finance and restrictions put inplace on movement of goods because of the CoVID19 pandemic.

List of Attendees:

S. No.	Name	Company	Designation
1	Aditi Paul	TRTA team GT	Expert on environment and climate change
2	Mohan Bhagwat	TRTA team GT	Expert on environment and climate change
3	Surbhi Dhingra	TRTA team GT	Social Development and Safeguard Specialist
4	Nitin Vikhe Patil	Secretary	APMC Paithan
5	Vinod Motkar	Prathisthan FPC	Director
6	Yogesh	Farmer	
7	Sheik Irfan	Freelance Journalist	Journalist
8	Sahilandra Jadhav	MSAMB	Horticulture Development Officer
9	Niteen Patil	MSAMB	AGM
10	Vijay Jagtap	MSAMB	Project co-ordinator
11	Chetan Bhakkad	GT	Associate Director
12	Vihang Jain	GT	Assistant Manager
13	Rishabh	GT	Assistant Manager
14	Madhur Gandhi	GT	Consultant
15	Sarang Tambhale	GT	Senior Associate

Meeting – 4

Minutes of the Public Consultation Workshops with Stake Holders

Objective :	Public Consultation for the Initial Environmental Examination report on 21 Fruit & Vegetable Processing Facilities of Maharashtra State Agricultural Marketing Board (MSAMB)		
Date:	23rd July, 2020	Location:	Online
Time:	11:00 AM	Meeting Type:	Meeting with Stakeholders
Organized by:	Grant Thornton India LLP and MSAMB Pune	Project Name:	**Maharashtra Agribusiness Network (MAGNET)**

Agenda of the meeting:

- To share project details, benefits and collect feedback and suggestion
- To discuss the implementation plans, temporary impacts that the projectinfrastructure may cause to the surroundings, and seek approval for the same

Overview:

Grant Thornton India is appointed by Asian Development Bank (ADB) and Government of Maharashtra in preparing the Maharashtra Agribusiness Network (MAGNET) project. The broadercontours of the project are to support value addition in post-harvest segments of targeted horticulture value chains, facilitate agribusiness investment, stimulate FPOs/FPCs and value chain operators within the value chain, support resilient horticulture production systems and enhance private sector participation.

Topics covered during the presentation:

- Maharashtra Horticulture scenario and need for the project
- Introduction to MAGNET
- MAGNET three Outputs, its objective and impact

- Details on Output 3 – which focuses on rehabilitation and upgradation of 16 existing facilities, development of 4 new facilities and strengthening of NIPHT

- Environmental safeguards

  - Anticipated environmental impacts during pre-construction, construction and operation stage
  - Mitigation measures for deal with the above-mentioned environmentalimpacts

- Social Safeguards
  - About Social safeguards policy of ADB and its objectives
  - Brief overview on indigenous people in Maharashtra
  - Is there a need to trigger policy on Indigenous people?
  - Tribal Inclusion approach
  - Involuntary resettlement
- Gender Safeguards
  - Role of gender and its implementation in the project design
- Grievance Redressal Mechanism (GRM)
  - Structure and process of GRM
- Open discussion and feedback

Key discussions:

- The participants understood the information and had no questions relating toEnvironmental and Social safeguards.

- Participants asked question relating to access to finance and restrictions put inplace on movement of goods because of the Covid19 pandemic.

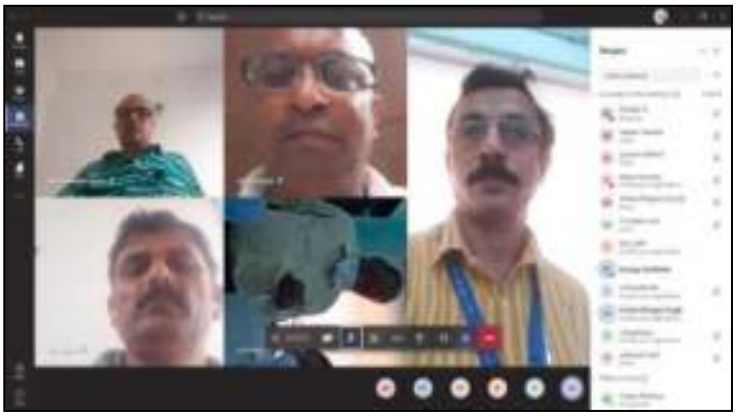
- Mr. SR Chaudhari asked as to what measures would be taken for disruptions in vehicle traffic during the construction phase of the project in Bapgaon.

- The participants were assured that there are enough measures that have been putin place to prevent any disruptions during the construction phase. For example, the road adjoining the project construction site will be half closed; the contractors have been informed to take enough precautions to avoid traffic issues andhindrance to public.

- Secretary of APMC Kalyan, Mr. Chaudhari invited their Civil engineer for suggestions to MSAMB's civil team. He suggested that the plinth height to be takenat 2 mt. GT Environmental safeguard experts as well as the MSAMB team duly noted the suggestion.

- The safeguards team asked the Sarpanch Mr. Patil about flooding instances on the project land. The participants informed that the there is no frequent flooding. However, flooding happens every 10 to 15 years.

- Apart from the above-mentioned points, no other issues were raised. Everyone present understood the information presented during the consultation meeting.



List of Attendees:

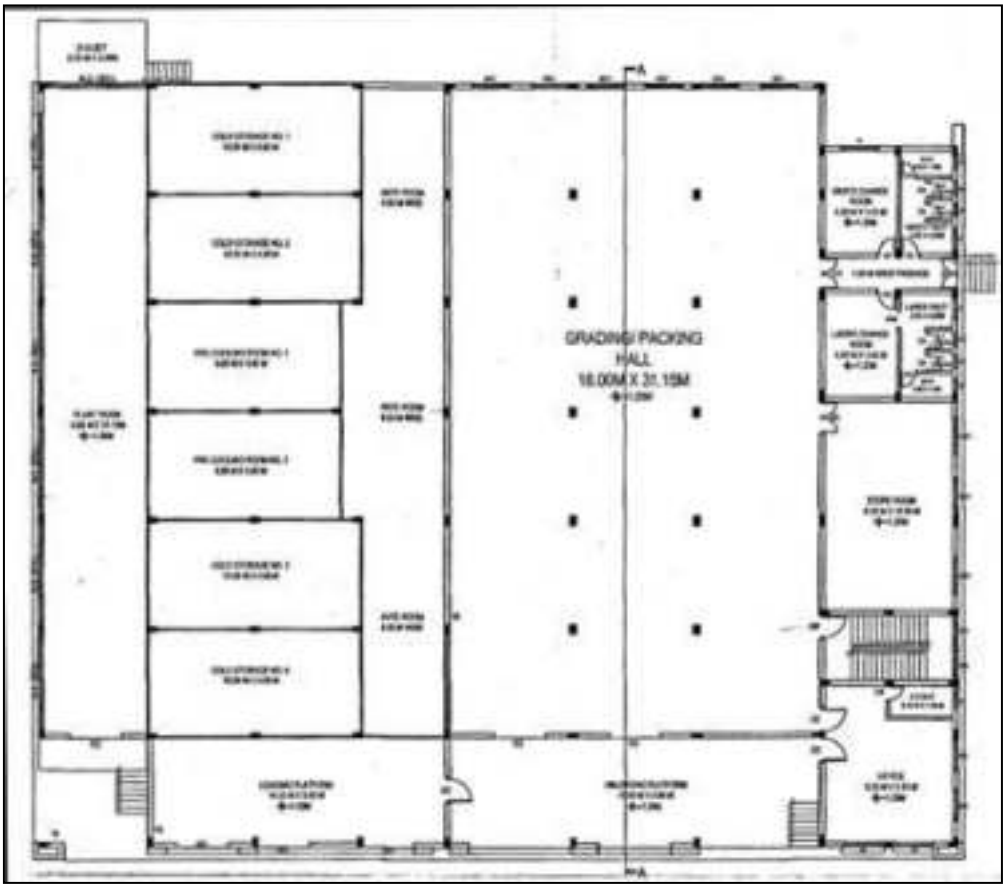
S. No.	Name	Company	Designation
1	SR Chaudhari	APMC Kalyan	Secretary
2	Mr. Mangaldas Patil	Gram panchayat	Sarpanch, Bapgaon
3	Mr. Deshmukh	APMC Kalyan	Civil Engineer
4	Yashwant Patil	Jai Mallhar Hotel	Owner
5	NB Deshmukh		Member of the public
6	Jaywant Adhikari	Farmer	Farmer
7	Shailendra Jadhav	MSAMB	Safeguards
8	Niteen Patil	MSAMB	AGM
9	Vijay Jagtap	MSAMB	ADB Project in charge
10	Manohar Desai	MSAMB	Engineer, Civil department
11	Sudhir Kosalge	MSAMB	Engineer, Civil department
12	Aditi Paul	GT	Expert on environment and climate change
13	Mohan Bhagwat	GT	Expert on environment and climate change

14	Surbhi Dhingra	GT	Social Development and Safeguard Specialist
15	Rishabh	GT	Assistant Manager
16	Sarang Tambhale	GT	Senior Associate

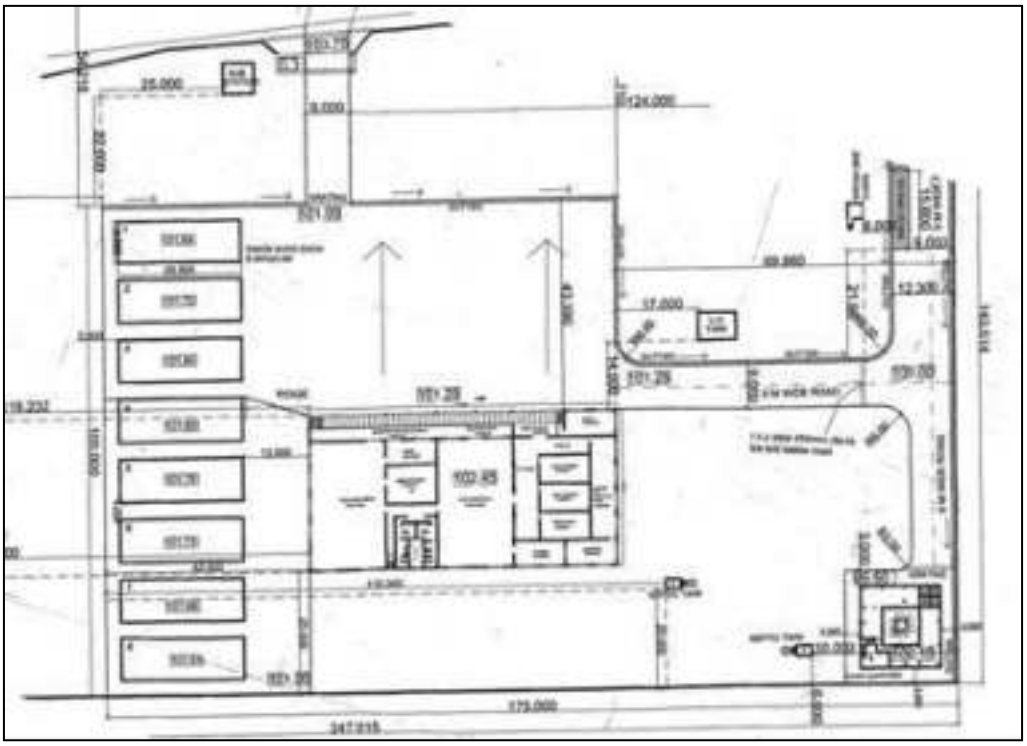
Appendix 6: Site Plans of Selected Facilities

