सत्यमेव जयते
Goverment Of India

బాగవానీ మిషన
Horticulture Mission

Department of Horticulture
Government of Andhra Pradesh

IMPLEMENATION GUIDELINES 2025

MISSION FOR INTEGRATED DEVELOPMENT OF HORTICULTURE (MIDH)

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PLANTATION INFRASTRUCTURE & DEVELOPMENT

Production of planting material

i) Small Nursery (0.4 to 1 Ha.):

Total Unit Cost: Rs. 20.00 lakh/Ha as project based activity, on pro-rata basis i.e., minimum area 1 Acre with proportionate funding with Rs.4.00 Lakh Assistance.

100% assistance of unit cost amount will be provided to public sector and in case of private sector, back-ended subsidy of cost, subject to a maximum 50% of **Rs.10.00 lakh/unit**, as project based activity. Each nursery will have to produce a minimum of 50,000 numbers plants per Ha of mandated perennial fruit plants, tree spices, aromatic plants, plantation crops, perennial flowers etc. per year, duly certified for its quality by concerned agency.

It is mandatory that Small nursery established should get Accredited within 18 months from the date of release of last instalment.

INFRASTRUCTURE PROPOSED FOR DEVELOPMENT OF SMALL NURSERY

Sl. No	Name of the component	Estimated Cost (Rs. in lakhs)	Subsidy allowed 100% under public sector (Rs. in lakhs)	Subsidy allowed 50% under private sector (Rs. in lakhs)
1	Establishment of scion block (1.50 Acre) required crop wise, variety wise plant material will be procured from Research Station / certified nursery.	2.65	2.65	1.325
2	Installation of drip irrigation for new scion blocks / existing scion block or orchards	0.80	0.80	0.40
3	Digging of bore well (Depth in meters) & Purchase of submersible pump	2.50	2.50	1.25
4	Erection of shade net 500 sq.mt @ Rs. 710 per sq. mt. (Tubular / rectangular structure)	3.55	3.55	1.775
5	Vermicompost unit (600 cubic feet each) (1 nos.)	1.00	1.00	0.50
6	Electrification of farm to the extent required	2.50	2.50	1.25
7	Land preparation if required	2.20	2.20	1.10
8	Construction of store room **(8x5 Mts)**	3.00	3.00	1.50
9	Fencing @Rs.300 per running metre	2.00	2.00	1.00
	Total	**20.20**	**20.20**	**10.10**
	Limited to:	**20.00**	**20.00**	**10.00**

Note: The above specifications may be on prorata basis relative to the size of the small nursery (0.4 Ha to 1 Ha.) proposed.

ii) Large Nursery (1 to 2 Ha.):

Total Unit Cost: Rs. 30.00 lakh/Ha. as project based activity, on pro-rata basis.
1 Ha. – Rs.30.00 lakh.
2 Ha. – Rs.30.00 lakh x 2.

100% assistance of unit cost amount will be provided to public sector and in case of private sector, back-ended subsidy of cost, subject to a maximum of Rs.30.00 lakh/per 2 Ha. as project based activity. Each nursery will have to produce a minimum of 1,00,000 numbers plants per Ha of mandated perennial fruit plants, tree spices, aromatic plants, plantation crops, perennial flowers etc. per year, duly certified for its quality by concerned agency.

It is mandatory that large nursery established should get Accredited within 18 months from the date of release of last instalment.

INFRASTRUCTURE PROPOSED FOR DEVELOPMENT OF LARGE NURSERY

Sl. No	Name of the component	Estimated Cost (Rs. in lakhs)	Subsidy allowed 100% under public sector (Rs. in lakhs)	Subsidy allowed 50% under private sector (Rs. in lakhs)
1	Establishment of scion block (2.00 Acre) required crop wise, variety wise plant material will be procured from Research Station / certified nursery.	3.60	3.60	1.80
2	Installation of drip irrigation for new scion blocks / existing scion block or orchards	1.20	1.20	0.60
3	Digging of bore well (Depth in meters) & Purchase of submersible pump	2.50	2.50	1.25
4	Erection of shade net 1000 sq.mt @ Rs. 710 per sq. mt. (Tubular / rectangular structure)	7.10	7.10	3.55
5	Vermicompost unit (600 cubic feet each) (2 nos.)	2.00	2.00	1.00
6	Electrification of farm to the extent required	2.50	2.50	1.25
7	Land preparation if required	2.50	2.50	1.25
8	Construction of store room / grafting shed (9x6 Mts)	4.00	4.00	2.00
9	Farm Pond (20*20*3 mts)	1.50	1.50	0.75
10	Fencing @ Rs.300 per running metre	2.00	2.00	1.00
11	Nursery equipments	1.10	1.10	0.55
	Total	**30.00**	**30.00**	**15.00**

Note: The Large nursery of Project Cost above Rs.30.00 lakh shall be credit linked

The beneficiary has to establish the proposed infrastructure within the total cost of the operational guidelines of MIDH.

- Mother plants have to be procured from ICAR Institutions/ Research Stations only.
- The beneficiary has to produce the standard quality plant material.
- The beneficiaries shall submit application to DHOs (as per the district targets only) in the prescribed format along with the Pattadar Passbook or **Lease Agreement document executed for 10 years along with the certificate issued by Tahsildar for proof of land** .
- The beneficiary shall also enclose the water & soil analysis report from the approved lab.
- DHO should verify the site physically.
- After the inspection of the site by the concerned H.O. and DHO, the proposal should be obtained in the form of a project (Detailed project Report) by the beneficiary and the project with the recommendations should be placed before the District Mission Committee (DMC) for sanction of the proposals for Establishment of Nurseries.
- After approval of District Mission Committee (DMC) the Detailed Project Report should be forwarded to O/o Commissioner/Director of Horticulture.
- The proposal will be placed before the State Level Executive Committee for sanction of the proposals for Establishment of Nurseries.
- After approval by the SLEC, Administrative sanction orders will be communicated to the beneficiary / District Horticulture Officer concerned.
- The beneficiary should submit the certificate consisting of Non-Submergence of that particular survey no of the land where the nursery is proposed to be taken up.
- Stage wise photos (i.e, before, during and after the completion of work) should be recorded before release of payment.
- The subsidy amount will be released in two equal instalments i.e., 1st instalment will be released basing on the recommendation of the DHO after completion of 50% of the works and 2nd instalment will be released after the physical verification of the nursery, scrutiny and verification of the vouchers towards the expenditure incurred by the beneficiary and recommendation of the Joint Technical Team for release of subsidy and submission of proposal by the DHO to NHB for accreditation under copy marked to Mission Director. Then only 2ndinstallment release will be considered.
- All the components which are proposed for development of nurseries are mandatory for release of subsidy.

List of documents to be submitted by the applicant for Establishment of Nurseries under Private Sector:

- Application form with full details with latest photograph of the applicant.
- Land records (Pattadar pass book / pahani given by MRO)
- Soil and Water analysis reports.
- The proposed infrastructure for obtaining the subsidy along with the estimates as per the guidelines (Project proposal).
- Progeny / scion block is mandatory.
- Estimates of civil structures – Prepared by any State Government Engineering Depts.
- The video and photographs of the farm should be produced to the department by the beneficiary before and after the establishment of nursery.
- Annual plan for the production of plant material species-wise has to be submitted to Mission Director / DMC. Monthly progress report to be submitted by the farmer to DMC / SHM.

iii) Upgrading nursery infrastructure to meet accreditation norms:

Total Unit Cost: Rs. 8.00 lakh/nursery of 2 ha

100% assistance will be provided to public sector and 50% of cost to private sector subject to a maximum of Rs. 4.00 lakh/Ha. (Max of 2 Ha.). The infrastructure facilities will include establishment of:

1. Hot bed sterilization of media, Working shed, Virus indexing facility (for citrus & apple), Hardening chamber/net house, Mist chamber, Establishment of Mother Block, Irrigation and fertigation facility/unit.
2. The subsidy will be worked out on prorata basis.

INFRASTRUCTURE PROPOSED FOR UPGRADING NURSERY INFRASTRUCTURE TO MEET ACCREDITATION NORMS

SI. No	Name of the component	Amount (Rs. In Lakhs)
1	Hot bed sterilization of media	1.00
2	Working shed 10x10x10 feet	1.40
3	Virus indexing facility (for Citrus sps.)	1.00
4	Hardening chamber / Net House	1.00
5	Mist chamber	0.50

6	Establishment of Scion block (1.50 Acre) required crop wise, variety wise plant material will be procured from Research Station only.	2.65
7	Installation of drip irrigation for new Scion block or orchards and fertigation	0.80

- The components are indicative for upgradation of nursery to meet accreditation norms. The components should be chosen on need based manner required for accreditation.
- Visit of DHO & Technical team to the nursery is must.
- Beneficiaries should take steps to get Accreditation & Rating compulsorily within 18 months of receiving the subsidy to check the quality of transplants / saplings produced in the plantation.

iv) Establishment of Tissue Culture Units:

Objective:

- To encourage production and supply of good quality planting material in private sector by setting up TC lab and to generate employment.
- Sanction of TC unit as per the norms of MIDH under Private Sector, will be considered by State SLEC meeting.

Setting up of new TC Unit:

Total Unit Cost: Project based upto Rs. 250.00 lakh per project for a capacity of 25 lakhs plants or pro-rata basis for minimum 10 lakh plants.

- Assistance @ 100% to public sector and in case of private sector, credit linked back ended subsidy @ **40%** of cost i.e. Rs. 100.00 lakh/unit as Project based activity.
- Each TC unit will produce a minimum of 10 lakh plants/year or on pro-rata basis for higher capacity upto 25 lakh plants/unit of mandated crops, duly hardened, for which protocols are available for commercial use.
- Accreditation of each TC Lab will be mandatory within 18 months from the date of receipt of last installment.
- The assistance will be released in two installments to the concerned beneficiary after physical verification of the progress of work by the District Officers / Technical Teams.

List of Documents to be submitted by the applicants for Establishment of TC Unit

1	Application form of the applicant/promoters
2	Basic data sheet with complete technical specifications.
3	Detailed project report as per MIDH guidelines.
4	Partnership deed

5	Firm Registration certificate/certificate of Incorporation
6	Bank sanction letter along with appraisal report.
7	Approval from Gram Panchayat/Municipality /corporation.
8	Approval from Pollution Control Board Acknowledgement
9	SSI Registration certificate
10	Fire Department approval with drawings
11	Pan card taken on company name (Xerox copy).
12	Electricity approval
13	KYC documents of all the partners
14	GST Registration
15	Land conversion. (for one acre only)
16	DMC Approval (District Collector & Magistrate)
17	Affidavit
18	Land documents (sale deed / Lease deed Agreement) for 10 years along with certificate issued by Tahsildar for proof of land
19	Land records (Pattadar pass book / pahani given by MRO).
20	The proposed infrastructure for obtaining the subsidy along with the estimates as per the guidelines (Project).
21	Estimates of civil structures – Prepared by any State Government Engineering Depts.
22	Soil Testing report from approved Lab
23	Water Testing report from approved Lab

- The beneficiary has to establish the proposed infrastructure with total cost of Rs.250.00 lakhs as per the operational guidelines of MIDH.
- The beneficiary has to produce the standard quality plant material.
- The beneficiaries shall apply the application for Establishment of the unit to Horticulture Officers in the prescribed format along with the Pattadar Passbook or Lease Agreement document executed for 10 years along with the certificate issued by Tahsildar for proof of land.
- The beneficiary shall also enclose the water & soil analysis report from the approved lab.
- The beneficiary shall also enclose the bank consent/sanction letter for release of loan amount for establishment of nursery under credit linked back-ended subsidy.
- After the inspection of the site by the concerned H.O. and DHO, the proposal with the recommendations will be placed before the DMC for sanction of the proposals for TC Lab.
- After consideration by the DMC, the same will be forwarded to O/o the Directorate.
- The same proposal will be placed before the State Level Executive Committee for sanction of the proposals.
- After consideration by the State Level Executive committee of State Horticulture Mission, the same will be sent to NHM, for approval in Empowered Committee Meeting, New Delhi.

- After approval by the EC meeting, administrative sanction orders will be communicated to the beneficiary / District Officer concerned and to the Bank which is providing the loan amount.
- The subsidy amount will be released in two equal installments i.e., 1st installment will be released after completion of 50% of the works and 2nd installment will be released after establishment of TC Lab and after physical verification of the TC lab by the District Officer / Technical Teams.

v. <u>Establishment of Seed Infrastructure:</u>

i) Production of quality seed and uplifting material including handling, processing, packing, storage for identified horticulture crops

Total Unit Cost: Rs. 300.00 lakh

100% of cost to public sector and in case of private sector, credit linked back subsidy @ 50% of cost of project.

List of Documents to be submitted by the applicants for Establishment of Seed Processing Unit.

1	**Application form of the applicant/promoters**
2	Basic data sheet with complete technical specifications.
3	Detailed project report as per MIDH guidelines.
4	Partnership deed
5	Firm Registration certificate/certificate of Incorporation
6	Bank sanction letter along with appraisal report.
7	Approval from Gram Panchayat/Municipality /corporation.
8	Approval from Pollution Control Board Acknowledgement
9	SSI Registration certificate
10	Fire Department approval with drawings
11	Pan card taken on company name (Xerox copy).
12	Electricity approval
13	KYC documents of all the partners
14	VAT/CST Registrations.
15	Land conversion. (for one acre only)
16	DHM approval (District Collector)
17	Affidavit
18	Land documents (sale deed / Lease deed Agreement) for 10 years along with certificate issued by Tahsildar / Panchayat Secretary for proof of land
19	Land records (Pattadar pass book / pahani given by MRO).
20	The proposed infrastructure for obtaining the subsidy along with the estimates as per the guidelines (Project).
21	Estimates of civil structures – Prepared by any State Government Engineering Depts.

22	Soil Testing report
23	Water Testing report

- The beneficiary has to establish the proposed infrastructure with total cost of Rs.300.00 lakhs as per the operational guidelines of MIDH.
- The beneficiary has to produce the standard quality plant material.
- The beneficiaries shall apply to DHOs in the prescribed format along with the Pattadar Passbook or Lease Agreement document executed for 10 years along with the certificate issued by Tahsildar for proof of land.
- The beneficiary shall also enclose the water & soil analysis report from the approved lab.
- The beneficiary shall also enclose the bank consent for release of loan amount for establishment of nursery under credit linked back-ended subsidy.
- After the inspection of the site by the concerned H.O. and DHO, the proposal with the recommendations will be placed before the District Level Executive Committee for sanction of the proposals for Seed Processing Unit.
- After consideration by the District Mission Committee or District collector the same will be forwarded to O/o State Horticulture Mission.
- The same proposal will be placed before the State Level Executive Committee for sanction of the proposals.
- After consideration by the State Level Executive committee of State Horticulture Mission, the same will be sent to NHM, for approval in Empowered Committee Meeting, New Delhi.
- After approval by the EC meeting administrative sanction orders will be communicated to the beneficiary / District Officer concerned and to the Bank which is providing the loan amount i.e. 50% of project cost.
- The subsidy amount will be released in two equal installments i.e., 1st installment will be released after completion of 50% of the works and 2nd installment will be released after establishment of Seed Processing Unit and after physical verification of the Seed Processing Unit by the District Officer / Technical Teams.

Cost Break up for Establishment of Seed Processing Unit

S.No	Description	Indicative Percentage (%)	Max. Amount (Rs. in lakhs)
1.	Civil Works	45-50	143.00
2.	Plant & Machinery	40-45	131.00
3.	Electrical & Other Items	5-10	26.00
	TOTAL		**300.00**

Particulars of Seed Infrastructure Units (Subject to change as per field scenario)

1. Production of quality seed material of Horticulture crops. (Details of the crop, variety should be mentioned in the DPR, Guidelines and procedure in vogue stipulated for seed production should be adhered with and should be approved with the concerned authorities).

2. Building includes, seed quality control lab, Office room, Processing unit, Godown, Threshing yard and cold storage unit for storage of Horticulture seeds.

3. **Seed processing Equipments**:

   Air screen cleaner, Special gravity separator / Spiral separator, Seed dressing unit. Weighing balance, Packaging machine, Dehumidifier, PH meter, Seed grader, heat sealer, Air conditioners (2 units with 1 cap, each), Bagging and sealing, desiccators, Digital temperature & humidity indicator, Miscellaneous including any other latest machines and equipment.

4. **Seed quality testing Equipments:** Seed sampling and dividers like seed tries, sample storage boxes and racks, balances, purity board (5), Germinators (2), Refrigerator, Sand sterilizer, Hot air oven (2), Seed grinder, stereo binocular, Incubators, Auto clave, UV lamp, Electrophoresis unit, PCR unit, Gel documentation, Controlled seed storage, Thermometers / Temperature controlled centrifuge, Hygrometer, Power backing system (Generator/Solar), Computer with software and its accessories, Seed germination tables, purity working tables (5 Nos), Seed moisture meter, petri plates / plastic trays, Laboratory chemicals (as per requirement) Miscellaneous including any other latest machines and equipments.

GUIDELINES FOR ESTABLISHMENT OF NEW GARDENS

Objective:

To bring additional area under identified Fruit crops, vegetables, Flowers, Aromatic crops, Exotic and Niche crops with improved varieties / Hybrids.

Implementation Procedure:

I. **Eligibility and Area Limits**

- All categories of farmers including general, Scheduled Castes (SC), Scheduled Tribes (ST), small and marginal farmers, and farm women are eligible for subsidy.
- A maximum area of **2 Hectares per beneficiary** is permitted for assistance under the "Establishment of New Gardens" (Perennials) component, as per operational guidelines.
- **SC (17.1%) and ST (5.33%)** farmers shall be covered as per the prescribed minimum ratio under this component.

II. **Beneficiary Selection Process**

- Priority should be given to the small, marginal farmers and women farmers during selection of beneficiaries.
- Beneficiary selection must be conducted in a **transparent manner** through **Grama Sabhas**. The selected list must be **registered on the Suraksha Portal** and **approved by the District Mission Committee**.
- Priority should be given to farmers who have an **assured source of irrigation**, and **integration with micro-irrigation (drip)** is mandatory for better survival of plantations.
- Beneficiaries who have already **availed the maximum permissible assistance** in previous years are **not eligible** for further assistance. Horticulture Officers (HOs) and field staff must exercise caution during selection.

III. Subsidy and Assistance

- The **maximum eligible subsidy** is **40% of the total cost**, covering plant material, inputs, supporting structures, INM/IPM, etc.
- Subsidy is provided over **two years** in a **ratio** of **60:40**.
- Second-year assistance is **subject to a minimum 80% survival rate** of the plantation.
- All assistance shall be disbursed to beneficiaries through **Direct Benefit Transfer (DBT) Mode**.

IV. Verification and Documentation

- Field staff (HEOs/VHAs/VAAs/ VSAs/MPEOs) must **verify the land and collect applications** in the prescribed format.
- Landholding of the farmers must be **certified by Horticulture Officers** based on original **Pattadar Pass Book** or **Adangal** signed by the **Mandal Revenue Officer (MRO)**.
- Horticulture Officers must maintain a **register** documenting details of the selected beneficiaries.
- **Selection, documentation, and registration** should be completed in a **time-bound manner** for timely grounding of the component.
- DHOs/ADsH are instructed to submit the **success stories** and benefits of the component in written (Word, PPT) along with soft copy and hard copy with high resolution photographs and videos.

V. Field Inspection and Monitoring

- Before scheme sanction, the **field level** staff (HEOs/VHAs/VAAs/VSAs/MPEOs) must **inspect 100% of the fields** identified in their jurisdiction and ensure **soil suitability** and **availability of water**.

- **Post-plantation inspections**:
    - Field level staff (HEOs/VHAs/VAAs/VSAs/MPEOs) must inspect **100% of the plantation area**.
    - HOs must inspect **at least 50%** of the plantations.
    - DHOs/ADsH must inspect a **minimum of 10%** of the plantations.

- DHOs/ADsH should ensure the geo-tagging of the component in the **Krishi Mapper App**.

VI. Plant Material and Cropping Pattern.

- **Priority must be given** to sourcing plant material from **tied-up Horticultural Farms (HDA)** or **Research stations** of **ANGRAU / Dr. YSRHU**.
- **The DHOs are directed to lift the plant material from the Horticultural Farms (HDA).**
- Farmers may also be permitted to procure planting material from nurseries registered under the AP Nursery Act 2010 or from NHB-accredited nurseries, in cases where planting material is unavailable or has been exhausted in the Horticulture Farms (HDA).
- In case of sweet orange budlings, nurseries that are taken up viral indexing and free from viral diseases are only permitted.
- In the case of tissue culture plants, planting material shall be permitted only from laboratories accredited by the Department of Biotechnology, Government of India, under the National Certification System for Tissue Culture Plants (NCS-TCP).
- New plantations must be **mandatorily integrated with drip irrigation** systems.
- **Intercropping and multi-storied cropping** systems shall be encouraged in all **perennial orchards** using region-specific intercrops to enhance **soil fertility** and generate **interim income** during the gestation period.

VII. Training and Capacity Building

- Horticulture Officers shall **organize training programmes** for beneficiaries, covering the complete **package of practices** and **advanced cultivation techniques** specific to each crop.

VIII. Billing and Certification

- Before recommending assistance, **HO must certify** the plantation bill/ input supply bills/self certified farmer's bills /vouchers and other relevant documents.

IX. Release of Assistance

- DHOs/ADsH should thoroughly examine the documents submitted by the Horticulture Officers (HOs) to ensure that they are in accordance with the prescribed guidelines.
- After approval by the competent authority, the DHOs/ADsH shall process for the release of assistance to the beneficiaries.
- No assistance shall be paid to Nurseries/TC Labs/Input Dealers directly.

PATTERN OF ASSISTANCE FOR MANGO (7.5 m X 7.5 m) FOR ONE HECTARE (REGULAR SPACING)

Cost Norms: Rs.1.25 lakh/Ha. **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.30 lakh/Ha. **Assistance for 2nd year: Rs.0.20 lakh/Ha**

Spacing: 7.5m x 7.5m **No. of plants: 178/ Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (178 No. of plants/Ha @ Rs.100 per plant) including transportation and staking.	17800	3600	21400	7120	1440	8560
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	18000	12000	30000	7200	4800	12000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	23000	18000	41000	9200	7200	16400
iii	**IPM/PP Chemicals/Bio pesticides/Inter cropping**	16200	16400	32600	6480	6560	13040
Total		**75000**	**50000**	**125000**	**30000**	**20000**	**50000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR MANGO (5 m X 5 m) FOR ONE HECTARE (HIGH DENSITY PLANTATION)

Cost Norms: Rs.2.00 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.48 lakh/Ha **Assistance for 2nd year: Rs.0.32 lakh/Ha**

Spacing: 5m x 5m **No. of plants: 400/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (400 No. of plants/Ha @ Rs.100 per plant) including transportation and staking.	40000	8000	48000	16000	3200	19200
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	23000	17000	40000	9200	6800	16000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	34500	32500	67000	13800	13000	26800
iii	**IPM/PP Chemicals/ Bio pesticides/ Inter cropping**	22500	22500	45000	9000	9000	18000
Total		**120000**	**80000**	**200000**	**48000**	**32000**	**80000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR MANGO (3 m X 2 m) FOR ONE HECTARE (ULTRA HIGH DENSITY)

Cost Norms: Rs.3.00 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year : Rs.0.72 lakh/Ha **Assistance for 2nd year: Rs.0.48 lakh/Ha**

Spacing: 3m x 2m **No. of plants: 1667/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (1667 No. of plants/Ha @ Rs.100 per plant) including transportation and staking.	166700	33340	200040	66680	13336	80016
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	6000	38000	44000	2400	15200	17600
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	4500	24500	29000	1800	9800	11600
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	2800	24160	26960	1120	9664	10784
Total		**180000**	**120000**	**300000**	**72000**	**48000**	**120000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR MANGO (4 m X 2 m) FOR ONE HECTARE (ULTRA HIGH DENSITY)

Cost Norms: Rs.3.00 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.72 lakh/Ha **Assistance for 2nd year: Rs.0.48 lakh/Ha**

Spacing: 4m x 2m **No. of plants: 1250/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (1250 No. of plants/Ha @ Rs.100 per plant) including transportation and staking.	125000	25000	150000	50000	10000	60000
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	21000	38000	59000	8400	15200	23600
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	24500	32500	57000	9800	13000	22800
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	9500	24500	34000	3800	9800	13600
Total		**180000**	**120000**	**300000**	**72000**	**48000**	**120000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR GUAVA (3 m X 3 m) FOR ONE HECTARE (HIGH DENSITY)

Cost Norms: Rs.2.00 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.48 lakh/Ha **Assistance for 2nd year : Rs.0.32 lakh/Ha**

Spacing: 3m x 3m **No. of plants: 1111/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (1111 No. of plants/Ha @ Rs.50 per plant) including transportation and staking.	55550	11110	66660	22220	4444	26664
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	26000	25000	51000	10400	10000	20400
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	21000	24000	45000	8400	9600	18000
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	17450	19890	37340	6980	7956	14936
Total		**120000**	**80000**	**200000**	**48000**	**32000**	**80000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR SWEET ORANGE (6 m X 6 m)

FOR ONE HECTARE (REGULAR SPACING)

Cost Norms: Rs.1.25 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.30 lakh/Ha **Assistance for 2nd year: Rs.0.20 lakh/Ha**

Spacing: 6m x 6m **No. of plants: 278/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (278 No. of plants/Ha @ Rs.60 per plant) including transportation and staking.	19460	3892	23352	7784	1557	9341
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	25000	18000	43000	10000	7200	17200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	20500	14500	35000	8200	5800	14000
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	10040	13608	23648	4016	5443	9459
Total		**75000**	**50000**	**125000**	**30000**	**20000**	**50000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR ACID LIME (6 m X 6 m)

FOR ONE HECTARE (REGULAR SPACING)

Cost Norms: Rs.1.25 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.30 lakh/Ha **Assistance for 2nd year: Rs.0.20 lakh/Ha**

Spacing: 6m x 6m **No. of plants: 278/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (278 No. of plants/Ha @ Rs.40 per plant) including transportation and staking.	11120	2224	13344	4448	890	5338
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	25000	18000	43000	10000	7200	17200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	23880	16168	40048	9552	6467	16019
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	15000	13608	28608	6000	5443	11443
Total		**75000**	**50000**	**125000**	**30000**	**20000**	**50000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR POMEGRANATE (5 m X 3 m)

FOR ONE HECTARE (REGULAR SPACING)

Cost Norms: Rs.1.25 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.30 lakh/Ha **Assistance for 2nd year: Rs.0.20 lakh/Ha**

Spacing: 5m x 3m **No. of plants: 667/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (667 No. of plants/Ha @ Rs.60 per plant) including transportation and staking.	40020	8004	48024	16008	3202	19210
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	14000	14000	28000	5600	5600	11200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	10500	16500	27000	4200	6600	10800
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	10480	11496	21976	4192	4598	8790
Total		**75000**	**50000**	**125000**	**30000**	**20000**	**50000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR CASHEW (6 m X 6 m) FOR ONE HECTARE (REGULAR SPACING)

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year : Rs.0.18 lakh/Ha **Assistance for 2nd year : Rs.0.12 lakh/Ha**

Spacing: 6m x 6m **No. of plants: 278/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (278 No. of plants/Ha @ Rs.60 per plant) including transportation and staking.	16680	3336	20016	6672	1334	8006
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	10000	8000	18000	4000	3200	7200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	13000	13500	26500	5200	5400	10600
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	5320	5164	10484	2128	2066	4194
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR CASHEW (5 m X 5 m)

FOR ONE HECTARE (HIGH DENSITY)

Cost Norms: Rs.1.5 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.36 lakh/Ha **Assistance for 2nd year: Rs.0.24 lakh/Ha**

Spacing: 5m x 5m **No. of plants: 400/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (400 No. of plants/Ha @ Rs.60 per plant) including transportation and staking.	24000	4800	28800	9600	1920	11520
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	28000	18500	46500	11200	7400	18600
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	24000	24000	48000	9600	9600	19200
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	14000	12700	26700	5600	5080	10680
Total		**90000**	**60000**	**150000**	**36000**	**24000**	**60000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR COCOA (3 m X 3 m)

FOR ONE HECTARE (REGULAR SPACING)

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakhs/ Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 3m x 3m **No. of plants: 500/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (500 No. of plants/Ha @ Rs.15 per plant) including transportation and staking.	7500	1500	9000	3000	600	3600
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	15500	9000	24500	6200	3600	9800
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	15000	14500	29500	6000	5800	11800
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	7000	5000	12000	2800	2000	4800
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR CUSTARD APPLE (4 m X 4 m)

FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 4m x 4m **No. of plants: 625/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (625 No. of plants/Ha @ Rs.45 per plant) including transportation and staking.	28125	5625	33750	11250	2250	13500
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	8000	5000	13000	3200	2000	5200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	6500	10500	17000	2600	4200	6800
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	2375	8875	11250	950	3550	4500
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR SAPOTA (5 m X 5 m) FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 5m x 5m **No. of plants: 400/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (400 No. of plants/Ha @ Rs.45 per plant) including transportation and staking.	18000	3600	21600	7200	1440	8640
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	12000	8000	20000	4800	3200	8000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	9500	12000	21500	3800	4800	8600
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	5500	6400	11900	2200	2560	4760
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR BER (5 m X 5 m) FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 5m x 5m **No. of plants: 400/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (400 No. of plants/Ha @ Rs.45 per plant) including transportation and staking.	18000	3600	21600	7200	1440	8640
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	12000	8000	20000	4800	3200	8000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	10500	8100	18600	4200	3240	7440
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	4500	10300	14800	1800	4120	5920
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR GRAPE (1.8 m X 2.4 m) FOR ONE HECTARE

Cost Norms: Rs.3.00 lakhs/ Ha **Period of Assistance: 2 years**

Assistance for 1st year : Rs.0.72 lakhs/ Ha **Assistance for 2nd year : Rs.0.48 lakhs/ Ha**

Spacing: 1.8 m x 2.4 m **No. of plants: 2315/ Ha.**

Sl. No.	Name of the Material Component	Material Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Plant Material** (2315 No. of plants/Ha @ Rs.25 per plant)	57875	0	57875	23150	Farmers will get 2nd year assistance of Rs.48000/- if the survaival rate is more than 80%	23150
2	**Supporting structure**						
i.	Cost of pillars	122125	0	122125	48850		48850
ii.	Cost of GI Wire, angles etc.,	120000		120000	0		48000
Total		**300000**	**0**	**300000**	**72000**	**48000**	**120000**
Note:	Maximum assistance allowed to a beneficiary is up to 1 Ha						
	Required inputs should be borne by the farmer						

PATTERN OF ASSISTANCE FOR PINE APPLE (SUCKERS) FOR ONE HECTARE

Cost Norms: Rs. 1.10 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.264 lakh/ Ha **Assistance for 2nd year: Rs.0.176 lakh/ Ha**

Spacing: 0.6 m x 0.6 m **No. of plants: 27778/** Ha**.**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (27,778 No. of plants/Ha @ Rs.2 per plant) including transportation and staking.	55556	11111	66667	22222	4444	26667
2	**Inputs**						0
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	5500	8000	13500	2200	3200	5400
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	3444	14500	17944	1378	5800	7178
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	1500	10389	11889	600	4156	4756
Total		**66000**	**44000**	**110000**	**26400**	**17600**	**44000**
Note:	Maximum assistance allowed to a beneficiary is upto **1 Ha**						

PATTERN OF ASSISTANCE FOR BANANA (TISSUE CULTURE) FOR ONE HECTARE

Cost Norms: Rs. 1.75 lakh/ Ha

Assistance for 1st year: Rs.0.42 lakh/ Ha

Spacing: 1.8 m x 1.8 m

Period of Assistance: 2 years

Assistance for 2nd year: Rs.0.28 lakh/ Ha

No. of plants:3086 / Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Plant Material** (3086 No. of plants/Ha @ Rs.15 per plant)	46290	0	46290	18516	0	18516
2	**Inputs**						
i	**Oragnic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	12000	12000	24000	4800	4800	9600
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	31710	43000	74710	12684	17200	29884
iii	**IPM/PP Chemicals/ Bio pesticides**	15000	15000	30000	6000	6000	12000
Total		**105000**	**70000**	**175000**	**42000**	**28000**	**70000**

Note: Maximum assistance allowed to a beneficiary is upto **1 Ha**

PATTERN OF ASSISTANCE FOR PAPAYA FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/ Ha

Period of Assistance: 2 years

Assistance for 1st year: Rs.0.18 lakh/ Ha

Assistance for 2nd year: Rs.0.12 lakh/ Ha

Spacing: 1.8 m x 1.8 m

No. of plants:3086 / Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Plant Material** (3086 No. of plants/Ha @ Rs.12 per plant)	37032	0	37032	14813	0	14813
2	**Inputs**						
i	**Oragnic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	4000	10000	14000	1600	4000	5600
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	2000	15006	17006	800	6002	6802
iii	**IPM/PP Chemicals/ Bio pesticides**	1968	4994	6962	787	1998	2785
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **1 Ha**

PATTERN OF ASSISTANCE FOR DRAGON FRUIT (2.7 m X 3 m) FOR ONE HECTARE

Cost Norms: Rs.6.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.1.62 lakh/Ha **Assistance for 2nd year: Rs.1.08 lakh/Ha**

Spacing: 2.7m x 3m **No. of plants: 5000/**Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (5000 No. of plants/Ha @ Rs.35 per plant) including transportation and staking.	210000	0	210000	70000	Farmers will get 2nd year assistance of Rs.108000/- if the survaival rate is more than 80%	84000
2	**Supporting structure** (Cost of pillars)	230000	0	230000	92000		92000
3	**Supporting Structures** (Cost of GI Wire, tyre/ring structure etc.,)	235000		235000	0		94000
Total		**675000**	**0**	**675000**	**162000**	**108000**	**270000**

Note: Maximum assistance allowed to a beneficiary is up to **1 Ha**
Required inputs should be borne by the farmer

PATTERN OF ASSISTANCE FOR AVOCADO FOR ONE HECTARE

Cost Norms: Rs.1.25 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.30 lakh/Ha **Assistance for 2nd year: Rs.0.20 lakh/Ha**

Spacing: 5 m x 5 m **No. of plants: 400 /Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (400 No. of plants/Ha @ Rs.75 per plant) including transportation and staking.	30000	6000	36000	12000	2400	14400
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	20000	18500	38500	8000	7400	15400
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	15000	15000	30000	6000	6000	12000
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	10000	10500	20500	4000	4200	8200
Total		**75000**	**50000**	**125000**	**30000**	**20000**	**50000**

Note: Maximum assistance allowed to a beneficiary is upto **2 Ha**

PATTERN OF ASSISTANCE FOR FIG FOR ONE HECTARE

Cost Norms: Rs.1.25 lakh/ Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.30 lakh/Ha **Assistance for 2nd year: Rs.0.20 lakh/Ha**

Spacing: 3.5m x 3.5m **No. of plants: 772/Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (772 No. of plants/Ha @ Rs.30 per plant) including transportation and staking.	23160	4632	27792	9264	1853	11117
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	27500	20000	47500	11000	8000	19000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	15000	15000	30000	6000	6000	12000
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	9340	10368	19708	3736	4147	7883
Total		**75000**	**50000**	**125000**	**30000**	**20000**	**50000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR PASSION FRUIT (4 m X 4 m)

FOR ONE HECTARE

Cost Norms: Rs.2.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.66 lakh/Ha **Assistance for 2nd year: Rs.0.44 lakh/Ha**

Spacing: 4m x 4m **No. of plants: 1250/** Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (1250 No. of plants/Ha @ Rs.30 per plant) including transportation and staking.	37500	7500	45000	15000	3000	18000
2	**Supporting structure** (Cost of pillars)	127500	0	127500	51000	0	51000
3	**Supporting Structures** (Cost of GI Wire, angles etc.,)	0	102500	102500	0	41000	41000
Total		**165000**	**110000**	**275000**	**66000**	**44000**	**110000**

Note: Maximum assistance allowed to a beneficiary is up to 2 Ha
Required inputs should be borne by the farmer

PATTERN OF ASSISTANCE FOR STRAWBERRY FOR ONE HECTARE

Cost Norms: Rs.2.00 lakh/Ha **Period of Assistance: 2 year/installments**

Assistance for 1st year: Rs.0.48 lakh/Ha **Assistance for 2nd year: Rs.0.32 lakh/Ha**

Spacing: 0.9 m x 0.45 m **No. of plants: 25,000 /Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)	Assistance (in Rs.)
		Total	**Total**
1	**Cost on Plant Material** (25,000 No. of plants/Ha @ Rs.4 per plant) including transportation and staking.	120000	48000
2	**Inputs**		
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	35000	14000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	27000	10800
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	18000	7200
Total		**200000**	**80000**

Note: Maximum assistance allowed to a beneficiary is upto **1 Ha**

PATTERN OF ASSISTANCE FOR AMLA FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 6 m x 6 m **No. of plants: 278/**Ha

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (278 No. of plants/Ha @ Rs.50 per plant) including transportation and staking.	13900	3100	17000	5560	1240	6800
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	15000	13000	28000	6000	5200	11200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	11000	10000	21000	4400	4000	8400
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	5100	3900	9000	2040	1560	3600
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR KARONDA FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 4 m x 4 m **No. of plants: 625 / Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (625 No. of plants/Ha @ Rs.15 per plant) including transportation and staking.	9375	3100	12475	3750	1240	4990
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	17000	13000	30000	6800	5200	12000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	13225	10000	23225	5290	4000	9290
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	5400	3900	9300	2160	1560	3720
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

**** Border /Live fencing is also permitted. Assistance limited to Rs.48/- per plant on prorata basis.**

PATTERN OF ASSISTANCE FOR JAMUN FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 8 m x 8 m **No. of plants: 156/Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (156 No. of plants/Ha @ Rs.100 per plant) including transportation and staking.	15600	3100	18700	6240	1240	7480
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	17000	13000	30000	6800	5200	12000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	7000	10000	17000	2800	4000	6800
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	5400	3900	9300	2160	1560	3720
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR TAMARIND FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 10 m x10 m **No. of plants: 100 /Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (100 No. of plants/Ha @ Rs.55 per plant) including transportation and staking.	5500	1100	6600	2200	440	2640
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	22000	15000	37000	8800	6000	14800
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	12000	10000	22000	4800	4000	8800
iii	**IPM/PP Chemicals/ Bio pesticides /Inter cropping**	5500	3900	9400	2200	1560	3760
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

**** Border plantation is also permitted. Assistance limited to Rs.300/- per plant on prorata basis.**

PATTERN OF ASSISTANCE FOR JACKFRUIT FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 10 m x10 m **No. of plants: 100 / Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (100 No. of plants/Ha @ Rs.100 per plant) including transportation and staking.	10000	2000	12000	4000	800	4800
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	18500	14000	32500	7400	5600	13000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	12000	10000	22000	4800	4000	8800
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	4500	4000	8500	1800	1600	3400
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

**** Boarder plantation is also permitted. Assistance limited to Rs.300/- per plant on prorata basis.**

PATTERN OF ASSISTANCE FOR PHALSA FOR ONE HECTARE

Cost Norms: Rs.0.75 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1st year: Rs.0.18 lakh/Ha **Assistance for 2nd year: Rs.0.12 lakh/Ha**

Spacing: 2.5 m x 3 m **No. of plants: 1333/Ha**

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material** (1333 No. of plants/Ha @ Rs.25 per plant) including transportation and staking.	33325	6665	39990	13330	2666	15996
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	5000	10000	15000	2000	4000	6000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	5000	9335	14335	2000	3734	5734
iii	**IPM/PP Chemicals/ Bio pesticides/Inter cropping**	1675	4000	5675	670	1600	2270
Total		**45000**	**30000**	**75000**	**18000**	**12000**	**30000**

Note: Maximum assistance allowed to a beneficiary is upto **2Ha**

PATTERN OF ASSISTANCE FOR LOOSE FLOWERS FOR ONE HECTARE

Cost Norms: Rs.0.50 lakh/Ha **Period of Assistance: 1 year**

Assistance for year : Rs.0.20 lakh/Ha

Sl. No.	Name of the Material Component	Unit Cost (in Rs.)	Assistance (in Rs.)
1	**Cost on Plant Material (Seed/ seedlings/grafts etc.,)** including transportation and staking.	13200	5280
2	**Inputs**		
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	11000	4400
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	13000	5200
iii	**PP Chemicals/ Bio pesticides**	8400	3360
iv	**INM/IPM** (Bio fertilizers, Micro Nutrients, Yellow / Blue sticky traps, pheromone traps, light traps, Poison baits etc., **and Others** (Staking, Trellies etc.,)	4400	1760
Total		**50000**	**20000**

Note: Maximum assistance allowed to a beneficiary is upto 1 Ha

Crops allowed for Assistance: Rose, Chrysanthemum, Tuberose, Jasmine, Crossandra, Marigold (F1), Aster

PATTERN OF ASSISTANCE FOR HYBRID VEGETABLES

FOR ONE HECTARE

Cost Norms: Rs.0.60 lakh/Ha **Period of Assistance: 1 year/season**

Assistance for 1 year/ Season : Rs.0.24 lakh/Ha

Sl. No.	Name of the item	Unit Cost (in Rs.) for 1st year/ Season	Assistance (in Rs.) for 1st year/ Season
1	**Cost on Plant Material** (Seed/ seedlings/grafts etc.,) including transportation and staking.	12000	4800
2	**Inputs**		
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	10000	4000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers)	14000	5600
iii	**PP Chemicals**	12000	4800
iv	**INM/IPM** (Bio fertilizers, Bio pesticides, Micro Nutrients,Yellow and Blue sticky traps, pheromone traps, light traps, Fruit fly traps, Poison baits etc.,) **and Others** (Stalking, Trellies, Temparory Pandals etc.,	12000	4800
Total		**60000**	**24000**

Note: Maximum assistance allowed to a beneficiary is up to **1 Ha**

Crops allowed for Assistance:

a. **Regular Season Vegetables:** Tomato, Brinjal, Bottle Gourd, Bitter Gourd (only Grafted Seedlings)
b. **Cuttings / Corns/ Tubers** : Sweet Potato, Colacasia, Elephant Foot Yam, Tapioca
c. **Off Season Vegetables:** (Summer: April-May) Tomato, Okra, Cucumber, Green Chillies, Brinjal, Bottle Gourd, Bitter Gourd, Leafy Vegetables.
d. **Cool Season Vegetables:** Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Zucchini (summer squash), French beans, Peas, Capsicum, Carrot, Beet root.

PATTERN OF ASSISTANCE FOR ONION FOR ONE HECTARE

Cost Norms: Rs.0.50 lakh/Ha **Period of Assistance: 1 year/season**

Assistance for 1 year/ Season : Rs.0.20 lakh/Ha

Sl. No.	Name of the item	Unit Cost (in Rs.) for 1st year/ Season	Assistance (in Rs.) for 1st year/ Season
1	**Cost on Plant Material** (Seed/ seedlings/grafts etc.,) including transportation and staking.	10000	4000
2	**Inputs**		
i	**Oragnic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	8000	3200
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers)	12000	4800
iii	**PP Chemicals/ Bio pesticides**	14000	5600
iv	**INM/IPM and Others** (Bio fertilizers, Micro Nutrients, barrier crops, Yellow / Blue sticky traps, pheromone traps, light traps, Poison baits etc.,	6000	2400
Total		**50000**	**20000**

Note: Maximum assistance allowed to a beneficiary is up to **2 Ha**
Crops Allowed: Onion and Garlic **Open Pollinated varieties / composites / synthetics.**

PATTERN OF ASSISTANCE FOR AROMATIC PLANTS (LEMON GRASS /CITRONELLA/PALMA ROSA etc.) FOR ONE HECTARE

Cost Norms: Rs. 0.50 lakh/Ha **Period of Assistance: 2 years**

Assistance for 1 year: Rs.0.12 lakh/Ha **Assistance for 2nd year: Rs.0.08 lakh/Ha**

Spacing: 50 c.m x 30 c.m

Sl. No.	Name of the item	Unit Cost (in Rs.)			Assistance (in Rs.)		
		1st year	2nd year	Total	1st year	2nd year	Total
1	**Cost on Plant Material (Seed/ Suckers)** including transportation and staking.	25000	0	25000	10000	0	10000
2	**Inputs**						
i	**Organic Manures and Fertilizers** (FYM, Neem/Castor/Groundnut Cakes/Vermicompost/Green Manure etc.,)	5000	15000	20000	2000	6000	8000
ii	**Inorganic fertilizers** (Straight/Complex/Mixed fertilizers, Water Soluble fertilizers, Bio fertilizers and Micro Nutrients)	0	5000	5000	0	2000	2000
iii	**PP Chemicals/ Bio pesticides**	0	0	0	0	0	0
iv	**INM/IPM** (Bio fertilizers, Micro Nutrients) **/Inter cropping**	0	0	0	0	0	0
Total		**30000**	**20000**	**50000**	**12000**	**8000**	**20000**

Note: Maximum assistance allowed to a beneficiary is up to **2 Ha**

2ND YEAR & 3RD YEAR MAINTENANCE

- **The gardens that have 75% survival are only eligible for extending 2nd year maintenance (2024-25 plantations). Gardens that have 90% survival are only eligible for extending 3rd year maintenance (2023-24 plantations)**
- Field staff (HEOs/VHAs/VAAs/VSAs/MPEOs) shall take up 100% inspection, 75% by Horticulture Officers and 10% by DHOs and report to the Director of Horticulture by 15th June for ascertaining the survival.
- Before extending input assistance to the beneficiaries under 2nd and 3rd year maintenance, DMC should take necessary proactive steps so that beneficiary shall be motivated to take up gap filling on their own to maintain 75% survival for 2nd year maintenance and 90% survival for 3rd year maintenance.
- While calculating the total cost as per the package, the subsidy amount indicated for each sub-component under IPM / INM should be strictly followed and no diversification of funds from one input to another is allowed i.e., from Bio pesticide to chemical pesticide/organic manures to inorganic fertilizers etc.
- The expenditure on IPM / INM, over and above subsides indicated are to be borne by farmer him/her self.
- The cost involved in components like preparation of land, planting, stacking, inter-cultivation operation should be borne by farmer only. No subsidy will be provided to labour component.

PATTERN OF ASSISTANCE PER Ha. TO BE FOLLOWED FOR 2nd YEAR MAINTENANCE PROGRAMME (GARDENS ESTABLISHED DURING 2024-25)

Amount in Rs.