Nashik division

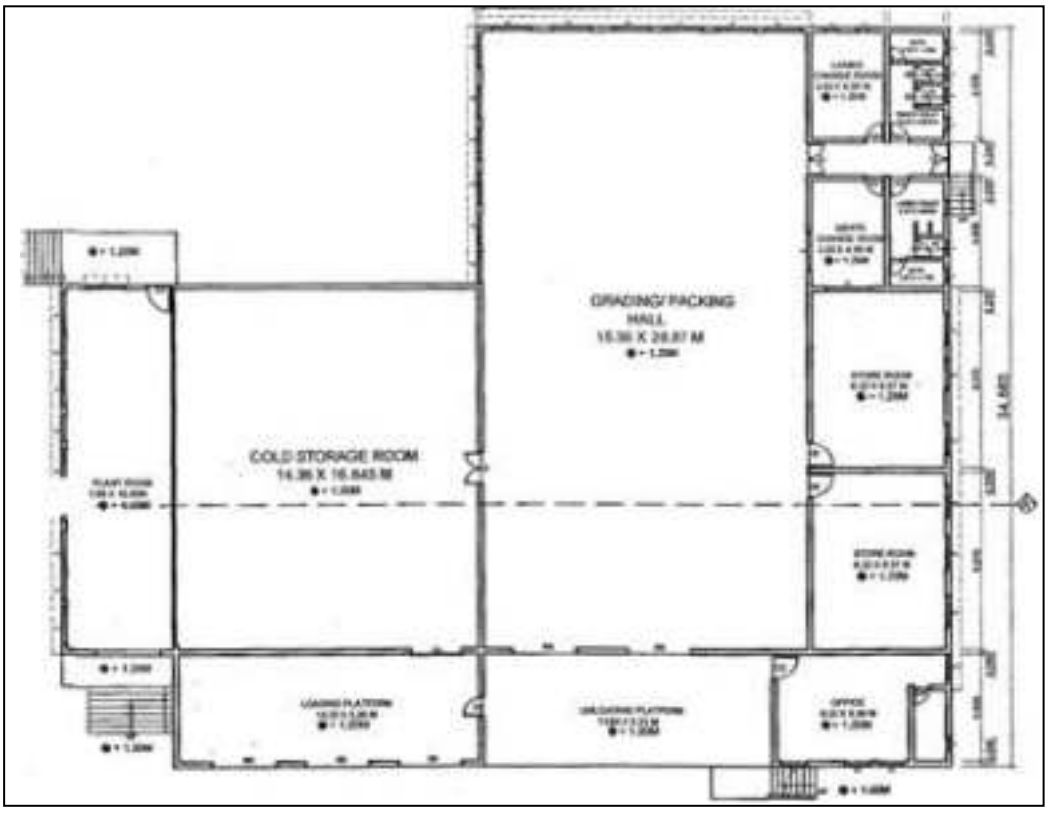
Export facility centre – Mohadi



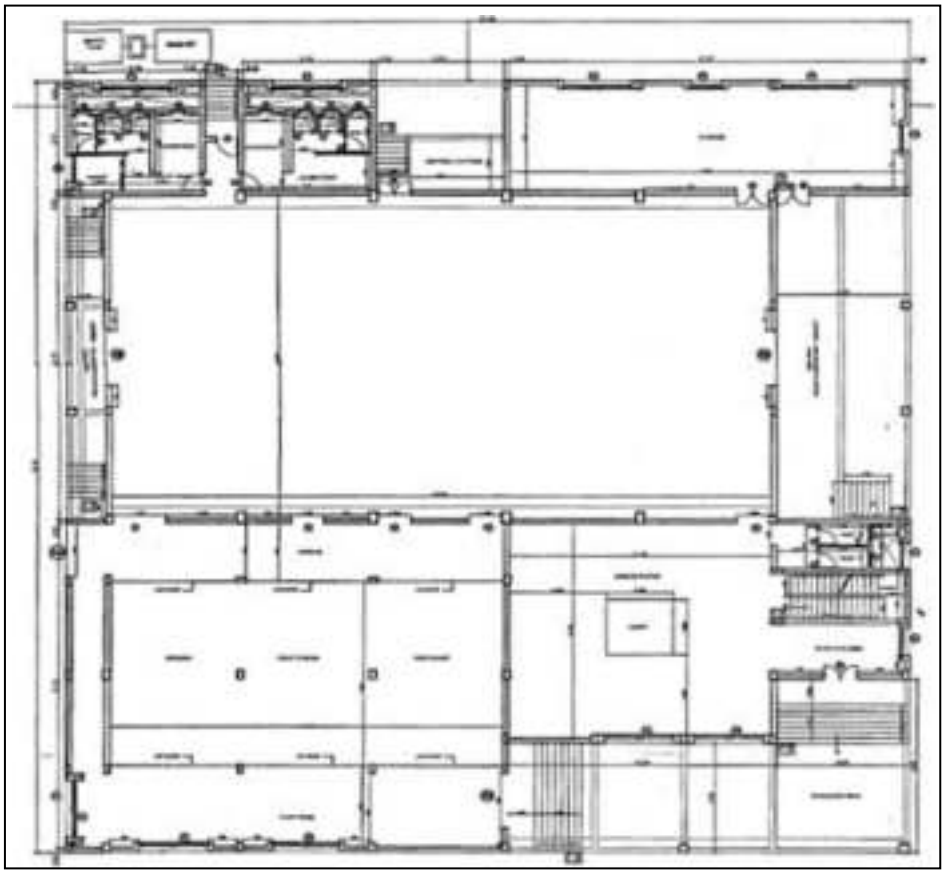
Export facility Centre - Kalvan



Export facility Centre – Chandwad

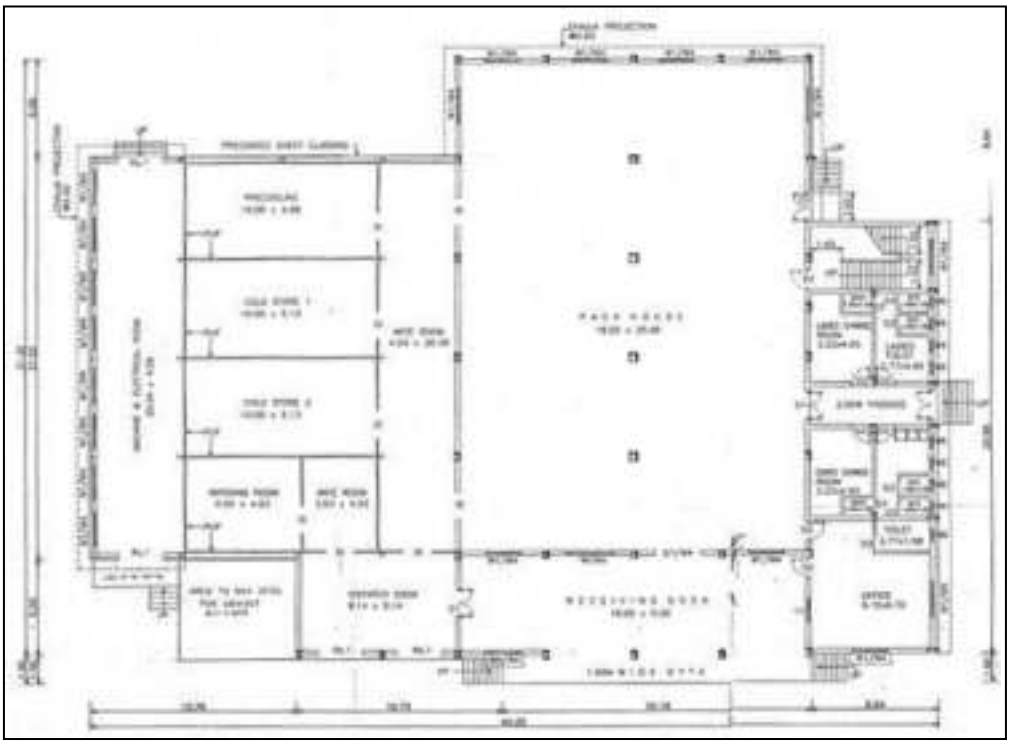


Export facility Centre, Savda



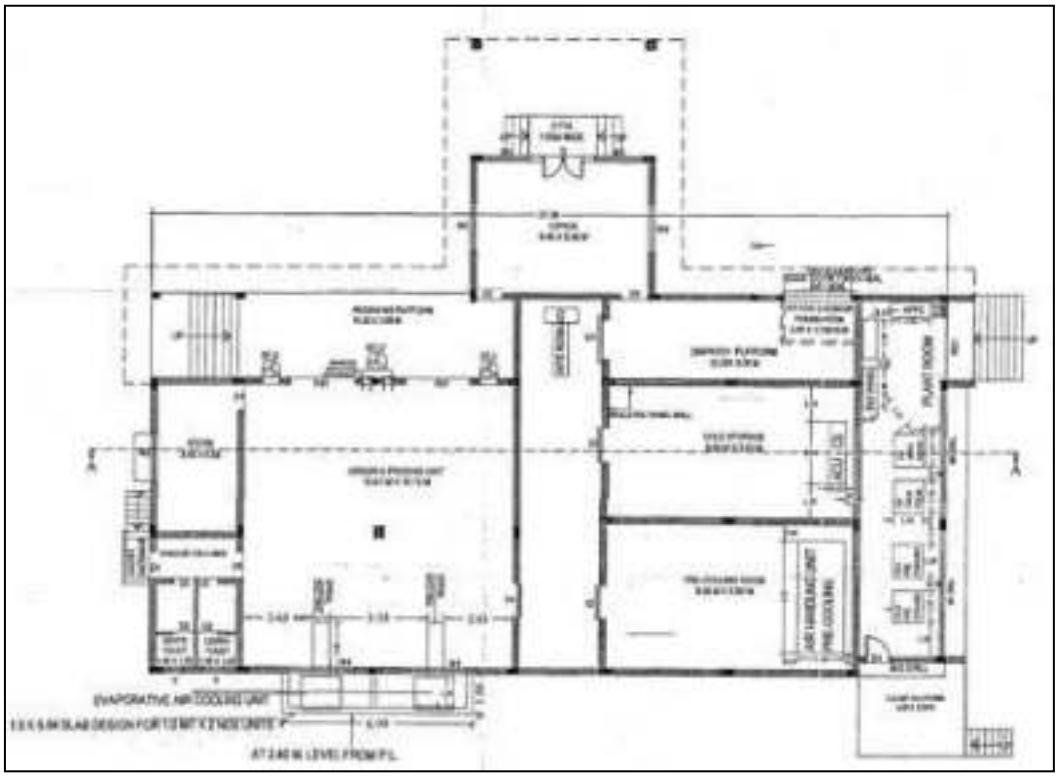
Aurangabad division

Export facility centre Jalna

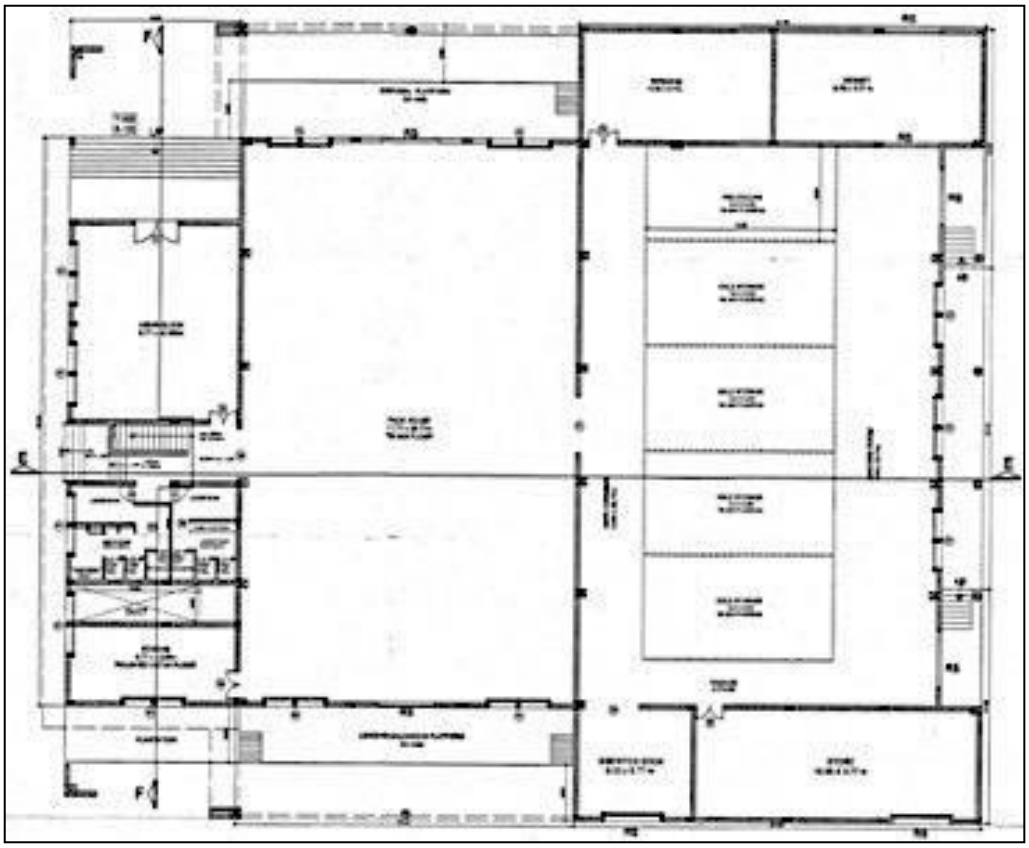


Latur division

Export facility Centre Ardhapur



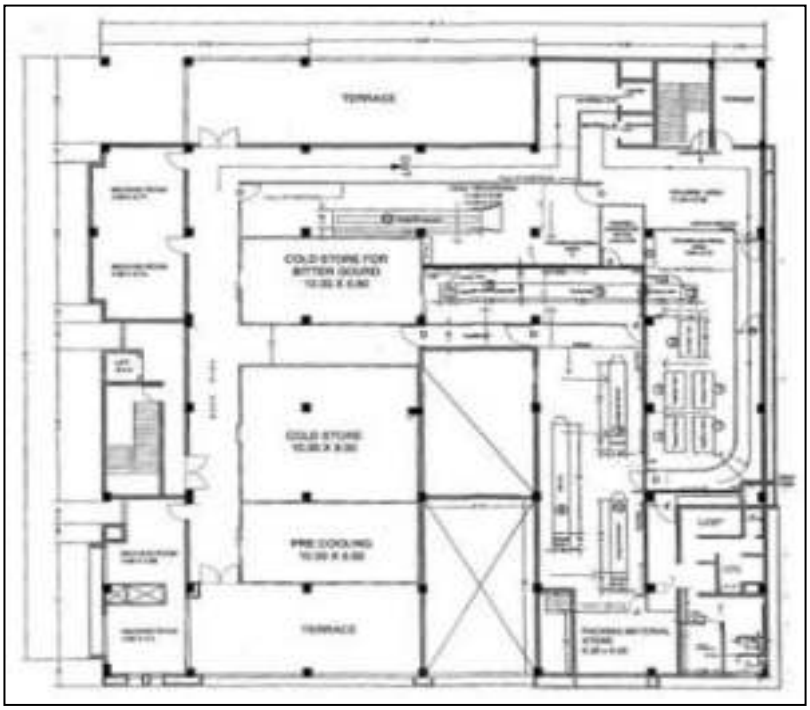
Export facility Centre Latur



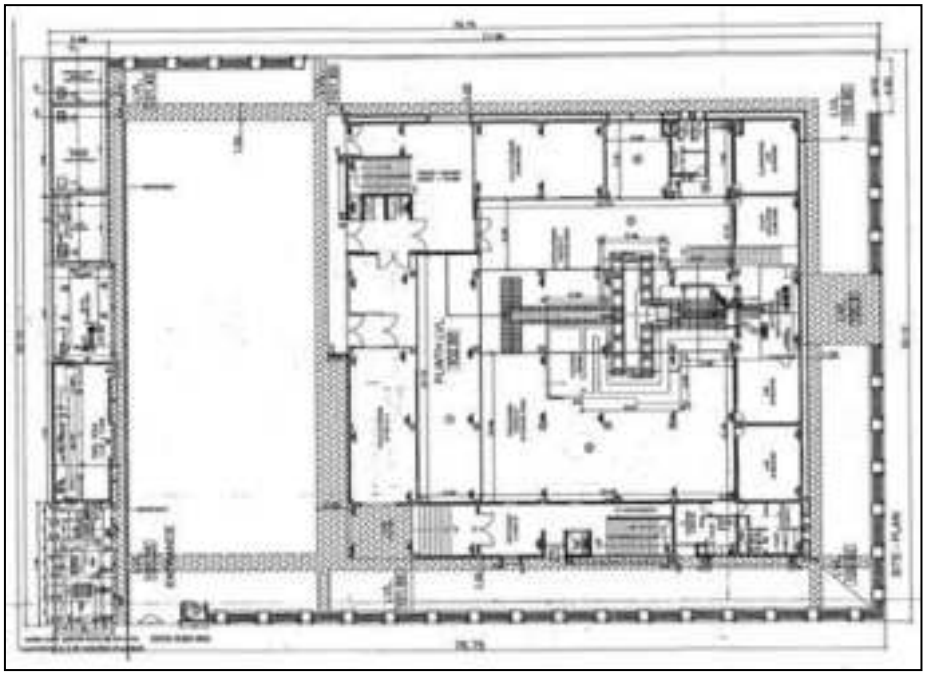
Ratnagiri division

Vapor Heat Treatment Facility, Vashi

Vegetable processing facility, Vashi

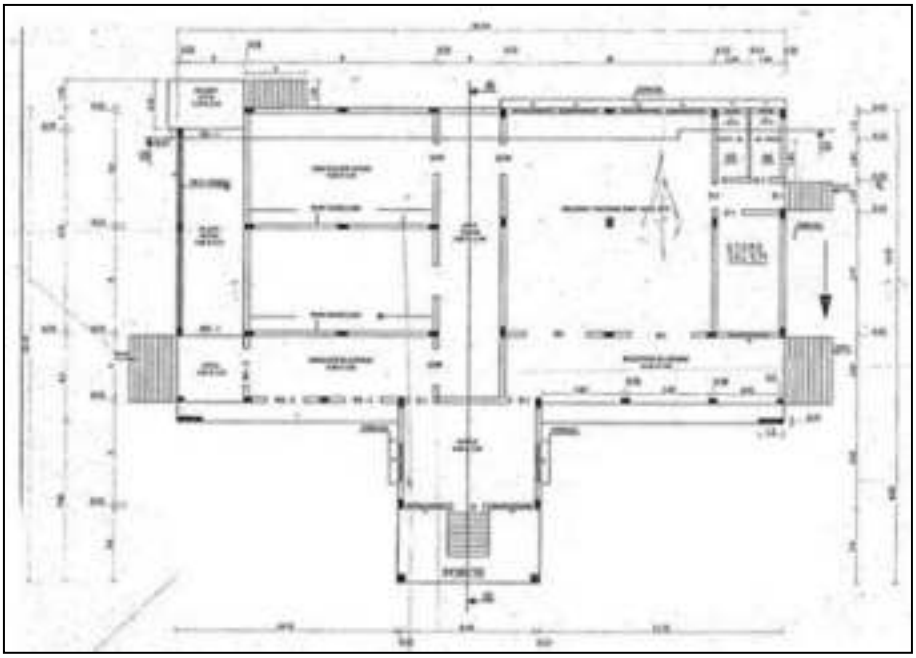


Irradiation facility Centre



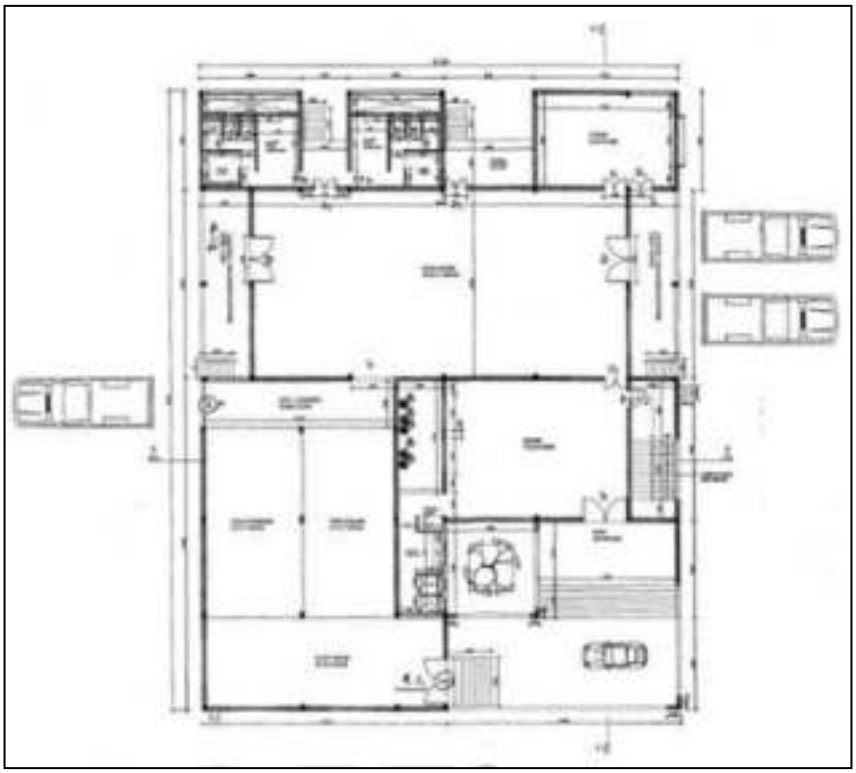
Amravati division

Export Facility Centre, Chandur railway



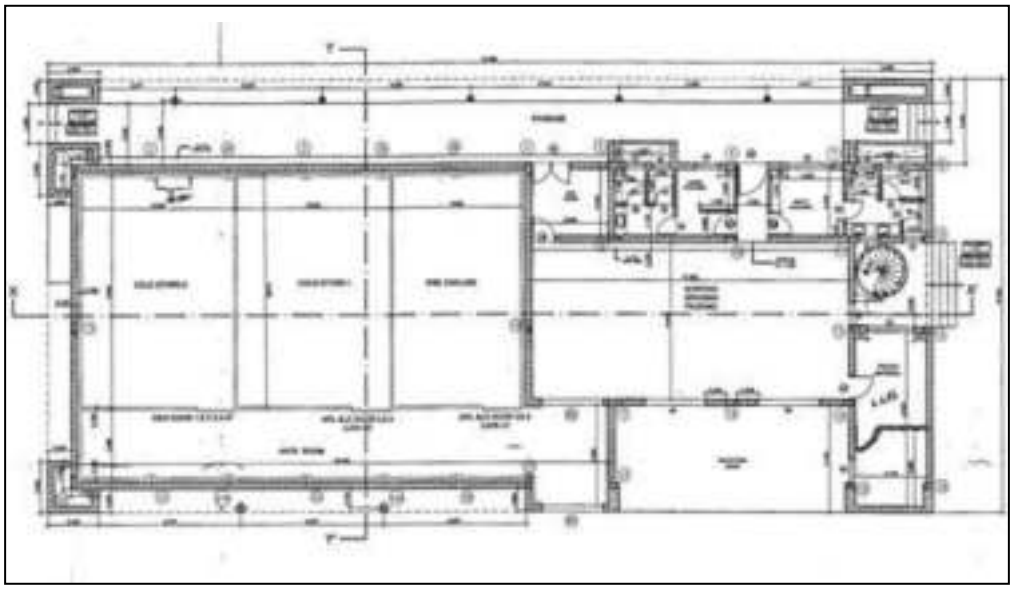
Nagpur division

Export facility Centre, Karanja Ghadge

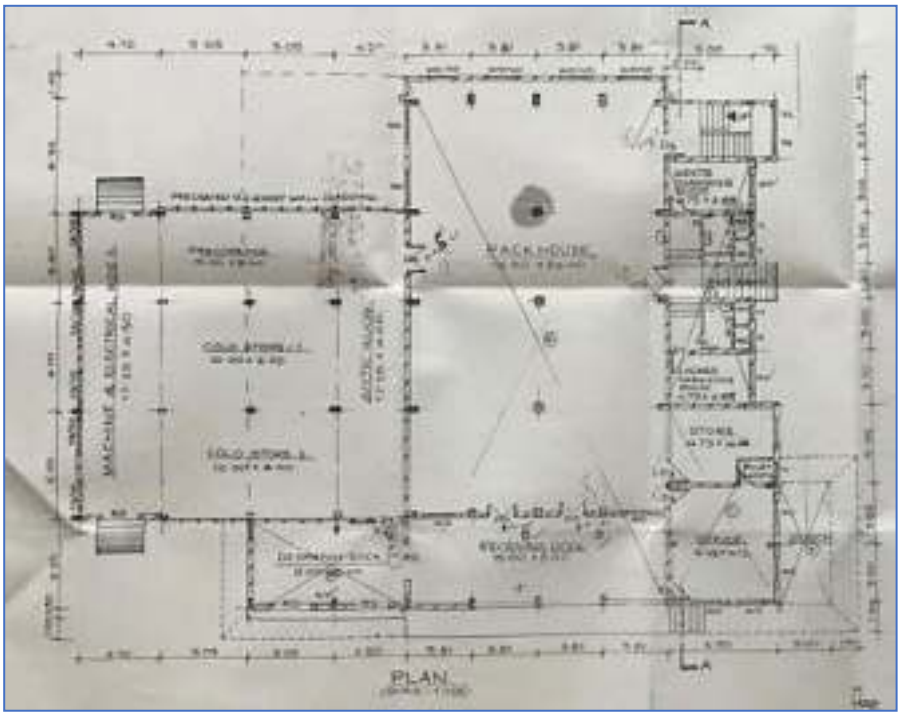


Pune division

Export facility centre Talegaon Dabhade

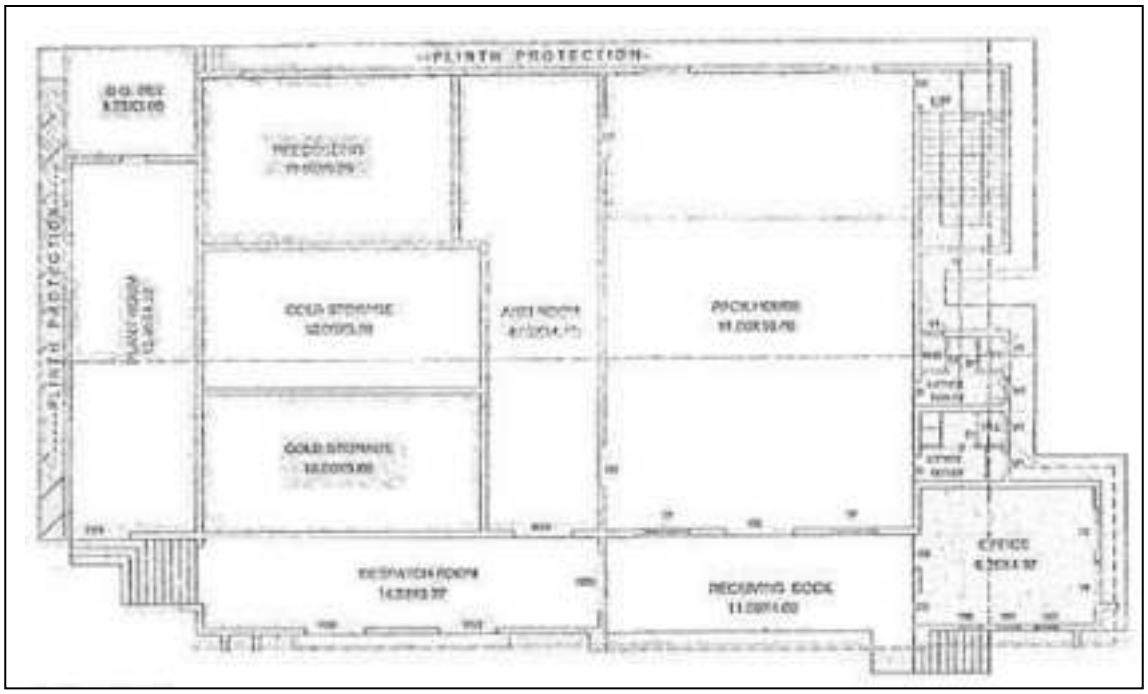


Export facility Centre Baramati



Kolhapur division

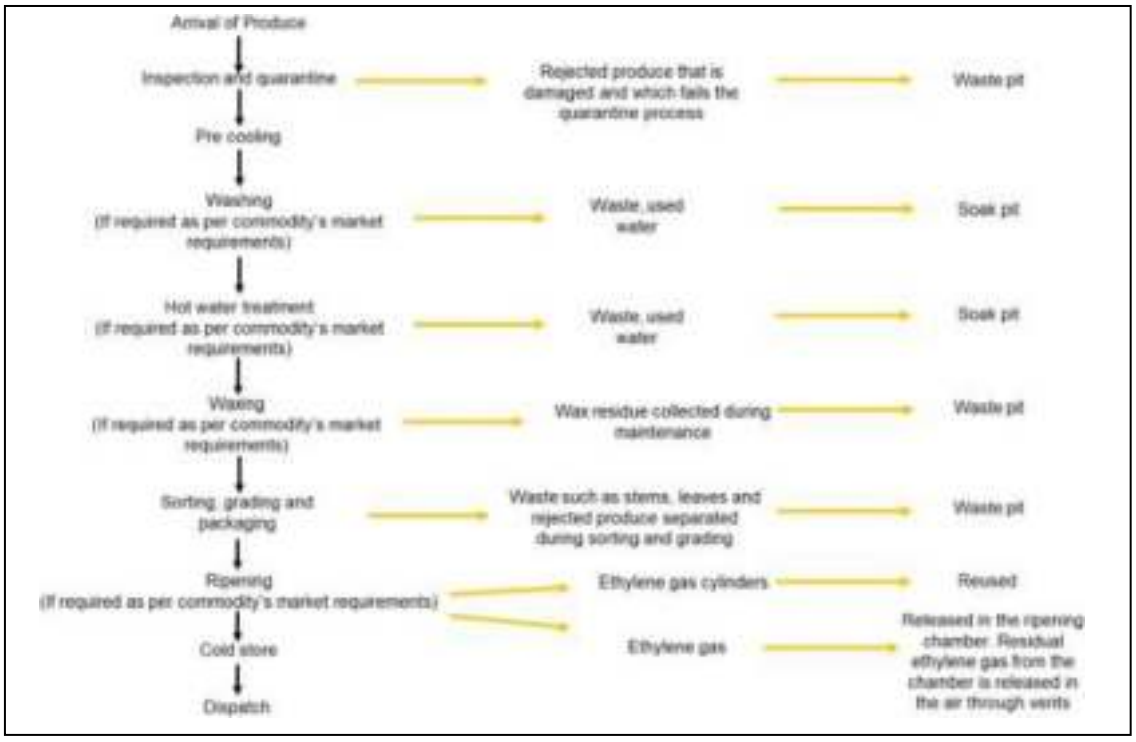
Atpadi export facility Centre facility layout

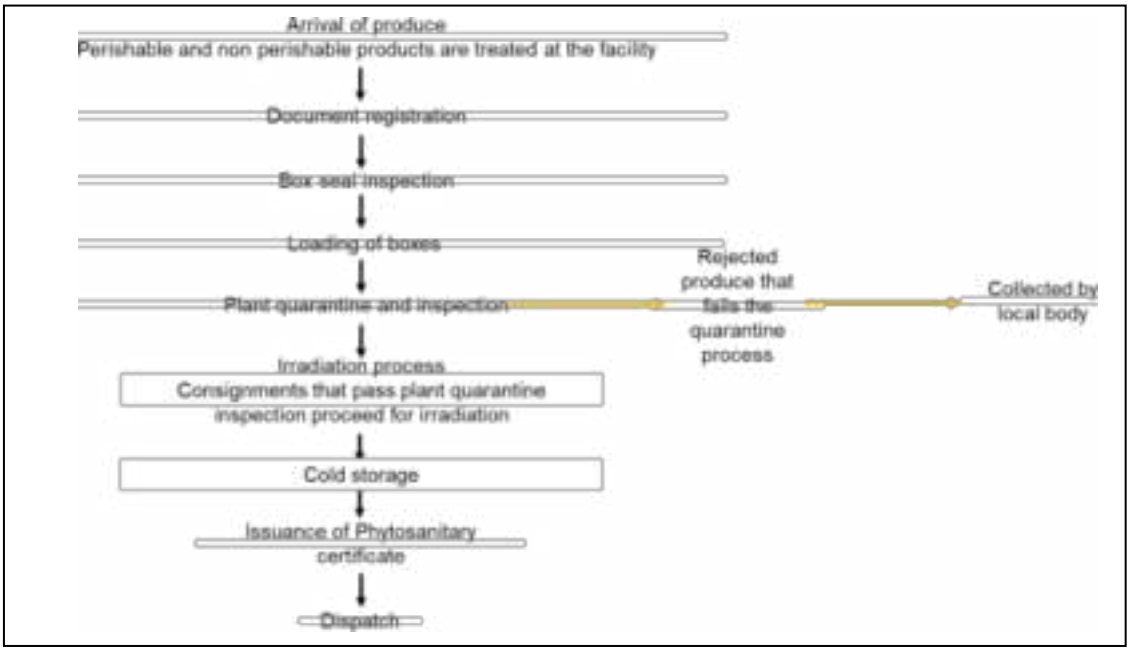


Appendix 7: Process Flow Diagrams of MSAMB Facilities

Process flows taking place at MSAMB facilities

The process flow diagrams depict the flow of produce through various primary processing stepsand disposal of waste materials.





Appendix 8: Common Clauses Applicable to MSAMB facilities

The land allocated by APMC/ Farmer co – operative union is leased to MSAMB. MSAMB will have the right to construct required facilities or any other use. AMPC/ Farmer co – operative union will not raise any objections.

1. After construction of the facilities, the facilities will be operated by any third-party subject to MSAMB's discretion. APMC will not interfere with it.

2. MSAMB if required can pledge this land for raising/ availing loan and APMC/ Farmer co –operative union will not object and APMC/ farmer co – operative union will co-operate with MSAMB for availing of such a loan. It is mandatory on APMC/ farmer co – operative union to provide all kind of required documents to MSAMB for availing loan. However, if government's permission is necessary for such loan MSMAB will be responsible to seek such permission from government. If loan availed, then MSAMB will be responsible to repay such loan.

3. APMC/ farmers co – operative union has sub leased this land. However, for any land dispute raised, APMC/ farmer co – operative union will be responsible for such court cases, appeals thereof. Expense for such disputes, court cases will be borne by APMC/ Farmer co – operative union. For any decision related to such disputes APMC/ farmer co – operative union will seek permission of MSAMB, its mandatory for APMC to take prior permission of MSAMB for such cases.

4. While erecting project on leased land if any third party (may be member of APMC/ Farmerco – operative union committee itself or any other institute) or any individual raises objection or creates hinderance in erecting project APMC/ Farmer co – operative union will resolve such dispute. Any expenses for such dispute will be borne by APMC/ Farmers co – operative union.

5. All types of government taxes, local self – government taxes will be borne by APMC. If such land is given to private investor for development on PPP basis then such expense (taxes) will be borne by that private investor.

6. If MSAMB constructs agricultural commodity handling facility then after completion of suchproject MSAMB will bear expenses towards property tax, N/A (Non-agriculture land conversion fee) and other taxes.

7. MSAMB will not have any authority to sell, transfer title of land to any third party.

8. Expenses for this sub lease (stamp, registration fees) will be borne by MSAMB.

Appendix 9: Environmental Audit

A. Executive Summary

1. Maharashtra Agribusiness Network Project (MAGNET) is proposed for funding by the Asian Development Bank (ADB). aims to improve the networks of post-harvest facilities and marketing management for the ten selected value chains. They are – banana, custard apple, green and red chilies, guava, okra, orange, pomegranate, sapota, strawberry, and sweet lime.

2. The project targets to support farmer producer organizations (FPOs) and achieve averageagriculture sector growth rate of 5 per cent, promote agriculture produce export, and establish fair, competitive, and accessible agriculture markets. ADB has engaged Grant Thornton, to support the State government and ADB for designing and preparing the loan for MAGNET Project,and this Initial Environmental Examination (IEE) is part of the preparation deliverable.

3. The Core Outputs of the MAGNET Project are:

- **Output 1: Institutional, technical, and marketing capacities of agribusiness institutions and FPOs strengthened** – Through this component the project will address the need for capacity building and provide advisory services on (a) policyreforms on post-harvest handling, food processing and climate resilient measures; (b) crop-specific guidelines on harvest quality, postharvest handling, climate change adaptation and relevant certification; (c) introduction of best practices to enhance productivity, quality, safety and climate compatibility to meet the market/export requirements; (d) support on FPOs' business plan improvement and organizational/financial management capacity enhancement particularly for FPOs led by women; (e) training on the latest agriculture technologies on cultivation and agribusiness marketing; and (f) leadership training and buyer-seller meets to enhance links and supply arrangement between committed buyers and FPOs.

- **Output 2: Access to finance of FPOs and value chain operators (VCOs) strengthened** – This component includes the following activities: a) provision through selected PFIs of investment and working capital sub-loans to beneficiaries;and b) provision of matching grants to beneficiaries.

- **Output 3: Agriculture value chain infrastructure improved and operational for the target horticulture crops** – The component focuses on attending the needof capacity and productivity enhancement of the existing facilities of Maharashtra State Agriculture Marketing Board (MSAMB) and National Institute of Post-HarvestTechnology as well as development of new infrastructure to meet the demand forpost-harvest handling and agribusiness. The component includes –

(a) expansion and modernization of the seventeen (17) identified facilities across the State, (b) develop three (3) new facilities as major capacity addition (at Baramati, Pachod and Beed) cold-chain and packhouse segment, and (c) strengthen the existing post-harvest management training facility at Talegaon, Pune. The entire component includes planning, designing and implementation of all civil construction work in a manner that is climate compatible and mitigates disaster risks.

4. For the proposed interventions involving facilities that already exist, the IEE has documented environment compliance audit and on-site assessment, to identify concerns relatedto impacts on the environment. The objective of the compliance audit is to determine whether actions were in accordance with ADB's safeguard principles and requirements, in order to identify and plan appropriate measures to address outstanding compliance issues. Where noncomplianceis identified, a corrective action plan agreed on by ADB and the MSAMB will be prepared. The plan will define necessary remedial actions, the budget for such actions, and the time frame for resolution of noncompliance.

5. Including a training facility at Talegaon Pune, there are twenty-one (21) sites, which either modernisation of the units and/or expansion have been proposed. There are 17 facilities that aresubject of the environmental audit (s.no. 1 – 16). The table below highlights the location of the facilities, and indicates those facilities that will undergo modernization and those will undergo both modernization-expansion works:

Table 1. Target facilities under Output 3 for modernisation and/or expansion.

S. No.	Name of the Facility	State District	Works Summary
1	Modern facility Centre, Karmad	Aurangabad	Only modernization of the processes with minor civil works for installation of Rain Water Harvesting System and construction of Storm Drains
2	Modern facility Centre, Ardhapur	Nanded	
3	Export facility Centre, Latur	Latur	
4	Irradiation Facility Centre (IFC)	Thane	Additional radiation dosage capacity and strengthen allied equipment
5	Vegetable Processing Facility (VPF)		
6	Vapor Heat Treatment (VHT) Centre		
7	Export facility Centre, Mohadi		
8	Export facility Centre, Kalvan		

S. No.	Name of the Facility	State District	Works Summary
9	Export facility Centre, Chandwad	Nashik	Expansion and modernization along with installation of Rain Water Harvesting system and Storm Water drains
10	Export facility Centre, Jalna	Jalna	
11	Export facility Centre, Savda	Jalgaon	
12	Modern facility Centre, Chandurrailway	Amravati	
13	Orange Export facility Centre, Karanja Ghadge	Wardha	
14	Export facility Centre, Baramati	Pune	
15	Export facility Centre, Talegaon		
16	Export facility Centre, Atpadi	Sangli	
17	Additional Facility for Custard Apple,Beed	Beed	New facility adjoining to existing facility within the existing premise. No new acquisition of land required
18	Fruits & Vegetables Handling Facility Centre, Baramati	Pune	
19	Strengthening of training facility at National Institute of Post-Harvest Technology (NIPHT)	Pune	
20	Fruits and Vegetable Handling FacilityCentre, Pachod	Aurangabad	New facility on new parcel of land being leased by APMC
21	Export Facility Centre, Warud	Wardha	Modernization of packhouse and APEDA certification

6. As per Government of India's, Environmental Impact Assessment (EIA) Notification 2006,buildings with built-up area of more than 20,000 sq. mts. are categorised as Category B project and should undertake detailed EIA study. All other building constructions are required to follow general rules without any mandatory requirement to undertake EIA study. As the built-up area of all proposed buildings (proposed under Output 3) are way below 20,000 sq. mts., the civil worksinvolved does not trigger the applicability of EIA Notification 2006.

B. Description of Existing Facilities

B.1. Existing Facility

7. MAGNET is aimed to support the development of horticulture sector and agribusiness through promoting value addition in post-harvest segments of targeted horticulture value chains,facilitate agribusiness investment, stimulate FPOs and value chain operators within the value chain, support resilient horticulture production systems and enhance private sector participation.The project has identified 10 key crops namely, Pomegranate, Banana, Guava, Orange, Sweet lime, Sapota, Custard Apple, Strawberry, Okra, Green and Red Chilies and a number of post- harvest facilities that shall be upgraded to promote value addition and exports of select value chains.

8. The Output 3 focuses on improving post-harvest infrastructure by expansion and modernization of 17 existing select facilities of MSAMB across 7 districts. The locations of these facilities are shown on the map below.