S. No.	Name of the crop	Plant Material	INM/IPM	Total Assistance
1	**2**	**3**	**4**	**5**
1	Mango (7.5 m x 7.5m)	630	2030	**2660**
2	Mango (5 m x 5m)	1000	2280	**3280**
3	Mango (3 m x 2m)	5838	2162	**8000**
4	Mango (4 m x 2m)	4368	2632	**7000**
5	Sweet Orange (6 m x 6 m)	980	2221	**3201**
6	Guava (3 m x 3 m)	2780	3086	**5866**
7	Acid Lime (6 m x 6 m)	560	2641	**3201**
8	Pomegranate (5 m x 5 m)	1600	2240	**3840**
9	Banana	-	10246	**10246**
10	Papaya	-	6165	**6165**
11	Cashew (6m x 6m)	560	3440	**4000**
12	Cocoa (3 m x 3m)	1000	3000	**4000**
13	Custard Apple	3488	4992	**8480**
14	Dragon Fruit	2000	8000	**10000**
15	Avocado	1200	4800	**6000**
16	Fig	3000	7000	**10000**
17	Amla	1200	4800	**6000**
18	Karonda	375	5625	**6000**
19	Jamun	468	5532	**6000**
20	Tamarind	550	5450	**6000**
21	Jack fruit	1000	5000	**6000**
22	Passion fruit	1600	4400	**6000**
23	Garcinia	1060	4940	**6000**

PATTERN OF ASSISTANCE PER Ha. TO BE FOLLOWED FOR 3rd YEAR MAINTENANCE PROGRAMME (GARDENS ESTABLISHED DURING 2023-24)

Amount in Rs.

S. No.	Name of the crop	Plant Material	INM/ IPM	Total Assistance
1	**2**	**3**	**4**	**5**
1	Mango (7.5 m x 7.5 m)	252	2408	**2660**
2	Mango (5 m x 5m)	400	2880	**3280**
3	Mango (3 m x 2m)	2338	5662	**8000**
4	Mango (4 m x 2m)	1750	5250	**7000**
5	Guava (3x 3 m)	1110	4756	**5866**
6	Cashew (6m x 6m)	224	3776	**4000**
7	Cocoa (3 m x 3 m)	400	3600	**4000**
8	Pomegranate (5 m x 3 m)	1072	4262	**5334**
9	Sweet Orange (6 m x 6 m)	392	2809	**3201**
10	Acid Lime (6 m x 6 m)	224	2977	**3201**
11	Custard Apple	-	8480	**8480**
12	Dragon Fruit	-	10000	**10000**
13	Avocado	1200	4800	**6000**
14	Fig	-	10000	**10000**
15	Amla	480	5520	**6000**
16	Karonda	-	6000	**6000**
17	Jamun	-	6000	**6000**
18	Tamarind	220	5780	**6000**
19	Jack fruit	400	5600	**6000**
20	Passion fruit	-	6000	**6000**
21	Garcinia	420	5580	**6000**

MUSHROOM CULTIVATION

Objectives:

- To **establish a sustainable, income-generating activity** by producing edible and medicinal mushrooms that meet local, national, and export market demands.
- To **optimize the utilization of agricultural by-products** (like straw, sawdust) and convert them into high-protein food.
- To **promote employment and entrepreneurship** among farmers, rural youth, and women.
- To **diversify farm income** and reduce dependency on traditional crops.
- To **contribute to nutritional security** by providing a rich source of protein, vitamins, and minerals.
- To **support environmental sustainability** by recycling organic waste and reducing carbon footprints.

Under Mushroom cultivation assistance will be provided for setting up of individual Mushroom production, span production and compost making units. The details of the cost norms and pattern of assistance for Mushroom cultivation is as follows.

Particulars	Cost Norms	Pattern of Assistance
Production Unit	Rs. 30.00 lakh/unit	100% of the cost to public sector and 40% of cost for private sector, for meeting the expenditure on infrastructure, as credit linked back ended subsidy.
Spawn making unit	Rs. 20.00 lakh/unit	100% of the cost to public sector and 40% of cost for private sector, for meeting the expenditure on infrastructure, as credit linked back ended subsidy.
Compost making Unit	Rs. 30.00 lakh/unit	100% of the cost to public sector and 40% of cost for private sector, for meeting the expenditure on infrastructure, as credit linked back ended subsidy.
Low Cost/ Small Scale mushroom production unit	Rs.2.00 Lakh/unit for a structure of size of 200 sqft	Assistance @ 50% per unit for meeting expenditure on infrastructure and inputs subject to a maximum of 5 units per beneficiary. Availing bank loan is Exempted

The assistance provided for Establishment of Mushroom production unit is 40% of the cost (of Rs 30.00 lakh Max permissible cost) to private sector for meeting the expenditure on infrastructure as credit linked back ended subsidy and Detailed Project Report with all the required following documents is to be submitted by the applicants for Establishment of Mushroom production unit. Duly obtaining District Collectors approval the DPR has to be submitted to the Director of Horticulture for approval by the SLEC.

Application Form

1. Synopsis duly signed by the Promoter
2. Basic data sheet with complete technical specification Detailed project report as per MIDH guidelines.
3. Partnership deed.
4. Firm registration certificate.
5. Bank sanction letter (duly signed by the Bank Manager, attested after verifying original letter by DHO)
6. Bank Appraisal letter (duly signed by the Bank Manager, attested after verifying original letter by DHO)
7. Building construction plan approval from Gram Panchayat.
8. Fire Department approval with drawings/ Insurance.
9. Pan card on the name of the company – Xerox copy.
10. Pan card Xerox copies of the Directors along with copies of last 2 years IT returns.
11. Electricity approval.
12. KYC documents of all the partners
13. DMC approval (District Mission Committee)
14. Affidavit (Format-VII) on Rs. 100/- stamp paper.
15. Land documents (sale deed / lease deed) Pattadar pass book copy
16. NOC from NABARD / NHB / APEDA / DIC / SFC and MFPI
17. Justification report by DHO.

Details of estimated cost of mushroom production unit:

S.No.	Details	Amount (Rs. in Lakh)
A	Construction / Modification / Renovation of buildings / construction of infrastructure etc.	9.00
a	Building includes cropping room, Pasteurization room, Laboratory, Store room and office room etc.,	
B	Purchase of machinery	21.00
a	1 Lab tables, 1 office table, chair & 6 wooden stools	
b	Godrej alma rah with cash chest	
c	Humidifiers for 3 cropping rooms / Automatically Humidity control / Air handling unit for temperature & CO2 control / temperature measuring instruments	
d	Aluminum racks for incubation / cropping room	
e	Trolley for transporting bags	
f	LPG cylinders	
g	Pressure cooker 20 liters cap	
h	Refrigerator 300 liters cap	
i	Paddy straw 60 tons	
j	Polythene bags	
k	Miscellaneous (Solar panel, sprayers/water pump, Substrate seeding machine & spawned Substrate mixture, etc can also be used)	
	Total	**30.00**

Details of estimated cost of Low cost/ Small Scale Mushroom Production unit:

S.No.	Details	The total amount (Rs. in Lakhs).
I.	Fabrication works	
1	a. 40 number (6m long) 1.5 Inch round / square pipe b. 40 number 3X3 inch square flats c. 40 number 2 inch round pipe cut pieces	Rs.40,000
2	Insect proof nylon net to cover windows/ ventilation and other open Spaces including labor charges for fixing	Rs.8,500
3	a. Plastic rope (8620 mts) b. Poly propylesne covers (Min.150 micron) c. Paddy straw, spawns & other miscellaneous expenses.	Rs.20,000 Rs.5,500 Rs.10,000
II.	Sterilization of Substrate	
1	Sterilization mechanism including electrification (Auto clave of minimum 100 Itrs)- Mandatory	Rs.71,500
III	Machineries and tools required	
1	a. Humidifying system includes'/ HP motors, Thermo Hygrometer mobility sensor device, 30 no's pipes, sprinklers, fittings, overhead tank and gunny bags etc,. b. Choppers and accessories for straw preparation	Rs.17,000 Rs.13,000
IV.	Post Harvest Management	
1	Harvesting tools, trays, crates, packing and weighing machine and Packing covers	Rs.11,500
V.	Other necessary accessories and inputs	Rs.3,000
VI.	Note: Utilization of Solar Water Heater in Mushroom Production can be Encouraged as fuel saving (Eco-friendly activity)	
	Total	**2,00,000**

Guidelines for Rejuvenation/ Replacement of Senile Plantation and Canopy Management

(Mango, Sweet Orange, Acid Lime, Cashew)

Objective:

- To increase the production and productivity of orchards of more than 5 - 25 years old by removal of old unproductive / senile trees and replanting with fresh planting material / rejuvenating the old and senile orchards with appropriate and integrated combination of inputs, pruning / grafting techniques.
- To regulate the shape and growth of tree.
- To Maximize the productivity with quality fruit production
- To reduce the pest and disease incidence which will reduce the cost of cultivation of fruits crops and reduction in usage of chemical pesticides and fungicides.

Implementation procedure:

- District Horticulture Mission should ensure that Rejuvenation/ Replacement of senile plantation and canopy management programme to be implemented on cluster approach in a contiguous area, instead of doing it in scattered & unplanned manner. This approach will help in providing both backward and forward linkages and enable the Dept., to do effective extension service.
- Old unproductive & senile Orchards of Mango, Sweet Orange, Acid lime, Cashew and Cocoa plantations exists should be selected for Rejuvenation programmes.

Time frame for taking up rejuvenation

S.No	Crop	Month
1	Mango	June
2	Citrus	August
3	Cashew	June

- Minimum area per each block should be above 10 Ha.
- **New clusters** shall be selected under this programme as per location -specific crops in holistic manner.
- The assistance under these components shall not be extended to the beneficiaries already covered during **previous years.** The DHOs & HOs should be cautious while selecting the beneficiaries and preferences shall be given to SF & MF.
- The beneficiary selection need to be done in most transparent manner by conducting **Gramasabhas** and the list should invariably be approved by District Mission Committee (DMC).
- Coverage of **SC (17.1%) and ST (5.33%)** & Women farmers as per the prescribed ratio is minimum mandatory.
- The farmers who are having assured source of irrigation are eligible.
- Selection and documentation process should be completed in a time bound manner.
- The Field staff (VHAs/ VAAs/HEOs/MPEOs) of the concerned area should verify the land and crop details of farmers and should obtain applications with the following details.

1	Name of the Farmer	8	Age of the Garden
2	Father's / Husband's Name	9	Extent Proposed for Rejuvenation/ Canopy Management (Ha.)
3	Village	10	No. of Trees existing in the garden proposed for Rejuvenation/ Canopy Management
4	Mandal	11	Yield status of the crop during last year
5	Category	12	Recommended activity
6	Survey No.	13	No. of gaps identified for gap filling
7	Total Extent Ha.	14	No. of trees proposed for Canopy Management/ Top working or If any

- The field level Officer (HEOs/VHAs/VAAs/VSAs/MPEOs) of the concerned area should inspect 100% of the fields identified under his/her jurisdiction

before sanction of the scheme and he/she himself/herself should satisfy before recommendation of the component.

- Land holding of the farmers should be certified by Horticulture Officers on the basis of the original Pattadar pass book or Adangal signed by MRO.
- The Horticulture Officers (HOs) shall organize training programmes to the beneficiaries under Rejuvenation/ Replacement of senile plantation and canopy management programme on selection of quality plant material, training & Pruning/ Top working activities, INM & IPM etc through audio visual aids **with the help of resource persons / experienced progressive farmers.**
- The DHOs/PHOs in the district should take approval of DMC for the selected beneficiaries.
- The **Horticulture Officers (HOs) and DHOs/ADsH** should randomly inspect the identified fields before extending the assistance to the beneficiaries.
- The field-level officers (VHAs/VAAs/HEOs/MPEOs) of the concerned area must inspect 100% of the rejuvenated orchards. Additionally, the Horticulture Officer (HO) should inspect at least 75% of the area, and the Assistant Director of Horticulture (ADH) must inspect a minimum of 10%.
- The HO concerned should maintain Register for recording the details of beneficiaries.
- Photographs of orchards along with farmers before and after Rejuvenation/Canopy Management/Top Working etc. should be maintained by the HO concerned. The same copies to be made available in the DHOs/PHOs office.
- The assistance will be provided to the beneficiaries through DBT Mode.
- Horticulture Officers (HOs) should also collect yield data and assess the impact of the rejuvenation programmes from the farmers, and submit success stories to the SHM Cell in a timely manner.

S No	Details of the Sub- Component	Max. Permissible Cost in Rs.	Pattern of Assistance @ 40% in Rs.
1	Removal of dead/dying/old plants and replacement with new plants	10000.00	4000.00
2	Top-working/Canopy management	10000.00	4000.00
3	Cost of input towards nutrient management, pest management and irrigation	40000.00	16000.00
2	**Total**	**60000.00**	**24000.00**

Note: The above 3 components may be implemented in separate (or) in combination to meet the objective of the rejuvenation/replacement of senile orchards.

Criteria for selection of Gardens

- Unproductive gardens
- Senile & neglected gardens
- Pest & disease infected plants
- Garden with less number of trees per unit area with poor production

Crop parameters to be followed for Rejuvenation/ Replacement of Senile Plantation and Canopy Management

I. MANGO: (Age should be more than 25 years)

1) Gap filling with choice varieties
2) Canopy Management (can be done in 3 types)
   i) Bushy types are to be provided with proper aeration and ventilation by removal of dead, diseased, drooping & crisis cross branches, in case of gardens where there is poor light penetration.
   ii) Lanky trees with more wood have to be deheaded by way of pollarding.
   iii) Unproductive trees have to be top-worked.
3) Application of Bordeaux paste/copper based fungicides to cut ends.

4) Preparation of Basins.
5) Timely application of manures (FYM/Neem-cake/vermin compost/fertilizers) as per recommendation.
6) Trimming of new growth, retaining 4–5 branches evenly distributed on all sides to achieve a dome-shaped canopy.
7) Cultivation of intercrops such as sunhemp and dhaincha to enhance soil fertility and suppress weed growth.
8) Plant protection measures to be taken as per need.

II. <u>CITRUS CROP /ACIDLIME/SWEET ORANGE: (Age should be more than 8 years)</u>

1) Removal of diseased, dead and dried branches.
2) Spraying of Bordeaux mixture or any copper fungicide.
3) Bahar treatment for crop regulation
4) Preparation of basins and timely application of manures FYM/ Neem-Cake / Vermicompost and fertilizers as per recommendation.
5) Combined micro-nutrients sprays at 15 days interval on newly emerging leaves to correct the deficiencies of different elements.
6) Plant protection measures to be taken as per need.

III. <u>CASHEW: (Age should be more than 20 years)</u>

1) Gap filling with suitable variety
2) Canopy Management by removal of dead, diseased, drooping & criss-cross branches, for proper light penetration.
3) Application of Bordeaux paste/copper-based fungicides to cut ends.
4) Preparation of Basins.
5) Timely application of manures FYM/ Neem-cake/ vermin compost and fertilizers as per recommendation.
6) Cultivation of intercrops such as sunhemp and dhaincha to enhance soil fertility and suppress weed growth.
7) Plant protection measures to be taken as per need.
8) Selected/identified cashew gardens are to be taken care for avoiding stem borer by applying protection measures.

CREATION OF WATER RESOURCES

Objective:

The main objective of Construction of community tanks, on-farm ponds, and reservoirs with plastic / RCC lining is to ensure life-saving irrigation to Horticulture crops.

a. Water Harvesting Structures for Community-Construction of on farm community tank, pond/reservoirs with use of plastic/RCC lining:

Cost norms / pattern of assistance for Water Harvesting Structures-Community Farm Ponds:

Item	Cost norms	Pattern of assistance
Water Harvesting Structures for Community-Construction of on farm community tank, pond/ reservoirs with use of plastic/RCC lining	**Rs. 24.00 lakh/ unit** @ Rs 80 per cubic metre in general areas and Rs 30 lakh/ per unit @ Rs 100 per cubic meter for scheduled areas for a maximum capacity of 30,000 cub mts.	Assistance @ 75% to irrigate 10 ha of command area, for a storage capacity of 30,000 cubic meter and for smaller capacity on pro-rata basis depending upon the command area either with use of minimum 500-micron plastic films or RCC/HDPE lining; owned & managed by a community/farmer group. Cost for non-lined ponds/tanks (only in black cotton soils) will be 30% less. Assistance will be restricted to the cost of plastic/RCC lining. However, for non MNREGA beneficiaries, assistance on entire cost including construction of pond/tank as well as lining can be availed under the scheme.

- The community tanks, pond/ on farm water reservoir with use of plastic / RCC lining should be taken up by group of 5-10 farmers, for which farmer wise details, indicating crop etc need to be collected.

- The unit cost is Rs. 24.00 lakh in plain areas and Rs. 30.00 lakh for scheduled areas.
- The pond size shall be 100 m x 100 m x 3 m (30,000 cu m) to irrigate 10 ha of command area and for smaller capacity on pro-rata basis depending upon the command area either minimum 500 micro plastic films or RCC/HTPE lining owned and managed by a Community / Farmer group.
- Cost for non-lined ponds / tanks (only in black cotton soils) will be 30% less, and assistance will be restricted to cost of plastic / RCC lining.
- Lining material should confirm to BIS standards.
- The BIS standards for 500 microns should be of **IS 16352:2020** with Geo membrane sheet. The BIS Certificate shall be ensured from the supplier.
- The visibility of BIS marking shall be ensured before laying and during inspection.
- This programme can be done in conjunction with MGNREGS and wherever possible adequate convergence has to be ensured.
- The water bodies shall be linked with micro irrigation facility for judicious use of water.

PROCEDURE FOR IMPLEMENTATION:

1. Farmers cultivating horticulture crops are eligible.
2. Farmers are to be sensitized and motivated to understand the concept of farm ponds to store water in rainy season in farm ponds from bore wells, canals, runoff etc provide lifesaving irrigation to the orchards/ crops during peak periods of summer to save the gardens.
3. Beneficiaries are to be identified in Gramasabhas and list has to be approved in DMC.
4. The Horticulture officer and MI Engineer of APMIP have to conduct the preliminary inspection of site of identified farmer and collect the following details for assessing the feasibility (Application Form of farm / farmers inspection report of site is enclosed).

- Name of the farmer

- Father/ Husband's name
- Caste/ category of farmer i.e. SF/MF & SC/ST.
- Name of the Horticulture crop grown and its extent in Ha.
- Nature of irrigation source: whether the Bore well is functional Yes/No.
- Energization - Yes/No.
- Nature of soil suitable for excavation of farm ponds and feasibility of the site for taking up of farm ponds.

5. After inspection of the site, a digital photo may be taken along with the farmer, HO & MI Engineer at the site proposed for farm pond showing land marks in the field (Before excavation) and the techno feasibility report duly certified by HO & MI Engineer along with application of farmer is to be submitted to DHOs.
6. The DHO should strictly follow the **SC/ST allocation** in implementation of the programme.
7. Priority should be given to the small, marginal farmers and women farmers during selection of beneficiaries.
8. After receipt of the application along with Technical feasibility report, the same shall be placed before **"District Mission Committee"** for approval.
9. Based on the approval by DMC, the administrative sanction shall be accorded, for taking up the farm pond as per the guidelines. The time limit for completion of community tanks may be indicated as **"60 days"** from the date of issue of administrative sanction.
10. The farmers have to take up excavation work, bunding and lining with plastic sheet as per specification (500 microns) / RCC lining. The farmers have to provide chain linked mesh fencing to community tanks at their own cost.
11. During field inspections / Survey, ensure transportation of excavated soil or bund formation with excavated soil resulting in extra land covered under pond.
12. The farmers should strictly follow the specifications of community tanks as given in the administration sanction.

13. The existing RCC lined community tanks and **old incomplete community tanks** are not eligible for subsidy.
14. The BIS standards for 500 microns should be of **IS 16352:2020** with Geo membrane sheet. The BIS Certificate shall be ensured from the supplier.
15. Farm ponds with a group of farmers proposed to be constructed; the DHO should discuss with PD, DWAMA for convergence or get it approved by District Collector.
16. The water bodies shall be linked with **micro irrigation facility** for judicious use of water therefore the farmers having electricity connection are to be selected.
17. Micro irrigation shall be mandatory for better water use efficiency.
18. The HO/DHO/MI Engineer shall give technical assistance to the farmer on quality of plastic sheet/ RCC proposed for lining etc. besides inspecting the community tanks from time to time for necessary technical advice.
19. MI Engineers need to be visited / inspects at least thrice during execution and technical guidance and at final stage.
    a. For marking
    b. During excavation / cutting of slope
    c. Bund formation and trimming of banks
20. After completion of the community tanks, the farmers have to submit completion report of community tanks along with specifications to Horticulture Officer.
21. After completion of Farm pond the MI Engineer shall take the measurements and record it in the **M Book.** If the community tanks are completed as per specification, the joint inspection team consisting farmer, HO/MI Engineer, DHO, DMIO should inspect and recommend for subsidy based on ground reality.
22. **The size of the Community farm pond should be 100m length X 100m breadth X 3m depth. The Capacity of the farm pond is to be calculated by taking the average of top and bottom areas multiplied by depth using the formula:**

$$\frac{(L1 \times B1) + (L2 \times B2) \times \text{depth}}{2}$$

L1 length of the top **B1 breadth of the top**

L2 length of the bottom **B2 breadth of the bottom**

Depth 3 mts, ½ mt of free bund (Height of the bund)

The total volume of the farm pond should be 30000 cu.m.

23. For smaller size of ponds, cost will be admissible on pro rata basis depending upon the command areas / Volume of the farm pond.
24. Before release of subsidy directly to farmers, an agreement has to be executed by farmers / farmers group on Rs.100/- stamp paper stating that "we (farmer / farmers (indicate names)) are responsible for completion of community farm ponds as per the guidelines and specifications given under MIDH, and complete the unit within prescribed period and maintenance of farm pond in future.
25. The Joint inspection committee comprising **of Farmer, HO/MI Engineer, DHO, DMIO** shall finally inspect the community tanks, verify all the bills, check & confirm the quality of the lining of farm ponds as per the standards and take digital photographs.
26. The HO/ DHO shall ensure that the community farm pond is owned & managed by a community / farmer group.
27. Display board (Iron) of suitable size depicting the following details in Telugu version has to be erected.

Department of Horticulture
Government of Andhra Pradesh and MIDH GOI

Name of the farmers:
Name of Father / Husband: Total expenditure:
Village : Subsidy amount(Rs):
Size of farm pond : year of sanction:
Capacity of farm pond:
Command area:

Joint Inspection Report for release of Assistance to Community farm pond

	Particulars	Specifications	Observations	Total Cost (Rs) in terms of earth work done	Eligible cost (Rs)	Eligible Subsidy (Rs)	Subsidy released so far	Subsidy proposed to be released	Bank details	Remarks
1	2	3	4	5	6	7	8	9	10	11
1	Pond Excavation	Measurements : Top:L1XB1 mts:								
		Bottom:L2XB2 mts, depth								
2	Capacity in Cu Mts	(L1 x B1) + (L2 x B2) X depth / 2								
3	Cost of Sheet/RCC Lining	Geomenbrane/HDPE sheet of 500 microns (Area x rate) m x m								
4	Smoothening of surfaces	No.of Mandays x rate								
5	Sheet fixing charges/RCC Lining	No.of Mondays x rate								
6	**Sub Total**									
7	Fencing	Cost of link mesh (wt x rate)								
		No.of granite poles(No x rate)								
		Labour Charges (No.of Mandays)								
	Sub Total									
	Grand Total									

Certificates:

1) This is to certify that group of farmers have constructed farm pond as per specifications of MIDH.

2) This is to certify that all the original purchase bills of the items mentioned above have been verified by the team and found correct.

3) This is to certify that group of farmers were not sanctioned subsidy under Farmpond earlier.

4) This is to certify that an amount of Rs._____(Rupees_____) is released as 1st and 2nd instalments .

5) The balance subsidy amount of Rs._____(Rupees_____) may be released.