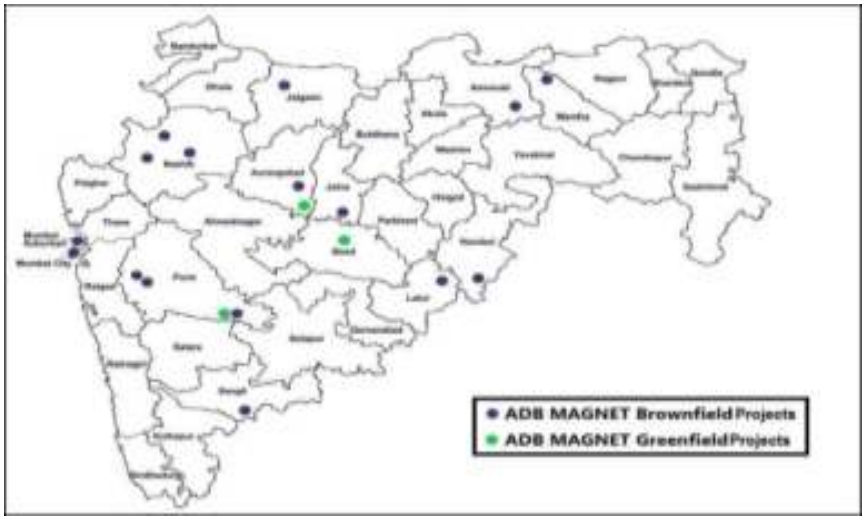
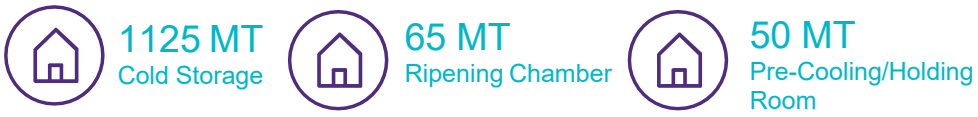


Figure 1: Locations of the proposed projects under Output 3 of MAGNET Project.

9. MSAMB has 44 such facilities in various regions of the state considering the climate and production of fruits and vegetables in the region. This includes 21 export facility centres (out of which only 17 are being modernized), 20 fruit and vegetable modern market facility centre and 3Flower export facility. With these facilities the state has established 1919 MT's Cold Storage, 225 MT of Pre-cooling and 200 MT of Ripening chamber capacity has been developed in the state byMSAMB. About 60,000 MT's plus agri commodities have been handled through facilities for export and domestic market purpose.

10. Under this project, 17 export facility centres shall be upgraded with the total investment ofINR 198.30 crores leading to increased capacity for cold storage, ripening chambers and pre- cooling while other modifications and repairs are also proposed for select locations along with addition of required utilities such as pallets, crates, dock levellers, conveyor system etc. Furthermore, one greenfield facility, and 3 brownfield expansion are proposed with a total investment of INR 132.37 crores. Apart from this, the training centre of MSAMB will also be strengthened. Theproposed upgradation in post-harvest capacities of Maharashtra is:



B.2. Locations of the existing MSAMB facilities

11. The various locations of the facilities proposed for expansion and modernization are indicated with geographic coordinates as follows:

Table 2. Geographical Coordinates of the facilities.

S.NO	Name of the Facility	State District	Location	Geographical Coordinates
Existing Facilities				
1	Export facility Centre, Mohadi	Nashik	APMC, Dindori, Submarket, Mohadi area, Gate No 1286, Taluka – Dindori	20°08'23.3"N 73°53'34.0"E
2	Export facility Centre, Kalvan		At Post Bhendi Taluka - Kalvan	20°29'41.9"N 74°04'31.1"E
3	Export facility Centre, Chandwad		APMC, Chandwad, A/P-Chandwad, Taluka - Chandwad,	20°19'01.0"N 74°15'22.8"E

S.NO	Name of the Facility	State District	Location	Geographical Coordinates
4	Export facility Centre, Savda	Jalgaon	Survey no.329, 330, 331, 332, APMC Rawer Taluka - Raver	21°09'16.6"N 75°53'03.4"E
5	Export facility Centre, Jalna	Jalna	APMC Jalna, Market yard, Taluka – Jalna	19°52'29.5"N 75°53'45.7"E
6	Modern facility Centre, Karmad	Aurangabad	APMC, Aurangabad, Submarket Karmad Peth, Taluka - Karmad	19°52'03.4"N 75°32'07.7"E
7	Modern facility Centre, Ardhapur	Nanded	APMC, submarket yard Ardhapur, Taluka - Ardhapur,	19°15'38.7"N 77°21'31.2"E
8	Export facility Centre, Latur	Latur	Maharashtra Industrial Development Corporation, Latur	18°23'12.4"N 76°29'18.3"E
9	Irradiation Facility Centre (IFC)	Thane	Ground floor, Plot no 3, Sector 19 F, Vashi, Navi Mumbai	19°04'58.7"N 73°00'42.8"E
10	Vegetable Processing Facility (VPF)		1st floor, above IFC premises	
11	Vapor Heat Treatment (VHT) Centre		Niryat Bhavan, Vegetable Market, APMC Premises, Sector 19, Vashi	19°04'29.5"N 73°00'35.3"E
12	Modern facility Centre, Chandur railway	Amravati	Chandur Railway, Pragane Manjarkhed, Kasba, Taluka - Chandur Railway	
13	Orange Export Facility centre, Warud	Amravati	MIDC – Warud	21°29'03.8"N 78°14'44.3"E
14	Orange Export Facility Centre, Karanja Ghadge	Wardha	APMC Ashti Taluka – Ashti	21°09'51.9"N 78°25'40.6"E
15	Export facility Centre, Baramati	Pune	APMC Baramati, Jalochi, Taluka - Baramati	18°08'40.7"N 74°36'47.3"E
16	Export facility Centre, Talegaon		Horticulture Training Centre, Talegaon Dabhade, Taluka - Maval	18°43'20.5"N 73°39'44.1"E
17	Export facility Centre, Atpadi	Sangli	APMC Atpadi, Taluka Atpadi	17°25'41.1"N 74°55'09.8"E

S.NO	Name of the Facility	State District	Location	Geographical Coordinates
New Proposed Facilities				
18	Additional Facility for Custard Apple	Beed	****Brownfield expansion***, adjoining to existing Export Facility Centre, APMC, Beed !	19°01'07.6". 75°46'31.2"E
19	Fruits & Vegetables Handling Facility Centre, Baramati	Pune	****Brownfield expansion***, adjoining to existing Export Facility Centre, APMC, Baramati, Jalochi, Taluka – Baramati	18°08'41.8"N 74°36'45.7"E
20	Strengthening of training facility at National Institute of Post- Harvest Technology (NIPHT)	Pune	****Brownfield expansion***, adjoining to existing NIPHT, Talegaon Dabhade, Taluka – Maval	18°43'17.0"N 73°39'45.4"E
21	Fruits and Vegetable Handling Facility Centre	Aurangabad	****Greenfield project site***, APMC Paithan Submarket Pachod, Taluka- Paithan. (Land provided by APMC)	19°34'01.3"N 75°37'40.2"E

12. None of the existing project sites are located within any eco-sensitive zones such as forestor wildlife habitats and migration corridors of wildlife. None of the facilities have forests wildlife or eco-sensitive locations within 15-20 km radius around each individual facility. However, in case of Vashi based facilities, the Thane Creek Flamingo Sanctuary is at 10km from the 3 existing facilities at Vashi in Navi Mumbai being in vicinity of Thane creek. But since the facilities are already existing and no major expansion work is proposed together being the fact that these facilities exist in approved commercial and industrial sectors of Vashi by MMRDA (Mumbai Metropolitan Regional Development Authority).

13. None of the existing facilities including the Vashi locations fall in the vicinity of building orstructures of cultural or heritage importance. Neither do they have archaeological sites and placesof tourist's importance.

14. The individual description of the facility are as follows:

B.1.1. Mohadi Export Facility Centre, Nashik

15. Mohadi Export Facility centre was established in 2014 on a plot size of 8,000 sq. m. withcurrent utilized area of 1571. Sq. m. The proposed expansion/ modernization includes setting upof 250 MT of cold storage, Holding Room of

20 MT, Pre-cooling chamber of 5 MT Plastic Pallets,Electric Hydraulic Pallet and other utility items. The facility has been leased to Nature One FreshProduce Pvt. Ltd. For a period of 10 years since 2014 to 2024. The facility is mainly used for primary processing of Grapes. The grapes season extends from December to May depending upon the time of grafting operation. This export facility is used for mainly for grapes while other fruits and vegetables such as pomegranate, chilies and okra are also packed and for exports. Thetotal proposed investment for the modernization of the facility in INR 490.12 Lakhs.

B.1.2. Kalvan Export Facility Centre, Nashik

16. Kalvan Export Facility centre was established in 2012 on a plot size of 17,500 sq. m. with current utilized area of 2042. Sq. m. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, Pre-cooling chamber of 10 MT Plastic Pallets, Electric Hydraulic Pallet and other utility items. The facility has been leased to M/s Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processingof variety of horticulture crops including grapes onion, tomato, chilly and okra from September toFebruary. The total proposed investment for the modernization of the facility in INR 489.19 Lakhs.

B.1.3. Chandwad Export Facility Centre, Nashik

17. Chandwad Export Facility centre was established in 2015 on a plot size of 8000 Sq. m. with current utilized area of 1512 Sq. m. The proposed expansion/modernization includes settingup of 2 x 50 MT of cold storage, conveyor belt a shed of 700 Sq. The facility is non-operational from some years. The facility is mainly used for primary processing of variety of horticulture crops including grapes onion, tomato, chilly and okra from September to February. The total proposedinvestment for the modernization of the facility in INR 204.87 Lakhs.

B.1.4. Savda export facility centre, Jalgaon

18. Savda Export Facility centre was established in 2009 on a plot size of 8000 Sq. m. with current utilized area of 1403. Sq. m. The proposed expansion/modernization includes setting upof 2 x 25 MT of cold storage, Pre-cooling chamber of 10 MT, a shed, Plastic Pallets, Electric Hydraulic Pallet and a training hall with the required items for training. The facility has been leasedto M/s Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainlyused for primary processing of variety of horticulture crops including Banana and Maize from October to May. The total proposed investment for the modernization of the facility in INR 695.11Lakhs.

B.1.5. Vegetable processing centre, Vashi, Thane

19. Vegetable processing centre, Vashi was established in 2016 on the 1st floor of MSAMB complex in Navi Mumbai with on a 1418.39 Sq. M. area. The proposed expansion/modernizationincludes setting up of CCTV cameras for better flow of goods and to enhance security, a spiral staircase and a goods lift. The facility is owned and operated by MSAMB itself. The facility is mainly used for primary processing of variety of vegetables such as Okra, various types of gourds,Tomatoes and leafy vegetables. The facility can be used all year long. The total proposed investment for the modernization of the facility in INR 100.91 Lakhs.

B.1.6. Vapor heat treatment, Vashi, Thane

20. Vapor heat treatment centre, Vashi was established in 2016. It is based on the 2nd floor ofthe MSMAB complex in an area of 3779 Sq. m. The proposed expansion/modernization includes setting up of 125 MT of cold storage, quarantine lab equipment, conveyor belt, automatic doors, plastic pallets, electric hydraulic pallet truck. The facility owned and operated by MSMAB. The facility is mainly used for vapor heat treatment of Mangoes, Custard apples and Guavas from March to May and July to September. The total proposed investment for the modernization of thefacility in INR 145.95 Lakhs.

B.1.7. Irradiation facility centre, Vashi, Thane

21. Kalvan Export Facility centre was established in 2016 on a plot size of 4000 Sq. m. with current utilized area of 2946. Sq. m. The proposed expansion/modernization includes enhancement of source capacity, installation of temperature control system, addition idler conveyor system, installation of person and product scanning system, atomized material handlingand storage racks, atomized doors at the loading and unloading area, auto dock levellers, packhouse to irradiation facility, plastic pallets, electric hydraulic trucks and conveyor belts. The facility is owned and operated by MSAMB. The facility is mainly used for irradiation of Mangoes, Onions, spices, ready to eat food items, etc. The perishable food items that are to be exported to Australia and USA are irradiated. The total proposed investment for the modernization of the facility in INR 92.52 Lakhs.

B.1.8. Latur export facility centre, Latur

22. Latur Export Facility centre was established in 2010 on a plot size of 10,370 Sq. m. With current utilized area of 2320. Sq. m. The proposed expansion/modernization includes modification to ripening chamber, humidity, CO2 controller, Ethylene controller, plastic pallets, Electric hydraulic Pallet truck, Upgradation of compressors of cold storage, dock levellers, dock seal and

training hall. The facility has been leased to RJS FPC for a period of 2 years since 2017to 2020. The facility is mainly used for primary processing of variety of horticulture crops includingBanana, Citrus fruits and repacking of apples from August to February. The total proposed investment for the modernization of the facility in INR 389.94 Lakhs.

B.1.9. Ardhapur export facility centre, Nanded

23. Ardhapur Export Facility centre was established in 2014 on a plot size of 4000 Sq. m. with current utilized area of 492. Sq. m. The proposed expansion/modernization includes setting up of Humidity, CO2 and Ethylene control, plastic pallets, electric hydraulic pallet truck. The facilityhas been leased to Sheya irrigation Ltd. For a period of 3 years since 2017 to 2020. The facility is mainly used for primary processing of variety of horticulture crops including Bananas from June to December. The total proposed investment for the modernization of the facility in INR 60.42Lakhs.

B.1.10. Karmad export facility centre, Aurangabad

24. Karmad Export Facility centre was established in 2017 on a plot size of 4,000 Sq. m. with current utilized area of 492. Sq. m. The proposed expansion/modernization includes setting up training hall, provision of plastic pallets and electric hydraulic pallet truck. The facility has been leased to Karmad farmer producer company. For a period of 10 years since 2018 to 2028. The facility is mainly used for primary processing of variety of horticulture crops including Green chili, Pomegranate, Tomato, Mosambi from February to November. The total proposed investment forthe modernization of the facility in INR 140.94 Lakhs.

B.1.11. Jalna export facility centre, Jalna

25. Jalna Export Facility centre was established in 2004 on a plot size of 14163 Sq. m. with current utilized area of 1212. Sq. m. The proposed expansion/modernization includes setting partitions for uniflow of goods and materials, holding room, pre – treatment inspection room, material storage room, post treatment inspection room, NPPO office, inspection kits, dock levellers, dock seal, dock door, plastic pallets and electric hydraulic pallet truck. The facility has been leased to AMPC Jalna. For a period of 3 years since 2017 to 2020. The facility is mainly used for primary processing of variety of horticulture crops including Kesar Mangoes and vegetables. Mangoes are processed from March to May. Vegetables are available for the entire year the total proposed investment for the modernization of the facility in INR 117.18 Lakhs.

B.1.12. Atpadi export facility centre, Sangli

26. Atpadi Export Facility centre was established in 2017 on a plot size of 8000 Sq. m. with current utilized area of 682.6 Sq. m. The proposed expansion/modernization includes setting upof 2 x 25 MT of cold storage, plastic pallets, Electric Hydraulic Pallet truck, plastic crates, conveyorbelts and other utility items. The facility has been leased to Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of horticulture crops including Grapes and Pomegranates. Grapes are available from November, December, January. Pomegranates are available all year round. The total proposed investment for the modernization of the facility in INR 297.51 Lakhs.

B.1.13. Talegaon Dabhade export facility centre, Pune

27. Talegaon Dabhade Export Facility centre was established in 2009 on a plot size of 4000 Sq. m. with current utilized area of 578 Sq. m. The proposed expansion/modernization includessetting up of automatic sorting and grading line for Pomegranates, Plastic pallets, Electric hydraulic pallet truck, Ripening chambers for Banana 4 x 20. The facility has been leased to Nisarg Fresh Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processing of variety of horticulture crops including Grapes, Pomegranates, Mango, Onion and vegetables in their respective seasons. Vegetable are available all year round. The total proposed investment for the modernization of the facility in INR 452.32 Lakhs.

B.1.14. Baramati Export facility centre, Pune

28. Baramati Export Facility centre was established in 2007 on a plot size of 6350 Sq. m. with current utilized area of 1003.33 Sq. m. The proposed expansion/modernization includes setting up of 4 x 20 MT of ripening chamber, Training hall, Plastic Pallets, Electric Hydraulic Palletand other utility items. The facility has been leased to APMC Baramati. For a period of 10 years since 2014 to 2024. The facility is mainly used for primary processing of variety of horticulture crops including Grapes, Pomegranates and Mangoes. The facility is operational all year round except a few months during monsoon season. The total proposed investment for the modernization of the facility in INR 381.53 Lakhs.

B.1.15. Chandur Railway export facility centre, Amravati

29. Chandur Export Facility centre was established in 2012 on a plot size of 17,500 Sq. m. with current utilized area of 2042. Sq. m. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, Pre-cooling chamber of 10 MT Plastic Pallets, Electric Hydraulic Pallet, dock leveller

and other utility items including electrification, internal road network and provisioning for environment planning. The facility has been leased to Satguru Enterprises Ltd. For a period of 10 years since 2017 to 2027. The facility is mainly used for primary processingof variety of horticulture crops including grapes onion, tomato, chilly and okra from September toFebruary. The total proposed investment for the modernization of the facility in INR 280.98 Lakhs.

B.1.16. Export facility Centre, Warud:

30. The facility is currently being operated and maintained by MSAMB, Amaravati division and is seasonally used by FPO (Dr Panjabrao Deshmukh Krishi Shetimaal Prakriya, Panan, Sahakari Sanstha Ltd.) for grading, sorting and waxing of orange followed by precooling and cold storage facility. The unit has following post-harvest facilities - precooling (5 MT operated for 6 hours), grading (2 MT per hour) and a cold storage (25 MT) and a weigh bridge (60 MT). The facility is being prepared for APEDA certification. To meet APEDA requirement the packhouse floor will be modernized with new flooring, additional segregated pre and post inspection rooms, holding room and ergonomically well-designed toilets.

B.1.17. Karanja Ghadge export facility centre, Wardha

31. Karanja Ghadge Export Facility centre was established in 2014 on a plot size of 4000 Sq. m. with current utilized area of 492.Sq. m. The proposed expansion/modernization includes setting up of 2 x 50 MT of cold storage, Plastic Pallets, grading unit with waxing unit, Constructionof Training hall along with LCD Projector, Sound system, Tables, Chairs with air conditioners, holding room, Pre-treatment inspection room, material storage room, post-treatment inspection room, dock leveller. The facility is mainly used for primary processing of variety of horticulture crops such as Oranges. The total proposed investment for the modernization of the facility is INR 624.21 Lakhs.

B.2. Processes

32. The facilities were built to demonstrate and enable best practices in post-harvest handlingof fresh fruits and vegetable produce. The facilities were also established to provide such infrastructure which requires high capital investment which was not at levels required in the market. Public funded post-harvest infrastructure ensured its access to farmers.

33. The components or facilities provided in these post handling centres correspond to the crops grown in the region, and the post-harvest needs of those crops. Components such as coldstorage, precooling and packhouses are common across all the facilities while components suchas ripening chambers and waxing units are installed as per requirement of the crops grown in those

regions.

34. Post-harvest handling infrastructure was chronically lacking and was a hindrance to growth of the export sector. After establishing such facilities, awareness of the requirement of good practices has increased amongst value chain stake holders and farmers. The usage of suchfacilities has also led to decrease in food waste.

B.2.1. Export Facility

B.2.1.1 Inspection and Quarantine

35. As selected by farmers on the guidelines of Agricultural and Processed Food Products Export Development Authority's (APEDA) SOP, the fruits, and vegetables commodities in loose inplastic crates arrive in trucks and vans from respective farms at the receiving area of the concerned fruit processing facility. The vehicle with laden fruit or vegetable crates is weighed on the weighing scale designated for the purpose after the entrance gate and again weighed after the vehicle is emptied. The difference in weight is noted in the register of the facility duly by the weighing clerk and a paper slip indicating the name, details of the vehicles, commodities weighedand date and time are noted, is handed over to the farmer or his representative.

36. Next, the crates are placed for inspection of the required quality aspects (as per the country of destination and its respective SOP's) and random sampling is done in the presence ofthe government quarantine officer, farmer or representative and MSAMB deputed official to witness the inspection. The randomly selected required quantity of sampled fruits or vegetable commodities are sent for Test Report to prescribed approved laboratory (APEDA-SOP's). After the due test report is received, the study of rejection in weight percentage indicated in the Test Report is examined carefully. If the rejection is more than 10% then entire fruit or vegetable consignment from the concerned farmer is rejected and returned to source.

37. Next step after due examination of Test Report for Quality aspects (of destination country),quarantine officer permits for allowing physical sorting and gradation of the fruit or vegetable consignment. The commodity consignment packed in crates and placed on pallets is admitted toHolding Area of the facility. The commodity is later sorted on the mechanically operated sorting and grading machines into different size categories.

38. Now depending upon the requirement of destination country, the sorted and graded commodity is subjected to either Hot Wash or Gamma Ray Irradiation Treatment as per the destiny countries SOP's. The radiation source utilized is Cobalt-60 (60Co) of strength 500 kCi.

39. Now, there are basically 6 streams of treatment or processing for the commodities as follows:

(i) Dry Clean Process: Here the concerned commodity is cleaned with moist cloth with each individual fruit being cleaned manually by skilled workers. These skilledworkers are employed by the contractor who is awarded operation of the fruit processing facility by MSAMB through bidding process for a specific period of number of years which is generally 3 years.

(ii) Hot Wash facility: The commodity is transferred into suspended crates and given dip into Hot Water at 47^0 C for 3 minutes and then taken out and dried with hot airblower. The hot water is given a dose of Sodium Hypo Solution ($NaHClO_3$) havinga concentration of 200 ppm which serves as fungicide. The hot water is used for 4-5 cycles of cleaning of commodities and then discarded by releasing into municipal sewers. The water is heated with solar heaters and taken connection from a specially built holding tank.

(iii) Vapour Heat Treatment: In this treatment process the crates packed with commodity is admitted into Vapour Treatment Chambers where in water vapour isused to disinfect the commodities of any bacterial or fungal growth. The vapour iscreated with electric heaters and the condensate water is recirculated for vaporisation. The vapour temperature required as per (APEDA SOP) is 47°C. The treatment is done for about 20-25 minutes and then the commodity laden crates are taken out for drying and packing.

(iv) Ethylene Ripening Process: The fruits subjected for export as per destination country and its SOP's are admitted to artificial ripening process using Ethylene (C_2H_4) Gas from commercially available cylinders. Ethylene is released into the Cooling Chamber where the commodity laden crates are stored later, with a concentration permitted by Food Standards & Safety Authority of India (FSSAI) at 100 ppm. The concentration is maintained and controlled using an online monitoring equipment specially required for the purpose. The dosage of ethylene is done for 24 hours and after that it is brought outside for further storage into coldrooms.

(v) Wax Treatment: The commodity destined for specific country requiring wax treatment as per its SOP is admitted to a conveyor which has a small spray fittedover it to administer very small quantum of edible oils (called as wax which solidifyafter sometime) on the fruit skins evenly due to rolling and revolutionary motion. The FSSAI permitted dosage of permitted surface coating with prescribed oils/edible bee wax is 50 milligram/1 kg of fruit processed.

(vi) Gamma Ray-Irradiation: The Irradiation facility at Vashi uses Cobalt-60 (60Co) ofstrength 500 kCi as the source for irradiation. The crates laden with commodities as received from the farmers and after due sampling (randomly

only a few boxes are opened and sampled) the crates loaded with packed fruits and vegetables (APEDA-SOP) at the farmers end are admitted directly for Irradiation Treatment without opening each crate and its packing. The packed boxes are not disturbed and directly exposed to the radiation treatment. The residence time for exposure is about 20 seconds which kills all pathogens and bacterial growth including their larvae and eggs. After the treatment is over the packed cartons are stored into precooling chambers and later to cold rooms.

B.2.1.2. Pre-Cooling

40. The commodities which have undergone treatment or not requiring any treatment are moved to pre-cooling chambers in crates either with paper packing or bare as per the SOPs of destined country. The pre-cooling chambers are loaded with pallets containing crates of packed commodities and the doors are closed. The pre-cooling system uses forced cooling in which air is sucked from the surface of the commodities packed in crates and recirculated at 10-20ºC for about 8 hrs.

B.2.1.3. Cooling

41. The pallets containing the individual crates or cartons from the pre-cooling chambers arewithdrawn and admitted to the cooling chambers where again the commodities are stored in forced air cooling maintained at 2°C to 4°C up to the time they are dispatched either to the sea port or airport as the case may be.

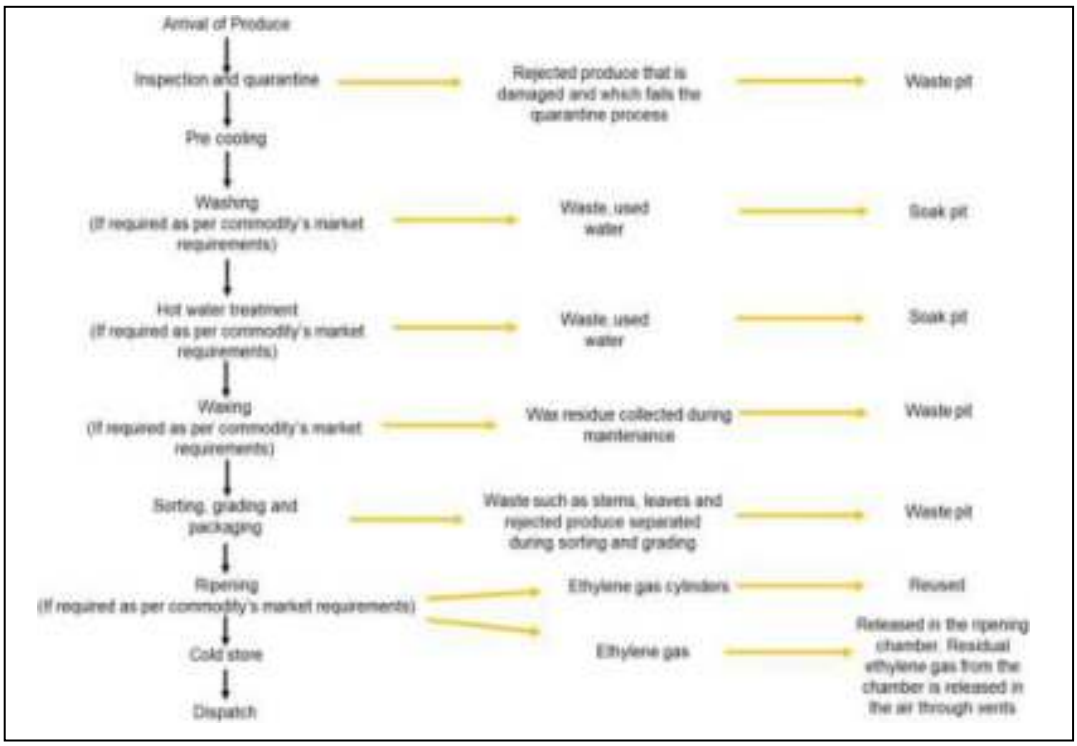


Figure 2. Procedures performed in the export facilities.

B.2.2. Irradiation

B.2.2.1. Document Registration

42. After the Test Report is approved by the Quarantine Officer, the commodity to be exportedis entered into the prescribed register by the Qualified [BRIT (Board of Radiation & Isotope Technology, a Unit of Department of Atomic Energy, Government of India Certified; https://britatom.gov.in/about-us/brit-board)] equipment operator in terms of the consignment weight and name of the fruit or vegetable.

B.2.2.2. Box Seal Inspection

43. After the Irradiation treatment process is over the, individual cartons containing treated fruits or vegetables are pasted with labels in format prescribed by Atomic Energy Regulatory Board guidelines and the details pertaining to name of commodity, country of origin, date of irradiation treatment, weight of carton. This information is filled-in by the Operator, who is designated for the equipment with the seal of the unit or facility handling it, and sealed with tapesfor thorough packing with the printed prescribed document table clearly visible on each carton. The prescribed symbol of the application of Irradiation treatment is ensured to be clearly visible for display on the pasted certificate format along with the completeness for the packing. The details of the consignment batch with individual cartons handled and other aspects such as nameof commodity, farmer, place of origin etc. are entered into the register at the operator's location and kept under lock and key for safe custody.

B.2.3. Dispatch

44. The concerned quarantine official inspects the consignment for final examination to his satisfaction as regards the availability of his certificate and due authentication on the documents required to be examined at either seaport or airport. Further, the completeness about the packingof each carton is ensured by the respective handling contractor for their fulfilling APEDA-SOP's authentication. After the final examination of the consignment is over, the cartons are loaded intotrucks or vans by manual workers for transport to seaport or airport as the case may be.

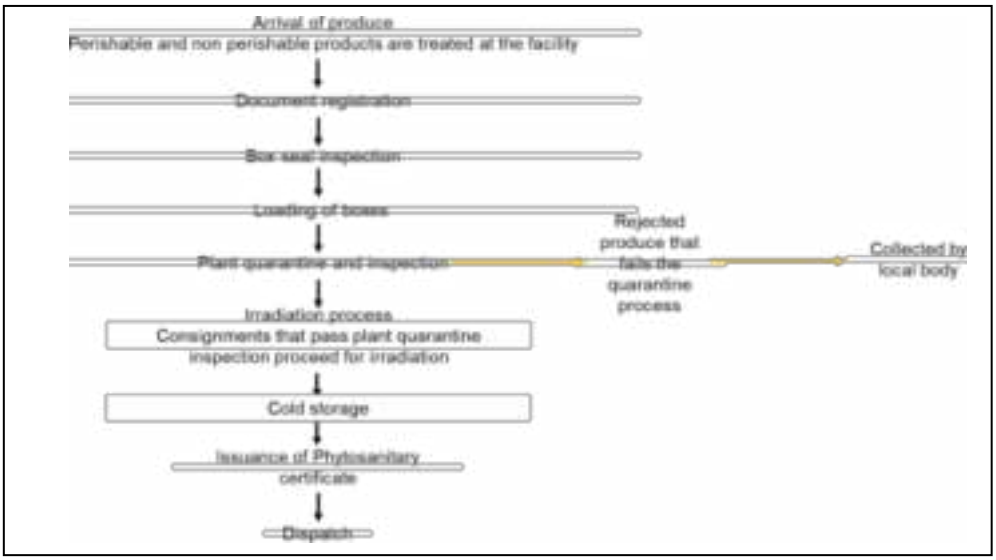


Figure 3. Procedures performed in the irradiation facilities.

C. Policies

The Environment (Protection) Act, 1986, amended in 1991

45. This Act is considered as an umbrella Act as it provisions the issuance of many rules andnotifications, which aims for the protection and improvement of the environment. Under section 3(3), the Act empowers the Central Government to establish authorities in charged with the mandate of preventing environmental pollution in all forms and tackle specific environmental problems peculiar to different parts of the country. Following rules and notifications are of relevance to the project:

- Environmental Impact Assessment (EIA) Notification of 1994 amended in 2006.
- The Noise Pollution (Regulation and Control) Rules, 2000
- The Solid Waste Management Rules, 2016
- Construction and Demolition Waste Management Rules, 2016
- Plastic Waste Management Rules, 2016
- Diesel Generator Set – Emission and Noise Standards, 2002

Environmental Impact Assessment (EIA) Notification, 2006

46. The notification has categorized different construction projects of various sectors to Category A and B based on the spatial extents of the potential impacts on human health, and natural and manmade resources. These projects that falls neither of the categories follows the general conditions stipulated under the notification. Category A projects must obtain Environmental Clearance (EC) from the Central Environmental Impact Assessment Authority. Category B projects are further categorized in B1 and B2. B1 projects should obtain EC from theState Environmental Impact Assessment Authority. Category B2 projects do not need EC from the government. All projects are required to obtain Consent to Operate and Consent to Establishfrom State Pollution Control Boards and relevant local authority.

47. As per EIA Notification 2006, the proposed facilities are categorized under "Building or Construction projects or Area Development projects". According to this category, all buildings withbuilt-up area of more than 20,000 sq. m. are categorised as Category B project and should undertake detailed EIA study. All other building constructions are required to follow general ruleswithout any mandatory requirement to undertake EIA study. Since the scope and scale of expansion of the existing facilities, including brownfield and greenfield projects are below threshold of 20,000 sq. m.., the civil works involved under Output 3 do not require to undertake detail EIA studies. The projects should follow rules and regulation as per categorization of the industries under Air and Water Act given below.

C.1.1. Water Supply Consumption

48. The applicable regulation is as per modified provisions (2016) under section 18(1)(b) of the Water (Pollution & Prevention Control) Act, 1974. The water is used in major quantities- 3000litres per day by only those of existing MSAMB facilities using Hot Water Treatment and Vapour Heat Treatment process. Further the consumption of 3000 litres is only during 3-4 months of the harvesting season and for remaining period this quantity is not required at all. The rest facilities do not require water for process requirements. All of the facilities need water for drinking and other requirements.

49. The individual existing facility complies with the provisions of this regulation and abides by the rules. Except for Vashi, the existing facilities extract ground water have their respective captive bore wells. As described above, the facilities other than Vashi do not require water for processing. So, the quantity of water extracted is mainly for consumptive uses mainly for drinking and washroom use. These quantities are further required for staff and workers during peak season of 3-4 months during each year. In other times when there is no activity at the facility, water withdrawal is minimum as only 5-7 staff and 2-

4 workers are present so the water consumption is still less.

C.1.2. Water Pollution Abatement

50. As per modified provisions (2016) under section 18(1)(b) of the Water (Pollution & Prevention Control) Act, 1974 the individual unit or facility producing or discharging waste water is required to comply with the provisions for meeting the approved methodology in applying the waste water treatment in this context to the process waste water (i.e. discharged hot water laden with fungicide Sodium Hypochlorite solution) and the treatment to sewage generated to meet thestandards before it is released into public sewers.

51. The sources of wastewater from the existing facilities are mainly 2 which are a) The process wastewater from hot water discharges containing dosage of sodium hypochlorite @ 200 ppm concentration and b) the sewage or septage generated from the toilets provided to the staffand workers in the premises.

52. Amongst the existing facilities only those handling Hot Water Treatment (HWT) use waterfor processing i.e., using hot water for washing of fruits and vegetable commodities. The rest facilities which do not have such hot water treatment facilities do not generate wastewater in significant quantities and therefore do not generate process wastewater. As regards the processing of wastewater generated from hot wash, there is no treatment required as the water does not contain chemicals required for treatment or does not have precisely chemical oxygen demand (COD) content and also do not have biological oxygen demand (BOD) as the waste water does not have contamination with biological origin. It has only a given dosage of sodium hypochlorite solution which has dosage of 200 ppm which is equivalent of 0.02 % and is within tolerance limits of wastewater discharge standard for industries given as follows: (The sodium hypo solution disintegrates rapidly when coming into contact with air and the chlorine gets evaporated reducing the water to normal water after some time)

Table 3. Wastewater standard of CPCB (Central Pollution Control Board).

Fruits and Vegetables Units (Concentration should not exceed)				
	pH	Suspended Solids (mg/l)	Oil & Grease (mg/l)	BOD at 27^{o}C for 3 days (mg/l)
Above 0.4 ton/day	6.5 – 8.5	50	10	30
0.1 – 04 ton/day	6.5 – 8.5	-	-	30

53. Further in view of non-requirement of treatment of discharge of waste hot water, no machinery and treatment plant are required for wastewater treatment before release into public sewer. At present the Hot water facility is under operation at Vashi and the waste hot water is therefore released into municipal sewage line provided to the facility by Municipal Corporation.

54. In regard to processing of sewage generation particularly in Vashi, the sewage generated is released into public sewer line provided by the local municipal corporation for the purpose, andno further treatment is required. For the remaining all facilities, each facility has a soak pit of adequate capacity to cater to the existing 5 - 7 staff and about 10-15 workers. In case of workers,they are employed only during the season of operation i.e. for a period of 3 to 4 months and thattoo depending upon the quantum of demand of exports of commodities handled. So, the workersare not necessarily employed every season throughout the year and their strength also dependsupon the quantum of consignment to be handled. In effect the existing volume of the soak pit to accommodate sewage generation from 6-7 staff members and 10-15 workers is sufficient to receive approximately 500 litres maximum in working season. In non-season working the daily load shall be approximately 150 litres daily. The septage generated is released into soak pit of approved design. The design, operation and cleaning of soak pit sludges shall be as per guidelines of Swatch Bharat Mission under Prime Ministers Flagship Programme initiated by Ministry of Jalshakti.

(https://jalshakti-ddws.gov.in/https://jalshakti-ddws.gov.in/sites/default/files/Final%20Draft_Handbook%20MDWS%2BWaterAid%20%20onsite%20sanitation.pdf)

55. Staff of the facility monitoring effluents is in compliance to standards. Monitoring of wastewater from the facilities is done by the staff deputed at Vashi facility. The monitoring is directly concerned with sodium hypochlorite, which is added for making hot water @ 200 ppm concentration where this is applied in weighed quantities by the attending staff. Therefore, the resulting wastewater shall also contain the same dosage of water which is permitted by the State Pollution Control Board through local Municipal Corporation to allow for release into public sewers.

56. In terms of compliance facilities to existing wastewater law, the person in-charge of eachof existing facility looks after the compliances of regulatory and statutory requirement and the compliance is done by the concerned staff at regular intervals. Periodic report is sent to Divisional Head Quarters of MSAMB.

57. The existing facilities use the soak pit disposal methodology for the discharge of sewage generated from toilets. The sewage comprises of liquid (urine) and solid (faecal wastes). The faecalwastes are decomposed by the

anaerobic bacteria present within the soil humus and the faecal wastes gets decomposed to organic carbon with the volume or weight reduction is about 70-80 %. The urine also gets decomposed along with the faecal wastes and is reduced to nitrogen, methaneand ammonia which are vented to the atmosphere from the soak pit masonry chamber through atall vent pipe. The organic carbon which is the main residue of the faecal wastes forms a sludge which is mechanically cleaned using jet cleaning machines by the local municipal authorities uponrequirement at regular intervals. The organic carbon or sludge so produced has high soil nutrient content and is again disinfected with prescribed chemicals (generally powder form Sodium Hypochlorite) after due sun drying it and sprinkling it with disinfectant before it is used in agriculture or horticulture applications.

C.1.3. Solid Waste Management

58. The existing facilities are governed under the 1) Plastic Waste Management Rules of 2016and 2) Solid Wastes (Management) Rules of 2016, which prescribe detailed guidelines for the disposal of the municipal and house hold solid wastes generated. The solid wastes namely categorized as a) inert wastes (glass, porcelain, ceramics etc.), b) recyclables wastes (plastic, polyethene and paper) and c) bio-degradable (food and vegetables wastes). The existing facilities produce mainly the recyclable wastes and bio-degradable which are under the law referred to.

59. The main sources of inert wastes are: 1) consumables such as glass ware, cups and plates and other ceramic items; 2) the recyclable wastes are mainly from packing and sealing items made up of plastic and polythene and similar items, cartons etc. 3) bio-degradable- comprising mainly of discarded fruits and vegetables, dressings such as twigs, leaves etc. and food wastes. The disposal of solid wastes is done through relevant local authority. The existingfacilities segregate the 3 varieties of wastes into separate waste bins and further into separate colour polythene bags (prescribed thickness minimum 50 microns and above) and hand over the same to the concerned local municipal authorities or agency appointed for such collection forfurther disposal at designated disposal sites. All dry waste such as recyclables wastes (i.e. metals and packaging materials, metal cans, strappings, etc) are disposed of once in six months as scrap to registered recyclers through bidding process. Solid waste management plan is being implemented by each facility that is complied by the concerned staff. The daily wastes are segregated into 3 classes, and stored into separate colour polythene bags with prescribed thickness.

C.1.4. Hazardous Wastes Management

60. The Hazardous and Other Wastes (Management and Transboundary Movement) Rules of 2016 governs the generation and disposal of hazardous wastes such as used batteries, lube oils and diesel, and also packing and refrigerants from cooling equipment of each existing facility.

61. Under this regulation, the diesel generator, as back-up during electric power failure, is source of hazardous waste. It periodically generates discarded batteries, waste lube oil and diesel as fuel. The diesel generator set has a separate shade and enclosure outside for each of the facility. There is adequate space to keep separately consumables such as diesel, lube oils,waste oils, and discarded batteries.

62. The spent isotopes from the Vashi facility are disposed of to the Bhabha Atomic ResearchCentre (BARC) collecting team. These team transports and disposes spent isotopes as prescribed guidelines under hazardous waste regulation. BARC is only authorized to pick up, handle, transport and dispose of the spent isotope.

C.1.5. BARC

63. Atomic Energy (Radiation Processing of Food and Allied Products) Rules, 2012 governs the operation, handling and disposal of the materials and wastes generated from Vashi facility, and implementation of BARC under the Atomic Energy Regulatory Board of India. For the Irradiation facilities, the operators are appointed by BARC and Board of Radiation and Isotope Technology (BRIT), a Unit of Department of Atomic Energy. BARC prescribes the qualification and experience for the operation of irradiation unit, which is complied with by the Vashi facility. The operators have to periodically undergo refresher courses and examination to validate their approvals or permits granted to them. Further, structural design of the radiation unit, radiation equipment, and handling of Cobalt-60 are all approved by BARC. The BARC is the parent head of the organization and since it is an R & D organization it has another unit BRIT which looks afterthe commercial aspects mainly the manufacturing and providing of technological consultancy services and knowhow and upkeep of the facility from its technological requirements.

C.1.6. Emergency Response

64. The MSAMB has a corporate policy of being prepared for the emergency response. Underthis policy, the facility-in-charge, particularly of Vashi facility, is the designated head/lead for emergency situation. The person is responsible in handling and managing the emergency situations. The head is trained for emergency response, and periodically undergoes trainings and refresher

courses to update knowledge resources. There are trained operators who assist the head, and similarly receiving periodic training and updating of knowledge.

65. In the history of operation of Vashi facility since its inception in 2016, no accident or emergency situation has arisen and due to the strict compliances of prescribed guidelines and practices no such incident is expected to happen due to strict adherence to the prescribed guidelines and periodic inspection by BRIT Team for providing the validation of the operational certificate for individual operator and the machine/equipment concerned and listed.

66. All facilities have adequate fire-fighting system in place and are periodically audited by relevant civil authority. The facility-in-charge for each facility is responsible of the periodic inspections and keeping the validity of the certificates, which are required by the regulatory authorities. Also, there is a periodic examination from the concerned municipal and civil authoritiesto inspect the facilities and permit operations after due satisfaction and compliances. The fire- safety certificate is available with MSAMB. Individual facility has firefighting systems as prescribed by the concerned authorities. This system is periodically checked and renewed after due examination by the inspector who grants the renewal certificate. During the environmental audit, all the facility has an adequate fire-fighting system in place and are regularly monitored and managed.

C.1.7. Air Quality Act

67. Air quality policy is applicable only for the stack of the diesel generator set, which runs periodically during electric supply failures. The diesel generator set is normally used to operate for about 10 - 20 minutes when there is power break down. In order to keep the genset in workingcondition, the concerned staff is authorized for its regular upkeep and maintenance. The generator set is periodically hauled for smooth working and provision for adequate diesel and lube oils with functional batteries.

C.1.8. Policy on Diesel Generator

68. The diesel generator set is governed under the Air, (Pollution & Prevention Control) Act, 1981 for the exhaust emissions from genset stack, and Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 for the usage of diesel, lube oil and battery. Each of the facility is complying with the provisions of regulatory requirements. Also, there is upkeep of each diesel genset for keeping it in working condition.

C.1.9. Policy on R22 Gas

69. In all facilities, the R22 gas is used as a coolant and all facilities have room cooling system.The refrigerant gases or R22 is used in cooling machinery and

equipment are governed by Air, (Pollution & Prevention Control) Act, 1981 and The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. Facilities are compliant to these policies.

C.1.10. Policy on Power Supply

70. All facilities are connected to the state's electricity grid and have their respective diesel generator set as a power back up. The electrical safety norms have been followed and been certified by relevant authority. The individual facility is governed under the Electricity Act 2003 and its amendments for its supply and usage of equipment and machinery needing electricity. Allsafety wiring layout, cables and ducts and fixtures are as per prescribed BIS (Bureau of Indian Standards) specification for the material requirement.

C.1.11. Polices under Motor Vehicles Act 2019

71. The following regulations are applicable to the operations of the facility and not in direct consequence but are indirectly required to comply with. During the pre-construction stage, construction stage and also operation stage transport trucks, tractors, mobile cranes, earth moving machinery is required to be deployed by the engineering, procurement, and construction (EPC) contractor which fall under the compliances of this regulations for meeting the vehicular exhaust gases. Also, each individual plying vehicle of diesel driven portable machinery is requiredto be compliant to exhaust gas emission standard BS-VI. Further the laden weight of each haulingtruck has a maximum permissible limit for its class of registration which has to be complied by theengaging EPC contractor. This is essential to prevent accidents and over speeding on public roads.

72. **The Motor Vehicles Act, 2019**: The amended Act came into force in 2020.This Act empowers the State Transport Authority to enforce standards for vehicular pollution and prevention control. The authority also checks emission standards of registered vehicles, collectsroad taxes, and issues licenses. From August 1997, the Pollution under Control Certificate (PUC) program was launched in an attempt to crackdown on vehicular emissions and applicable to every private and commercial vehicle registered with the State Transport Authority (RTA) for theperiodic (3 months) validity of PUC to be checked for exhaust emission standard BS-VI in force and for display on the vehicle.

73. **Noise Pollution (Regulation and Control) Act, 1990:** Under this Act, MOEF has promulgated noise standards for the usage of land during the day and night. The outdoor noise generated by logistics trucks and vans are governed under these rules. Also, the operation of diesel genset is governed to limit its noise levels during their respective operations particularly within the premises of each facility. The day time (0600 hrs. to 2200 hrs.) and night time

(2200 hrs. to 0600 hrs.) are designated time periods of usage and compliances under day and night times.

74. **Public Liability and Insurance Act, 1991:** Each facility is not directly influenced by this act. But this regulation involves MSAMB indirectly due to the various damages caused by EPC contractor by plying of logistics vehicles and damages caused by them to public properties suchas electricity poles, utilities, buildings, and places of public importance and cultural and heritage importance in their path and the EPC contractor shall be responsible for that.

C.1.12. ADB Safeguard Policy Statement (SPS)2009

75. The goal of ADB SPS is to promote the environmental and social sustainability of MAGNET Project by protecting the environment and people from potential adverse impacts and enhancing the benefits. Projects should comply with the requirements laid out in the SPS and with the laws and regulations of Government of India. Under the MAGNET Project, there are facilities that already exist, and these facilities require an environment compliance audit to determine whether the facilities are in accordance with ADB safeguard principles. Where noncompliance isidentified, a corrective action plan will be prepared. The plan will define remedial actions, the budget for these actions, and timeframe for achieving compliance.

D. Audit and Site Investigation Procedure

76. The individual facility was visited with an authorized official who arranged the site visits and introduction to the individual staff of the existing facility. The concerned site staff assisted by going around each existing facility and explaining all procedural details, standards followed and compliances required to be done. The relevant registers containing the details of machinery used, individual capacity, hours of operation including usage of electricity and water, disposal of waste water and sewage was covered. The operation of each equipment and deployment of skilled workers for particular tasks were gathered during the visits. The maintenance schedule of each machinery and equipment and details of its requirement such as quantum of water and other consumable used in operating it, temperature and pressure conditions of operations were noted.The utilities such as drinking water, wash room water, availability of rest rooms for males and females separately were examined. The diesel generator set was inspected with its existing condition, and checked the availability of adequate space for safe storage of diesel, lube oils anddiscarded batteries. The outdoor premises were inspected for existence of rain water harvesting structures, and validated the source for supply of water i.e. either surface water through pipe water or from borewell for each facility. The storage areas such as parking spaces for commodityladen logistics vehicles till they were emptied, weigh scale-bridge, availability of adequate spaceindoor for holding

areas, grading- sorting facilities, pre-cooling and cold chambers etc. The layout for air compressors, condensing units for available cooling and refrigeration equipment's was examined vis-à-vis laying of electric conduits and cables to ensure safety during operation of equipment and movement of workers and staff. The remaining details, which not recorded during site visits were reconfirmed over telephonic discussions with concerned staff of each facility.

77. Records and documents are reviewed to assess the compliance of the existing facilities to national regulations and policies. The following documents were reviewed:

Table 4. List of documents reviewed during the due diligence, assessment and environmental audit.

Si. No.	List of documents reviewed	Facility
1	No Objection Certificate (NOC) from pollution controlboard for DG set as power backup	Export facility centre in Mohadi andChandwad; fruits and vegetable in Ardhapur; and facilities in Vashi
2	Lease agreement	Specific facility is undetermined
3	Pre-construction NOC from local bodies (GramPanchayat, Municipal Corporation)	All facilities except for export facility centre in Savda, and fruits and vegetable centre in Karmad
4	Completion certificate from local bodies (AgricultureProduce Marketing Committee, Gram panchayat, Maharashtra Industrial Development Corporation)	Specific facility is undetermined
5	Architectural drawings	All existing facilities
6	Site plans and maps	All existing facilities
7	NOC from previous land owners	Specific facility is undetermined
8	Sanction letter from electricity board	Export facility centre in Mohadi and Chandwad; fruits and vegetable in Ardhapur; and facilities in Vashi
9	APEDA certification	Specific facility is undetermined

E. Findings

78. The existing facilities are required to meet relevant environmental safeguard requirements of ADB SPS 2009. These requirements include biodiversity conservation and sustainable use ofnatural resources, pollution

prevention and abatement, occupational and community health and safety, and conservation of physical cultural resources. The applicability of particular requirements was determined through the due diligence activities, assessments, and environmental audit processes. The objective of these processes on the existing facility is to determine the level of environmental soundness of the proposed projects under the MAGNET and assess compliance with relevant national policies. The summary of the findings is shown in the following table.

Table 5. Summary of the compliance of existing facilities on relevant environmental safeguard requirements.

ADB SPS Requirements	Findings
Biodiversity Conservation and Sustainable Natural Resource Management	
Modified Habitat	All proposed facilities are within commercial and industrial areas.
Natural Habitat	No such habitats. There are no threats to biodiversity and habitat.
Critical Habitat	
Legally Protected Areas	
Invasive Aliens Species	Operations of all existing facilities are not introducing invasive alienspecies. Instead, the facilities are ensuring quality of horticultural crops by removing unwanted materials (organic and inorganic) priorto dispatch.
Management and Use of Renewable Natural Resources	Except for Vegetable Processing Facility (VPF) and Vapor Heat Treatment (VHT) Centre, the existing facilities are not water intensive. To adapt with climate risks and manage water resources,rainwater harvesting will be installed for the export facilities in Mohadi, Kalvan, Chandwad, Savda, Jalna, Latur, Karanja, Baramati, Talegaon Dabhade and Atpadi; fruits and vegetablecentres in Karmad, Ardhapur, Chandur Railway, Pachod and Baramati; and additional facility centre for custard apple at Beed Water supply for VPF and VHT is connected to the Navi Mumbai Municipal Corporation.
Pollution Prevention and Abatement	
Pollution Prevention, Resource Conservation, and Energy Efficiency	For treating wastewater, only the VPF and VHT in Vashi is connected to the municipal sewage line provided by Municipal Corporation. All other existing facilities have soak pits which is enough to treat wastewater. All the existing facilities have no objection clearance for exhaust emissions from generator stack. Solar power system will be installed at the fruits and vegetable handling facility centres at Pachod and Baramati.
Wastes	For all the facilities, solid wastes are managed by their respectivestaff. Disposal of solid wastes are through the local authority. Need to improve solid waste management
Hazardous Wastes	Spent isotopes from the Vashi facility are disposed by Bhabha Atomic Research Centre (BARC) collecting team. BARC is only authorized to pick up, handle, transport and dispose spent isotope. All existing facilities have separate shade/enclosure

	outside for thediesel generators. There is adequate space to keep separately consumables such as diesel, lube oils, waste oils, and discarded batteries.
Pesticide Use and Management	No pesticide use
Greenhouse Gas Emissions	Facilities do not generate large amount of greenhouse gas
Health and Safety	
Occupational Health and Safety	Please next paragraph.
Community Health and Safety	No risks on community by any of the existing facility.
Physical Cultural resources	No risks physical cultural resources by any of the existing facility.

79. The major non-compliances are from the contractor's side of the existing facilities who are employing skilled workers. The major lapses are on occupational health and safety in terms of absence of aprons and gloves to be worn by the workers during operations such as sorting and grading of the commodities, and entry of unauthorized people is marked in few cases. Primary and basic training of the contractors along with workers is required regarding orientation for environmental, safety and occupational health rules.

80. The accumulation of biodegradable wastes in certain facilities are observed, which result in stinkand odour problems. Litter was strewn around certain facilities due to lack of training and knowledge on the part of contractor and the workers regarding applicable rules and regulations. Majority of the contractors present at the existing sites lacked awareness or knowledge on the environmental regulation on solid wastes.