Farmer MI Engineer Horticulture Officer District Horticulture Officer DMIO AP

b. Water Harvesting Structures for Individuals – Construction of on farm ponds/tanks etc., with use of plastic/RCC lining:

Subsidy pattern:

- As per the MIDH norms of GOI, the size of the farm pond should be **20mx20mx3m with the volume of 1200 cu.mt**.
- The total cost of the unit is Rs.1.50 Lakhs.
- **The financial assistance is 50% i.e Rs 75,000/- for 1200 cu.mt @ 62.50/- per cu.m on the total cost including 300 micron plastic / RCC lining.**
- Cost for non-lined ponds (only black cotton soils) will be 30% less.
- For smaller size of ponds, cost will be admissible on pro rata basis depending upon the command areas/volume of the Farm pond.

Procedure

1 Farmers are to be sensitized and motivated to understand the concept of farm ponds to provide lifesaving irrigation to the orchards/ crops during peak periods of summer to save the gardens.

2 Beneficiaries are to be identified in Gramasabhas and list has to be approved in DMC.

3 The Horticulture officer and MI Engineer of APMIP have to conduct the preliminary inspection of site identified by the farmer and collect the following details for assessing the feasibility.

- Name of the farmer
- Father/ Husband's name
- Caste/ category of farmer i.e. SF/MF & SC/ST.
- Name of the Horticulture crop grown and its extent in Ha.
- Nature of irrigation source: whether the Bore well is functional Yes/No.
- Energization - Yes/No.
- Nature of soil condition suitable for excavation of farm ponds and feasibility of the site for taking up of farm ponds.

4 At the time of inspection of the site, the geocoordinate of the location and a digital photo may be taken along with the farmer and HO & MI Engineer at the site proposed for farm pond (Before excavation). This together with the techno feasibility report duly certified by HO & MI Engineer and the application of farmer should be submitted to DHOs.

5 Priority should be given to the small, marginal farmers and women farmers during selection of beneficiaries.

6 After receipt of the application along with techno feasibility report, the same will be placed before **"District Mission committee"** for approval.

7 Based on the DMC approval, the administrative sanction will be issued to the farmers, for taking up the farm pond as per the guidelines, and time limit for completion of farm pond may be indicated as **"60 days"** from the date of issue of administrative sanction.

8 The farmers have to take up excavation work, bunding and covering of plastic sheet as per specification (300 microns)/ RCC lining. Lining material should confirm with BIS standards. The farmer has to provide fencing to farm pond at his own cost.

9 Chain linked mesh for fencing preferred rather than barbed wire fencing.

10 The farmer should strictly follow the specifications of farm ponds as given in the administration sanctions. The farmer is also allowed to use 500 microns Geomembrane sheet with 200 GSM in place of 300 microns plastic sheet. However the farmer has to meet additional expenditure over and above the unit cost fixed by GOI.

11 The existing RCC lined farm ponds and old incomplete farm ponds are not eligible for subsidy.

12 The HO/DHO/MI Engineer shall give technical assistance to the farmer on quality of plastic sheet/ RCC proposed for lining etc. besides inspecting the community tanks from time to time for necessary technical advice.

13 After completion of the farm ponds, the farmer has to submit completion report of farm pond along with specifications to Horticulture Officer.

14 The MI Engineer will take the check measurements of farm pond and record it in the M Book and if the farm pond is completed as per specifications, then photograph will be taken with farmer & joint inspection team with farm ponds.

15 The size of the farm pond should be 20m length X 20m width X 3m depth. The length 20m indicates the average of the Top and Bottom lengths of the farm pond. Width is also calculated in a similar manner and the total volume of the farm pond should be 1200 cu.m. The eligible subsidy should be calculated basing on the actual volume @ Rs 62.50/-/cu.m of the pond

16 For smaller size of ponds, cost will be admissible on pro rata basis depending upon the command areas / Volume of the farm pond.

17 Assistance @50% will be released after completion of farm pond including erection of fencing and sign board after inspection by the Joint committee. (enclosed)

18 The Joint committee comprising of **Farmer/MI Engineer or HO/DHO (or) DMIO** should finally inspect the farm pond and take digital photographs.

19 DHOs/Hos shall ensure that the beneficiary will take up maintenance of the farm pond.

20 The outer slopes of the farmpond bunds are to be utilized for taking up seasonal crops which will not only strengthen/ Control the soil erosion of the bund and also remunerative for income generation to the farmers. The DHOs/HOs are requested to motivate the farmers to take up the crops on the outer slopes of the farmponds.

21 Fencing should be completed simultaneously.

22 Farm ponds should be linked with drip irrigation.

23 A display board (Iron) of Size 2x4 ft depicting the following details in Telugu version has to be erected.

Department of Horticulture

Government of Andhra Pradesh and MIDH GOI

Name of the farmer:

Father / Husband: Total expenditure:

Village : Subsidy amount(Rs):

Size of farm pond : Non- subsidy amount:

Capacity of farm pond: year of sanction:

Command area:

24 The DHO is responsible for proper implementation of this programme, strictly as per the norms/guidelines of GoI without any deviation.

	Joint inspection report for release of Assistance to Individual farm pond									
S. No	**Particulars**	**Specifications**	**Observations**	**Total Cost (Rs)**	**Eligible cost (Rs)**	**Eligible Subsidy (Rs)**	**Subsidy relesed**	**Proposed to be released**	**Bank detaiils**	**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**		**10**
		Measurements : Top:L1XB1 mts:								
1	Pond Excavation	Bottom:L2XB2 mts, depth								
2	Capacity in Cu Mts	(L1 + L2) X (B1 + B2) X depth 2 2								
3	Cost of Sheet	Geomenbrane/HDPE sheet of 500 microns								
4	Smoothening of surfaces									
5	Sheet fixing charges									
6	**Sub Total**									
7	Fencing	Cost of link mesh								
		No.of granite poles								
		Labour Charges								
	Sub Total									
	Grand Total									

Certificates:

1) This is to certify that Sri/Smt_____S/o_____has constructed farm pond as per specifications of MIDH.

2) This is to certify that all the original purchase bills of the items mentioned above have been verified by the team and found correct.

3) This is to certify that Sri/Smt_____S/o_____ was not sanctioned subsidy under Farmpond earlier.

4) This is to certify that an amount of Rs._____(Rupees_____) is released as 1st instalment.

5) The farmer is eligible for subsidy of Rs._____(Rupees_____) as per the specifications of farm pond and an amount of Rs_____ (Rupees_____) may be released after deducting amount released as 1st instalment.

6) The subsidy amount of Rs._____(Rupees_____) may be released.

Farmer	MI Engineer	Horticulture Officer	District Horticulture Officer	DMIO APMIP

APPLICATION FORM FOR COMMUNITY FARM FONDS/ INDIVIDUAL FARM POND.

(Separate application has to be collected along with photograph for all the farmers involved in community farm ponds)

Photo of farmer

1. Name of the Farmer in Full :
2. Father (or) Husband name :
3. Village :
4. Mandal :
5. Survey No. :
6. (A).Category of SC /ST / BC :
   (B). Category of SF / MF/OF :
7. Total extent of land holding Ha :
   Details from web land records
8. Adhar card No. :
   (Enclose & Xerox copy of Adharcard)
9. Name of the existing crop Ha :
   No. of plants per Ha (Including of Horticulture plantations)
10. No. of Bore / Bores : Functioning Yes / No
11. Energisation done to motor : Yes / No
12. Electrification facilities existing : Yes / No
13. Bank details:
    1. Farmer SB A/C No :
    2. Name of the bank & Branch :
    3. I.F.S.C. code :
14. Nature of soil condition :
    Suitable for soil excavation.
    (i.e. Black soil/ sandy loan / Red soils/ other)
15. Drip facilities available : Yes / No
16. Mobile No:

Certified that the information furnished by me is true and correct to the best of my knowledge. I/ we agree to take up farm pond (community / individual) as per the specifications and guidelines of MIDH, for release of eligible subsidy.

Signature of Farmer.

Certification of the inspected authority HO & MI Engineers for taking up farm pond

1. Certified that the preliminary inspection has been conducted, for the proposed community irrigation tank. Contacted the group of farmers ( ), and found that the soil is suitable for taking up community farm pond with size_____, can irrigate _____ Ha, and recommended for taking up community farm pond as per MIDH guidelines & specifications WITH _____ lining. The Digital photo graph of the site before taking up community farm pond is enclosed.

Signature of Ho
Date:

Signature of MI Engineer
Date:

Approval of DHO

INTEGRATED PEST MANAGEMENT / INTEGRATED NUTRIENT MANAGEMENT

Objectives:

- To create awareness among the farmers on sustainable Horticulture.
- To control the pests by utilizing minimum recommended doses of pesticides for obtaining optimum results.
- To reduce cost of cultivation.
- To promote usage of bio – products & for maintenance of ecological balance.

Procedure:

- Needy clusters shall be selected for implementation of INM/IPM.
- Intensive awareness on a campaign mode on the concept of INM/IPM should be conducted for all the beneficiary farmers.
- Compact blocks of 50 - 100 Ha of each crop in 2 to 3 mandals that are needy of adopting INM/IPM practices are to be selected depending on pest prevalence and furnish the name of village/ Mandal / No.of farmers & extent proposed to be covered under the programme area along with time schedule for implementation.
- The assistance under this component shall not be extended to the beneficiaries already covered during previous years.
- Preference should be given to small/marginal/SC/ST farmers.
- The beneficiaries shall apply to the Horticulture Officers of the concerned area in the format prescribed along with original passbook.
- Land holding on the basis of original passbook of the farmer and plantation should be certified by the Horticulture Officers.
- Beneficiary selection must be conducted in a **transparent manner** through **Grama Sabhas**. The selected list must be **registered on the Suraksha Portal** and **approved by the District Mission Committee**.
- The assistance is provided on inputs only.
- Input packages containing a combination of Chemical and Bio-inputs should be recommended to the farmers in accordance with the field

situation and prevalence of pests and diseases with due approval of the scientists.

- The DHO should also furnish the detail report on the impact of IPM after taking up the programme.
- After completion of the programme the DHO should furnish the list of beneficiaries.

Pattern of Assistance:

- Assistance is limited to 30% cost, subject to a maximum of Rs. 1500/- per Ha on the total cost of inputs to a max ceiling of 2 Ha per beneficiary.

Mode of disbursement:-

- The Horticulture officer shall ensure that the farmers have taken up IPM practices as per the input package recommended with due verification of the bills of the inputs purchased.
- Horticulture officer shall certify the bills, submit to DHO along with the bank account details of the farmers and recommend for release of the assistance to the farmers.
- Assistance shall be disbursed to beneficiaries through **Direct Benefit Transfer (DBT) Mode**.

PROTECTED CULTIVATION

PROTECTED CULITIVATION – PATTERN OF ASSISTANCE

S No	Component	Unit	Cost Norms		Pattern of Assistance
			Unit Cost	Assistance	
1	**Protected Cultivation**				
A	**Poly house/ Hybrid Retractable structures**				
1	Fan & Pad System	Sq mts	• Rs. 1800/Sq.m (up to area 500 Sq. m) • Rs. 1600/Sq. m (>500 Sq.m up to 1008 Sqm) • Rs. 1500/Sq. m (>1008 Sq. m up to 2500 Sq.m)	***** Rs .900/ sqmt - Upto 500 sqmts- ***** Rs.800/Sqmt - >500 Sq.m up to 1008 Sqm - ***** Rs.750/ Sq.m - >1008 Sq. m up to 2500 Sq.m -	50% of cost limited to 2500 Sq.mt per beneficiary or on prorata basis for smaller areas.
B	**Naturally Ventilated System**				
1	Tubular/Rectangular Structure	Sq mts	• Rs. 1200/Sq.m (up to area 500 Sq. m) • Rs. 1050/Sq. m (>500 Sq.m up to 1008 Sqm) • Rs. 1000/Sq. m (>1008 Sq. m up to 2500 Sq.m)	***** Rs 600/ sqmt - Upto 500 sqmts ***** Rs.525/Sqmt - >500 Sq.m up to 1008 Sqm ***** Rs.500/ Sq.m >1008 Sq. m up to 2500 Sq.m	50% of cost limited to 2500 Sq.mt per beneficiary or on prorata basis for smaller areas.
2	Bamboo/Cable purlin structure	Sq mts	Rs.450 /sqmt	Rs.225 /sqmt	* For cable purlin structure - 50% of cost limited to 2500 Sq.mt per beneficiary or on prorata basis for smaller areas. * In case of Bamboo Structure assistance will be limited to 20 units per beneficiay and size of each unit not to exceed 200 sqmts.

S No	Component	Unit	Cost Norms		Pattern of Assistance
			Unit Cost	Assistance	
C	**Shadenet - Agrotextile net house**				
1	Tubular Structure/ Rectangular structure	Sq mts	Rs.710 /sqmt	Rs.355 /sqmt	50% of cost limited to 2500 Sq.mt per beneficiary or on prorata basis for smaller areas.
2	Bamboo / Cable purlin Structure	Sq mts	Rs.450 / sqmt	Rs.225 / sqmt	* For cable purlin structure - 50% of cost limited to 2500 Sq.mt per beneficiary or on prorata basis for smaller areas. * In case of Bamboo Structure assistance will be limited to 20 units per beneficiay and size of each unit not to exceed 200 sqmts.
D	Plastic / Non woven cloth tunnels	Sq mts	Rs.80 / sqmt	Rs.40/ sqmt	50% of cost limited to 2500 Sq.mt per beneficiary or on prorata basis for smaller areas.
E	Walk-in Tunnels	Sq mts	Rs.720/ sqmt	Rs.360/ sqmt	50% of the cost limited to 3 units per beneficiary (each unit not to exceed 800 Sq. m)
F	Anti Bird / Anti Hail Nets	Sq mts	Rs.50 /sqmt	Rs.25/ sqmt	50% of cost limited to 10000 sqmt beneficiary or on prorata basis for smaller areas.
G	Cost of planting material of high value fruits & vegetables grown in poly house/Shadenet House (Capsicum, Cucumber, Muskmelon, Tomato,	Sq mts	Rs.150/sqmt	Rs.75/sqmt	* 50% of cost limited to 2500 sqmt beneficiary or on prorata basis for smaller areas. * Crops like Capsicum, Cucumber,

S No	Component	Unit	Cost Norms		Pattern of Assistance
			Unit Cost	Assistance	
	Broccoli, Parsley, Celery and other crops approved by Research Institutions may be considered for assistance..				Muskmelon, Tomato, Broccoli, Parsley, Celery and other crops approved by Research institututions may be considered for assistance.
H	Cost of planting material & cultivation of Orchid (net house) & Anthurium (Poly house)	Sq mts	Rs.700/sqmt	Rs.350/sqmt	50% of cost limited to 2500 sqmt beneficiary or on prorata basis for smaller areas.
I	Cost of planting material & cultivation of Carnation & Gerbera under poly house	Sq mts	Rs.600/sqmt	Rs.300/sqmt	50% of cost limited to 2500 sqmt beneficiary or on prorata basis for smaller areas.
J	Cost of planting material & cultivation of Rose, Chrysanthemum and lilum under poly house	Sq mts	Rs.450 / sqmt	Rs.225 / sqmt	50% of cost limited to 2500 sqmt beneficiary or on prorata basis for smaller areas.
K	Mulching Plastic / Jute / Agro textile / Any other biodegradable material.	Ha	Rs.40,000 / Ha	Rs.20,000 /Ha	Assistance @ 50% subject to a maximum of 2 Ha per beneficiary or on prorata basis for smaller areas.
L	**Add on Components:**				
1	Hydroponics and Aeroponics	Sq mts	Rs.350 / sqmt	Rs.175 / sqmt	Assistance @ 50% subject to a maximum of 1000 sqm per beneficiary or on pro-rata basis for smaller areas .
2	Circulation Fans in polyhouse only	No	Rs.5000 / fan	Rs.2500 / fan	Assistance @50% subject to a maximum of 6

S No	Component	Unit	Cost Norms		Pattern of Assistance
			Unit Cost	Assistance	
					fans for a maximum area of 2500 sqm per beneficiary or on pro-rata basis for smaller areas .
3	Sensor based Automation System for fertigation	-	Rs. 4 lakh / unit	Rs. 2 lakh / unit	Assistance @ 50% per unit per beneficiary for a minimum area of 2500 sqm per beneficiary under protected cultivation.
4	Support system for vegetable crops	-	Rs. 0.20 lakh per ha	Rs. 0.10 lakh per ha	Assistance @50% for all farmers for a maximu area of 2 Ha per beneficiary or on a pro- rata basis for smaller areas.
5	Permanent Support Structures for Anti hail/Anti bird net	Sq mts	Rs. 20 per Sq.mt. of covered area	Rs. 10 per Sq.mt. of covered area	Assistance @ 50% for a maximum area of 2 ha. per beneficiary or on pro-rata basis for smaller areas.
6	Fencing (This component will be considered only in integration with other components of MIDH Scheme)	Mts	Rs. 300 per running metre	Rs. 150 per running metre	Assistance @ 50% subject to a maximum of 1000 running metres per beneficiary. The component should consist of 4 running lines with iron poles having distance of 10 feet between the poles.
7	Fruit/ Bunch cover (Paper /Nonwoven cover/Paper bags etc	Ha	Rs.0.50 lakh / ha	Rs.0.25 lakh / ha	Assistance @ 50% for all farmers for maximum area of 2 ha per beneficiary or on

S No	Component	Unit	Cost Norms		Pattern of Assistance
			Unit Cost	Assistance	
					pro-rata basisfor smaller areas.
8	Weed Mat	Sq mts	Rs.50 per Sq.mt.	Rs.25 per Sq.mt.	Assistance @ 50% for all farmers for maximum area of 4000 Sq.mt. per beneficiary or on pro-rata basis for smaller areas

**** Note: Above Unit cost norms will be 15% higher in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep islands.**

PROTECTED CULTIVATION

POLYHOUSES / SHADENET HOUSES:

Objectives:

- Enhancing productivity per unit area.
- Promotion of high value Horticulture crops under Polyhouses.
- Propagation of planting material to improve germination percentage and better hardening.
- To promote high value vegetable cultivation under Shadenet House.
- Year round production of floricultural crops and off season production of vegetables & fruit crops.
- Disease free and genetically superior transplants can be produced continuously.

Points to be considered while constructing Polyhouse / Shadenet Houses:

Poly house

The crops grown in open field are exposed to vivid environmental conditions, attack of insects and pests, whereas the polyhouse provides a more stable environment. Polyhouse can be divided in to two types

a) *Naturally ventilated Polyhouse*

These polyhouse do not have any environmental control system except for the provision of adequate ventilation and fogger system to prevent basically the damage from weather aberrations and other natural agents.

b) *Environmental controlled Polyhouse*

This type of polyhouse helps to extend the growing season or permits off-season production by way of controlling light, temperature, humidity, carbon-dioxide level and nature of root medium.

Shade house

Shade houses are used for the production of plants in warm climates or during summer months. Nurserymen use these structures for the growth of hydrangeas and azaleas during the summer months. Apart from nursery, flowers and foliages which require shade can also be grown in Shade houses. E.g. Orchids, These shade structures make excellent holding areas for field- grown stock while it is being prepared for shipping to retail outlets. Shade houses are most often constructed as a pole-supported structure and covered with either lath (lathhouses) or polypropylene shade fabric. Polypropylene shadenets with various percentages of ventilations are used. Black, green, and white coloured nets are used, while black colours are the most preferred as it retains heat outside.

a) Orientation of Polyhouse

- For multi-span Polyhouse, the orientation should be North-South
- The surrounding trees should be at a distance of 2.5 times of height of the tree to prevent from shading effect
- Shading from interior side is preferable for floricultural crops
- In winter, 50% shading and in summer, 100% internal shading is preferred to prevent excessive heat inside the Polyhouse.

b) Design of Polyhouse

The structure has to carry the following loads and is to be designed accordingly.

- **Dead load:** weight of all permanent construction, cladding, heating and cooling equipment, water pipes and all fixed service equipment's to the frame.
- **Live load:** weights superimposed by use (include hanging baskets, shelves and persons working on roof). The Polyhouse has to be designed for a maximum of 15 kg per square meter live load. Each member of roof should be capable of supporting 45 kg of concentrated load when applied at its centre.
- **Wind load:** The structure should be able to withstand winds of 110 kilometer per hour and at least 50 kg per square meter of wind pressure.

- Naturally ventilated Polyhouse is preferred for coastal regions
- Fan and pad system is suitable for Rayalaseema region
- 20 to 40% ventilation (side and top) in the Polyhouse with respect to floor area is essential for both the regions
- Quonset shape is preferred for vegetables
- Saw- tooth shape is preferred for flowers
- Insect proof net of 40- 50% perforation is essential for covering the ventilated area
- Height up to the ridge should be 4m
- Ridge to gutter should be 2.5m and total height of Polyhouse should be limited to 6.5m
- Aerodynamic shape and design along the periphery to with stand stalk and wind effects
- Total height up to ridge should be restricted to maximum of 6.5m otherwise, puncturing of film takes place due to wind velocity in coastal regions
- Fan to pad distance should be limited to 40m otherwise cooling uniformity will not be attained ion fan and pad system
- Air flow rate of 75 $m^3/min/m^2$ of the pad distributed with intermittent fans is essential.

c) Structural Design of Polyhouse

The Polyhouses are to be fabricated out of Galvanized Iron Pipes. The foundation can be 60cmx60cmx60cm or 30 cm diameter and one meter depth in PCC of 1:4:8 ratio. The vertical poles should also be covered to the height of 60 cm by PCC with a thickness of 5cm. This avoids the rusting of the poles.

- Tubular structures are preferred. Avoid channel structures as it may twist due to wind pressure
- Column should run up to top of the Polyhouse to ensure maximum structural strength
- Structure should with stand dead load, live load and crop load also.
- Foundation should be of Telescopic method not traditional
- Hot dip galvanizing with min.2mm thickness is desirable.
- Poly-grip mechanism anchored with zig - zag springs and overflow film should be rammed well below the soil
- Roll up sides and side vents should be covered with insect proof nets.

d) Wind effects

If the Polyhouse is naturally ventilated, the advantage of natural wind direction has to be taken to the maximum possible. The maximum dimension (length) of Polyhouse should be perpendicular to the wind direction especially in summer. For fan and pad Polyhouse the natural wind direction should be same as the air blown by fan.

Size of the Polyhouse

The dimension of NAV GH should not be more than 50m x 50m. Bigger the Polyhouse, more will be the temperature build up due to poor ventilation. The length of evaporatively cooled Polyhouse should not be more than 60m.

Spacing between Polyhouses

The spacing between naturally ventilated Polyhouse should be 10 to 15 m so that the exhaust from one Polyhouse should not enter the adjacent Polyhouse.

Height of Polyhouse

The maximum height can be up to 5m for 50m x 50m Polyhouse and this can be reduced as per the reduced size of the Polyhouse. Higher is the Polyhouse more is the wind load for structure and glazing. The side ventilation can be of 2 m width and roof ventilation is 1m in width

Components of Polyhouse

Roof: transparent cover of a Polyhouse.

Gable: transparent wall of a Polyhouse

Cladding material: transparent material mounted on the walls and roof of a green house.

Rigid cladding material: cladding material with such a degree of rigidity that any deformation of the structure may result in damage to it. Ex. Glass

Flexible cladding material: cladding material with such a degree of flexibility that any deformation of the structure will not result in damage to it. Ex. Plastic film

Gutter: collects and drains rain water and snow which is place at an elevated level between two spans.