F. Corrective Action Plan

Table 6. Corrective action plan for all the facilities

Issues	Corrective Actions	Facility	Responsible Agency	Source budget	Timeline
Awareness about Environmental, occupational safety andhealth issues and compliances to their regulatory applications.	Elementary and orientation trainingto be imparted to the contractor andthe skilled workers to be employed	All existing facilities	MSAMB and EPC Contractor	To be inclusive in bidding cost.	Within fort night of award of contract
Maintenance scheduleof each equipment	Training on themachine maintenance Monitoring of equipment and machineries so as not to produce excessive noise and emissions Repair of equipment and machine whennecessary	All existing facilities	MSAMB and facility operators	Inclusive on the operator's expenses	During operations of the facility
Risks of workers/operators of thefacilities on injuries and accidents.	Awareness training of facilityoperators on health and safety standards Provision of associated personal protective equipment Only authorized staff/workers are allowed to enter inthe facilities	All existing facilities	MSAMB and facility operators	Inclusive on the operator's expenses	During operationsof the facility
Improper handling of solid wastes by facilityoperators	Awareness training of facilityoperators on existing regulations on solid wastes management Disposal of solid wastes through authorized wastemanagement corporation/ institutions	All existing facilities	MSAMB and facility operators	Inclusive on the operator's expenses	During operationsof the facility

Appendix 10: Guidance on Preparation of Muck/Debris Disposal Plan

A large quantity of muck is expected to be generated as a result of construction civil work. Muck generated from excavation of any project component is required to be disposed in a planned manner so that it takes a least possible space and is not hazardous to the environment. The disposal of muck has to be scientifically planned by keeping in view no or low interface with any surface water body and or groundwater, and less travel of dumpers to the disposal site. The muck management and disposal plan can be prepared keeping in view the following guiding points:

- First quantify the muck expected to be generated during construction based final designs

- Then calculate the amount of muck that can be utilized in project construction work,such as use of stone chips/ rocks for compaction of earth;

- The balance to be disposed of away from the site and clear the site for construction;

- Till the muck is not transferred to the disposal site, the muck shall be properly compacted (i.e. with the use of a roller), and stored in form of small hills covered with tarpaulin to avoid fugitive dust emissions;

- Thereafter, the muck should be either disposed of to the site designated by the local authority and or identify a low-lying area and dispersions and ensure to havetaken appropriate permission depending on the owner of the land;

- Muck generally lacks nutrients and therefore, are difficult to re-vegetate. Thus, a layer of top-soil can be laid and plant trees of suitable species and soil binding grass and shrubs.

- Costing of disposal and plantation should be part of contractor’s work schedule and payment.

Appendix 11: Format for Quarterly Report on Tracking of Grievances Redressal

Cumulative Number of grievances received till date	Number of grievances received during the quarter	Nature of grievances	Statusof actiontaken	No. of grievances resolved during the quarter	No. of grievances resolved till date	Cumulative progress

Appendix 12: Environmental Due Diligence of IFC, Vashi

Environmental Due Diligence Report

IND: Maharashtra Agribusiness Network Project (MAGNET) Project – Expansion and Modernization of Irradiation Facility Centre (IFC) at Thane District

CHAPTER I. INTRODUCTION

A. Project Description

1. Maharashtra Agribusiness Network Project (MAGNET), proposed for funding by the AsianDevelopment Bank (ADB), aims to improve the networks of post-harvest facilities and marketingmanagement for 11 horticulture crops—banana, custard apple, green and red chili, guava, okra,orange, pomegranate, sapota, strawberry, sweet lime, and flowers.

2. The project targets to support farmer producer organizations (FPOs) and achieve average agriculture sector growth rate of 5%, promote agriculture produce export, and establish fair, competitive, and accessible agriculture markets. ADB has engaged Grant Thornton, to support theproject for designing and preparing the financing MAGNET Project, including preparation of this Environmental Due Diligence Report (EDDR) as part of deliverable.

3. The Core Outputs of the MAGNET Project are:

(i) **Output 1:** Institutional, technical, and marketing capacities of agribusiness institutions and FPOs strengthened. This output has no safeguard risks.

(ii) **Output 2:** Access to finance of FPOs and value chain operators strengthened. This output is expected to have some environment safeguard risks that are limitedand can be easily mitigated. Hence, it is categorized as FI.

(iii) **Output 3:** Agriculture value chain infrastructure improved and operational. This output involves planning, designing and implementation of civil construction work for all 21 post-harvest (17 existing and 4 new) facilities of Maharashtra State Agriculture Marketing Board (MSAMB) in a manner that is climate compatible and mitigates climate risks. There will be potential environmental risks related to the construction works, and health and safety concerns for workers. The impacts are expected to be site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. Hence, output 3 is categorized as B.

4. A detailed IEE has been prepared for all 21 facilities including – (i) expansion and modernization of the 17 existing facilities across the State, (ii) 3 new facilities as major capacity addition at Baramati and Pachod in cold-chain and packhouse segment and (iii) strengthening the existing post-harvest management training facility at Talegaon, Pune.

5. Under expansion and modernization of the existing 17 facilities of MSAMB, 1 of them is on improving a post-harvest irradiation facility where the radiation dosage capacity is proposed to be enhanced along with allied equipment of its Irradiation Facility Centre (IFC) located at Vashi.

6. As per Asian Development Bank's (ADB), Safeguard Policy Statement (SPS) of 2009, under the prohibited investment activities as listed in Appendix 5, production of or trade in radioactive materials, including nuclear reactors and components thereof is to be excluded from ADB financing. However, medical equipment, quality control (measurement) equipment, and anyequipment used for irradiation where the radioactive source is trivial and adequately shielded is allowed to be financed by ADB. Therefore, the ADB loan will not finance the procurement of the radioactive material i.e. Cobalt-60. However, the loan will finance the enhancement of the IFC inVashi which involves the operation of irradiation equipment.

7. **Proposed project in Vashi.** It is proposed that the IFC unit will increase the Cobalt dosage for irradiating horticultural crops to achieve microbial decontamination, delaying ofripening and enhancing shelf-life. The post-harvest facility will use Cobalt-60 for gamma irradiation treatment of mangoes, spices, onions, potatoes, pet food processing and other valueaddition in order to meet the export requirements and of the agriculture produce. The Cobalt-60 is being used with due permission from all relevant authorities (as been detailed out later in this document) and compliant with all mandatory guidelines as per the national and international laws, regulations, and treaties.

8. The use of Cobalt-60 for food irradiation is regular practice as per International Atomic Energy Agency (IAEA)[36] guidelines. The total capacity of the irradiation facility is 500 kCi, the current installed strength is 300 kCi, and MSAMB proposes to enhance the strength by additionally procuring 300 kCi by MSAMB. The radioactive material, i.e. Cobalt-60

B. Purpose and Scope of the Report

9. An environmental audit is required for projects with existing facilities as per the ADB SPS.The purpose of this due diligence report is to fulfil this requirement for the IFC in Vashi and alsodemonstrate that the use of radioactive material in the IFC unit is trivial and adequately shielded.Accordingly, this environmental due diligence report (EDDR) has been carried out to assess risksrelated to: (i) the usage of Cobalt-60 and processes in the IFC, Vashi, (ii) procurement and transportation of Cobalt-60, (iii) handling and disposal of radio-active material, iv) health and safety of staff working in the IFC. Based on the identified

[36] An intergovernmental forum for scientific and technical co-operation in the peaceful use of nuclear technologyand nuclear power worldwide.

environmental risks the EDDR identifies ongoing mitigation measures and recommends corrective actions to improve risk management.It also assesses ongoing monitoring and reporting mechanisms and stakeholder consultations and recommends corrective actions.

10. The EDDR also identifies gaps (if any) between the operations of IFC unit and use of Cobalt-60 and applicable laws and regulations, including international regulations on handling radioactive material and facilities and ADB's safeguard requirements. The EDDR also assesses the capacity of the implementing agency on understanding the importance of environmental impacts, implementing mitigation measures, monitoring and supervision and recommending appropriate capacity building needs.

11. The EDDR also includes an environmental management and monitoring plan (EMMP) as an instrument that provides guidance during project implementation.

C. Implementation Arrangements

12. The Government of India and ADB has agreed to finance the MAGNET project with proposed loan of $100.0 million from ADB's ordinary capital resources ADB will provide loans with a mix of project loan and FIL modalities. The government will provide $42.9 million as counterpartfunding to cover tax and duties, financing charges, and recurrent costs such as government staffsalary and related operational costs.

13. Since the project will be implemented in the State of Maharashtra, the State Governmentacting through the MAGNET Society will be the Executing Agency (EA). Thus, MSAMB will be the implementing agency (IA) or in other words the project proponent.

14. In order to institutionalize the best practices being adopted for the project and continue to scale-up the project objectives, a MAGNET Society was established as a special purpose vehicle,and the Principal Secretary Marketing leads this institution. The Society will function as an apex body for implementation, monitoring and coordination for ADB's assisted MAGNET project.

15. Within the MAGNET society, a dedicated Project Management Unit (PMU) was established, headed by the MSAMB General Manager as the Project Director (PD). The PMU will be responsible for the overall performance, monitoring and reporting of the project. A team of corenodal officers from the engineering department will assist the PD, to manage and coordinate theproject activities, including procurement, finance, safeguards (social and environment), value- chain, among others. In addition, there will be Nodal officers for each

output of the project. The PMU will also be supported by a Project Management Agency (PMA - a project implementation support consulting firm [PISC]), which will be hired during project implementation. The PMA will provide expert support for implementation of safeguard measures in project components under Output 2and Output 3 of the MAGNET project.

16. A total of 8 Project Implementation Units (PIUs) are to be notified at the division level, of each division of the MSAMB. The IFC unit is designated under Ratnagiri division PIU. The PIUs will be headed by the concerned Divisional Deputy General Manager (DDGM) and one designated Nodal Officer in each PIU will be responsible for day-to-day coordination with the PMU, and PMA. Each PIU will have dedicated nodal officers for each project output (1, 2, and 3), including social and environment safeguards. Each PIU will be staffed, and consultants/ experts will be hired on contract basis covering areas of agribusiness, technical, procurement, accounts, social, environmental safeguards, and one/two support staff, etc. as per need and agreed with the ADB. PIUs will be focal point for project implementation under MAGNET at divisional level. The institutional set up under the project is shown in figure 1 below.

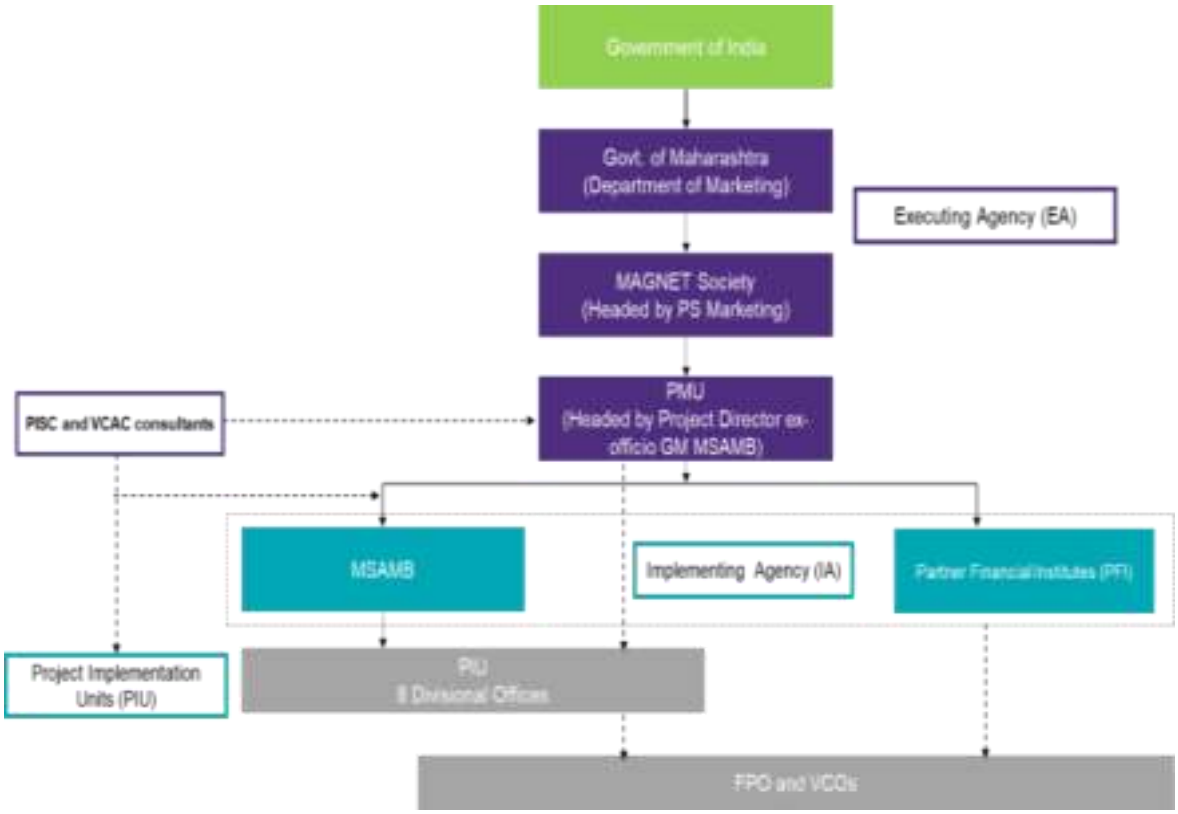


Figure 9: Institutional Arrangement for Project Implementation

17. The selected Contractor will undertake the civil works based on approved plans and designs in the selected sites and ensure compliance with environmental laws, rules, and regulations of the State & the country and ADB. The contractor in alliance with the PIU will be responsible for monitoring and reporting on all safeguard's aspects.

18. **Training and Capacity Building:** As part of Output 1 under environmental safeguard requirements, the TRTA team will train and enhance the capacities of the MAGNET Society, MSAMB, FIs, and the PIUs on the following aspects:

(i) Need for environmental safeguards and climate change risk management;
(ii) Laws, regulations, policies including ADB's Safeguard policies those that triggersby the project activities and exclusion list.
(iii) Screening process and how to screen sub-projects to be financed under output 2.
(iv) Impacts - hierarchy of impacts (avoid, reduce, and mitigate), magnitude of impacts,positive and adverse impacts, reversible and irreversible impacts, etc.
(v) Mitigation options, planning and budgeting.
(vi) Monitoring and reporting.
(vii) Institutional arrangements and Grievance Redressal Mechanism;

CHAPTER II. DESCRIPTION OF THE FACILITY

A. Irradiation Facility Centre (IFC), Vashi

19. In 2016, MSAMB has established IFC at Vashi, and has the approval by The Atomic Energy Regulatory Board (AERB) of Department of Atomic Energy (DAE)[37] and National Plant Protection Organization (NPPO) Government of India[38]. The United State Department of Agriculture – Animal and Plant Health Inspection Services (USDA-APHIS)[39] has accredited the facility for export of mangoes and pomegranate to United States of America. The facility has been accredited by Authorities of Australia Government for export of mangoes to Australia in 2017 as well.

20. Geographical location: The IFC unit is located in Sector 19 of Vashi locality. Vashi is a zone in Navi Mumbai, Maharashtra, across the Thane Creek of the Arabian Sea on the outskirtsof city of Mumbai. Shown in the map below. The geographical coordinates and detail address are:

Table 1: Geographical coordinates and location within State administrative districts

State District and MSAMB Division	Location Address	Geographical Coordinates
Thane district, Ratnagiri Division	Ground floor, Plot no 3, Sector 19 F, Vashi, Navi Mumbai	19°04'58.7"N. 73°00'42.8"E

21. **Operations of the Irradiation Facility Centre**. The facility is being managed andoperated by MSAMB, while the value chain operators only being served by the irradiation treatment unit and other storage infrastructures for their produces. The IFC receives and handles crops for exports, those that are supplied to United Kingdom, USA and Japan. The crops receivedby the facility are mainly mango, onion, grapes, guavas, pomegranates and all other crops that require irradiation of their respective markets. Ready to eat and ready to cook items are also treated in the IFC. Food ingredients and spices that are exported to USA and other markets arealso irradiated at this facility.

[37] Has the authority to lay down safety standard and frame rules and regulations regarding to the regulatory and safety requirements envisaged under the Atomic Energy Act,1962.
[38] Competent authority to certify freedom of the consignments from pests of quarantine concern for importing countries
[39] An agency of the United States Department of (USDA) responsible for protecting animal health, animal welfare, and plant health, and lead agency for collaboration with other agencies to protect U.S. agriculture from invasive pests and diseases.

22. Currently the facility has the capacity to treat 5MT of crops per hour. The radiation source utilized is Cobalt-60 (Co-60) of strength 300 kCi. The facility has a packhouse precooling of 5MT/batch, and 4 coldstorage units of 100MT each. There is no other treatment carried out in the unit. The unit is completely dedicated for Irradiation of Crops and other items.

23. IFC is supplied with electricity and water by Navi Mumbai Municipal Corporation.

Figure 10: Illustrates the location of the project areas at district level

Figure 11: Satellite image of the IFC unit location

24. **Process flow of Irradiation** - At first, the produces for irradiation treatment are registeredat the gate as per schedule. Only scheduled items or crops are received and strict checks are followed. Then, any of the Plant In-charge, Quality Control Officer, or Radiological Safety Officerreceives the irradiation request application from the representative of the respective packing house facility[40] along with a detailed post-harvest process sheet. The items should necessarily be packed in insect-proof packages and securely sealed and appropriately labelled/marked as per the Irradiation Operation Work Plan[41]. Each registered and accepted consignment for irradiation is assigned a Treatment Identification Number and the particulars are recorded in a product logbook.

25. Those produce that fails to pass inspection norms are rejected, and such products are stored separately at a dedicated waste area which is later collected by the municipal authority ondaily basis for disposal. The consignments passing plant quarantine inspections are stored in coldstorage/ holding room. Prior to storage of packages in untreated article storage area, Plant In- charge, Quality Control officer or Radiological Safety Officer ensures that the area is cleaned and mopped to maintain a high level of sanitation as per the SOPs.

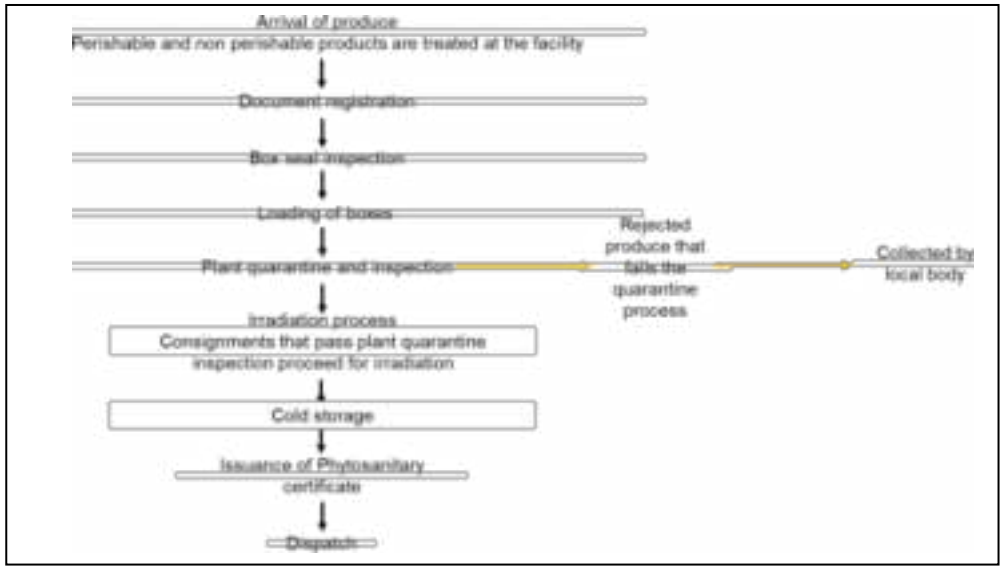


Figure 12: Irradiation Process Flow diagram of IFC Unit

26. The irradiation process is carried out in a special protected chamber, operated by BhabhaAtomic Research Institute (BARC) certified operator along with a certified Dosimetrist (trained personnel responsible for carrying out dose

[40] Necessary to be registered with APEDA.
[41] Detailed standard operating procedure (SOP) can be referred and downloaded from MSAMB website - https://www.msamb.com/Documents/266c1794-c171-4694-9279-2c2559ca5ab3.pdf

mapping[42] and dosimetry[43] using dosimeter[44]).

27. Food crops is exposed to a carefully measured amount of intense ionizing radiation. Thisis done in a special processing chamber for a specified duration. The radiant energy (i.e., Co-60 gamma rays) breaks chemical bonds that leads to decaying of food, leaving the food still like-fresh and disinfecting from microorganisms.

28. The radioactive material, i.e., Cobalt-60 is contained in two sealed stainless-steel tubes (one inside the other - double encapsulated) called "source pencils". These are placed in a rack and the entire rack is immersed in a water chamber underground when not in use. When irradiation takes place, the rack is raised. Figure 13 above illustrates an irradiation chamber. Wateris used to shield the Cobalt when it is not in use. The water is not radioactive.

Table 2: Capacities for Irradiation of agri produce at IFC are as under:

PRODUCT	**Throughput[45] (MT/Hr.) with present source activity (300 kCi)**	**Anticipated Throughput (MTs/Hr.) after enhancement to 450 kCi**
Mango (Low Dose)	4.0	6.0
Pomegranate (Low Dose)	4.0	6.0
Onion & Potato (Low Dose)	10	15
Cereals & Pulses (Low to mediumDose)	7.0	10
Processed Food (High Dose)	0.66	1.3
Spices, Herbs & Pet-feed (HighDose)	0.75	1.3

[42] Measurement of the absorbed dose distribution within a process load through the use of dosimeters placed at specific locations within the process load
[43] A system used for determining absorbed dose, consisting of dosimeters, measurement instruments and their associated reference standards, and procedures for the system's use.
[44] A device that, when irradiated, exhibits a quantifiable change in some property of the device which can be related to absorbed dose in a given material using appropriate analytical instrumentation and techniques
[45] The rate of production or the rate at which something is processed.

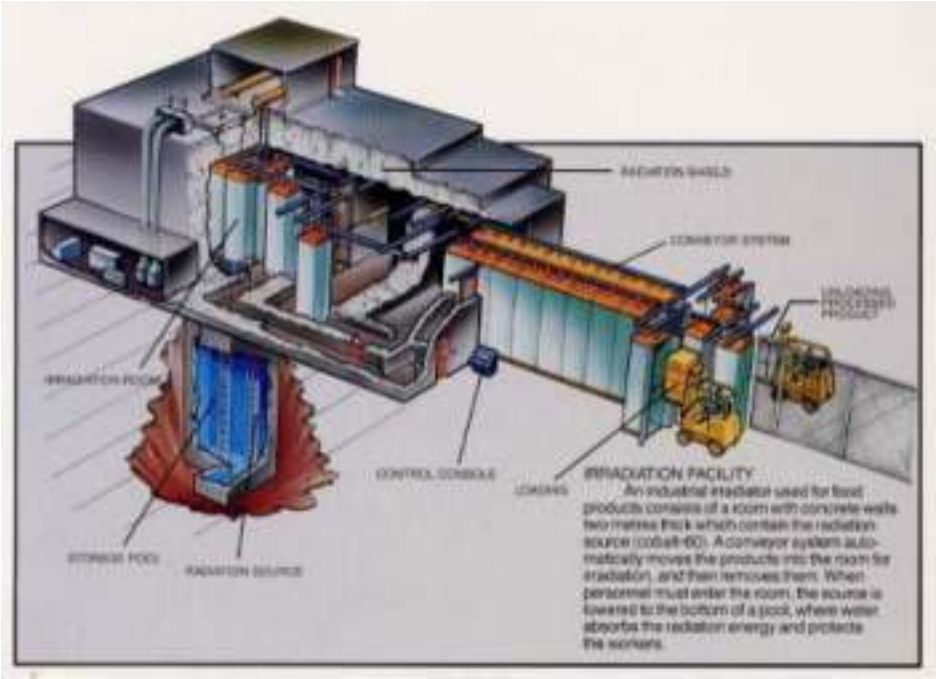


Figure 13: Illustration of an Irradiation Chamber using Cobalt-60[46]

29. **Radioactive Source Storage:** The water pool is of depth of 7-8 meters containing demineralize 45,000-55,000 litres of water which is resistant to corrosion. Water level is monitoredat three levels corresponding to maximum, normal, and abnormal low levels of water pool. The source storage water pool has auto-replenishment system. Adequate illumination is maintained for under-water operations. Appropriate controls are provided to prevent entry of any person and maintain physical barrier over the pool to avoid any fall. Demineralized, free from turbidity, fungusand any dissolved solid matter (20 µS.cm-1) with pH of 7.5 and 8 water quality is maintained for the pool – inside which cobalt pencils are stored.

30. The sealed boxes are stacked as per SOP and placed on the conveyor belt that carries the staked sealed and labelled boxes to the inner room where they are exposed to the rack containing source pencils.

31. Dosimetrist pre-sets the radiation dosage[47] of Cobalt-60 as per the food item. The Plant Operator, in consultation with Dosimetrist, sets the speed of the conveyor belt and the cycle timeat the beginning of each treatment process on the basis of Cobalt-60 source loading, product density and the other data provided by the designer of the facility in compliance with atomic regulations of

[46] Source: Centre for Consumer Research, UC Davis, https://tinyurl.com/4dzfx7aw
[47] Gray (Gy): Unit of absorbed dose where 1 Gy is equivalent to the absorption of 1 joule per kilogram (1 Gy = 1 J.kg-1).

India under the guidance and close supervision of BARC and Board of Radiation & Isotope Technology (BRIT)[48].

32. Conveyor speed is controlled through a programmable logic control (PLC) unit, which takes into account the source decay and required minimum dose. Cycle time is the time taken bythe product box to move from its position to next box position.

33. Before starting up of process, the Plant Operator conduct a search operation starting fromcontrol room to the inside of irradiation cell to check the presence of any person inside the cell. The whole process of search operation is completed in 5 minutes time and thereafter the locks positioned at various places inside the cell as well as the double door entry to the irradiation cellis closed. The operator monitors all such operations from the PLC room where there is no exposure.

34. At the end of irradiation process, the dosimetrist will retrieve the exposed dosimeters thatare kept at reference position[49] and perform dosimetry in order to verify that the exact dosage is given to the treated product. The dosimetry analysis is carried out at the climate-controlled dosimetry lab as per the procedure.

35. If the absorbed doses fall outside of the acceptable limits[50], the products are rejected andkept separately for safe disposal.

Personnel entry door to Irradiation Cell, IFC, Vashi

PLC for conveyor belt operational control

Figure 14: Warning Signs and Control Panel at IFC

[48] An independent unit of DAE, which provides products and services based on radiation and isotopes for applications in healthcare, agriculture, research and industry.
[49] The reference position is pre-defined by BRIT every year before the start of fruit season. As with use, the Cobalt-60 pencil decays, thus its radiation capacity also reduces, thus proportionately changes the reference position of minimum and maximum. The BRIT officials as part of safety survey visit the unit and measures distance for min./max exposure.
[50] Acceptable limits (i.e. dose in kilogray) depends upon the objective of crop Irradiation, i.e. whether for insect disinfestation, enhancing shelf-life, delay ripening process, etc. Often the acceptable limits are country specific and specified through contractual agreement. Atomic Energy Radiation Processing of Food and Allied Products Rules 2012, Schedule 1, specifies minimum and maximum dose as per Indian regulation.

36. After Cobalt radiation, the produce is stored in a segregated cold-storage and quarantined to maintain their hygiene and avoid contamination. Phytosanitary certificate is issued before the dispatch of the treated crop.