Column: vertical structure member carrying the Polyhouse structure Purlin: a member who connects cladding supporting bars to the columns Ridge: highest horizontal section in top of the roof

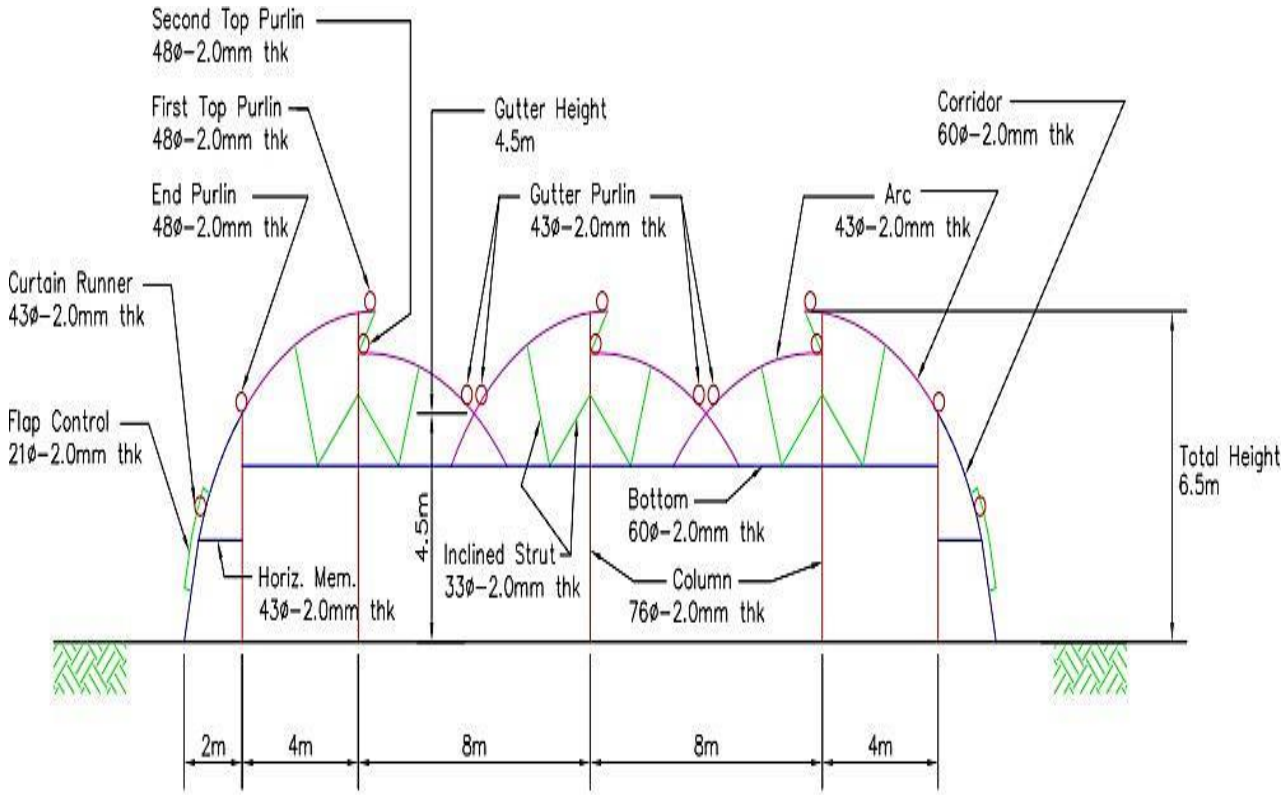
Girder: horizontal structure member, connecting columns on gutter height

Bracings: To support the structure against wind

Arches: Member supporting covering materials

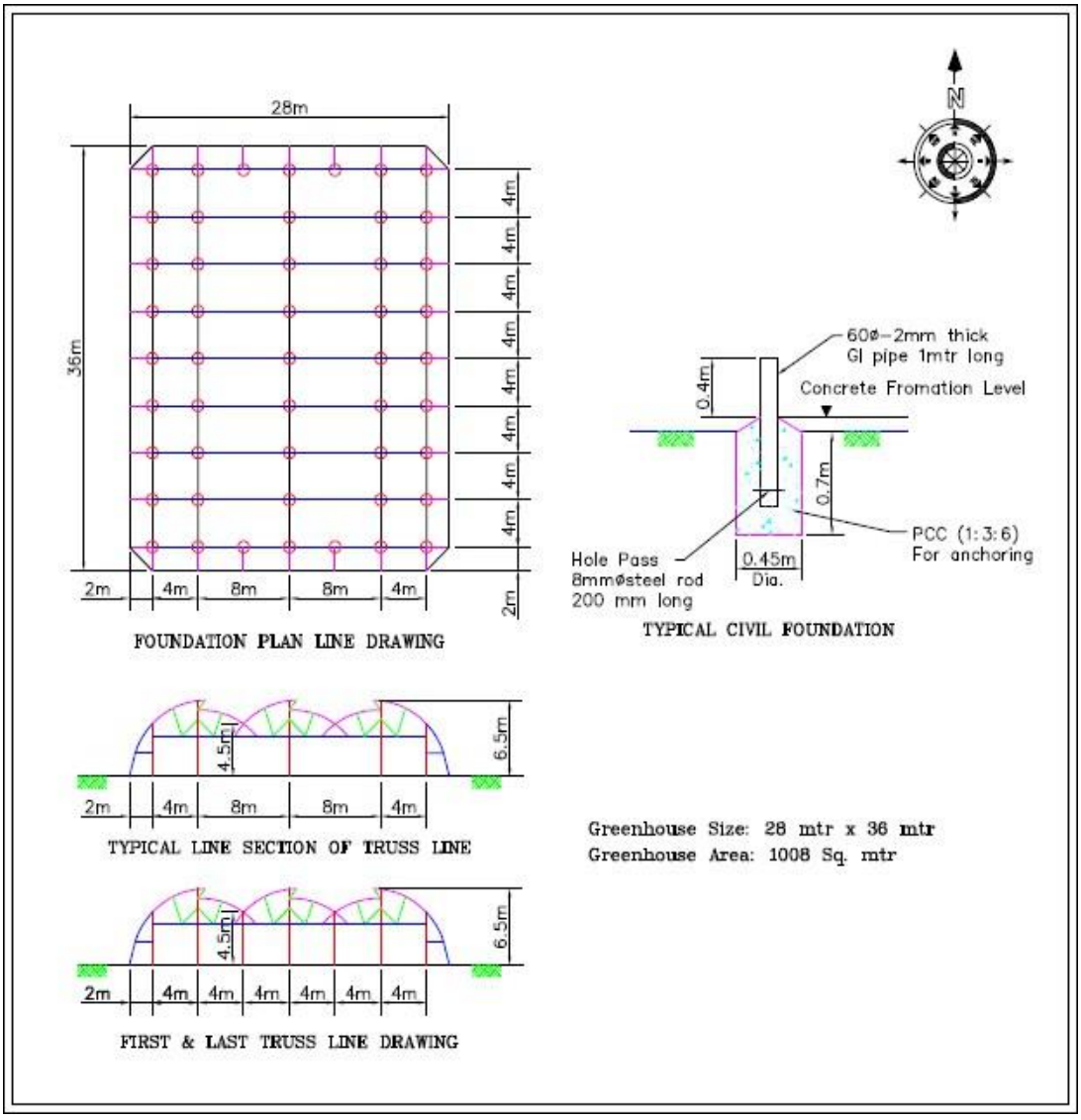
Foundation pipe: Connection between the structure and ground

Span width: Center to center distance of the gutters in multispan houses Polyhouse length: dimension of the Polyhouse in the direction of gable Polyhouse width: dimension of the Polyhouse in the direction of the gutter



TYPICAL LINE SECTION OF TRUSS LINE

TYPICAL OUTLINE DRAWINGS OF 1008 SQ.MTS POLYHOUSE



e) Cladding materials

Cladding materials are the covering materials used on the basic structure with the support of fastening mechanisms (i.e., Aluminium / GI profiles inserted with zig – zag springs).

Polythene proves to be an economical cladding material. Now long lasting, unbreakable and light roofing panels-UV stabilized clear fiber glass and polycarbonate panels are available. Plastics are used in tropical and sub-tropical areas compared to glass/fiberglass owing to their economical feasibility. Plastics create enclosed ecosystems for plant growth. LDPE (low density polyethylene) / LLDPE (linear low density polyethylene) will last for 3-4 years compared to polythene without UV stabilizers.

Comparison of different kinds of covering materials

Sl. No.	Type	Durability	Transmission		Maintenance
			Light	Heat	
1.	Poly ethylene	One year	90%	70%	Very high
2.	Poly ethylene UV resistant	Two years	90%	70%	High
3.	Fiber Glass	Seven years	90%	5%	Low
4.	Tedlar coated Fiber Glass	Fifteen years	90%	5%	Low
5.	Double strength Glass	Fifty years	90%	5%	Low
6.	Poly carbonate	Fifty years	90%	5%	Very low

Media preparation for Polyhouse production

The media used in Polyhouse generally have physical and chemical properties which are distinct from field soils.

- A desirable medium should be a good balance between physical properties like water holding capacity and porosity.
- The medium should be well drained.
- Medium which is too compact creates problems of drainage and aeration which will lead to poor root growth and may harbour disease causing organisms.
- Highly porous medium will have low water and nutrient holding capacity, affects the plant growth and development.
- The media reaction (pH of 5.0 to 7.0 and the soluble salt (EC) level of 0.4 to 1.4 dS/m is optimum for most of the Polyhouse crops).
- A low media pH (<5.0) leads to toxicity of micronutrients such as iron, zinc, manganese and copper and deficiency of major and secondary nutrients while a high pH (>7.5) causes deficiency of micronutrients including boron.

- A low pH of the growth media can be raised to a desired level by using amendments like lime (calcium carbonate) and dolomite (Ca-Mg carbonate) and basic, fertilizers like calcium nitrate, calcium cyanamide, sodium nitrate and potassium nitrate.
- A high pH of the media can be reduced by amendments like sulphur, gypsum and Epsom salts, acidic fertilizers like urea, ammonium sulphate, ammonium nitrate, mono ammonium phosphate and aqua ammonia and acids like phosphoric and sulphuric acids.
- It is essential to maintain a temperature of the plug mix between 70 to 75ºF. Irrigation through mist is a must in plug growing. Misting for 12 seconds every 12 minutes on cloudy days and 12 seconds every 6 minutes on sunny days is desirable.
- The pH of water and mix should be monitored regularly.

Watering system

Micro irrigation system is the best for watering plants in a Polyhouse. Micro sprinklers or drip irrigation equipments can be used. Basically the watering system should ensure that water does not fall on the leaves or flowers as it leads to disease and scorching problems. In micro sprinkler system, water under high pressure is forced through nozzles arranged on a supporting stand at about 1 feet height. This facilitates watering at the base level of the plants.

Fertigation system

In fertigation system an automatic mixing and dispensing unit is installed which consists of three systems pump and a supplying device. The fertilizers are dissolved separately in tanks and are mixed in a given ratio and supplied to the plants through drippers.

Fertilizers

Fertilizer dosage has to be dependent on growing media. Soilless mixes have lower nutrient holding capacity and therefore require more frequent fertilizer application. Essential elements are at their maximum availability in the pH range of 5.5 to 6.5. In general Micro elements are more readily available at lower pH ranges, while macro elements are more readily available at pH 6 and higher.

PRODUCTION PLAN OF HIGH VALUE VEGETABLES & FLOWERS IN POLYHOUSES / SHADENET HOUSES

Plan – 1 : Capsicum (July-March) + Cucumber (April-June)

Plan – 2 : Cucumber (June-Sept) + Marigold (Oct-Dec) + Cucumber (Jan-Mar) + Coriander (April-May)

Plan – 3 : Beans (May-Aug) + Tomato (Sept-Feb) + Cucumber / Summer squash (Mar-May)

Plan – 4 : Capsicum (July – Dec) + Tomato (Jan – April) + Leafy vegetables (May-June)

Plan – 5 : Cucumber (July – October) + Broccoli/Red Cabbage (Oct – Feb) + Leafy Vegetables / Summer squash (Mar-June)

Plan – 6 : Gerbera (July-March) + Leafy Vegetables (April-June)

Plan – 7 : Gerbera (July – Dec) + **Chrysanthemum** (Day neutral varieties)

Plan – 8 : Carnations (For mid climates) (Agency areas of Vizag and East Godavari dist, & Chittoor Dist. (Madanapalli)

Shadenet Cultivation (30% / 50% Shadenet)

Plan – 1 : Capsicum (July-March) +Cucumber(April-June)

Plan – 2 : Nursery (May-Aug) + Tomato (Sept-Feb) + Cucumber (Mar-May) (30% shadenet)

Plan – 3 : Gerbera (July-March) + Leafy Vegetables (April-June)

Suitable Varieties

Capsicum : Indra, Orabelle, Bachata, Color Capsicum

Tomato : Indeterminate (Himsona, NS-247, NS-537, US-2853)

: Semideterminate (US-618, US-1143, Abhinav, Lakshmi, Anup)

: Tanuja and Novara

Cucumber : Malini, Seethal, Tripti, US-6125, Valistar, Multi Star and

Kafka French bean : Super king, Classic –NZ (Pole types)

: Arka Komal, Arka Suvidha, Contender (Bush types)

Red Cabbage : Red jewel

Broccoli : Pusa KTS -1, Fantacy etc.,

DAY TO DAY OPERATIONS IN POLYHOUSES

గ్రీన్‌హౌస్‌లో క్షాప్టికమ్ సాగులో తీసుకొనవలసిన జాగ్రత్తలు

అధిక ఉష్ణోగ్రతను తగ్గించే చర్యలు :

- గ్రీన్‌హౌస్ లోపల ఉష్ణోగ్రత **30°C** కంటే అధికంగా వెళ్ళినట్లైతే గ్రీన్‌హౌస్‌లో నడక కోసం ఉపయోగించే దారుల్లో నీళ్ళు పిచికారి చేయాలి.
- మధ్యాహ్నం సమయంలో 45 నిమిషముల వ్యవధిలో 4 నుండి 5 సార్లు ఫాగర్స్ వేయాలి. దీని వలన **4 to 5°C** ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ వెలుపల పై భాగంలో స్ప్రింక్లర్లు అమర్చడం ద్వారా **3 to 4°C** ఉష్ణోగ్రత తగ్గుతుంది.

సస్యరక్షణ చర్యలు :

- గ్రీన్‌హౌస్ ద్వారం దగ్గర వెలుపల 1 : 10 నిష్పత్తిలో ఫార్మాల్డిహైడ్ కలిపిన నీళ్ళను నిల్వచేసి పాదాలు ఆద్రావ ములో తడిపి లోనికి ప్రవేశించాలి.
- గ్రీన్‌హౌస్ చుట్టూ 2 మీటర్ల వెడల్పులో కంచె పంట (ట్రాప్‌క్రాప్) వేసుకోవాలి. బంతిపూలు పెంపకము చేపట్టడం వల్ల రసం పీల్చే పురుగులు త్రిప్స్, అఫిడ్స్, పచ్చపురుగు వంటి పురుగలను నియంత్రిచవచ్చు.
- బెడ్ తయారీ సమయంలోనే 4000చ.మీ. విస్తీర్ణంలో టి.విరిడి, సుడోమోనాస్,టి.హర్జియానం లాంటి జీవ నిలీంధ్రనాశినిలను పశువుల ఎరువుతో కలిపి వేయాలి. దీని వల్ల బ్యాక్టీరియ ఎండుకుళ్ళు, మచ్చ తెగులు, ఎండుకొమ్మ తెగులను నియంత్రించవచ్చు.
- జిగురు పూసిన పసుపు, నీలం రంగు కార్డులను 4000 చ.మీ.కు 40 చొప్పున వాడాలి.
- 4000 చ.మీ. విస్తీర్ణమునకు లింగాకర్షణ (ఫిరోమోన్ ట్రాప్) 20 బుట్టలు వాడాలి.
- డీ లీఫింగ్ (ఆకులు తొలగించుట) చేసేటప్పుడు చేతులను పాలలో ముంచి ఆకులు తొలగించవలెను. దీని వలన వైరస్ వ్యాప్తిని అరికట్టవచ్చును. తీసివేసిన ఆకులను, కొమ్మలను వెంటనే బయట తీసివేయాలి.

గ్రీన్‌హౌస్‌లో జర్బరా సాగులో తీసుకొనవలసిన జాగ్రత్తలు

అధిక ఉష్ణోగ్రతను తగ్గించే చర్యలు :

- గ్రీన్‌హౌస్ లోపల ఉష్ణోగ్రత 30°C కంటే అధికంగా వెళ్ళినప్పుడే గ్రీన్‌హౌస్‌లో నడక కోసం ఉపయోగించే దారుల్లో నీళ్ళు పిచికారి చేయాలి.
- మధ్యాహ్నం సమయంలో 45 నిమిషముల వ్యవధిలో 4 నుండి 5 సార్లు ఫాగర్స్ వేయాలి. దీని వలన 4 to 5°C ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ వెలుపల పై భాగంలో స్ప్రింక్లర్లు అమర్చడం ద్వారా 3 to 4°C ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ ద్వారం దగ్గర వెలుపల 1 : 10 నిష్పత్తిలో ఫార్మాల్డిహైడ్ కలిపిన నీళ్ళను నిల్వచేసి పాదాలు ఆద్రావ ములో తడిపి లోనికి ప్రవేశించాలి.

సస్యరక్షణ చర్యలు :

- గ్రీన్‌హౌస్ చుట్టూ 2 మీటర్ల వెడల్పులో కంచె పంట (ట్రాప్‌క్రాప్) వేసుకోవాలి. బంతిపూలు పెంపకము చేపట్టడం వల్ల రసం పీల్చే పురుగులు త్రిప్స్, అఫిడ్స్, పచ్చపురుగు వంటి పురుగలను నియంత్రించవచ్చు.
- బెడ్ తయారీ సమయంలోనే 4000 చ.మీ. విస్తీర్ణంలో టి.విరిడి, సుడోమోనాస్, టి.హార్జియానం లాంటి జీవ నిలీం ధ్రనాశినిలను పశువుల ఎరువుతో కలిపి వేయాలి.
- జిగురు పూసిన పసుపు, నీలం రంగు కార్డులను 4000 చ.మీ.కు 40 చొప్పున వాడాలి.
- 4000 చ.మీ. విస్తీర్ణమునకు లింగాకర్షణ (ఫిరోమోన్ ట్రాప్) 20 బుట్టలు వాడాలి.

జెర్బరా సాగులో సస్యరక్షణ చర్యలు			
వ.నెం.	సమస్య	నివారణ మందులు	మోతాదు
1	తెల్లదోమ	వేపనూనె(10000PPM)	3 మి.లీ. /1 లీటరు నీటికి
		పెగసస్(డయాఫెన్‌ధయురాన్	1 గ్రా /1 లీటరు నీటికి
		ప్రైడ్(అసిటమాప్రిడ్	0.4 గ్రా /1 లీటరు నీటికి
2	లీఫ్ మైనర్	నువాన్ (డైక్లోరోపాస్)	1 మి.లీ. /1 లీటరు నీటికి
		వర్టిమెక్(అబామెక్టిన్)	1 మి.లీ. /1 లీటరు నీటికి
		ప్రైడ్(అసిటమాప్రిడ్)	0.4 గ్రా /1 లీటరు నీటికి
		వేపనూనె (10000PPM)	3 మి.లీ. /1 లీటరు నీటికి

3	త్రిప్స్	రీజెంట్ (ఫిప్రానిల్)	2 మి.లీ. /1 లీటరు నీటికి
		అక్టర (థయోమిథాక్సామ్)	0.5 గ్రా / 1 లీటరు నీటికి
		కాన్ఫిడార్ (ఇమిడాక్లోప్రిడ్)	0.5 గ్రా / 1 లీటరు నీటికి
4	రెడ్‌మైట్ (ఎర్రనల్లి)	నీళ్ళు స్ప్రే	
		వెట్టబుల్ సల్ఫర్ (నీటిలో కరిగే గంధకం)	1.5 గ్రా /1 లీటరు నీటికి
		వర్టిమెక్(అబామెక్టిన్)	1 మి.లీ. /1 లీటరు నీటికి
		మెజిస్టర్ (ఫెనజాక్విన్)	1 మి.లీ. /1 లీటరు నీటికి
3	మొగ్గ / ఆకుతినే గొంగళి పురుగు	వేపనూనె(10000PPM)	3 మి.లీ. /1 లీటరు నీటికి
		అవాంట్ (ఇండాక్సికార్బ్)	1 మి.లీ. /1 లీటరు నీటికి
		లార్విన్ (థయోడికార్బ్)	1 గ్రా / 1 లీటరు నీటికి
4	నిమటోడ్స్	వేపచెక్క	30 నుండి 50 గ్రా / 1 మొక్కకు
		కార్బోప్యూరాన్ గుళికలు	10 గ్రా /1 చ.మీ
5	మీలీబగ్	నువాన్ (డైక్లోరోఫాస్) + నువాక్రాన్ (మోనోక్రోటోఫాస్)	1.5 మి.లీ. +2 మి.లీ. /1 లీటరు నీటికి
6	వేరుకుళ్ళు	అలియట్ (ఫాసిటైల్ అల్యూమినియమ్)	1 గ్రా /1 లీటరు నీటికి
		కప్టాఫ్ (కప్టాన్)	2 గ్రా /1 లీటరు నీటికి
7	మొవ్వ కుళ్ళు	కొసైడ్ (కాపర్ హైడ్రాక్సైడ్)	2 గ్రా /1 లీటరు నీటికి
		అలియట్ (ఫాసిటైల్ అల్యూమినియమ్)	1 గ్రా /1 లీటరు నీటికి
8	ఆల్టర్నేరియా ఆకుమచ్చ	బావిస్టిన్ (కార్బండజిమ్) + మ్యాంకోజెబ్ (ఎమ్-45)	1 గ్రా + 2.5 గ్రా / 1 లీటరు నీటికి
9	బూడిద తెగులు	వెట్టబుల్ సల్ఫర్	1.5 గ్రా / 1 లీటరు నీటికి
		కరధేన్ (డైనోకాప్)	0.4 మి.లీ. / 1 లీటరు నీటికి
		ఇంథెక్స్ (మైక్లోబుటానిల్)	0.5 గ్రా / 1 లీటరు నీటికి

10	బోట్రైటిస్ (నల్లమచ్చ)	ఇంథెక్స్ (మైక్లోబుటానిల్)	0.5 గ్రా / 1 లీటరు నీటికి
		బావిస్టిన్ (కార్బండజిమ్) + మ్యాంకోజెబ్ (ఎమ్-45)	1 గ్రా + 2.5 గ్రా / 1 లీటరు నీటికి
11	బ్యాక్టీరియల్ బ్లైట్ (గోధుమ రంగు మచ్చలు పువ్వు రెక్కలపైన కొమ్మలపైన)	స్ట్రెప్టోసైక్లిన్ + కోసైడ్ (కాపర్ హైడ్రాక్సైడ్)	0.2 గ్రా + 2 గ్రా / 1 లీటరు నీటికి

వాడకూడని మందులు

హోస్థాథియాన్ (ట్రయజోఫాస్), టిల్ట్ (ప్రొపికొనజోల్), రిడోమిల్ (మెటలక్సిల్+ఎమ్-45), కంటాఫ్ (హక్సాకొనజోల్), స్పార్క్ (డెల్టామెత్రిన్+ట్రయజోఫాస్) టోపాస్ (పెన్‌కొనజోల్) క్యురాక్రాన్ (ప్రొఫెనోఫాస్)

గ్రీన్‌హౌస్‌లో కార్నేషన్ సాగులో తీసుకొనవలసిన జాగ్రత్తలు

అధిక ఉష్ణోగ్రతను తగ్గించే చర్యలు :

- గ్రీన్‌హౌస్ లోపల ఉష్ణోగ్రత 30°C కంటే అధికంగా వెళ్ళినట్లైతే గ్రీన్‌హౌస్‌లో నడక కోసం ఉపయోగించే దారుల్లో నీళ్ళు పిచికారి చేయాలి.
- మధ్యాహ్నం సమయంలో 45 నిమిషముల వ్యవధిలో 4 నుండి 5 సార్లు ఫాగర్స్ వేయాలి. దీని వలన 4 to 5°C ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ వెలుపల పై భాగంలో స్ప్రింక్లర్లు అమర్చడం ద్వారా 3 to 4°C ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ ద్వారం దగ్గర వెలుపల 1 : 10 నిష్పత్తిలో ఫార్మాల్డిహైడ్ కలిపిన నీళ్ళను నిల్వచేసి పాదాలు ఆద్రాపములో తడిపి లోనికి ప్రవేశించాలి.

సస్యరక్షణ చర్యలు :

- గ్రీన్‌హౌస్ చుట్టూ 2 మీటర్ల వెడల్పులో కంచె పంట (ట్రాప్‌క్రాప్) వేసుకోవాలి. బంతిపూలు పెంపకము చేపట్టడం వల్ల రసం పీల్చే పురుగలు త్రిప్స్, అఫిడ్స్, పచ్చపురుగు వంటి పురుగలను నియంత్రించవచ్చు.
- బెడ్ తయారీ సమయంలోనే 4000 చ.మీ. విస్తీర్ణంలో టి.విరిడి, సుడోమోనాస్, టి.హార్జియానం లాంటి జీవ నిలీంధ్రనాశినిలను పశువుల ఎరువుతో కలిపి వేయాలి.
- జిగురు పూసిన పసుపు, నీలం రంగు కార్డులను 4000 చ.మీ.కు 40 చొప్పున వాడాలి.
- 4000 చ.మీ. విస్తీర్ణమునకు లింగాకర్షణ (ఫిరోమోన్ ట్రాప్) 20 బుట్టలు వాడాలి.

కార్నేషన్ పాగులో సస్యరక్షణ చర్యలు

వ.నెం.	సమస్య	నివారణ మందులు	మోతాదు
1	త్రిప్స్	రీజెంట్ (ఫిప్రోనిల్)	2 మి.లీ. /1 లీటరు నీటికి
		ప్రైడ్ (అసిటమాప్రిడ్)	0.4 గ్రా / 1 లీటరు నీటికి
		అక్టరా (థయోమిథాక్సామ్)	0.5 గ్రా / 1 లీటరు నీటికి
2	రెడ్‌మైట్ (ఎర్రనల్లి)	నీళ్ళు స్ప్రే	1 మి.లీ /1 లీటరు నీటికి
		ఊమైట్ (ప్రొపెగైట్)	1.5 గ్రా /1 లీటరు నీటికి
		వెట్టబుల్ సల్ఫర్	

3	మొగ్గ తొలుచు పురుగు	ప్రాక్లైమ్ (అమామెక్టిన్ బెంజోయేట్)	0.2 గ్రా / 1 లీటరు నీటికి
		డెసిస్ (డెల్టామిత్రిన్)	0.5 మి.లీ /1 లీటరు నీటికి
		అవాంట్ (ఇండాక్సికార్బ్)	0.5 మి.లీ /1 లీటరు నీటికి
4	వేరుకుళ్ళు	బెనోమిల్ (బెన్‌లేట్)	2 గ్రా / 1 లీటరు నీటికి
		రిడోమిల్ (మెటలక్సిల్ + M45)	2 గ్రా / 1 లీటరు నీటికి
5	మొవ్వకుళ్ళు	బెనోమిల్ (బెన్‌లేట్)	2 గ్రా / 1 లీటరు నీటికి
6	ఆకుమచ్చ తెగులు మరియు పువ్వు రెక్కలపై మచ్చలు	కంటాఫ్ (హెక్సాకొనజోల్)	2 మి.లీ. /1 లీటరు నీటికి
		టిల్ట్ (ప్రొపికొనజోల్)	1 మి.లీ. /1 లీటరు నీటికి

వాడకూడని మందులు

లానెట్ (మిథోమిల్) వర్టిమెక్ (అబామెక్టిన్), కార్బోప్యూరాన్ రోకో (ధయాప్పనేట్ మిథైల్), పారాధియాన్, పెన్‌టాక్ (డయనోక్లోర్)

గ్రీన్‌హౌస్‌లో గులాబీ సాగులో తీసుకొనవలసిన జాగ్రత్తలు

అధిక ఉష్ణోగ్రతను తగ్గించే చర్యలు :

- గ్రీన్‌హౌస్ లోపల ఉష్ణోగ్రత **30°C** కంటే అధికంగా వెళ్ళినట్లైతే గ్రీన్‌హౌస్‌లో సడక కోసం ఉపయోగించే దారుల్లో నీళ్ళు పిచికారి చేయాలి.
- మధ్యాహ్నం సమయంలో **45** నిమిషముల వ్యవధిలో **4** నుండి **5** సార్లు ఫాగర్స్ వేయాలి. దీని వలన **4 to 5°C** ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ వెలుపల పై భాగంలో స్ప్రింక్లర్లు అమర్చడం ద్వారా **3 to 4°C** ఉష్ణోగ్రత తగ్గుతుంది.
- గ్రీన్‌హౌస్ ద్వారం దగ్గర వెలుపల **1 : 10** నిష్పత్తిలో ఫార్మాల్డిహైడ్ కలిపిన నీళ్ళను నిల్వచేసి పాదాలు ఆద్రావ ములో తడిపి లోనికి ప్రవేశించాలి.

సస్యరక్షణ చర్యలు :

- గ్రీన్‌హౌస్ చుట్టూ 2 మీటర్ల వెడల్పులో కంచె పంట (ట్రాప్‌క్రాప్) వేసుకోవాలి. బంతిపూలు పెంపకము చేపట్టడం వల్ల రసం పీల్చే పురుగులు త్రిప్స్, అఫిడ్స్, పచ్చపురుగు వంటి పురుగలను నియంత్రించవచ్చు.
- బెడ్ తయారీ సమయంలోనే **4000** చ.మీ. విస్తీర్ణంలో టి.విరిడి, సుడోమోనాస్, టి.హార్జియానం లాంటి జీవ నిలీం ధ్రనాశినిలను పశువుల ఎరువుతో కలిపి వేయాలి.
- జిగురు పూసిన పసుపు, నీలం రంగు కార్డులను **4000** చ.మీ.కు **40** చొప్పున వాడాలి.
- **4000** చ.మీ. విస్తీర్ణముసకు లింగాకర్షణ (ఫిరోమోన్ ట్రాప్) **20** బుట్టలు వాడాలి.

గులాబి సాగులో సస్యరక్షణ చర్యలు			
వ.నెం.	సమస్య	నివారణ మందులు	మోతాదు
1	త్రిప్స్	రీజెంట్ (ఫిప్రానిల్)	2 మి.లీ. /1 లీటరు నీటికి
		ప్రైడ్ (అసిటమాప్రిడ్)	0.4 గ్రా / 1 లీటరు నీటికి
		అక్టరా (థయోమిథాక్సామ్)	0.5 గ్రా / 1 లీటరు నీటికి
		లామ్డా సైలోత్రిన్+ వేపనూనె 10000 ppm	0.5 మి.లీ + 3 మి.లీ./ 1 లీటరు నీటికి
2	రెడ్‌మైట్ (ఎర్రనల్లి)	నీళ్ళు స్ప్రే	1 మి.లీ /1 లీటరు నీటికి
		ఊమైట్ (ప్రొపెగైట్)	1.5 గ్రా /1 లీటరు నీటికి
		వెట్టబుల్ సల్ఫర్	1.5 గ్రా /1 లీటరు నీటికి
3	మొగ్గ తొలుచు పురుగు	ప్రాక్లైమ్ (అమామెక్టిన్ బెంజోయేట్)	0.2 గ్రా / 1 లీటరు నీటికి
		డెసిస్ (డెల్టామిత్రిన్)	0.5 మి.లీ /1 లీటరు నీటికి
		అవాంట్ (ఇండాక్సికార్బ్)	0.5 మి.లీ /1 లీటరు నీటికి
4	బూడిద తెగులు	స్కోర్ (డయాపెన్ కనజోల్)	1 మి.లీ /1 లీటరు నీటికి
		వెట్టబుల్ సల్ఫర్	1.5 గ్రా /1 లీటరు నీటికి
		ఇంథెక్స్ (మైక్లోబుటానిల్)	0.5 గ్రా / 1 లీటరు నీటికి
5	బూజు తెగుళ్ళు	రిడోమిల్ (మెటలక్సిల్ + M45)	2 గ్రా / 1 లీటరు నీటికి
		అమిస్టర్ (అజాక్సిస్ట్రోబిన్)	1 మి.లీ. /1 లీటరు నీటికి

General problems of fertigation

Nitrogen tends to accumulate at the peripheries of wetted soil volume. Hence, only roots at the periphery of the wetted zone alone will have enough access to Nitrogen. Nitrogen is lost by leaching and de-nitrification. Since downward movement results in permanent loss of NO3 — N, increased discharge rate results in lateral movement of N and reduces loss by leaching.

Phosphorous

It accumulates near emitter and P fixing capacity decides its efficiency. Low pH near the emitter results in high fixation.

Potassium

It moves both laterally and downward and does not accumulate near emitter. Its distribution is more uniform than N&P.

Micronutrients

Excepting boron, all micronutrients accumulates near the emitter if supplied by fertigation. Boron is lost by leaching in a sandy soil low in organic matter. But chelated micronutrients of Fe, Zn can move away from the emitter but not far away from the rooting zone.

Problem management in Polyhouse cultivation

The troubles which arise in the culture of crops in the Polyhouse may be divided into several groups a) failure to supply the essential factors for optimum growth such as light, moisture, carbon dioxide and heat in amounts necessary for each individual crop b) fertilizer deficiencies c) fertilizer excesses d) toxic gases e) attacks by insects, animals, and allied pests and f) susceptibility to fungus, bacteria and virus troubles.

Fertilizer deficiencies

Symptoms of deficiencies of various fertilizers have been studied over a period of years with plants in Polyhouses.

Chlorosis

This is a term used to denote the loss of normal green colour from the foliage whether it is on the older, more mature leaves or the younger foliage. The entire leaf may be affected, or just areas between the veins, in which case the yellowing is most usually

in irregular patches shading into the green colour. Sometimes only the margin of the leaf or leaflets may be yellow, while the centre of the foliage is almost a normal green.

Necrosis

This refers to the death of the area severely affected by chlorosis. Necrotic spots or areas can also be caused by spray or aerosol damage, sunscald and other such factors which may have no relation of fertilizer.

Nitrogen deficiency

Generally the entire plant becomes lighter green, but the effect will be most noticeable on the older foliage. Gradually the oldest leaves loose their green colour, and most plants become yellow. The flowers are smaller and may lack well-developed colour.

Phosphorus deficiency

A purplish coloration developing first on the underside of the petiole, or leaf stem, which spreads to the main veins of the leaf is characteristic of this deficiency.

Potassium deficiency

The margins of the leaves of the older foliage become yellow, and the chlorosis progresses toward the mid-portion of the foliage as this deficiency increases in severity. The older leaves may drop in extreme cases of deficiency. Certain fumigants may cause marginal burning or chlorosis, and sometimes droplets of spray or fumigant may result in spots or blotches of chlorotic or necrotic nature.

Calcium deficiency

In sand culture, a typical symptom is the development of short clubby roots followed in a matter of several weeks by their death. In many cases insufficient calcium is associated with a low pH of the soil.

Iron deficiency

This is a rather common trouble although an actual lack of iron may not be the primary cause. As iron deficiency becomes more intense, necrotic areas appear on scattered portions of the yellow coloured leaves and the affected foliage may drop. Iron can become deficient in soil, but often the symptoms of this deficiency are induced by other causes from injury to the roots by over-watering or over fertilization. Nematodes, or other soil pests interfering with root growth can also induce iron chlorosis symptoms.

Boron deficiency

The number of cases where this is a limiting factor are few, and most of them are with certain rose and carnation varieties. The new foliage is thick or leathery and quickly becomes chlorotic. The rose flowers are usually very malformed. The stem tip dies, giving rise to growth of shoots immediately below, which in turn die at the tip, and a „witches broom" effect is observed. Because deficiency symptoms can sometimes be confused with the effects of some other environmental factor of cultural practice, a thorough review of fertilizer application, soil testing, soil type, watering practices, and other procedures is warranted before hasty conclusions are reached.

Fertilizer excesses

An unfortunate belief among many growers is that when a plant does not grow under apparently favorable conditions, the trouble can be overcome by applications of fertilizer. This practice has resulted in untold damage or loss of crops, as more often than not the original trouble could have been too much fertilizer in the soil. If additional fertilizer is applied when no more is needed, the results can be very injurious. Sometimes the difference between a high but safe nutrient level and an injurious nutrient level is not very great and the margin of safety may be extremely small. Therefore, it behaves the grower to test the soil in case of doubt to determine the advisability of fertilizer application.

Nitrogen excess

The plants exhibit heavy, rank growth, with large, dark green leaves that are often crisp and break easily. Additional nitrogen may inhibit root action, causing typical symptoms of iron chlorosis. If the root system is killed, the plants wilt excessively and never recover. This yellowing of the top foliage is very common in chrysanthemums and snapdragons. Over 75 ppm of nitrates is not safe.

Phosphorus excess

Over doses of phosphorus precipitate the iron from the soil solution and make it insoluble and unavailable, causing iron chlorosis to develop. Over 25 ppm may cause trouble.

Potassium excess

Up to a certain point, excessive potash apparently is not injurious. Greater amounts inhibit root action and may cause chlorosis, wilting, or immediate death of the plant. Over 60ppm is dangerous.

Calcium excess

Usually the pH of the soil will rise when there is excessive calcium. This causes iron chlorosis in many plants and has been called over liming injury. Over 300 ppm is high.

Iron excess

In the normal pH range of soil, there is little danger of excessive iron since phosphorus or calcium will precipitate it from the soil solution. At ph 5.0 or lower, iron becomes very soluble, and on hydrangeas brown dots appear on the leaves, indicating iron is being precipitated as water vapor is lost by transpiration.

Sulfate excess

A low pH may often be characteristic of soils high in sulfates. Sometimes high sulfates are encountered at pH 6.5. Over 600 ppm is toxic to most plants.

Boron excess

This trace elements is often found in soil to which unleached cinders have been added or where boric acid has been applied indiscriminately. Certain water supplies may have rather high amounts of boron. On roses, the serrations on the margin of the leaflets of the lower leaves turn black and the remaining leaves turn yellow and drop.

Aluminum excess

This is not troublesome except on hydrangeas that are being blued. Roots are burnt, and the plants wilt.

Soluble salts excess

Too much fertilizers in the soil injures or kills roots, and plant growth is severely reduced.

Remedial measures for excess fertilizer

When fertilizer levels rise to the point where they become toxic, immediate steps must be taken to remove the excessive materials. Excessive nitrogen leaching with heavy waterings and application of of straw mulch Excessive phosphorus can not be leached. Only by addition of lime or iron sulfate Excessive potassium leaching may wash some quantity, but in clay soils removal may be almost impossible. Excessive calcium Acidifying the soil excessive iron Raising the pH or by addition of phosphorus excessive sulfates Leaching and avoiding the use of sulfate forms of fertilizers excessive boron Water glass, or sodium silicate can be dissolved in water at the rate of 100 cubic

centimeters per gallon and applied to the soil. Excessive aluminum raising the pH or by adding phosphorus excessive soluble salts leaching.

Injury by toxic gases

Natural gas

This gas usually contains 95 per cent methane and 4 to 5 per cent ethane and frequently causes injury to Polyhouse plants. The common source of injury is from corroded or leaky gas pipes inside or outside the Polyhouse. This injuries usually occur during winter when the ventilators kept closed. Very small concentrations of gas are sufficient to cause damage to plants, its detection is difficult by sense of smell. One part to 350 will cause a headache after 2 hours, whereas 1 part of natural gas in 10,000 to 100,000 of air will injure many plants. The best method of detection is through the use of tomato plants. In the presence of gas the leaves of tomato turn downward, because of epinastic response, which causes petioles of leaves to grow more rapidly on the upper side. Carnations exposed to low concentrations will develop long stigmas, but this may also occur in bright weather in unshaded Polyhouses. In case of prolonged exposure of young buds even 1 part to 100,000 may kill the buds and flowers fail to develop. Rose foliage on the upper shoots exhibits epinasty, or a bending downward of the petiole. Severe leaf drop may follow and the flower colour often fades. Bulbous plants usually develop twisted foliage and the flowers do not open properly.

Ethylene gas

This gas apparently is a by-product of metabolic processes and is given off in very small quantities by plants or their parts. Dropping of flowers after pollination is thought to be associated with ethylene vapors. The carnation flowers close or may appear "sleepy", that is, the ends of the petals curl inward due to ethylene gas.

Sulphur dioxide

In very low concentrations this gas is toxic to plants. Sulphur dioxide enters the leaf through open stomata and kills the cells nearby, thus showing patches of dead tissues scattered over the leaf and frequently affecting the margins. Middle-aged leaves are more susceptible than young leaves.

Damage from sulphur dioxide is commonly found in localities where coal is burnt in large quantities. Foggy days are particularly dangerous. The common practice of using

sulphur on heating pipes in rose houses to control mildew is responsible for leaf drop on some varieties.

Mercury damage

Many plants are quickly damaged by vapors from metallic mercury. This damage is manifested in roses by peduncles of young buds turning yellow and later black. The color of flowers turns dark and leaves are scorched. Breaking of mercury thermometers or the use of bi chloride of mercury on beds as a disinfectant is the usual way in which mercury may be released. Control measures consist of removing all possible traces of mercury and covering the areas where mercury was spilled or applied with a 2-inch thickness of iron filings. Paint containing mercury as a fungicide should not be applied to rose houses.

2,4-D

The fumes of 2,4- dichlorophenoxy acetic acid and related compounds used as weed killers cause bending, curling, and other malformations of leaves, stems, flowers or bracts. Fumes or „drift‟ from a spray applied along the side of a Polyhouse may enter through the doors or side vents cause trouble. Therefore, it is well to prevent trouble by keeping such sources of potential damage out of the Polyhouse, boiler room, potting shed, or any place where the fumes could conceivably enter a Polyhouse.

Phenol compounds

Many materials containing phenol or its derivatives are toxic to plants. Tar, carbolic acid, pentachlorophenol and many others of similar nature should never be used under glass. Treatment of wooden bench members with wood preservatives containing phenol compounds results in severe damage to the plants.

PATTERN OF ASSISTANCE

1. PROPOSED MODELS ALONG WITH UNIT COST FOR DIFFERENT SIZES / MODELS OF POLYHOUSES & SHADENET HOUSES IN A.P.

Sl. No.	Component	Upto 500 Sq.m	> 500 to 1008 Sq.m	> 1008 to 2500 Sq.m	Financial Assistance
		Unit cost (Rs.)	Unit cost (Rs.)	Unit cost (Rs.)	
1.	**Polyhouse / Hybrid / Retractable structures**				50% of cost limited to 2500 Sq.m per beneficiary or on pro-rata basis for smaller areas.
a.	Fan & Pad System	1800	1600	1500	
b.	Naturally Ventilated system				
i.	Tubular / Rectangular structure	1200	1050	1000	
ii.	Bamboo / Cable purlin structure	450	450	450	
2.	**Shade net / Agro textile net house**				
a.	Tubular / Rectangular structure	710	710	710	
b.	Bamboo / Cable purlin structure	450	450	450	

NOTE: New Designs with new specifications will be encouraged as per the request made by the farmer in writing and after getting approval from the Director of Horticulture, A.P., Guntur, the construction must be taken up, otherwise, assistance will not be considered for such units.

2. PLANT MATERIAL

S. No.	Component	Unit Cost (Rs.)	Pattern of Assistance
1	Cost of planting material and cultivation of high value fruits and vegetables grown in poly-house / net house	Rs.150/- per Sqm	50% of cost limited to 2500 Sq.m per beneficiary or on pro-rata basis for smaller areas.
2	Cost of planting material and cultivation of orchid (net house) and Anthurium (poly house) grown in protected conditions.	Rs. 700/- per Sqm	
3	Cost of planting material & cultivation of Carnation & Gerbera in polyhouses.	Rs. 600/- per Sqm	
4	Cost of planting material & cultivation of Rose, Chrysanthemum and lilum under poly houses.	Rs. 450/- per Sqm	

Note:

1. **All the units under Polyhouse / Shadenet House should be constructed by the farmer as per the specifications.**
2. **Horticulture Engineers / MI Engineers should be involved in designing, footing, fabrication and installation of entire Polyhouse / Shadenet houses units and Horticulture Engineers / MI Engineers are held responsible for any deviation or any lacuna in the units. Necessary information and directions should be given to the Horticulture / MI Engineers after according**

administrative sanction for a unit.

3. **Other than G.I Pipes i.e., MS Pipes etc are not allowed in any part of the Polyhouse / Shadenet houses.**
4. **The expenditure over and above the unit costs shall be borne by the farmer and the unit must be constructed with all components specified in the check list, otherwise the units should not be considered for release of subsidy.**
5. **In case the units which are constructed with higher costs/higher specifications, the subsidy will be limited to the unit costs are approved by the Department of Horticulture.**

Terms & Conditions:-

- **Title of the land and copy of record of right :**

  The title of the piece of land on which the project is proposed to be set up should be in the name of applicant in the capacity of owner or in case of leased land, the **Lessee has to produce affidavit for minimum period of 10 years duly registered for availing subsidy.**

- The selected beneficiary who have already availed maximum limit of subsidy is not eligible.
- pH of the irrigation water should be in the range of 5.5 to 7.0 and EC between 0.1 to 0.3 ms/cm.
- pH of the soil used as propagating material / media should be in the range of 5.5 to 6.5 and EC between 0.5 to 0.7 ms/cm respectively.
- The selected beneficiaries should be given training programme and exposure visit on concept of protected cultivation, package of practices of high-tech floriculture and high value vegetables.
- The estimated project details designed by the technical consultant as per technical standards of MIDH should be attached to the application.
- **Soil and water analysis reports from reputed labs are also to be enclosed to the proposal.**
- Protected Cultivation of vegetables should be promoted under MIDH in clusters around major cities/metros. These clusters may be provided with other infrastructural facilities like pre-cooling units, cold storages, refer vans, vending carts etc. and marketing arrangements may be tied up by linking with cooperatives / private retail chain.
- Farmer is responsible for the erection of the Polyhouse / Shadenet House / insect net house.
- A display board depicting “Department of Horticulture” (Assisted Polyhouse with logo of MIDH).

- Subsidy will be released through online transfer to the beneficiary after joint inspection by the committee members.
- Assistance should not be availed from any Government department. An affidavit duly notarized Rs. 100 stamp paper (format enclosed) to be collected from the farmer along with the proposal.
- Polyhouse flowers, vegetables, medicinal and aromatic plants, spices etc. should be considered for cultivation.
- The proposals for construction of Polyhouse / Shadenet house may also be implemented in project mode with credit link back ended subsidy.
- Shade nets of 35 to 75 % shade should be used.
- Documentation with photographs to be done at various stages of erection of Polyhouse / Shadenet House and submit to State MIDH cell along with joint inspection report duly indicating the Name of the beneficiary, Extent, Village and Mandal.
- The photograph should clearly depict the board, unit, farmer and also committee members of joint inspection team.