37. **Roles and Responsibility, and Authority at IFC Unit:** As the IFC unit's main function isirradiation of the crops received, following paragraph discusses the roles and responsibilities of key designated employees responsible for carrying out the irradiation process. Apart from them, there are non-technical staffs who provide support in manning the in-coming and out-going operations, storage room, sanitation and hygiene maintenance staff, and staff supporting laboratory work. The following are the key people managing the operation of irradiation chamberand associated processes. It should be noted that since these personnel as and when required enters the irradiation chamber, they are provided with pocket dosimeter that records the exposureof the person and is later reported to BRIT on quarterly basis:

(i) **Dosimetrist** is responsible for dose mapping of product box and routine dosimetry.This professional is mainly located in the laboratory. However, before the start of every batch, the Dosimetrist enters the chamber to pre-set the dosage as well as to confirm the position of the dosimeter (at min. and max.) as per requirement andafter the end collects the dosimeters.

(ii) **Plant Operator** is responsible for carrying out treatment operations at the irradiation facility. The operator generally manages the PLC, controls the movement of the boxes, the speed of the conveyor belt and before start of every batch ensures there is no individual present inside the chamber.

(iii) **Radiological Safety Officer** is responsible for carry out radiological surveillance and personnel monitoring at the irradiation facility and maintain records of personal exposure to radiation (Annexure 12). The officer moves around the irradiation areato ensure safety regulations are followed.

(iv) **Quality Control Officer** is responsible for ensuring that good quality of programme articles is delivered for irradiation and good radiation practice are followed during the treatment. This officer is responsible to work with the clients to provide phytosanitary certificate.

(v) **Plant In-charge** is responsible for overall supervising the plant operation and maintenance as well as report to the management.

38. **Significance of Irradiation -** In irradiation processing, a product or material is intentionally irradiated to preserve, modify, or improve its characteristics. Irradiation is very effective ininactivating microorganisms.

39. **Safe use of food materials -** It is a simple and safe process involving exposure of productor material to ionizing radiation emanating from the source (such as cobalt-60) for a pre- determined time so as to impart a prescribed dose. A fraction of the radiation energy that reachesthe product is absorbed by the product which then enhances its shelf-life. The product that is irradiated with gamma rays does not become radioactive, and thus it can be handled normally, just as X-ray used for examination be it at hospital and or to inspect objects at public places.

B. Procurement and Transport of Cobalt-60

40. Cobalt-60 is the radioisotope which is produced by BRIT[51] in their highly safe and secured laboratories. The Cobalt-60 comes in the form of pencils that are completely encapsulated and sealed by the manufacturer (i.e. BRIT). It is procured in solid form encapsulatedin W-91 pencils (Figure 6) and stored in a lead cask weighing 6 tonnes and transported from themanufacturing unit to the facility under BRIT surveillance.

Figure 15: Cobalt-60 pencils from BRIT

41. The transport of radioactive material in India is governed by the AERB code on Safe Transport of Radioactive Material (AERB/NRF-TS/SC-1 (Rev.1), 2016[52]. AERB has also published a regulatory guide titled 'Security of Radioactive Material during Transport', (AERB/NRF-TS/SG-10), to ensure that the radioactive material is not mishandled during transportation.

42. The pencils are packed in layered and sealed tank. The vehicle also has lateral lining all through for additional protection. The transport vehicle is monitored through GPS facilityensuring any accident is immediately responded.

[51] BRIT is the only organisation in the country involved in production and supply of 60Co sealed radiation sources for irradiation.
[52] https://www.aerb.gov.in/images/PDF/CodesGuides/RadiationFacility/Transport/1.pdf

The transportation route is pre-determined and informed to the local police stations for safety and security purposes. Only two persons, the vehicledriver and the support staff are allowed in the vehicle. The staff are regularly trained on the safetyand security aspects and trained to fully abide by the rules.

43. The prime responsibility for ensuring compliance with the transportation regulations lies with the consignor, in this case it is BRIT. Thus, BRIT ensures that the appropriate packaging is selected for the transport of radioactive material and the package is prepared, marked and labelled as per the regulations. BRIT is also contracted by MSAMB to later replenish the depleted radiation material on chargeable basis.

44. BRIT has the required expertise and experience in designing, erecting, and commissioning of radiation processing facilities.

C. Handling and Disposal of Used Cobalt

45. Cobalt-60 decays continuously. The strength of a Cobalt-60 source decreases by about 12% per year. The time taken to lose 50% of its initial activity, i.e., its half-life, is 5.26 years. Additional pencils of Cobalt-60 are added periodically to the source rack to maintain its required source strength. At the end of their useful life, typically 20 years, Cobalt-60 pencils are removed and returned to BRIT for re-use, recycling or disposal. After about 50 years, 99.9% of the Cobalt- 60 contained in the pencils decays into non-radioactive nickel. Irradiation chamber was established in 2016, hence required to be replenished.

46. It is BRIT's responsibility to follow all regulated process and procedures as well as guidelines under the acts/ rules for installation, replenishment, testing, quarterly monitoring, dismantling and disposal.

47. The total capacity of the irradiation facility is 500 kCi, the current installed strength is 300 kCi, and MSAMB will enhance the strength by procuring additional 300 kCi under government financing. Hence, no disposal of used Cobalt-60 is required at this stage of the project.

48. The activity related to replenishment, unloading, loading, and dummy testing are all carried out by BRIT.

49. The water in the underground pool used for shielding the Cobalt-60 pencils is not radioactive. However, it may require refilling due to evaporation loss. In such case very low electrical conductivity cooling-water is used to replenish the shielding water pool. Water samples from the circulation system and the water pool is routinely monitored for pH, conductivity and radioactive contamination and records of the observations are maintained. Any abnormality is managed through application of Emergency Response Plan.

D. Occupational Health and Safety of Facility staff

50. The prevention of health hazards at workplace is ensured by AERB during regulatory inspection. As required in the Factories Act of 1948, AERB appoints qualified medical practitionersas certifying surgeons for the given units. These surgeons are available in research and development units as well as in production units of Department of Atomic Energy. The certifying surgeon exercises medical supervision (quarterly)[53] by carrying out the examination and certification of persons working in radiation area, dangerous operations and canteen as per the statute.

51. Occupational health related aspects including status of periodic medical examination of workers, health related problem encountered during normal working and training of certifying surgeons and para-medical staff are reviewed by a committee of AERB.

52. Each staff responsible for working in the irradiation area is provided with a pocket dosimeter that records exposure if any received by the person. These readings are submitted to AERB for evaluation and further action if any.

53. The unit needs to submit Quarterly and Yearly Report on Occupational Health which includes details of medical examination carried out and also the health profile of workers in different categories such as radiation, dangerous operation etc.

54. Analysis of Yearly Report on Occupational Health is carried out to assess the morbiditiesfor common diseases such as diabetes, respiratory diseases, cardiac diseases, anaemia, skin diseases etc. for different age groups.

55. AERB organises Occupational Health and Safety Professionals meet which helps medical officers as well as safety officers of different units to understand the development in safety as wellas in occupational health aspects.

[53] Safety Status report is appended to this document as Annex 12

CHAPTER III. REGULATORY AND POLICY REQUIREMENTS

A. National Environmental Regulations

56. The regulatory control for enforcing radiation safety provisions in respect of Cobalt-60 gamma radiation processing plants is mainly governed by the following:

(i) The Atomic Energy (Radiation Protection) Rules, 2004.
(ii) Atomic Energy (Radiation Processing of Food and Allied products) Rules, 2012
(iii) Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987.
(iv) AERB Safety Standard on Land–Based Stationary Gamma Irradiators.(AERB/RFIRRAD/SS-6 (Rev-I), 2007)
(v) AERB Safety Code on Operation & Maintenance of Land Stationary GammaIrradiators. (AERB-SC-IRRAD, 1993)
(vi) AERB Safety Standard for Testing and Classification of Sealed RadioactiveSources. (AERB-SS-3 (Rev-I), 2001)
(vii) AERB Safety Guide on Security of Radioactive Material during Transport.(AERB/NRFTS/SG-10, 2008)
(viii) AERB Safety Guide on Security of Radioactive Sources in Radiation Facilities(AERB/RF-RS/SG-1, 2011)

57. Above regulatory documents, information on radiation safety and regulatory aspects in respect of gamma radiation processing facilities and the applicable proformas/documents are available on website of AERB at, http://www.aerb.gov.in.

58. **Regulatory Requirements for Obtaining Licence:** The licensing process includesissuance of consent by the competent authority at various stages such as siting, construction, commissioning for operation of the facility, source replenishment, modification during routine operation, and Decommissioning. In current subproject case (i.e. enhancing the current installed strength by 300 kCi) would only require authorisation by AERB for source replenishment. Request for approval for source replenishment (augmentation) from AERB has been attached in Annexure 2.

59. **Atomic Energy (Radiation Protection) Rules, 2004.** These rules shall apply to practicesadopted and interventions applied with respect to radiation sources. Under this rule, license to establish a radiation installation for siting, design, construction, commissioning and operation; and decommission a radiation installation is required, including replenishment of the radiation source. Hence this is applicable and MSAMB shall follow the requirements of the rule to obtain requisite approval from AERB. As the license obtained under this rule is non-transferable without the priorapproval of the competent authority, MSAMB

shall not allow operation of the IFC unit by any third-party.

60. **Atomic Energy (Radiation Processing of Food and Allied Products) Rules, 2012**. This rule is applicable only to Irradiation Facility Centre at Vashi, Navi Mumbai. The facility carriesout radiation of fruits and vegetables using Cobalt-60. As per the rules, units having radiation facilities are required to follow the given measures. The existing facility at Vashi follows all stipulated requirements:

(i) Obtain licence to operate the facility from the Central Government under Atomic Energy(Radiation Protection) Rules, 2004

(ii) Hold valid license under Prevention of Food Adulteration Act, 1954

(iii) Process food and allied products within the absorbed dose limits as specified under Schedule I and II and packaging material as specified in Schedule III.

(iv) Carry out dosimetry as specified under Schedule IV.

(v) Affix label on the package after processing and indicate information for traceability including purpose of radiation, operating licence no#, batch identification detail, and date of processing.

(vi) Appoint certified person by Atomic Energy Regulatory Board to operate the radiation unit.

(vii) Maintain all product processing information and all-time security for the facility.

Table 1: Allowable dosage for fresh fruits and vegetables (other than Class I[54])

Purpose	Minimum (kilogram)	Maximum (kilogram)
Delay ripening	0.2	1
Insect disinfection	0.2	1
Shelf-life extension	1	2.5
Quarantine application	0.1	1

61. **Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987.** Disposal of radioactive wastes is done in accordance with the provisions of these rules, and in accordance with the terms and conditions laid down in the authorisation. As per the rule, a competent Radiological Safety Officer (RSO) is

[54] Class I – Blubs, stem, root tubers, and rhizomes;

appointed with the approval of the competent authority. The Radiological Safety Officer should necessarily be trained in radiological safety at the BARC. The RSO is responsible for all handling, disposal as well as emergency matters. In the event of accidental release of any radioactive material resulting in personnel, surface or environmental contamination, the Radiological Safety Officer shall:

(i) take steps to arrange for the immediate decontamination of the affected personnel and areas and other remedial measures as required.

(ii) inform immediately the employer and the competent authority; details of the incident, remedial measures initiated and programme for disposal of contaminated material if any.

62. **Safe Transport of Radioactive Material – AERB.** The objective of this safety code is to establish requirements that shall be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the transport of radioactive material. The requirements specified in this safety code shall be duly complied with so as to meet the performance standards which are characterized in terms of threegeneral severity levels: (i) Routine conditions of transport (incident free); (ii) Normal conditions of transport (minor mishaps); (iii) Accident conditions of transport. In this case BRIT as consignor isresponsible for transportation of Cobalt-60 pencils, thus these rules are applicable to BRIT.

63. **Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.** These rules shall apply to the management of hazardous and other wastes not specified separately in other rules. Hazardous waste means any waste, which by reason of characteristics,such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger to health, or environment.

64. Scientific disposal of hazardous waste through collection, storage, packaging, transportation, andtreatment, in an environmentally sound manner minimises the adverse impact on human health and on the environment. The hazardous waste can be disposed at captive treatment facility installed by the individual waste generators or at Common Hazardous Waste Treatment, Storageand Disposal Facilities (TSDFs). There are 40 Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs) available in 17 States/UTs.

65. Under this rule, all the facilities generating hazardous waste should draw an SOP for handling, and disposal of waste and waste shall be disposed to accredited authority responsible for disposalof such waste. The facilities should connect with local authorities such as municipality or gram- panchayat for the

required information.

66. **Plastic Waste Management Rules, 2016.** The rule aims to stipulate quality standards for the usage of plastic, especially for food grade plastic, and set responsibilities for all stakeholders in segregation, sorting, collection and disposalof plastic waste. As per the rules individual and bulk generators like offices, commercial establishments, industries are to segregate the plastic waste at source, handover segregated waste to the relevant authority, and pay user fee as per by-laws of the local bodies for collection and disposal of waste.

67. This rule is applicable to all the facilities of MSAMB as the packhouses generates plastic packaging waste. The facilities will be required to separate out the plastic waste and handover tothe local solid waste management authority and pay for such services.

B. International Environmental Standards and Regulations

68. **International Organization for Standardization (ISO).** IFC in Vashi is providing radiation processing services to approximately 300 customers from all over the country for irradiation of spices, Ayurvedic raw materials, pet feed, animal feed and packaging material etc. The facility has obtained certification for the ISO 9001:2015 and ISO 22000:2018 (Annexure 11). ISO 9001:2015 specifies requirements for a quality management system. IFC in Vashi demonstrates the ability to consistently provide products and services that meet customer and regulatory requirements. ISO 22000:2018 defines what the organization of the IFC in Vashi needs to do in order to demonstrate ability to control food safety hazards and ensure that food products are safe for consumption. This enables organizations to deliver food- related products and services with confidence throughout the supply chain. Both ISO certificates æ valid as of the period of the due diligence and review of the facility.

C. ADB Safeguard Policy Statement 2009

69. ADB's Safeguard Policy Statement (SPS) of 2009 consist of operational policies that seekto avoid, minimize, or mitigate adverse environmental and social impacts, including protecting therights of those likely to be affected or marginalized by the development process. ADB's safeguardpolicy framework consists of three operational policies on the environment, indigenous peoples, and involuntary resettlement.

70. As per ADB's Operations Manual, OM Section F1/OP Issued on 1 October 2013, the proposed project categorizes under **Category B for Environmental Impacts**, i.e. – a projectis classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most

cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP has thus conducted and EMP finalized as per Category B requirements.

71. According to SPS of 2009, ADB will not finance projects that do not comply with its safeguard policy statement, nor those projects that do not comply with the country's social and environmental policies and including Government of India's obligations under international laws. Further, ADB will not finance activities on the prohibited investment activities list in Appendix 5[55]. Under the prohibited investment activities as listed in Appendix 5 of SPS of 2009, production of or trade in radioactive materials, including nuclear reactors and components thereof is to be excluded from ADB financing. However, medical equipment, quality control (measurement) equipment, and any equipment for which the radioactive source is considered to be trivial and adequately shielded can be financed by ADB. For projects on existing facilities the SPS requires the conduction of an environmental audit of the existing environmental, health and safety systemsunder the project. This due diligence report has been carried out to fulfil this requirement.

72. This facility is approved by Atomic Energy Regulatory Board (AERB) & Department of Atomic Energy (DAE) and National Plant Protection Quarantine (NPPO) Government of India. Additionally, the United State Department of Agriculture – Animal and Plant Health Inspection Services (USDA-APHIS)[56] has accredited this facility for export of mangoes and pomegranate toUSA, and Authorities of Australia Government for export of mangoes to Australia.

73. The proposal for expansion of dosage capacity by only 300 kCi, will be well within total capacity of 500 kCi of the unit. Further, the procurement, transportation, and installation will be carried out by Board of Radiation and Isotope Technology (BRIT).

74. Board of Radiation and Isotope Technology (BRIT) is an Industrial Unit of Department of Atomic Energy (DAE), Government of India conceived a separate organization - BRIT –promotes use of radiation and isotopes in non-power sector, since March 01, 1989. BRIT is the only licensed organisation for production of Cobalt-60 in India.

75. BRIT undertakes to supply Cobalt-60 source required initially, as well as later to replenish,for the proposed plants on chargeable basis. BRIT supplies W-91 having outer dimension of 27.2mm diameter x 463mm length in SS-316L

[55] https://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement- june2009.pdf
[56] https://www.aphis.usda.gov/aphis/ourfocus/planthealth/import-information/sa_quarantine_treatments/irradiation/irradiation-treatment

encapsulation and E65535 with bend test 5 classification to IFC. BRIT being the supplier of the pencils (Cobalt-60) to IFC unit, will replenish the pencilsunder the supervision of BRAC and AERB.

76. For disposal of used Cobalt, BRIT will undertake disposal or recycling of decayed sourcesafter the useful life of sealed sources. Multi-Purpose Gamma Irradiator sources (W-91 type) are reused in Gamma Chamber sources to avoid unwanted dumping of decayed activity.

77. The facility has dedicated Radiology Safety Officer, trained by BARC and 24/7, MSAMB personnel can be reached out for any Emergency Purpose. (MSAMB Shri-Satish Waghmode – 022 -27840201; 9850228586)

78. Additionally, MSAMB have all requisite approvals in place for operation of IFC Unit at Vashi. Thus, based on field visit (before onset of COVID-19 pandemic) and review of institutional arrangement of procuring, transporting of Cobalt-60 and operation of the Irradiation technology atthe unit, as well as revisiting the safety status report of IFC, it is concluded that use of Cobalt-60 for irradiation of food crop at IFC Unit is safe. IFC never had any incidence of emergency so far and has been well maintaining the facility since 2016.

CHAPTER IV. ENVIRONMENTAL RISKS AND IMPACTS

A. Potential Environmental Risks and Impacts

79. **Mitigation of irradiation risks**: In 2016, MSAMB has established IFC at Vashi, and has the approval by Atomic Energy Regulatory Board (AERB) of Department of Atomic Energy (DAE)and National Plant Protection Organization (NPPO) Government of India. The United State Department of Agriculture – Animal and Plant Health Inspection Services (USDA-APHIS) has accredited the facility for export of mangoes and pomegranate into the USA. The facility has beenaccredited by Authorities of Australia Government for export of mangoes to Australia in 2017 as well.

80. Appendix 5 of the SPS prohibits the trade of radioactive materials under ADB financed projects. However, it allows the purchase of equipment for use of radioactive material if the radioactive source is "trivial" and "adequately shielded". In line with this, the inclusion of the irradiation facility can be included under ADB financing provided that the radioactive source is trivial and adequately shielded. The following paragraphs demonstrate that the irradiation facilitymeets both these requirements.

81. **Radioactive source is trivial.** Criteria for fulfilling the requirement of trivial that have beenconsidered under the project are: i) the quantities of Cobalt-60 to be procured and used in the facility; ii) whether the use of Cobalt-60 for food irradiation is novel or a regular practice; iii) existence of peer reviewed literature on the risks associated with irradiation using Cobalt-60; and iv) demonstration that the project will follow international good practices and standards. The following paragraphs elaborate on how the project fulfils the four criteria.

(i) *The quantities of Cobalt-60 to be procured and used in the facility.* Approximately 300 kCi of Cobalt-60 will be procured from the Board of Radiation Isotope and Technology (BRIT) under the project. However, this will be financed under the government financed components and not the ADB loan. This is a small amount of Cobalt-60 which will be used exclusively for the IFC over a period of 2-3 years[57].The total capacity of the irradiation facility is 500 kCi.

(ii) *Whether the use of Cobalt-60 for food irradiation is novel or a regular practice.* After many years of research and the development of domestic and international standards, more than 60 countries worldwide have regulations allowing the use of irradiation for one or more food products. The use of Cobalt-60 for

[57] p. 50. https://mofpi.nic.in/sites/default/files/RPP-TECDOC.pdf.pdf

food irradiation is regular practice as per IAEA guidelines. Irradiation has become widely acceptedas a proven and effective post-harvest treatment to reduce bacterial contamination, slow spoilage, and maintain food quality. The IFC in Vashi will increase the Cobalt dosage for irradiating horticultural crops to achieve microbial decontamination, delaying of sprouting, and enhancing shelf-life. The post-harvestfacility will use Cobalt-60 for gamma irradiation treatment of mangoes, spices, onions, potatoes, pet food processing and other value addition in order to meet theexport requirements and of the agriculture produce.

(iii) *Existence of peer reviewed literature on the risks associated with irradiation using Cobalt-60.* There are several articles and documents that show that food irradiation in general and food irradiation using Cobalt-60 gamma rays in particular have minimal health risks. Studies conducted on the nutrient content and quality of radiated crops and food products show that the change in ingredients and contents of food products is negligible. The increased shelf life of the food products is known to bring substantial social and economic benefits. Weblinks to articles and documents on the safety of irradiated food products are listed below:

- https://apps.who.int/iris/bitstream/handle/10665/39463/9241561629- eng.pdf?sequence=4&isAllowed=y
- https://www.fda.gov/food/buy-store-serve-safe-food/food-irradiation-what-you- need-know
- https://www.iaea.org/topics/food-irradiation
- https://www.iaea.org/publications/10801/manual-of-good-practice-in-food- irradiation
- https://ec.europa.eu/food/safety/biosafety/irradiation/legislation_en
- https://academic.oup.com/cid/article/33/3/376/278043
- https://www.mcgill.ca/oss/article/health-you-asked/food-irradiation-dangerous
- https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular- biology/cobalt-60

(iv) *Demonstration that the project will follow international good practices and standards.* The IFC in Vashi has been accredited by a number of government agencies from export market countries such as the USDA – APHIS and the Government of Australia, NPPO's National Standard for Phytosanitary Measures (NSPM-21). It is also compliant with national policies and standards under the Government of India as shown below:

- Accreditation from USDA-APHIS.
- Accreditation from Govt. of Australia.
- NPPO's National Standard for Phytosanitary Measures (NSPM-21)
- Dosimetry and technical evaluation as per American Society for Testing Materials (ASTM) standards.
- Food Irradiation as per DAE Food Rule 2012.
- Accredited and followed the standards Food Safety and Standards Authority of India (FSSAI)[58]
- Operation and maintenance of facility as per AERBs Safety codes withLicense of Operation.
- Food Irradiation as per DAE Food Rule with License of Food Irradiation.

82. **The radioactive source is adequately shielded**. Criteria for fulfilling the requirement onthe radio active source being adequately "shielded" that have been considered under the projectare: i) the type of packaging and shielding material used and their effectiveness in shielding handlers from radiation; ii) existence of capacity and best practice standards/regulations within the project/government agency to safely handle the Cobalt-60 and equipment throughout the supply chain. The following paragraphs show compliance with these 2 criteria:

(i) Type of packaging and shielding material used and their effectiveness in shieldinghandlers from radiation.

- *Safety interlocks*. As discussed before, is fail-safe design and used to avoidpersonnel exposure to high radiation levels. The system controls access to the radiation protection areas and monitors safety devices.

- *Shielding of Cobalt-60*. Radioactive source is stored in water pool with depths of 7-8 meters of demineralize 45,000-55,000 litres of water and resistant to corrosion.

(ii) Existence of capacity and best practice standards/regulations within the project/government agency to safely handle the Cobalt-

[58] Established under the Ministry of Health & Family Welfare, the FSSAI has been established under the Food Safety and Standards Act, 2006, which is a consolidating statute related to food safety and regulation in India.

60 and equipment throughout the supply chain.

- *Monitoring ionization radiation exposures*. Dosimetry monitoring is the practice of wearing personal radiation measurement badges (dosimeters) to measure the amount of dose exposure. These badges provide readings about the dose of ionizing radiation an individual receives. Dose measurements and history are captured and stored. Personal monitoring is carried out by employers to evaluate the level of exposure of their workers to hazardous materials in the workplace. It is a quantitativeevaluation that consists of measuring the hazard through personal monitoring and/or sampling. For this exercise, MSAMB have annual contract with AERB approved laboratory in Mumbai. The reports aregenerated quarterly basis and reported to the AERB with Quarterly Safety Status Report periodically.

- *Record Keeping***.** An adequate quality assurance (QA), including appropriate quality control measures, will be established for the design and manufacture, construction, operation, and industrial safety of irradiators. Records of all QA procedures will be maintained for the entire life of the irradiator.

- *Trained Staff*. As per AERB, the irradiation facility needs to appoint Radiological Safety Officer (RSO), and Plant Operator certified by Bhabha Atomic Research Centre (BARC). MSAMB have deployed the adequate experienced staff to operate the irradiation facility.

83. Following are the potential environmental risk and impacts:

Table 2: Environmental Risk and Impact Matrix

Environmental Risk	Impact	Severity	Likelihood of occurrence
Radioactive source rack stuck in an unshielded position	Exposure of personnel in case they unknowingly enter the chamber	High	Low. Personnel are trained and dummy run of the operation along with preventive maintenance is frequently carried out
Radioactive contamination-(detection of leaking radioactive sources),	Contamination of source storage waterpool and the entire system of water flow	Low	Low. Source is double encapsulated.
Fire, explosion or gas leakages inside the accelerator equipment area, radiation cell or product storage area	Mass scale damage into the facility and exposure to radioactive material	High	Low. Continuous check and preventive maintenance are carried out by the trained staff. Additionally, there are regular third-party inspection by BARC and AERB. Apart from this thethick wall of the chamber is fire and water proofed.
Loss of source shielding(e.g. very low water level in the gamma radiation processing facility or GRAPF)	Leading to no or lowshielding	Low	Low. Auto refilling system is installedand is regularly calibrated to check performance.
Malfunctioning or deliberate failure of the safety interlock systems and access control systems, breach ofsecurity.	Exposure of personnel and or loss of radioactive material	Low	Low. All operating personnel are well guarded and all locks are system operated with layers of access controls. Thus, difficult to manipulate.
Accidental radiation exposure of individual(s) in excess of dose limits	Leading exposure of personnel	Medium	Low. Each individual is aware of ill- effects, and protocols are in place.
Natural occurrencessuch as earthquake,flood, tornadoes, etc.	Leading exposure of personnel	Low	Low. Facility location, layout and design plans, have been approved by AERB after keeping buffer capacity.
Transportation of Cobalt-60 pencils andrisk associated	Leading exposure of personnel and masses	High	Low. Cobalt-60 comes in the form of pencils that are completely encapsulated and sealed by the manufacturer (i.e. BRIT).
Installation of the Cobalt-60 in the underground irradiation water chamber	Leading exposure ofpersonnel	High	Low. BRIT follow all regulated process and procedures for installation, and completely encapsulated during installation.

Environmental Risk	Impact	Severity	Likelihood of occurrence
Disposal of Cobalt-60 pencils and risk associated	Leading exposure of personnel and masses	High	Low. Radioactive waste is managed in accordance with the requirements of the government. There is separate processing of radioactive waste from non-radioactive wastes in the IFC.
Generation of processwaste (waste fruits, dressings), waste oil etc.	Increasing load at sanitary landfill	Low	High. Everyday waste is generated due to crop reject

B. Review of Mitigation Measures

Table 3: Environmental Risk Mitigation and Gap Filling Measures

Environmental Risk	Impact	Mitigation Measures being taken	Role and Responsibility	Gaps/Areas for improvement	Gap filling measures
1. Radioactive source rack stuck in an unshielded position	Exposure of personnel in case they unknowingly enter the chamber	PLC raises alarm as first indicator. Additionally, all personnel are trained and mock run of the operation along with preventive maintenance is carriedout frequently.	RSO, Operator, BARC, AERB	Mock drills on system failure are a good way of checking the performance of the people while under risk/ danger	Mock drills in presence of relevant authorities must be conducted
2. Radioactive contamination- (detection of leaking radioactive sources),	Contamination of source storage water pool and the entire system of water flow	Radioactive source is double encapsulated.	BRIT	Monitoring of water quality and exposure of workers/staff in the facility	Regular monitoring of water quality and ensuring no contamination. Regular monitoring of workers/staff exposure to radiation

Environmental Risk	Impact	Mitigation Measures being taken	Role and Responsibility	Gaps/Areas for improvement	Gap filling measures
3. Fire, explosion or gas leakages inside the accelerator equipment area, radiation cell or product storage area	Mass scale damage into thefacility and exposure to radioactive material	Continuous check and preventive maintenance are carried out by the trained staff. Additionally, there are regular third-party inspection by BARCand AERB. Apart from this the thick wall of the chamber is fire and waterproofed.	IFC Unit, BRIT during installation andor replacement BARC and AERB regular inspections	Mock drills on system failure are a good way of checking the performance of the people while under risk/ danger	Mock drills in presence of relevant authorities must be conducted
4. Loss of source shielding (e.g. very low water level in GRAPFs)	Leading to no or low shielding	Auto refilling system is regularly calibrated to check performance.	IFC Unit operator, RSO	Monitoring of water quality	Regular monitoring of water quality and ensuring no contamination. Regular monitoring of workers/staff exposure to radiation
5. Malfunctioning or deliberate failure of the safety interlock systems and access control systems, breach of security	Exposure of personnel and or loss of radioactive material	As each of the personnel to the operation is well guarded and all locks are system operated with layers of access controls. Thus, difficult to manipulate.	IFC Unit operator, RSO	Mock drills on system failure is a good way of checking the performance of the people while under risk/ danger	Mock drills in presence of relevant authorities must be conducted

Environmental Risk	Impact	Mitigation Measures being taken	Role and Responsibility	Gaps/Areas for improvement	Gap filling measures
6. Accidental radiation exposure of individual(s) in excess of dose limits	Leading exposure of personnel	Each individual is aware of ill-effects. Training of staff and contractors	IFC Unit operator, RSO	NA	NA
7. Natural occurrences such as earthquake, flood, tornadoes, etc.	Leading exposure of personnel	The facility location, layout and design plans, have been approved by AERB after keeping buffer capacity.	AERB	Absence of Green belt and storm water drainage	Development of Green Belt and storm water drainage around the facility

Environmental Risk	Impact	Mitigation Measures being taken	Role and Responsibility	Gaps/Areas for improvement	Gap filling measures
8. Development of health problems or illnesses amongst staff working in the facility due to exposures during transportation, installation, and disposal of Cobalt-60.	Long term health problems or terminal illnesses	1. Occupational Health related aspects including status of periodic medical examination of workers, health related problem encountered during normal working are reviewed by a committee of AERB. 2. Each staff responsible for working in the irradiation area is provided with a pocket dosimeter that records exposure if any 3. Analysis of Yearly Report on Occupational Health is carried out to assess the morbidities for common diseases such as diabetes, respiratory diseases, cardiac diseases, anaemia, skin diseases etc. for different age groups.	MSAMB and AERB	While all measures are taken for Occupational Health and Safety, it is also important for the staff to remain healthy in general. Such awareness should be generated	To organise health awareness programs including general physical and mental health

Environmental Risk	Impact	Mitigation Measures being taken	Role and Responsibility	Gaps/Areas for improvement	Gap filling measures
9. Generation of food waste fromthe crop rejects	Load in sanitary landfill	Currently being collected by the municipal body on daily basis	MSAMB	Waste is not segregated at source. Possibility of food waste compost anduse of manure in green belt development/ area development	Segregating waste in 3 colour Bins as per biodegradable, non-biodegradable and inert waste. Biodegradable waste to be composted and rest disposed using municipal facility.

CHAPTER V. CORRECTIVE ACTION PLAN

84. Based on the gaps and gap filling measures identified in chapter 4, the following table summarizes the key gap filling measures to be taken.

Table 4: Corrective Actions

Environmental Risk	Gap Filling Measure	Responsibility	Budget needed	Timeline
Emergency event leading to radioactive exposure	Two mock drills per year on handling emergency/ event	MSAMB along with BRIT	INR 50,000	Twice in a year
Occupational Health and Safety and general health of Staff	To organise health awareness programs including general physical and mental health	MSAMB	INR 100,00	Once in a year
Environmental conservation	Green-belt development	MSAMB	INR 150,000	To be completed in a year's time
Solid Waste Disposal – Waste segregated at source	Provision of colour-coded waste collection bins (3 colours x 3 sets; 1 set at processing hall, 1 set at sorting/receiving point, 1 set at the workers rest place outside the processing hall) say INR. 3000/- per set x3= INR.9000/≈ say INR.10000/=	MSAMB	INR 100,00	To be completed in a year's time

85. The progress on implementation of these measures will be monitored by the PMU and included in the environmental monitoring reports to be prepared for the project and submitted to ADB.

CHAPTER VI. CONCLUSIONS

86. MAGNET Project proposed for funding by the Asian Development Bank (ADB), targetsto support farmer producer organizations (FPOs) and achieve average agriculture sector growth rate of 5%, promote agriculture produce export, and establish fair, competitive and accessible agriculture markets.

87. Under Output 3, which includes expansion and modernization of the existing 17 facilities of MSAMB, one of them is on improving a post-harvest irradiation facility where the radiation dosage capacity is proposed to be enhanced along with allied equipment of its IFC located at Vashi. Through MSAMB procurement, the IFC unit will increase the Cobalt dosagefor irradiating horticultural crops to achieve microbial decontamination, delaying of sprouting and enhancing shelf-life.

88. The use of Cobalt-60 for food irradiation is regular practice as per International Atomic Energy Agency (IAEA) guidelines. The total capacity of the irradiation facility is 500 kCi, the current installed strength is 300 kCi, and MSAMB proposes to enhance the strength by additionally procuring 300 kCi by MSAMB.

89. The expansion and modernization of the irradiation facility in Vashi can be included under ADB financing because the radioactive source is trivial and adequately shielded. Approximately 300 kCi of Cobalt-60 will be procured from BRIT by MSAMB, that will be utilized for around 2-3 years. Irradiation has become widely accepted as a proven and effective post-harvest treatment to reduce bacterial contamination, slow spoilage and maintain food quality.The IFC in Vashi has been accredited by a number of government agencies from export marketcountries such as the USDA – APHIS and the Government of Australia, NPPO's National Standard for Phytosanitary Measures (NSPM-21). It is also compliant with national policies and standards under the Government of India. The IFC has fail-safe design to avoid personnelexposure to high radiation levels, and the radioactive source is stored in water pool with depthsof 7-8 meters. Personal monitoring is carried out by employers to evaluate the level of exposure of their workers to hazardous materials in the workplace. As per requirement of AERB, the irradiation facility have adequate experienced staff to operate the irradiation facility.

90. The EDDR is prepared for the IFC in Vashi and found compliant to most national and international regulations and standards. However, some corrective actions and areas for improvement were identified:

(i) Conducting frequent mock drill to gauge the ability of the staff to handle any emergency situation. Involvement of BRIT, local police station, disaster risk management team, as well as local city authority should be included;

(ii) Staff awareness to be raised on how to manage general health-wellbeing suchthat occupation health impacts could be reduced;

(iii) For betterment of environmental conservation, green belt and storm water drainto be developed around the facility; and

(iv) Solid waste at the facility to be segregated into biodegradable, non-biodegradable and inert waste if generated, and try to compost the biodegradable waste at the unit itself and use for green belt development and our beautifying the surrounding.

Annexures of the EDDR

Annexure 1 of the EDDR: BRIT Certificate

भारत सरकार
GOVERNMENT OF INDIA
परमाणु ऊर्जा विभाग
DEPARTMENT OF ATOMIC ENERGY
विकिरण एवं आइसोटोप प्रौद्योगिकी बोर्ड
BOARD OF RADIATION AND ISOTOPE TECHNOLOGY
(Marketing & Services)

Jacob Sebastian.
Deputy General Manager

e-mail: Jacob@britatom.gov.in

Mob:09869454140
Tele:022-25574363,25565535,27887702

BRIT/Project House
VNP Marg Anusaktinagar
Mumbai - 400094

Ref: BRIT/M & S/ C-2627 05.02.2021

CERTIFICATE

This is to certify that Board of Radiation & Isotope Technology, Department of Atomic Energy Government of India, is the only agency authorized to fabricate Co-60 irradiator source in India

(Jacob Sebastian)

Dr. Bhaskar N. Patil
Deputy General Manager
MSAMB, Vashi, Navi Mumbai.

Annexure 2 of the EDDR: License for Operation of Gamma Radiation ProcessingFacility in Vashi

परमाणु
ऊर्जा
नियामक
परिषद

अध्यक्ष
CHAIRMAN

भारत सरकार
GOVERNMENT OF INDIA

Atomic
Energy
Regulatory
Board

Application No. 18-325122	**Issuance Date : March 23, 2018**
Ref. No: AERB/ RSD/ Licence/MH-43309 /R-1/2018 / 595	**Expiry Date : March 23, 2021**

LICENCE FOR OPERATION OF GAMMA RADIATION PROCESSING FACILITY

In exercise of the powers conferred under Section 16 and 17 as applicable of the Atomic Energy Act, 1962 read in conjunction with Rule 3 of the Atomic Energy (Radiation Protection) Rules, 2004, the Atomic Energy Regulatory Board (AERB) hereby renews licence in favour of Shri Kishore Toshniwal for operation of the following Gamma Radiation Processing Facility (GRAPF) located at APMC market, Plot No. 03, R-wing, Sector No. 19F, Vashi, Navi Mumbai.

GRAPF Category	ISOTOPE	Maximum Source Strength	Photon Energy (MeV)
IV	Co-60	18.5 PBq (400 kCi)	1.33 & 1.17

Managing Director, M/s Maharashtra State Agricultural Marketing Board (MSAMB), Navi Mumbai and Shri Kishore Toshniwal are hereby identified as the employer and licensee respectively, for the purpose of assigning the responsibilities specified in the Atomic Energy (Radiation Protection) Rules, 2004, in respect of radiation protection of workers, public and environment because of possession and operation of the above source and security of above source by M/s Maharashtra State Agricultural Marketing Board (MSAMB), Navi Mumbai.

TERMS AND CONDITIONS

The Licensee is responsible for,

1. Ensuring compliance with the relevant provisions of the
   a) Atomic Energy Act, 1962; and
   b) Atomic Energy (Radiation Protection) Rules, 2004.
2. Operation, use and maintenance of GRAPF in accordance with provisions of AERB Safety Code on Radiation Processing facilities; AERB/RF-RPF/SC-1 (Rev.1), and other applicable documents issued by AERB.
3. Operation of GRAPF only by the trained and qualified personnel of M/s Maharashtra State Agricultural Marketing Board (MSAMB), Navi Mumbai.
4. Maintenance of complete records of Quality Assurance (QA) for GRAPF.
5. Submission of periodic safety status report to AERB in the months of January, April, July and October every year.
6. Reporting promptly to AERB of any radiation safety related unusual occurrence during operation of GRAPF.
7. Availability of a copy of this Licence at the place where the GRAPF is being operated.

This Licence may be suspended/modified/withdrawn as deemed fit in the event of any contravention of the provisions of the Act/Rules or terms and conditions mentioned above.

Competent Authority

Managing Director
(Atten.: Shri Kishore Toshniwal)
M/s Maharashtra State Agricultural Marketing Board
Plot No. 3, Opp. Dana Burndar, Sector-19F, APMC Area
Navi Mumbai-400705
MAHARASHTRA

ISO 9001:2008 Organisation

NIYAMAK BHAVAN, ANUSHAKTI NAGAR, MUMBAI - 400 094

IM. No. 14
04/04/2018

परमाणु ऊर्जा नियामक परिषद

Atomic Energy Regulatory Board

भारत सरकार

GOVERNMENT OF INDIA

अध्यक्ष
CHAIRMAN

Ref. No: AERB/ RSD/IAS/ Licence/ MH-43309 /R-2/2021/ 339	Valid from : March 24, 2021
	Expiry Date : March 24, 2024

LICENCE FOR OPERATION OF GAMMA RADIATION PROCESSING FACILITY

In exercise of the powers conferred under Section 16 and 17 as applicable of the Atomic Energy Act, 1962 read in conjunction with Rule 3 of the Atomic Energy (Radiation Protection) Rules, 2004, the Atomic Energy Regulatory Board (AERB) hereby renews licence in favour of Shri Sunil Pawar, Managing Director, M/s Maharashtra State Agricultural Marketing Board (MSAMB), Navi Mumbai for operation of the following Gamma Radiation Processing Facility (GRAPF) located at APMC market, Plot No. 03, R-wing, Sector No. 19F, Vashi, Navi Mumbai.

GRAPF Category	ISOTOPE	Maximum Source Strength	Photon Energy (MeV)
IV	Co-60	18.5 PBq (500 kCi)	1.33 & 1.17

Managing Director, M/s MSAMB, Navi Mumbai and Shri Sunil Pawar is hereby identified as the employer and licensee respectively, for the purpose of assigning the responsibilities specified in the Atomic Energy (Radiation Protection) Rules, 2004, in respect of radiation protection of workers, public and environment because of possession and operation of the above source and security of above source by M/s MSAMB, Navi Mumbai.

As per Rule (3) of Atomic Energy (Radiation Processing of Food and Allied Products), Rules (AE (RPF&AP) R), 2012, the licensee shall obtain a separate License from Department of Atomic Energy (DAE), Mumbai for irradiation of Food and Allied Products.

TERMS AND CONDITIONS

The Licensee is responsible for,

1. Ensuring compliance with the relevant provisions of the
   a) Atomic Energy Act, 1962; and
   b) Atomic Energy (Radiation Protection) Rules, 2004.
2. Operation, use and maintenance of GRAPF in accordance with provisions of AERB Safety Code on Radiation Processing facilities; AERB/RF-RPF/SC-1 (Rev.1), and other applicable documents issued by AERB.
3. Operation of GRAPF only by the trained and qualified personnel of M/s MSAMB, Navi Mumbai.
4. Maintenance of complete records of Quality Assurance (QA) for GRAPF.
5. Submission of periodic safety status report to AERB in the months of January, April, July and October every year.
6. Reporting promptly to AERB of any radiation safety related unusual occurrence during operation of GRAPF.
7. Availability of a copy of this Licence at the place where the GRAPF is being operated.

This Licence may be suspended/modified/withdrawn as deemed fit in the event of any contravention of the provisions of the Act/Rules or terms and conditions mentioned above.

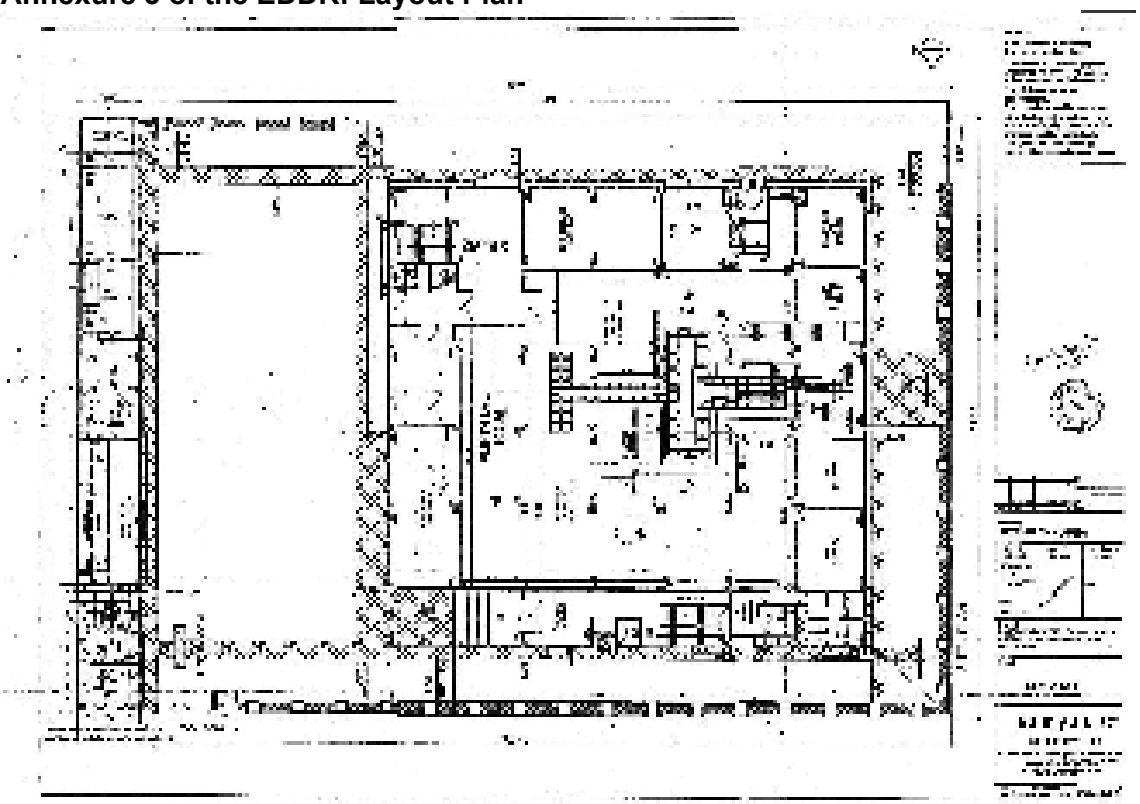
Competent Authority

Managing Director
(Atten.: Shri Sunil Pawar)
M/s Maharashtra State Agricultural Marketing Board
Plot No. 3, Opp. Dana Bundar, Sector-19F, APMC Area
Navi Mumbai-400705, Maharashtra

नियामक भवन, अनुशक्तिनगर, मुंबई - 400 094
NIYAMAK BHAVAN, ANUSHAKTI NAGAR, MUMBAI - 400 094

दूरभाष / TELEPHONE
फैक्स / FAX
E-mail:
वेबसाईट / WEBSITE

Annexure 3 of the EDDR: Layout Plan



Annexure 4 of the EDDR: NMMC Occupancy certificate

नवी मुंबई
महानगरपालिका

Navi Mumbai Municipal Corporation

कार्यालय : ने.मुं.म.पा. मुख्यालय, भूखंड क्र. १, किल्ले गावठाण जवळ, पामबीच जंक्शन, से. १५ए, सी.बी.डी. बेलापूर, नवी मुंबई - ४०० ६१४
दूरध्वनी : ०२२-२७५६ ७०७०/१/२/३/४/५
फॅक्स : ०२२-२७५७३७८५ / २७५७७०/७

Office : N.M.M.C. Head Quarter, Plot No.1, Near Kille Gaonthan, Palmbeach Junction, Sec-15A, C.B.D. Belapur, Navi Mumbai - 400 614
Tel. : 022 - 2756 7070 /1/2/3/4/5
Fax. : 022 - 27573785 / 275770/6

जा.क्र./नरवि/घोप्र/प्र.क्र./ /२०१७
दि. /२०१७

भोगवटा प्रमाणपत्र

वाचले :- १) नवी मुंबई महानगरपालिकेकडील बांधकाम प्रारंभ प्रमाणपत्र क्र. नमुमपा/ नरवि/ बां.प/ प्र.क्र.ए-११८७२/४९६३/२०११, दि. १८/१०/२०११.
२) नवी मुंबई महानगरपालिकेचे दि. ३१/०७/२००८ रोजीचे अधिमुल्य शुल्क आकारणीबाबतचे परिपत्रक.
३) वास्तुविशारद मे. सम्यक सी' यांनी दि. १६/०८/२०१७ रोजी सादर केलेला बांधकाम पूर्णत्वाचा दाखला.

नवी मुंबई येथे भूखंड क्र. ०३, सेक्टर १९एफ, वाशी, नवी मुंबई या जागेचे मालक मे. महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे यांनी जागेवरील बांधकाम दि.३१/०१/२०१६ रोजी पुर्ण केलेले आहे. त्याबाबतचा दाखला संबंधित वास्तुविशारद मे. सम्यक सी' यांनी सादर केलेला आहे. नवी मुंबई महानगरपालिकेकडील बांधकाम प्रारंभ प्रमाणपत्र दि. १८/१०/२०११ मध्ये नमुद केलेल्या अटी व शर्ती तसेच महानगरपालिकेचे दि. ३१/०७/२००८ च्या अधिमुल्य शुल्क आकारणीबाबतच्या परिपत्रकानुसा विविध शुल्क वसुली बाबतची कार्यवाही केलेली आहे. त्यामुळे सदर जागेत

१)	मुख्यालये क्षेत्रफळ	: ४०००.०० चौ.मी.
२)	अनुज्ञेय चटई क्षेत्र निर्देशांक	: ४.००
३)	एकुण अनुज्ञेय बांधकाम क्षेत्र	: १६०००.०० चौ.मी.
४)	फेअर होल्डिंग वापरास्तालील बांधकाम क्षेत्र	: १५८२८.९८७ चौ. मी.

वानुसार वापर करणेस परवानगी देण्यात येत आहे.

(अभिजित ए. बोबीन)
सहायक संचालक,
नगररचना
नवी मुंबई महानगरपालिका

"जन्म असो वा मरण आवश्यक नोंदणीकरण"

Annexure 5 of the EDDR: Genset 500KVA NOC

महाराष्ट्र शासन
विद्युत निरीक्षक यांचे कार्यालय
निरीक्षण विभाग क्र. १, उद्योग, ऊर्जा व कामगार विभाग,
११ वा रस्ता, वागळे इस्टेट, ठाणे (प) ४००६०४

ई-मेल : eleinsthane1.ei@mahapwd.com & eleinsthane1.ei@gmail.com   दुरध्वनी क्र. (०२२) २५८२१८४८

जा.क्र.विनिठा-१/स्वोप/४३४१/२०१३   दिनांक :- 21-11-2013

प्रति,

M/s. Maharashtra State Agricultural Marketing Board,
Plot No.03, Sector-19F, APMC Market Yard,
Danan Bunder Market, Vashi,
Navi Mumbai

विषय- ५०० केव्हीए जनित्राच कार्यान्वित करण्यासाठी परवानगी.

संदर्भ- १. नकाशा मंजूरी क्रमांक -   दिनांक -
२. आपले पत्र क्रमांक -   दिनांक ११.११.२०१३

महोदय,

[illegible] दिनांक १८.११.२०१३ [illegible]

मंजूरी- १. अ) जनित्र धारकाचे नांव व पत्ता :- M/s. Maharashtra State Agricultural Marketing Board, Plot No.03, Sector-19F, APMC Market Yard, Danan Bunder Market, Vashi, Navi Mumbai

ब) जनित्र उभारणी ठिकाणचा पत्ता :- वरीलप्रमाणे

क) जनित्र प्रकार, वापर उद्देश :- औद्योगिक (फक्त स्वतःचे वापरासाठी)

२. जनित्र माहिती:-

इंजिन	बनावट	अ.क्र.	क्षमता (हॉ.पॉ.)	इंधन	
	कमिन्स	२५३८५९११	६००	डिझेल	
अल्टरनेटर	बनावट	अ.क्र.	क्षमता (केव्हीए)	एव	
	स्टॅम्फोर्ड	[illegible]	५००	४१५ व्होल्ट	
एक्सायटर	बनावट	अ.क्र.	सीटी रेशो	गुणक	प्र.रिडींग
	एल अँण्ड टी	१३११४८०१६	८००/५	१६०	[illegible]

अटी:-

१. विद्युत [illegible] मे. श्री [illegible] प्रा.लि. म.ठेक्र. १९८९१ [illegible]
२. [illegible] १९५८ [illegible] (विद्युत), सा.बां.विभाग, मुंबई [illegible]
३. [illegible]
४. के.वि.प्र.सुरक्षा विनियम १३(४) [illegible]
५. [illegible] के.वि.प्र.सुरक्षा विनियम क्र. ३ व ११ [illegible] २९ [illegible]
६. [illegible]
७. [illegible]
८. [illegible]
९. [illegible]
१०. [illegible]

Ananwal

विद्युत निरीक्षक
निरीक्षण विभाग क्र. १, ठाणे

प्रत- मा. मुख्य अभियंता (विद्युत), सा.बां.विभाग, मुंबई [illegible]
प्रत- [illegible] निरीक्षण विभाग क्र. १, ठाणे [illegible]

Annexure 6 of the EDDR: NMMC Construction NOC

नवी मुंबई महानगरपालिका
स्थानिक संस्था कर विभाग

[illegible] /२०१७
स्थानिक संस्था कर विभाग,
सेक्टर ०६, बेलापूर, नवी मुंबई
दिनांक: ०९/०८/२०१७

ना हरकत प्रमाणपत्र

दाखला देण्यात येतो की, अर्जदार **मे. महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे पत्ता-भुखंड क्र. ०३, सेक्टर क्र. १९ एफ, वाशी, नवी मुंबई** यांची महाराष्ट्र महानगरपालिका (मालाचे प्रवेशाकरीता स्थानिक संस्था कर) नियम २०१० अन्वये अनोंदीत व्यापारी म्हणुन गणना करण्यात आलेली असून त्यांनी या कार्यालयात सादर केलेल्या दि. १८.१०.२०११ अन्वये मंजुर **वेअर हाउसिंग** कारणासाठी बांधकाम परवानगी / नकाशा प्रमाणे एकुण बांधकाम क्षेत्रफळ **३९४८.८६८ चौ. मी.** वर रु. **६,८१,१८०/-** (अक्षरी रुपये सहा लाख एक्याऐंशी हजार एकशे ऐंशी मात्र) चा भरणा धनाकर्ष (डी डी) क्र. ०६०३९७ दि. २५.०७.२०१७ रोजी चालनाद्वारे स्थानिक संस्था करापोटी भरणा केला आहे.

स्थानिक संस्था कराचा भरणा करणे व स्थानिक संस्था कर नियमानुसार स्थानिक संस्था कर विभागाची नोंदणी करुन निर्धारणा करणे बंधनकारक राहील. या अटीस अधिन राहुन सदरचे ना हरकत प्रमाणपत्र देण्यात येत आहे.