After the selection of the beneficiaries:-

- Administrative sanction proceedings will be issued by the District Administration (DMC).
- After undergoing training the farmer should take up the installation of Polyhouse as per the technical specifications of MIDH.
- The Firm has to complete the construction of Polyhouse / Shadenet House within 60 days from date of issue of administrative sanction proceedings.

Assistance Limit :- The assistance will be released to the beneficiary only through online transfer in Two Installments.

The 1st Installment (50%) will be released after receipt of inspection report from the DHO stating that the structure of the unit is completed without cladding material (i.e., sheet laying) & MI component.

The 2nd installment (50%) will be released after receipt of Joint Inspection Report from the DHO along with check list in the prescribed format and concerned photos.

Constitution of Joint Inspection Committee for Polyhouse / Shadenet house &
Planting Material under Protected Cultivation

DHO shall organize Joint inspection of the Polyhouse / Shadenet House duly constituting a committee with the following members :

1. PD, MIP / DMIO
2. District Horticulture Officer (concerned)
3. Horticulture Officer
4. Horticulture Engineer / MI Engineer
5. Banker (in case of bankable project)
6. RSK Functionary

The joint inspection report should be in format with all necessary certifications. If any of the committee members has not attended the inspection, DHO shall give reasons for not attending the joint inspection.

After the completion of the erection of the Polyhouse:

- The beneficiary should submit the work completion certificate to the DHO.
- The beneficiary has to submit all the original bills for the expenditure incurred to the DHO for further processing.
- DHO to co-ordinate with the members of the joint inspection committee and should arrange inspection of the completed Polyhouse.
- Later the committee shall inspect the unit and submit joint inspection report in the (format enclosed).
- Photograph of the unit along with farmer and committee members has to be enclosed to the joint inspection report.
- Basing on the joint inspection reports the DHO concerned should submit proposals / claims to Head Office for release of assistance.
- The assistance has to be released to the beneficiaries directly through online transfer only.

WORK FLOW & CHECK LIST FOR DOCUMENTS TO BE SUBMITTED TO *POLYHOUSE / SHADENET HOUSE / PLANT MATERIAL*

Sl.No.	Description	Documents to be submitted by / Action to be taken
1	Application Form –Format-I	Farmer
2	Soil & Water Analysis Water Report	
3	Affidavit – Format – II	
4	Pattadar Pass Book Copy	
5	Project Estimate	
6	Organization of training programme / Field Visit	HO / DHO
7	District Mission Committee Approval	DHO
8	Issue of Administrative Sanction- Format – III	District Collector
9	Erection of Polyhouse	Farmer
10	1st Joint Inspection after foundation	DHO&HO
11	Completion & Under Taking – Format – IV	Farmer & Fabricator
12	Submission of bills & invoices	Farmer / HO
13	Constitution of Joint Inspection Committee	DHO
14	Final Joint Inspection Report - Format - V	Committee Members
15	Submission of proposals / claims to the Director of Horticulture basing on the Joint inspection report along with photo graphs	DHO
16	Release of subsidy to the beneficiary through online transfer with the approval of DMC.	DoH

FORMAT – I

Department of Horticulture – Government of Andhra Pradesh
(MIDH Scheme)

Proposals submitted to District Collector for sanction of Poly House

/ Shadenet House / Plant Material under MIDH

Recent Passport Size Photograph of Farmer

1	Name of the Farmer	:	
2	Father / Husband‟s Name	:	
3	Village	:	
4	Mandal	:	
5	Category (SF/MF/OF)	:	
6	Category (SC/ST/BC/OC)	:	
7	Age	:	
8	Educational Qualifications	:	
9	Permanent Address	:	
10	Contact Phone Number	:	
11	Location land – Village – Mandal – District		
12	Total land (acres) ------	:	
13	Title deed registered sale deed with EC from Register (enclosed)	:	Yes/No
14	Land status (Own/ Lease)	:	
15	Land survey Number	:	
16	Bore well / open well (specify)	:	
17	Crops grown at present		
18	Energization to bore well done	:	Yes / No
i	Electricity bill (copy) enclosed	:	Yes/No
19	Type of construction proposed Poly house/ Shadenet house 1) Poly house - Sq.Mt--------- 2) Shadenet houses - Sq.Mt ------ 3) Walking tunnels ----------	:	
20	Types of crops proposed to grow in Poly house / Shadenet house	:	
21	Survey no ----- where the poly house / shadenet house proposed to install	:	
22	Soil & water analysis as per report	:	Yes/No
i	Soil - EC PH	:	
ii	Water - EC PH	:	

23	Road facility available	:	Yes/No
24	Nearest Market Point	:	
I	Identify proof (Mark) / Voter ID (Furnished)	:	Yes/No
ii	Ration Card (Furnished)	:	Yes/No
25	Aadhar card No. (Furnished), if so Details of Aadhar Card	:	Yes/No No:
26	Bank pass book details	:	
I	Name of the Bank	:	
ii	Branch name – IFSC code	:	
iii	Account Number	:	
iv	First page of bank pass book (enclosed)	:	Yes/No
27	Whether subsidy availed under this component Yes / No	:	Yes/No
(a)	If Yes (furnish following details)		
i	Type of structure Poly house / Shadenet house done	:	
ii	Area (Sq.Mt)	:	
iii	Year of installation	:	
iv	Subsidy amount availed & Present Status	:	
v	Subsidy sanctioned by Department (indicate name of the Department)	:	
vi	Name of the standard & specified firm for construction of Poly house / Shadenet house	:	Name: Address: Contact No:
vii	Estimates given by firm for new constructions	:	Rs.
viii	Subsidy is allowed as per Govt. norms	:	Rs.
ix	Non subsidy amount to be borne by farmer	:	Rs.
x	Design of poly house given (enclosed)	:	Yes/No
28	Whether the farmers has Participated in training if any earlier on Protected cultivation	:	Yes / No
	If Yes further details		
i	No. of days trained	:	
ii	Name of the place where he got trained	:	
29	In case of loany cases	:	Bank consent is to be furnished along with list of documents (enclosed)
i	Name of the Bank	;	
ii	Details of bank/ Branch Name	:	
30	Preliminary inspection report submitted by Horticulture officer and satisfied all requirements, required for taking up Poly /Shade net Houses	:	Yes/No

Declaration

I, _____

declare that the particulars furnished above and the documents furnished are true to the best of my knowledge and I promise that the benefit obtained from MIDH will be used for the purpose for which it is given and in case of misuse I am liable for any action deemed to be fit by Govt. of Andhra Pradesh., including recovery of the subsidy amount with 12% interest to the Government.

Enclosures:

1. Pattadar Pass Book
2. Detailed Project Estimate
3. Soil & Water Analysis
4. Affidavit

Signature of the Farmer.

Recommendations of the HORTICULTURE ENGINEER / MI ENGINEER:

_____

_____.

Signature of the HORTICULTURE ENGINEER / MI ENGINEER

Signature of the RSK Functionary

Signature of the Horticulture Officer

Signature of the District Horticulture Officer

FORMAT – II

AFFIDAVIT (Rs. 100/- Stamp Paper)

I / We _____ (Name of the Promoter / Director) son of _____Father's Name) resident of _____ (residence address) do hereby solemnly affirm and declare here under.

1) That I am the director of _____,(name of the beneficiary) having its registered office at _____, (office address of beneficiary) and I am fully aware of the facts relating to the setting up the Polyhouse / Shadenet house at_____ (location of the Polyhouse / Shadenet house) for _____ (activities to be undertaken by Polyhouse) and the application made to MIDH for availing assistance under Developmental Schemes __

2) That the terms and conditions of the scheme of MIDH under which an application has been made by the applicant have been properly read and understood by me and I affirm that the Polyhouse / Shadenet house / proposal / scheme comply with the terms and condition of MIDH and the application has been made in the correct applicable scheme.

3) That the proposed activities to be undertaken by the Polyhouse / Shadenet house / proposal / scheme are covered under the above scheme of MIDH and no part of the scheme / infrastructure of the Polyhouse / Shadenet house is designed or assigned to be used for any activity other than the activities specified in the application at present or in the near future.

4) That the information provided in the application for availing assistance under developmental schemes — _____is true and correct to the best of my knowledge and belief. The estimates of the cost of Polyhouse / Shadenet / proposal / scheme, financial viability and operating results have been worked out / computed as per the rule and generally accepted principles and norms in this regard.

5) No Subsidy / grant – in – aid has been availed by the farmer from any central Govt./ State govt. or any its agencies for this unit.

6) I / We also solemnly affirm that the proposed activity in the application for availing assistance under development Schemes _____ is a completely new

activity and not a pre — existing activity or any Component thereof and further I assure that the unit will be utilized for the same activity for which the assistance is sought from the MIDH through MIDH of Andhra Pradesh for the economic period of 15 years. In case, if the unit is misused I am liable for any action deemed to be fit by the Govt. of Andhra Pradesh including recovery including recovery of the subsidy amount with 12% interest to the Government. The information furnished in the application dated _____ is true to the best of my knowledge and belief and nothing material has been concealed.

7) In case of concealment of any facts in this regard, the MIDH would have right to cancel my application out right at any stage.

8) I will display a sign board depicting "Department of Horticulture" (MIDH, Assisted Polyhouse) with logo of MIDH.

9) The release of subsidy is subject to actual expenditure, receipts, inspection, MIDH norms etc., In case of any discrepancy / dispute the decision of the Mission Director & Director of Horticulture is final.

10) I agree and resolve that the department reserves the right to modify, add or delete any term/ condition without assigning any reason thereof and shall also have right to pre and post inspect / monitor the Polyhouse and verify the related records at any time during the economic life of the Polyhouse by the concerned officers.

DEPONENT VERIFICATION

Verified on solemn affirmation at _____ that the content of the above affidavit are true to the best of my knowledge and belief and nothing material has been concealed.

DEPONENT / COMPETENT AUTHORITY

(To be signed by Notary with seal)

Format – III

PROCEEDING OF THE DISTRICT COLLECTOR,DISTRICT

Present:

Proce.No. ,..... Dt. 2025

Sub:- Horticulture Dept-..... District – _____ – Construction of Polyhouse /Shadenet / Plant Material under Protected Cultivation – Administrative Sanction Orders- Issued.

Ref: 1. Annual Action Plan 2015-16.

2. **Application of Sri……. S/o.** .....**,……..(V**)

……., (M).....District received through **H.O.,…….**

&&&

ORDERS:

Sri……, S/o. ……, ...,(V), **……(M)……DISTRICT Sy.No……,** have been selected as beneficiary for Construction of Polyhouse under Protected Cultivation under MIDH for the construction of Polyhouse for **……..,Sqmt** and the eligible subsidy is 50% of the total Cost subject to a maximum Rs._____/- Per Sqmt limited to _____ Sqmts for the beneficiary.

In view of the above, Administrative sanction is hereby accorded to him for Construction of Polyhouse / Shadenet house under Protected Cultivation under MIDH for the construction of Polyhouse for **…….., Sqmt** and the eligible subsidy is 50% of the total unit Cost subject to a maximum of Rs.___/- Per Sqmt limited to _____Sqmts for the beneficiary duly following the conditions furnished here under to release subsidy by the Department of Horticulture.

The subsidy will be released subject to the following terms & conditions:-

1. The farmer should follow the Technical Specifications for construction of Polyhouse under Protected Cultivation issued by the MIDH as follows.
2. The farmer should display the board and place in front of the Polyhouse. The Logo of MIDH and the matter mentioned below.

Financial Assistance by MIDH & Department of Horticulture

ANDHRA PRADESH

Name	:	S/o	:
Village	:	Mandal	:
District		Component	:
Area In Sqmt:		Assistance	:

3. The farmer should obtain a certificate undertaking with the following matter from Polyhouse fabricated firm "Certified that the material supplied and Constructed the Polyhouse as per the guidelines and standard fixed by the MIDH and the area constructed in ---------- Sqmts in the field of Sri/ Smt_____ S/o, W/o. _____ in _____ Village of _____ Mandal of _____ DISTRICT. "
4. The farmer should submit affidavit on Rs. 100/- Stamp Paper with notary about the Polyhouse constructed by him (Copy enclosed).
5. The beneficiary should undergo 3 days training as per the Schedule given by the DHO.
6. Farmer is responsible for the installation of the Polyhouse / Shadenet / Plant Material and for the payment to the fabricator / Supplier.
7. After completion of work, the subsidy will be released to the farmer based on the recommendation of DHO along with the Joint Inspection team certificate.
8. Subsidy will be released through online transfer to the beneficiary account, after receipt of satisfactory joint inspection report from the committee members.
9. In case of any disputes between farmer and the Manufacturer / Supplier regarding Polyhouse and Shadenet House related matters after verification by the designated committee & satisfaction of the farmer and manufacturer / supplier with the verification report, the manufacturer / supplier only be responsible for legal matters in this regard and Department will not be any part of legal proceedings, if any.

District Collector,

. . . . DISTRICT.

To

Sri..... S/o. ....., ..., (V),..... , (M)

. . ..DISTRICT

Copy to Horticulture Officer,....., ,... DISTRICT

Copy to Horticulture Engineer _____

Format - IV

Dt: ……

To

The District Horticulture Officer,

. . . .District

COMPLETION & UNDERTAKING

This is to certify that as per the guidelines and technical standards of MIDH the construction / Planting of Polyhouse / Shadenet house / Plant Material was completed. The following materials were supplied for construction of Polyhouse / Shadenet house / Plant Material in an area of …….. sq.mtrs in……. survey no……. . of Sri……, S/o……, ……..(V), ...(M) , ... District

S.No	Name of the Item	Quantity	Rate	Total Amount
1				
2				
3				
4				
5				
	Total			

Signature of Farmer:

Signature :

Name :

Seal :

Cell No. :

Format – V

FORMAT TO CONDUCT FINAL AND JOINT INSPECTION OF POLYHOUSE / SHADENET HOUSE / PLANT MATERIAL BY THE COMMITTEE UNDER PROTECTED CULTIVATION										
Sl.No.	**Name of the Farmer & Address**	**Category**	**Village**	**Mandal**	**Survey No.**	**Area in Sq.mtrs.**	**Crop**	**Expenditure incurred by the farmer (Rs.)**	**Subsidy recommended by the committee (Rs.)**	**Remarks**
1	2	3	4	5	6	7	8	9	10	11

Certificates:

1) This is to certify that the above farmer has installed Polyhouse / Shadenet House / Plant Material as per the Technical standards of MIDH.
2) This is to certify that all the original purchase bills of the items for expenditure incurred as mentioned in column no. 9 have been verified and found correct.
3) This is to certify that the above farmer is eligible to avail subsidy of Rs. _____/- as mentioned in column no. 10.
4) The subsidy amount of Rs. _____/- may be released

Promoter *RSK functionary* *HORTICULTURE / MI ENGINEER* *HO* *DHO* *DMIO*

Note: 1. Weight, Length & Required quantity will be varies with the design of the unit and size of the unit for both Polyhouses and Shadenet houses, but unit cost will be considered as per the MIDH rates according to size of the unit.

FAN & PAD SYSTEM POLYHOUSE

Design No. 1.3 Polyhouse (1008 Sq.mtrs) CCPH 28 m X 36 m = 1008

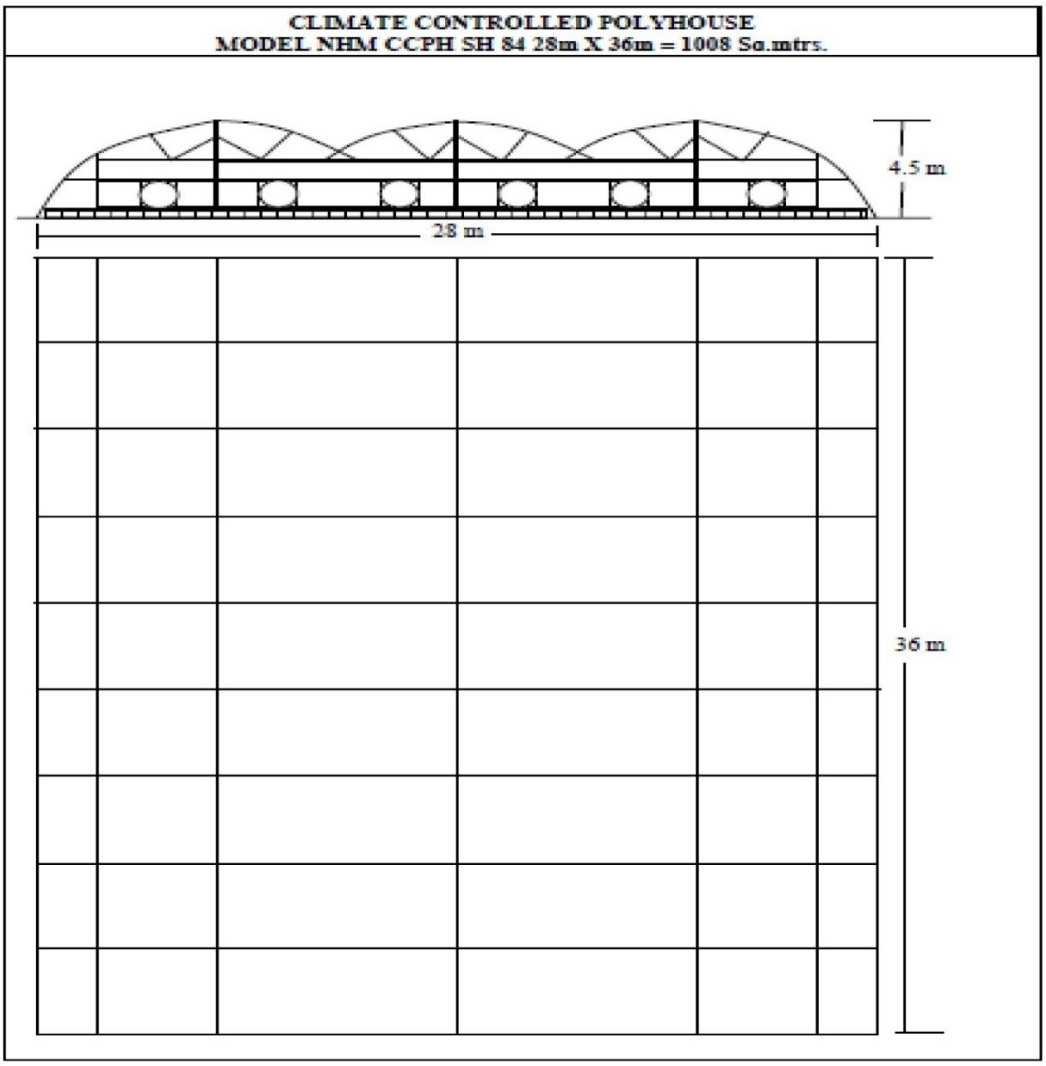


Table No. 1: General Specifications for NVPH Models

1.	All members of the structure should be made of Galvanized Iron (GI) with minimum 360 GSM galvanizing
2.	All members should be of minimum 2 mm thickness which shall be verified by equivalent minimum weight as follows- 2 ½"-3.75Kgs/mtr.; 2"-2.9Kgs/mtr.; 1 ½""-2.3Kgs/mtr.;-1 ¼"- 2.1Kgs/mtr.; 1"-1.6Kgs/mtr.; ¾"-1.25Kgs/mtr.; ½"-1Kgs/mtr.
3.	Members should not be welded to one another, but fixed with the nut bolts
4.	Members should not have any welded joints upto 6.5 mtrs. length
5.	The overall slope of the foundation should be between 1.25 % and 2 % so as to keep the Gutter slope accordingly
6.	The shape of the Polyhouse should be according to aerodynamic so as to reduce the impact of wind & consequent damage of Polyhouse. The structure should also follow aerodynamics along all four sides with corridors.
7.	Grid should be of 4m X 8m
8.	Top height should be minimum 6.5 mts in all the districts of Andhra Pradesh.
9.	Gutter height should be minimum 4 mtrs.
10.	Side curtains should be of minimum **3.5 – 4.0** m height . Insect net 35 mesh fixed and polythene movable fitted to curtain pipe with plastic/GI clamps and supported by GI guard 20/22 mm OD pipes 2.0 mm thick on corridor pipes **(or)** **Mono filament Shadenet 35% can be adopted in the place of Insect net wherever farmer desires to have, if the Arid climate & Humidity levels are high in their area.**
11.	Top Vent should be of minimum 1.2 m height. This vent should be closed with insect proof net of maximum of 20 mesh size and this should be closed after the preparation of planting beds.
12.	Cross bracing should be provided as follows- Horizontal cross bracing on 4 corners of Polyhouse (For all models)Vertical Cross bracings on 4 corners of Polyhouse (For all models above 1009 Sq.mtrs.) **(or)** a) Horizontal bracings: 42 OD Horizontal bracing must be provided in each bay of both sides (gable front & rear) i.e., second pillar to top arch of each 8m bay length. b) Cross bracings: Every second column top to third column of both sides (gable front & rear) must be connected 42 OD with 2 mm thickness GI pipes to transfer the wind loads to the ground. c) Bottom to pillar Bracings: 32mm OD with 2mm thickness 1.2m length bracing to be fixed from pillar to 8m bottom.

13	Gutter orientation must be north and south direction, top ventilation should face East orientation. Based on local conditions East – West gutter is also accepted, in such cases top ventilation should face north.
14	Tractor entry must be provided for the above 2000 sqmt.
15	Balcony width should be 2.5 mts.
16	Chain-pully shall be provided for Monofilament Shadenet underneath the polyhouse.
17	Curtain rod protection box must be provided.
18	Drainage pipe with 6.5 mt must be attached to gutters.
19	Air circulation by "air circulating fans": ➢ In hot and humid climate, when ambient temperature and humidity are in higher side, it is very natural that both these factors have a tendency to increase further inside a Polyhouses. Under such condition „air circulating fans" inside the Polyhouse will do a good job to reduce the harmful effect of high humidity and temperature on plant. The increased air flow inside the plant canopy reduces the leaf temperature and disperses the high humidity around leaves, which maintain the transpiration pull of crop. This will work best when coupled with exhaust fans that will throw out the accumulated hot and humid air. Small fans with a cubic-foot-per-minute (ft3/min) air-moving capacity of one quarter of the air volume of Polyhouse are sufficient. Place the fans in diagonally opposite corners but out from ends and sides. The goal is to develop circular (oval) pattern of air movement. Operate fans continuously during required period of a day.

<u>NOTE</u>: New Designs with new specifications will be encouraged as per the request made by the farmer in writing and after getting approval from the Commissioner of Horticulture, A.P., Guntur, the construction must be taken up, otherwise, assistance will not be considered for such units.