तसेच अर्जदाराने उपरोक्त दि. १८.१०.२०११ अन्वये मंजुर बांधकाम क्षेत्राहीता अधिकचे बांधकाम करुन त्याचे सुधारीत बांधकाम परवानगी घानेतर घेतली असल्यास त्यानुसार वाढीव क्षेत्रफळावर स्थानिक संस्था कराचा भरणा करुन निर्धारणा करणे बंधनकारक राहील.

उप-आयुक्त (स्था.सं.कर)
नवी मुंबई महानगरपालिका

प्रत:-

१. मे. महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे
पत्ता-भुखंड क्र. ०३, सेक्टर क्र. १९ एफ, वाशी, नवी मुंबई
२. सहाय्यक संचालक नगररचना विभाग न.मुं.म.पा. यांना पुढील कार्यवाहीसाठी.

Annexure 7 of the EDDR: NMMC Debris NOC

नवी मुंबई महानगरपालिका
'डी' विभाग कार्यालय, तुर्भे
डेब्रीज ना हरकत दाखला

दाखला देणेत येतो की, अर्जदार मे. महाराष्ट्र राज्य कृषी पणन मंडळ ,पुणे भू.क्र. क्र. ०३ सेक्टर क्र. १९ एक, वाशी, नवी मुंबई यांचे अर्जाप्रमाणे दिनांक १०/०८/२०१७ रोजी प्रत्यक्ष जागेवर पाहणी केली असुन उपरोक्त भुखंडाच्या क्षेत्रात बांधकाम साहित्य / डेब्रीज असल्याचे आढळुन आले नाही. तरी सदरहु भुखंडावर असलेल्या इमारतीचे भोगवटा प्रमाणपत्र देण्यास या कार्यालयाची हरकत नाही.

सहायक आयुक्त
'डी' विभाग, तुर्भे
नवी मुंबई महानगरपालिका

जा.क्र. / नमुंमपा / 'डी' तुर्भे / ४४३७ /२०१७
'डी' विभाग कार्यालय, तुर्भे
नवी मुंबई महानगरपालिका
दिनांक -१२ /०८/२०१७
प्रत -

१. मे. महाराष्ट्र राज्य कृषी पणन मंडळ ,पुणे भू.क्र. क्र. ०३ सेक्टर क्र. १९ एक, वाशी, नवी मुंबई
२. मा. वैद्यकीय आरोग्य अधिकारी, न.मुं.म.पा. यांना माहितीस्तव सादर.

Annexure 8 of the EDDR: NMMC Drainage Connection certificate

नवी मुंबई
महानगरपालिका

NAVI MUMBAI
MUNICIPAL CORPORATION

नमुंमपा मुख्यालय, प्लॉट क्र.१,
किल्ले गावठाणजवळ, पामबीच जंक्शन,
सेक्टर-15ए, सी.बी.डी., बेलापूर,
नवी मुंबई - 400 614
दूरध्वनी क्र. : 2756 7130

NMMC Headquarter, Plot No.1,
Near Kille Gaonthan, Plambeach Junction,
Sector-15A, C.B.D., Belapur,
Navi Mumbai - 400 614.
TEL. No. : 2756 7130

जा.क्र.नमुंमपा/का.अ.(तुभे)/ 236 /२०१६
दिनांक :- 26/09/२०१६

मलनि: स्सारण जोडणी प्रमाणपत्र

याद्वारे असे प्रमाणित करण्यात येते की, **वाशी** नोड मधील तुभे विभाग कार्यक्षेत्रातील **भूखंड क्र. ०३, सेक्टर क्र. १९एक, वाशी, नवी मुंबई** येथे मे. **मुंबई कृषि उत्पन्न बाजार समिती** (द्वारा मे. **महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे**) यांनी केलेले मलनि:स्सारण जोडणी कामाची तपासणी केली आहे. सदरचे काम नवी मुंबई महानगरपालिकेच्या नियमांनुसार व नवी मुंबई महानगरपालिकेने मंजूर केलेल्या नकाशे व आराखड्यांनुसार असून हे काम समाधानकारकरित्या पूर्ण करण्यात आले आहे.

कार्यकारी अभियंता (तुभे)
नवी मुंबई महानगरपालिका

प्रत :- माहितीसाठी

१) नगररचनाकार, नगररचना विभाग, नमुंमपा.
२) विभाग अधिकारी, तुभे विभाग, नमुंमपा.

Annexure 9 of the EDDR: NMMC Health Department NOC

	नवी मुंबई महानगरपालिका	Navi Mumbai Municipal Corporation
	तिसरा माळा, भूखंड क्र-1 अे, से- 15 अे मुख्यालय, सी.बी.डी.नवी मुंबई 400 614 दूरध्वनी क्र: 27567262,	THIRDFLOOR,PLOT NO-1A,Se-15AHEAD OFFICE, CBD,NAVI MUMBAI- 400 614TEL. No. : 27567262

जा.क्र./न.मुं.म.पा./आरोग्य/557/2017
दिनांक :-03/07/2017

प्रति,
मे. महाराष्ट्र राज्य कृषि पणन मंडळ,पुणे
भूखंड क्र. 03, सेक्टर क्र. 19 एक, वाशी,
नवी मुंबई.

विषय : भोगवटा प्रमाणपत्र मिळण्यासाठी इमारतीचे बांधकाम करण्यात किंवा त्यानंतर करावयाच्या द्वार प्रतिबंधात्मक उपाययोजना अधिनियम 1996 अंतर्गत आरोग्य विभागाचे ना हरकत प्रमाणपत्र.

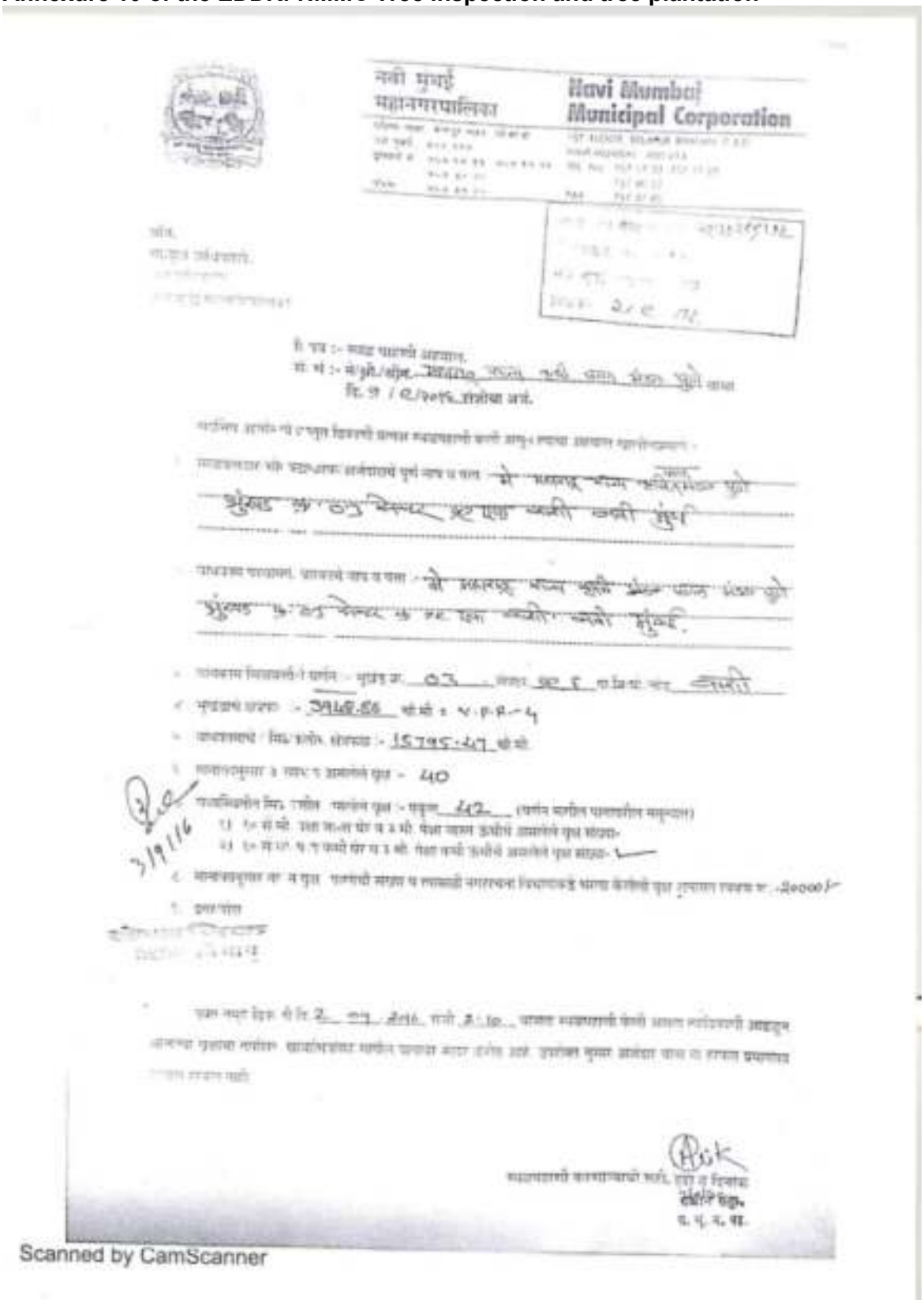
संदर्भ : 1) नमुंमपा अधिनियम, महाराष्ट्र शासन राजपत्र, ऑक्टोबर 31, 1996/कार्तिक 9 शके 1998 जाहीर नोटीस.
2) आपला अर्ज दि. 31/03/2015.

उपरोक्त संदर्भिय विषयानुसार, आपल्या **मे. महाराष्ट्र राज्य कृषि पणन मंडळ,पुणे, भूखंड क्र. 03, सेक्टर क्र. 19 एक, वाशी, नवी मुंबई.** विभाग तुर्भे, क्षेत्रफळ 15795.47 चौ. मी. (वेअर हाउसिंग) या ठिकाणी आरोग्य विभागाने केलेल्या पहाणी अंतर्गत, आपण हितसंबंध अधिनियमातील तरतुदीनुसार आवश्यक असलेल्या बाबींची पूर्तता केल्याचे आढळून आले आहे. त्यानुसार आपणास भोगवटा प्रमाणपत्र मिळणेसाठी आरोग्य विभागाचे ना हरकत प्रमाणपत्र देण्यात येत आहे.

वैद्यकिय आरोग्य अधिकारी
नवी मुंबई महानगरपालिका

प्रत : नगर रचनाकार, नवी मुंबई महानगरपालिका.

Annexure 10 of the EDDR: NMMC Tree inspection and tree plantation



नवी मुंबई
महानगरपालिका

Navi Mumbai
Municipal Corporation

Scanned by CamScanner

[illegible] ------------ [illegible] :-

अ.क्र.	झाडांचे नाव	[illegible]	उंची	अंदाजे वय	झाडांचे ठिकाण	सद्यस्थिती	शेरा
1)	आकेशिया - 20 नग	[illegible]	[illegible]	२ ते ३ वर्षे	[illegible]	[illegible]	[illegible]
२)	[illegible] - 22 नग	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]
					[illegible]		[illegible]
							[illegible]
							[illegible]
							[illegible]

उद्यान सहाय्यक

उद्यान अधिक्षक

सहाय्यक उद्यान अधिकारी (प.)

नवी मुंबई महानगरपालिका
Navi Mumbai Municipal Corporation
प्लॉट नं. १ व २, गोवर्धनी चौक, सेक्टर -१५ए, सी.बी.डी., बेलापूर नवी मुंबई - ४०० ६१४
दूरध्वनी क्र. : २७५६७००१, २७५६७००२
Plot No. 1 & 2, Govardhani Chowk, Sec.15A, C.B.D., Belapur, NAVI MUMBAI – 400 614. TEL. No. : 27567001, 27567002

जा.क्र.नमुंमपा/वृ.प्रा./भा.इ./टे.क्र.५/१३३४/२०१६
दिनांक :- १६/ ६/२०१६

ना हरकत प्रमाणपत्र

दाखला देण्यात येतो की, अर्जदार **मे. महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे भुखंड क्र. ०३, सेक्टर क्र. १९एफ, वाशी, नवी मुंबई** येथील भूखंडांच्या बांधकामा अंतर्गत महाराष्ट्र (नागरी क्षेत्रे) वृक्ष संवर्धन व जतन अधिनियम १९७५ चे कलम ११(१) अन्वये प्रती १०० चौ.मी. विकसित क्षेत्रास एक झाड लावणे बंधनकारक असल्याने सदर भूखंडावरील एकूण **३९४८.८६८ चौ.मी.** क्षेत्रावर **४० नग** एवढी झाडे लावलेली असल्याचे प्रत्यक्ष पहाणीव्दारे दिसून येते.

वरीलप्रमाणे लागवड करण्यात आलेल्या **४० नग** झाडांचे संवर्धन व जतन करणेबाबतची सर्वस्वी जबाबदारी **मे. महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे, भुखंड क्र. ०३, सेक्टर क्र. १९एफ, वाशी, नवी मुंबई** यांची आहे व राहील.

तरी सदर भूखंडावर वृक्ष लागवड केलेबाबतचे प्रमाणपत्र देण्यात येत आहे.

उप आयुक्त (उद्यान)
नवी मुंबई महानगरपालिका

प्रत :-

१. **मे. महाराष्ट्र राज्य कृषि पणन मंडळ, पुणे, भुखंड क्र. ०३, सेक्टर क्र. १९एफ, वाशी, नवी मुंबई.**
२. मा.नगररचनाकार, नवी मुंबई महानगरपालिका यांना माहितीस्तव सादर.

Annexure 11 of the EDDR: ISO Certificates

CERTIFICATE OF COMPLIANCE

ICS

INTERNATIONAL CERTIFICATION SERVICES PVT. LTD.

This is to certify that the

QUALITY MANAGEMENT SYSTEM of

BOARD OF RADIATION & ISOTOPE TECHNOLOGY

Site 1: Radiation Processing Plant, Vashi – Department Of Atomic Energy, Govt. Of India, Sec-20, Vashi, Navi Mumbai – 400 703, Maharashtra, India.

Site 2: ISOMED, Trombay – Department Of Atomic Energy, Govt. Of India, Mumbai – 400 094, Maharashtra, India.

has been assessed and registered as complying with the requirements of the following International Standard

ISO 9001:2015

The Quality Management System applicable to

Scope : Site 1: Providing Gamma Radiation Processing Services For Hygienization Of Spices, Ayurvedic Raw Materials, Pet Feed And Packaging Materials At Radiation Processing Plant (RPP), Vashi.
Site 2: Providing Gamma Radiation Processing Services For Sterilization Of Medical Products And Hygienization Of Spices, Ayurvedic And Herbal Products At ISOMED, Trombay.

Registration No.	: RQ91/8181
Registered Date	: 25th August, 2009
Reassessment Date	: 19th September, 2018
Issue Date	: 04th October, 2018
Expiry Date	: 24th August, 2021

IAF

JAS-ANZ

Managing Director
International Certification Services Pvt. Ltd.

Accredited by Joint Accreditation System of Australia and New Zealand

Validity of this certificate is based on periodic audits of the management system defined by the above scope and is contingent upon prompt written notification of significant changes to the management system and/or its conformance thereof shall be immediately communicated to ICS.
Further clarifications regarding the scope of this certificate and the applicability of ISO 9001:2015 requirements may be obtained at www.icsasian.com

CERTIFICATE OF COMPLIANCE

ICS

INTERNATIONAL CERTIFICATION SERVICES PVT. LTD.

This is to certify that the

HACCP BASED FOOD SAFETY MANAGEMENT SYSTEM of

RADIATION PROCESSING PLANT, VASHI

Board Of Radiation And Isotope Technology, Department Of Atomic Energy, Govt. Of India, Sec 20, Vashi, Navi Mumbai 400 703, Maharashtra, India.

has been assessed and registered as complying with the requirements of the following International Standard:

ISO 22000 : 2018

The Food Safety Management System is applicable to:

Scope : Providing Gamma Radiation Processing Services For Hygienization Of Spices, Ayurvedic Raw Materials, Pet Feed And Packaging Materials At Radiation Processing Plant RPP, Vashi.

Food Category	: H
Registration No.	: RH91/6399
Registered Date	: 08th November, 2010
Reassessment Date	: 12th March, 2019
Revision Date	: 23rd June, 2020
Issue Date	: 23rd June, 2020
Expiry Date	: 07th November, 2022

JAS-ANZ

IAF

Managing Director
International Certification Services Pvt. Ltd.

Accredited by Joint Accreditation System of Australia and New Zealand

Validity of this certificate is based on periodic audits of the management system defined by the above scope and is contingent upon prompt, written notification of significant changes to the management system and/or its components thereof shall be immediately communicated to ICS.
Further clarifications regarding the scope of this certificate and the applicability of ISO 22000:2018 requirements may be obtained at www.icsasian.com.

Annexure 12 of the EDDR: Sample Safety Status Report

Reference Number: 21-724533(07/04/2021)

APPLICATION TO ATOMIC ENERGY REGULATORY BOARD (AERB) FOR SAFETY STATUS REPORT

Reference Number	**: 21-724533**
Date of Application	**: 07/04/2021**

Part A

Equipment Details:

Equipment Identification no.	Last Operational Status	Last Operational Status Date	Status Updated in last 6 month

Part B

Source Details:

Source Identification no.	Isotope	Last Operational Status	Last Operational Status Date	Status Updated in last 6 month
S-GRAPF-017851	Co-60	Working	07/04/2021	Yes
S-GRAPF-017852	Co-60	Working	07/04/2021	Yes
S-GRAPF-017853	Co-60	Working	07/04/2021	Yes
S-GRAPF-017854	Co-60	Working	07/04/2021	Yes

S-GRAPF-017854	Co-60	Working	07/04/2021	Yes
S-GRAPF-017855	Co-60	Working	07/04/2021	Yes
S-GRAPF-017856	Co-60	Working	07/04/2021	Yes
S-GRAPF-017857	Co-60	Working	07/04/2021	Yes
S-GRAPF-017858	Co-60	Working	07/04/2021	Yes
S-GRAPF-017859	Co-60	Working	07/04/2021	Yes
S-GRAPF-017860	Co-60	Working	07/04/2021	Yes
S-GRAPF-017861	Co-60	Working	07/04/2021	Yes

S-GRAPF-017862	Co-60	Working	07/04/2021	Yes
S-GRAPF-017863	Co-60	Working	07/04/2021	Yes
S-GRAPF-017864	Co-60	Working	07/04/2021	Yes
S-GRAPF-017865	Co-60	Working	07/04/2021	Yes
S-GRAPF-017866	Co-60	Working	07/04/2021	Yes
S-GRAPF-017867	Co-60	Working	07/04/2021	Yes
S-GRAPF-017868	Co-60	Working	07/04/2021	Yes
S-GRAPF-017869	Co-60	Working	07/04/2021	Yes

S-GRAPF-017870	Co-60	Working	07/04/2021	Yes
S-GRAPF-017871	Co-60	Working	07/04/2021	Yes
S-GRAPF-017872	Co-60	Working	07/04/2021	Yes
S-GRAPF-017873	Co-60	Working	07/04/2021	Yes
S-GRAPF-017874	Co-60	Working	07/04/2021	Yes

Reference Number: 21-724533(07/04/2021)

Part C	
Institute Details:	
Name	: MAHARASHTRA STATE AGRICULTURAL MARKETING BOARD
Permanent Address	: PLOT NO. 3, OPP. DANA BUMDAR, SECTOR 19F
Landmark	: APMC AREA
City	: NAVI MUMBAI
State	: MAHARASHTRA
Postal Code	: 400705
Telephone Number	: 02227840201
Fax Number	:
Email Id	: ifc@msamb.com
Head of the Institute Details:	
Name	: SUNIL PAWAR
Designation	: MANAGING DIRECTOR
Telephone Number (Office)	: 02227840201
Mobile Number	: 8928195133
Email Id	: ifc@msamb.com
Licensee Details:	
Name	: SUNIL PAWAR
Designation	: MANAGING DIRECTOR
Telephone Number (Office)	: 02227840201
Mobile Number	: 8928195133
Email Id	: ifc@msamb.com

Reference Number: 21-724533(07/04/2021)

Part D

Employee Details:

SRL No	Name	Date of Birth	Designation	Qualification	Experience	PMS No.
1	APOORV VIKAS RAYAMANE	20/11/1995	Plant Operator	RSO Certification for Radiation Processing Facilities	0.25	
2	SUSHIL SHANTARAM CHAVAN	31/01/1982	Radiation Safety Officer	RSO Certification for Radiation Processing Facilities	18	024000C0001

Part E								
Safety Tool Details:								
SRL No	**Instrument ID**	**Instrument Type**	**Make**	**Model**	**Type of Detector**	**Sr. No.**	**Availability**	**Last Calibration Date**
1	SE-0126474	Communication Device (Phone, Mobile etc.)	NA	NA	NA	NA	Available	
2	SE-0126473	Access Control (PIN/Biomatrix/Card Reader etc.)	NA	NA	NA	NA	Available	
3	SE-0126472	Closed Circuit TV(CCTV)	NA	NA	NA	NA	Available	
4	SE-0053058	Thermometer	Meco/ Sensorex	GT-01	NA	59000430/ SF0011458	Available	
5	SE-0053057	Closed Circuit TV(CCTV)	NA	NA	NA	NA	Available	
6	SE-0053056	Communication Device (Phone, Mobile etc)	NA	NA	NA	NA	Available	
7	SE-0053055	Intrusion Alarm	NA	NA	NA	NA	Available	
8	SE-0053054	Fence	NA	NA	NA	NA	Available	
9	SE-0053053	Gate	NA	NA	NA	NA	Available	
10	SE-0053052	Gun Monitor	AUTOMESS	6112M	GM Counter	157016	Available	05/09/2018
11	SE-0053051	Contamination Monitor	NUCLEONIX	GA720	GM Counter	13/07/049	Available	02/08/2019
12	SE-0053050	Pocket dosimeter	ArrowTech	W200	Ion Chamber	287862	Available	02/08/2019
13	SE-0053049	Pocket dosimeter	ArrowTech	W500	Ion Chamber	NG287924	Available	02/08/2019

14	SE-0053048	Pocket dosimeter	ArrowTech	W138	Ion Chamber	NG28785 7	Available	02/08/2019
15	SE-0053047	Pocket dosimeter	NUCLEO NIX	PD 714	GM Counter	0009/2015	Available	02/08/2019
16	SE-0053045	Pocket dosimeter	NUCLEO NIX	PD 714	GM Counter	0007/2015	Available	23/11/2019
17	SE-0053044	Pocket dosimeter	NUCLEO NIX	PD 714	GM Counter	0006/2015	Available	22/11/2019
18	SE-0053043	Pocket dosimeter	NUCLEO NIX	PD 714	GM Counter	0003/2015	Available	21/11/2019
19	SE-0053042	Gamma zone monitor	NUCLEO NIX	GA 720	GM Counter	13/07/049	Available	02/08/2019
20	SE-0053040	Gamma zone monitor	NUCLEO NIX	GA 720	GM Counter	12/12/106	Available	13/07/2019
21	SE-0053038	Gamma zone monitor	NUCLEO NIX	GA 720	GM Counter	12/09/002	Available	13/07/2019
22	SE-0053037	Survey meter	PLA	PRM 135A	GM Counter	141	Available	31/07/2019
23	SE-0053036	Survey meter	PLA	PRM 135 A	GM Counter	140	Available	30/07/2019
24	SE-0053035	Survey meter	PLA	PRM 135 A	GM Counter	139	Available	30/07/2019

Reference Number: 21-724533(07/04/2021)

Part F	
Upload Safety Status Report Details:	
Whether trained/certified staff member(s) declared in eLORA is/are adequate and available in your institute?	: Yes
Whether functional radiation measuring tool(s), monitoring tool(s), QA tools and safety tool(s) is/are available as declared in eLORA?	: Yes
Whether all the Radioactive source(s), equipment(s) and installation(s) are safe and secured from radiation safety standpoint?	: Yes
Whether Operational Status of Radioactive source(s), equipment(s) and installation(s) declared in eLORA is/are updated?	: Yes
From Date	: 01/01/2021
To Date	: 31/03/2021
Other attachment (if any specific matter need to be reported to AERB)	: QSSR Jan_Mar 2021.pdf

Questions	Answers	Comments
The employer and licensee name are updated in e-LORA	Yes	NA
The contact details of Institute, employer, licensee, and RSO are updated in e-LORA	Yes	NA
RSO approval is valid	Yes	NA
Gamma Radiation Processing Facility have a valid license for operation	Yes	NA
There are no disused sources available in the institute.	Yes	NA
Adequate numbers of qualified and trained personnel are available in the radiation facility	Yes	NA
Personal monitoring badges (TLD badge etc.) are provided to all the radiation workers/professionals and the dose records are up to date	Yes	NA
The proper use and storage of personal monitoring badges by the radiation workers/professionals are ensured	Yes	NA

There is no modification made to the approved layout and modification, if any were carried out only after obtaining prior approval from AERB	Yes	NA
There is no active non-compliance(s) pending in the institute profile in e-LORA against the institution	Yes	NA
Adequate Conventional safety measures are available in the radiation facility (fire and flood)	Yes	NA
Records of all submissions made to AERB and approvals received are maintained (including hard copy submissions) in the institution	Yes	NA
Minimum numbers of required measuring & monitoring instruments with valid calibration are available	Yes	NA
The daily, weekly, monthly and annual Quality Assurance (of all the relevant structures, systems & components & sources as per the Safety Code are carried out and records are maintained	Yes	NA
Records of periodic radiation survey and QA are	Yes	NA
maintained		
Radiological protection survey around the irradiation cell are carried out periodically and the radiation levels are found to be within permissible limits	Yes	NA
Emergency preparedness plan is prepared as per the prescribed format and submitted to AERB.	Yes	NA
Emergency handling procedures are displayed at appropriate places in the radiation facility	Yes	NA
Radiation warning symbol prepared as per the Safety Directive of AERB are posted at appropriate places in the radiation facility	Yes	NA
Control console displays, safety interlocks, electrically operated indicators such as beam ON/OFF, lights etc. are functional	Yes	NA
Maintenance and repair in gamma irradiator facility are performed only by trained personnel.	Yes	NA
Reporting of the incidents, if any and its investigation and implementation of remedial action are carried out.	Yes	NA

Reference Number: 21-724533(07/04/2021)

The transport of disused/decayed source, if any, for its disposal were carried out with the permission of AERB	Yes	NA
Unreported Unusual incidents / excessive exposure has occurred in the institute during this calendar year.	Yes	NA

Part
Undertaking:
I/We hereby certify that the particulars provided in this application are true and correct to the best of my knowledge and belief. I understand that if at any stage it is found that the information provided by me/us is/are false or not authentic, appropriate regulatory action may be initiated against me/us and my/our institution.