Table No. 1.1 Specification of GI pipe for NVPH Models

Sr. No.	Particulars	Size (Outside Diameter)	Size (Nominal Diameter)
1	Tor bar for hold-fast in foundation	8mm	n.a.
2	Columns	76 mm	2 ½"
3	Foundations for all columns	60 / 76 mm	2" / 2 ½"
4	Truss bottom-Big	60 mm	2"
5	Truss bottom-Small Sides & Front/Back(F/B)	60 mm	2"
6	All Corridors	60 mm	2"
7	Top cross	43 mm	1 ¼"
8	Corridor support members(sides & F/B)	43 mm	1 ¼"
9	Trusses-Top curved members	48 mm	1 ¼"
10	Purlins-(All except curtain)	48 mm	1 ¼"
11	Door column	48 mm	1 ¼"
12	Door	43 mm	1"
13	Purlins-Curtain	43 mm	1"
14	Truss members (minimum 5 nos per Bay)	33 mm	1"
15	Cross bracing	43 mm	1"
16	Door top	43 mm	1"
17	Curtain-Universal	33 mm	1"
18	Runners (for top UV Film)	27 mm	¾"
19	Curtain pipe	27 mm	¾"
20	Curtain handle	27 mm	¾"
21	Curtain guide	21 mm	½"

TABLE - 2 GENERAL SPECIFICATIONS FOR FAN & PAD SYSTEM	
1	All members of the structure should be made of Galvanized Iron (GI) with minimum 50 microns thick galvanizing
2	All members should be of minimum 2 mm thickness which shall be verified by equivalent
3	bers should not be wielded to one another, but fixed with the nut bolts
4	Members should not have any welded joints upto 6.5 mtrs. Length
5	The overall slope of the foundation should be between 1.25 up to % and 2 % so as to keep the Gutter slope accordingly
6	The shape of the Polyhouse should be according to aerodynamic so as to reduce the impact of wind & consequent damage of Polyhouse. The structure should also follow aerodynamics along two sides with corridors.
7	Grid should be of 4m X 8m
8	Top height should be minimum 4.5 mtrs.
9	Gutter height should be minimum 3 mtrs.
10	Excavation of top loose soil upto 0.45 m deep & 0.3m wide, Brick/UCR soiling below soil surface of 0.2m depth, 0.1m PCC of 1:4:8, 0.23m Brick wall of 0.15m height below soil surface & 0.6m height above ground surface below the pads & below the fans. Brick wall above ground surface shall be duly plastered with two coats of exterior cement paint. OR A rigid independent structure should be provided for installation of Fans, which shall be strong enough so as to give proper support to the Fans & prevent the vibrations from being transferred to the polyhouse structure.
11	Entrance Room should be provided which shall be of minimum 2mtrs Wide X 2mtrs. Length X 2.4mtrs. Height, with double door entry system.
12	Distance between the Fans & Pads should not exceed 32mtrs
13	Pads should be necessarily be of Cellulose & no other material shall be allowed

TABLE – 2.1

SPECIFICATIONS OF G.I. PIPE FOR FAN & PAD SYSTEM

1 ALL MEMBERS SHALL BE OF MINIMUM 2mm THICKNESS.
2 ALL MEMBERS SHOULD BE MADE OF GALVANIZED IRON (G.I.)
3 MEMBERS SHOULD NOT BE WELDED BUT FIXED WITH THE NUT & BOLTS
4 MEMBERS SHOULD NOT HAVE ANY WELDED JOINTS.

Sl.No.	Particulars	Size (Outside Diameter)	Size (Nominal Diameter)
1	Tor bar for hold-fast in foundation	8mm	n.a.
2	All Columns	76 mm	2 ½”
3	Foundations for all Columns	60 mm	2”
4	Truss Bottom-Big	60 mm	2”
5	Truss Bottom-Small F/B	48 mm	1 ½”
6	Truss Bottom-Small Sides	48 mm	1 ½”
7	All Corridors	48 mm	1 ½”
8	Corridor support members	43 mm	1 ¼”
9	Trusses-Top curved members	43 mm	1 ¼”
10	Purlins	43 mm	1 ¼”
11	Door Column	43 mm	1 ¼”
12	Door	33 mm	1”
13	Truss members (minimum 5 nos per Bay)	33 mm	1”
14	Cross bracing	33 mm	1”
15	Door Top	33 mm	1”

TABLE – 2.2
SPECIFICATIONS OF OTHER ITEMS FOR FAN & PAD MODELS

Sl. No.	Particulars	Specification
1	Clamps	Minimum Pre-galvanized G P Sheet 2.0mm thick duly zinc plated.Which resist 400hrs of Salt spray test.
2	Nuts & bolts	Minimum 10mm High tensile duly zinc Plated. Which resist 150hrs of Salt spray test. For structure joint 6-mm-8mm shall be allow for pertins titting gutter to purlin
3	Insect net	40mesh/50 mesh UV stabilised below curtains.
4	Laminated woven PE film for apron	UV stabilized (minimum 140 gsm)and having minimum tearing strenth 140 Kg/m2 should be used for side Apron which shall be of 1m to 1.5m above ground level.
5	Aluminium profiles	Minimum 190grms per mtr. GI Profiles shall not be allowed.
6	Springs	Minimum 2.3mm spring steel duly zinc plated & hardened /plastic/powder coated.
7	Screws	Minimum 20 mm Self drilling tapping.
8	Shade net	35% or 50% UV stabilized shadenet preferably white colour. 95 gsm for 50 % and 75 GSM for 35%
9	UV film	Minimum 200 microns thick, UV stabilized diffused Multilayer (Min 3 Layers)
10	Gutter	Made out of minimum 1mm thick GI or 1.2 mm aluminium Hardened Sheet.& minimum 500 mm perimeter trapezoidal section.
11	Door	Door should be made out of UV stabilized FRP with minimum 1mm thickness.& fixed on SS heavy Hinges.
11	GI wire for Shadenet Support	Minimum 12 Gauge G.I wire/PEI min. 2.2 thickness should be used to fix shadenet with sliding arrangement for opening & closing as per requirement.
12	Pulleys assembly with nuts & bolts	According to standard specification.
13	Plastic rope	UV stabilised ropes should be used with minimum 4mm thickness.
14	Curtain rings	Visibly strong & effective
15	Curtain clamps	Visibly strong & effective.

TABLE 2.3

SPECIFICATIONS OF FAN & PAD SYSTEM

1	**Exhaust fans (Minimum 50" size & having about 20000 to 25000 cfm)**	For effective cooling inside the green house Exhaust Fans having heavy galvanised steel box frame each having capacity of minimum 20000 CFM at 0 static pressure. The number of Fans shall be calculated as per the requirement so as to maintain temperature inside the green house as follows- **below** When ambient temperature is 42 C & ambient humidity is **35°C** between 30- 40% **Below**When ambient temperature is 42 C & ambient humidity is **37°C** between 60- 70% Fans shall have SS blades with aerodynamic design so as to give maximum efficiency with minimum power consumption, and belt driven axcial flow fan, having centrally auto openable louvers & GI sheet & Grills.
2	**Cellulose Cooling Pads**	4" or 6" thick impregnated cellulose cooling pads of suitable area,calculated so as to maintain the temperature inside the green house as follows: **below** When ambient temperature is 42 C & ambient humidity is **35°C** between 30- 40% **Below**When ambient temperature is 42 C & ambient humidity is **37°C** between 60- 70% The Pads shall be stifff enough to make it self supporting even at continuous water flow and at the same time is efficiently protected against any decomposition caused by water and air, resulting in minimum working life span of 3 years.
3	**Water Circulating System For Pads**	Water circulating system shall comprise of all Aluminium Frame, Gutter & Cover, PVC Pipe for water distribution on cooling pad so as to wet the pad completely.
4	**Fogging System**	Fogging system, including 16mm Lateral Pipes at a spacing of 3 mtrs. & make 4 way with antileak distance Foggers at spacing of max. 3 mtrs.PVC submain shall be aloud it buried under ground HDPE Submain, Ball valves, Fittings & accessories, including Disc/Screen Filter & Water storage tank (minimum 1000ltrs.)PVC submain shall be allowed it buried under ground.
5	**Controll Head For Water Circulating System**	Brass/SS/PVC Ball Valves, Flush Valves, Disc/Screen Filter, Water storage Tank of min1000 Ltrs. Capacity, Electricity Pump set of ISI mark of sufficient capacity so as to keep the pads always wet.

6	**Control Head for Fogging system**	Control head consisting of- 1) Water storage tank having capacity to hold minimum water required for continuous operation of fogging system for 1 hour, 2) ISI marked Pump having sufficient discharge so as to operate all the foggers at any given time, at minimum pressure of 35mtrs. at the point of emitter 3) Sand Filter & Disc Filters having capacity required for above system 4) By-pass assembly, valves, pressure gauge, fitting & accessories 5) Powder coated Panel box including digital timer, MCB, contactors, relays, auto starter, auto manual switch, Voltmeter, wiring, etc.
7	**Controller**	For maintaining the proper & adequate temperature & humidity simultaneously inside the Polyhouse a micro-processed based programmable temperaure, Humidity & time based Controller. User Friendly, with 1 Humidity Probe & 2 temperaure Probes shall be installed. The Controller shall control Pad Pump, Fogger Pump & Fans individually for controlling climate. The controller shall be provided with suitable constant voltage transformer for the safe working of the controller.
8	**Control Panel Box**	All electricals shall be enclosed inside a control panel duly powder coated and consisting of a set of MCB, relays, contactors, manual / Auto Mode including wiring ISI mark copper cable of suitable size & in closed conduit pipe MCB separate set for each Fans, Pump of Pad & Pump of Foggers..
9	**Wiring**	All electricals shall be connected by using ISI marked copper wire cable of required size. These wires shall be enclosed in ISI marked conduit pipe. The entire electrical work shall be certified by licenced electrical engineer.

TABLE- 3

S. No	**The specification of the Poly Tunnel structures with roof ventilation is as follows:**
1	Tunnel with top Ventilation and Trellising. The structure is prefabricated and assembled on site by means of bolts, nuts and washers only, without welding. The structure is made of galvanized steel pipes and profiles for long life. This enables easy implementation and full adaptation to all related subsystems used in modern greenhouse production. The structure is designed for wind speed of 100 km/h & 25kg/m2 vertical load & crop specific.
2	**Dimension:**
3	Front gable: 8.0 m
4	Side wall: 100m (25x4m)
5	Height: 5.5 m (at vent top bar)
6	Side vent height: 2.5 – 3. meters
7	Covered area of one structure: 800 sq m
8	Column + foundation: made from 90mm pipe
9	Arch: Made off 60mm pipe
10	Along the structure at 2.2m level & on ridge vent, 60x40 C- profile with Omega lockers (with coated springs)
11	Front gables 40x80 profile to support the gable while giving free entrance for cultivation
12	4mm & 4.5mm 1/7 twisted transverse cable & 3mm lengthwise (10) wires for crop trellising
13	2x1.9 pre-galvanized sliding doors covered with 6mm double wall polycarbonate
14	Manual roll-up curtain on both sides, made of 3/4" pipe and same polyethylene as the roof cover,
15	The curtain is secure to the tunnel by 8mm rope.
16	One meter width overlap to ensure rain resistance at the beginning & end of each curtain.
17	Covering and vent open vents
18	5 layered 200 Microns IR 504
19	25 meshes (Top vent) to block penetration of birds and fly's and insect 27% wind, 8-10% shade.
20	A high-density polyethylene net, super-stabilized against UV ray
21	50 meshes (sides vent), anti-insect net
22	The net should be made of monofilaments 120 gsm that are manufactured with special UV-resistant materials, giving the net durability and longevity. It has strong tucked selvedges, and is flexible, light, and easy to spread.25-27% shade.The net will be sewed to a skirt, to block penetrations of animals and heavy weather.
	General information:
1	The structural designs are in accordance with the Israeli standards: Steel standards 1225, load standards 414/1982, 412/1992.
2	Load calculation: 120 km/h & 25kg/m2 vertical load (including self-weight)
3	All metal pipe are made of hot dip pre-galvanized at 275 grams/m2
4	Drip and Foggers
5	Red/ Green Chroma Net as per crop and area specific with 5 years guarantee

TABLE # 4.0

GENERAL SPECIFICATIONS FOR FLAT TYPE AND ROUND TYPE SHADENET HOUSES

1	ALL pipes should be made of hot dip Galvanized Iron only (300 GSM)
2	All pipes should be of minimum 2 mm thickness
3	All the joints should be fixed with clamps, bolts and nuts only
4	No pipe shall have a welded joint upto 6m length.
5	Shade net houses with 4m height shall be used for cultivation and should be provided with Drip irrigation system and Trellising System as mandatory items

TABLE # 4.1

SPECIFICATIONS OF GI PIPES IN ROUND TYPE SHADE NET HOUSE - 4m/5m HEIGHT					
GRID SIZE:		**6m x 4m**			
	Center Height:	**4m/5m**	**Side Height:**	**3m/4m**	
S.NO	**PARTICULARS**	**PIPE SIZE OD in mm**	**NOMINAL DIA**	**Unit wt (kg/m)**	**LENGTH (m)**
1	Foundations for Balcony pipes	48mm/3mm thickness	1.5"	3.5	1.20
2	Foundations for Outer Columns	48mm/3mm thickness	1.5"	3.5	1.00
3	Foundations for Inner Columns	48mm/3mm thickness	1.5"	3.5	0.75
4	Main Columns	60mm/2mm thickness	2"	2.9	3.0/4.0
5	Truss Pipe (Along the gable)	48mm/2mm thickness	1.5"	2.3	6.00
6*	Arch Pipe	48mm/2mm thickness	1.5"	2.3	6.40
7*	Center support pipe	33mm/2mm thickness	1.5"	1.6	1.00
8*	Purlin Pipe (Across the gable)	48mm/2mm thickness	1.5"	2.3	4.00
9*	Corridor/Balcony Pipe	60mm/2mm thickness	2"	2.9	3.6/4.8
10*	Horizontal Member in Corridor	33mm/2mm thickness	1.5"	1.6	1.00/1.20
11*	Knee bracing at all columns	33mm/2mm thickness	1.5"	1.6	1.20
2.5m wide corridors for 4m height shall be provided on all four sides					
*	Lengths upto 200mm may vary from fabricator to fabricator based on their clamping/joint mechanisms/design				

TABLE # 4.2

SPECIFICATIONS OF GI PIPES IN STANDARD SHADE NET HOUSE WITH PIPE PURLINS

GRID SIZE: 6m x 4m			Shade Net Height from GL - 4m		
S.NO	**PARTICULARS**	**PIPE SIZE OD in mm**	**NOMINAL DIA**	**Unit wt (kg/m)**	**LENGTH (m)**
1	Foundations for Balcony pipes	48mm/3mm thickness	1.5"	3.5	1.20
2	Foundations for Outer Columns	48mm/3mm thickness	1.5"	3.5	1.00
3	Foundations for Inner Columns	48mm/3mm thickness	1.5"	3.5	0.75
4	Main (All) Columns	60mm/2mm thickness	2"	2.9	4.00
5	Truss Pipe (Along the gable)	48mm/2mm thickness	1.5"	2.3	6.00
6	Purlin Pipe (Across the gable)	48mm/2mm thickness	1.5"	2.3	4.00
7	Corridor/Balcony Pipe	60mm/2mm thickness	2"	2.9	4.80
8	Horizontal Member in Corridor	33mm/2mm thickness	1.5"	1.6	1.20
9	Knee bracing at all columns	33mm/2mm thickness	1.5"	1.6	1.20
2.5m wide corridors for 4m height shall be provided on all four sides					

* Lengths upto 200mm may vary from fabricator to fabricator based on their clamping/joint mechanisms/design

TABLE # 4.3

SPECIFICATIONS OF GI PIPES IN FLAT TYPE SHADE NET HOUSE WITH PIPE PURLINS - 4m/3m HEIGHT

GRID SIZE: 6m x 6m					
S.NO	**PARTICULARS**	**PIPE SIZE OD in mm**	**NOMINAL DIA**	**Unit wt (kg/m)**	**LENGTH (m)**
1	Foundations for Balcony pipes	48mm/3mm thickness	1.5"	3.5	1.20
2	Foundations for Outer Columns	48mm/3mm thickness	1.5"	3.5	1.00
3	Inner Columns	60mm/2mm thickness	2"	2.9	4.0/5.0
4	Outer Columns	60mm/2mm thickness	2"	2.9	3.0/4.0
5	Truss Pipe (Along the gable)	48mm/2mm thickness	1.5"	2.3	6.00
6	Purlin Pipe (Across the gable)	48mm/2mm thickness	1.5"	2.3	4.00
7	Corridor/Balcony Pipe	60mm/2mm thickness	2"	2.9	3.6/4.8
8	Horizontal Member in Corridor	33mm/2mm thickness	1.5"	1.6	1.00/1.20
9	Knee bracing at all columns	33mm/2mm thickness	1.5"	1.6	1.20
2m wide corridors for 3m height and 2.5m wide corridors for 4m height shall be provided on all four sides					

* Lengths upto 200mm may vary from fabricator to fabricator based on their clamping/joint mechanisms/design

TABLE # 4.4

SPECIFICATIONS OF STRUCTURE COMPONENTS				
FLAT TYPE SHADE NET HOUSE WITH CABLE PURLINS - 4M HEIGHT				
GRID SIZE: 8m x 5m				
S.NO	**COMPONENT**	**Size**	**Unit wt (kg/m)**	**LENGTH (m)**
1	Foundations for Main Columns	**Metal Plate Base with Plug**	4.0	0.60
2	Foundations for balcony pipes	**Stay Rod of 14mmOD/ Lip-C profile:3mm**	3.5	1.50
3	Outer Columns	**OD: 90mm x 2.6mm / SHS: 60 X60 X2.6mm - ISI**	5.5/5.0	4.00
3	Inner Columns	**OD: 60mm x 2.0mm / SHS: 50 X 50 X 2mm**	2.9/3.1	5.00
4	Cable Purlin	**HIGH TENSILE GI WIRE ROPE - 6mm/5mm/4mm**	1 x 19/7 x 19	As per reqt.
5	Corridor/Balcony Pipe	**RHS: 40 X 20 X 2mm/6mm wire rope**	2.0	4.80
6*	Horizontal Member in Corridor	**RHS: 40 X 20 X 2mm**	2.0	1.20
2.5 m wide corridors shall be provided on all four sides				
*Optional in case of corridors with pipes				

TABLE # 4.5

SPECIFICATIONS OF OTHER STRUCTURAL ITEMS USED IN ROUND TYPE AND FLAT TYPE SHADE NET HOUSES

Sl. NO	PARTICULARS	SPECIFICATIONS
1	CLAMPS	Should be made from minimum 2.5mm thickness MS sheets and hot dip galvanized. The clamps shall resist 400 hours of salt spray test.
2	BOLTS, NUTS AND WASHERS	High tensile bolts, nuts and washers with a minimum size of 3/8" or M10 and Zinc Plated to White or Yellow color. This hardware shall resist 150 hours of salt spray test
3	Galvalume profiles	These profiles made of GI sheet strip of minimum 0.6mm thickness and coated with Aluminum alloy and should have the provision to run two springs.
4	Zig-Zag Springs	The springs shall be made of high tensile steel wire with a minimum diameter of 2.5mm and coated with Zinc /PP/HDPE materials.
5	INSECT PROOF NET	UV stabilized insect proof net(preferably in white color) made of HDPE monofilament fabric to the size of 40mesh/ 50mesh having a minimum weight of 105 GSM.
6	Shade Net - Tape Type	UV stabilized shade net made of tape type yarn from HDPE virgin raw materials. Preferably white Color shade net with 50% shade shall be used for cultivation purposes and Green/Black color shall be used for Nursery applications. The 50% shade net should be of minimum 90 GSM.
7	Shade Net - Monofilament type	UV stabilized shade net made of monofilament yarn from HDPE virgin raw materials. Preferably white Color shade net with 50% shade shall be used for cultivation purposes and Green/Black color shall be used for Nursery applications. The shade net with minimum 115 to 125 GSM should be used in shade net structural applications
8	HUMAN ENTRY	The human entry should be free from the main structural members and foundations. The human entry should be fixed within the balcony area with independent foundations. The human entry shall have a double door entry system with a minimum cubicle size of 4m(L) x 3m(W) x 2m(H). The cubicle shall be made of independent structural members with two doors and covered with Insect proof net / Apron materials. The doors shall not have any gaps or vents, and preferably fitted with air sealing materials.
9	TRACTOR ENTRY	The tractor entry should be free from the main structural members and foundations. The tractor entry should have a minimum size of 2.7m width and 2.7m height with independent structural members. The entry shall have a collapsible door system covered with insect proof net. Air sealing materials shall be used in door system.

TABLE # 4.6

SPECIFICATIONS OF SYSTEMS USED IN ROUND TYPE AND FLAT TYPE SHADE NET HOUSES

S.NO	PARTICULARS	SPECIFICATIONS
1	Trellising System	The trellising system shall be made from high tensile GI wire of 2.5mm OD with a minimum of 50 to 70 GSM Zinc plating. Two wires per bed shall be installed at a height of 3m from Ground level all along the bed. The GI wires should be supported by 5mm wire rope + 4mm GI Wire rope at every 5m across the length of the trellising wire.
2	Drip Irrigation System	Class - II Laterals should be used with a minimum size of 16mm OD. Emitters maximum spacing should be 0.3m with a maximum discharge of 2.1 LPH. Preferably pressure compensated emitting pipe with no-drain should be used in structures. Two laterals per bed shall be laid with a maximum lateral spacing of 0.8m. The Drip Irrigation system shall contain all the essential components like Disc Filter, Manifold and Fertilizer injection system, Main pipes, submain pipes, collection sub main pipes, Air Release Valves, Ball Valves and Flush Valves. All the PVC pipes buried underground shall be of minimum CLASS-II BIS standard.
3	Fogging System	Class - III Laterals should be used with a minimum size of 16mm OD. Maximum lateral spacing should be 3m with a maximum emitter spacing of 3m. Maximum emitter discharge of a 4-way fogger shall be 4 x 7.5lph = 30 LPH. The fogger should be able to create a droplet of size less than 90 microns. Foggers with anti drain valves should be operated at a minimum pressure of 3kgf/sq.cm.
4	Over head sprinkler System	Class - II Laterals should be used with a minimum size of 16mm OD. The sprinklers shall be fixed at a maximum spacing of 3m x 3m. The sprinkler discharge shall be in the range of 75 to 110 LPH. Sprinklers shall be fitted with anti drain valves and should be operated at a pressure range of 1.5 to 2.0 kgf/sq.cm.
5	Micro Tunnel	0.5"HDPE pipes(2m - 2.4m) should be bent in inverted 'U ' shape and fixed into soil at every 1.2m and tied with a pair of plastic rope of 2mm dia. LDPE Polythene sheet of 1.8m to 2.28m width and 100 micron thick ness shall be covered on HDPE Pipes fixed in soil all along the bed to form a tunnel with a width of 1.2m to 1.5 m at base and a height of 0.4 to 0.5m at the center of the tunnel. The ends of the tunnels will be closed.
6	Retractable Shade Net	The shade net shall be opened and closed by means of ropes, pipes, brackets, pulleys and chains. The net shall be opened or closed uniformly throughout the length of the structure with the help of one or two persons. The net should be supported on wires or ropes. The retractable net should be installed within in the top 30 cm to 40cm height of the structure.
7	Vegetable Seedling Trays	The farmer shall be provided with 98/104 cavity seedling trays to raise quality seedlings to meet their local demand for seedlings. The tray should be re-usable for a minimum of 4 to 5 times with a minimum thickness of 0.6 to 0.8mm with a minimum average weight of 110 grams/ tray.

TABLE # 4.7

SPECIFICATIONS OF EARTH WORK FOR FOUNDATIONS ADOPTED IN SHADENET HOUSES

S.NO	PARTICULARS	SPECIFICATIONS
1	CEMENT CONCRETE : B300 GRADE	B300 GRADE CEMENT CONCRETE SHALL BE PREPARED BY MIXING CEMENT, SAND AND METAL CHIPS-19MM SIZE IN 1:2:4 RATIO
EARTH WORK FOR 4M HEIGHT STRUCTURES		
1	BALCONY FOUNDATION PITS	15" diameter x 1.8m depth
2	OUTER COLUMN FOUNDATION PITS	15" diameter x 1.5m depth
3	INNER COLUMN FOUNDATION PITS	12" diameter x 1.2m depth
EARTH WORK FOR 3M HEIGHT STRUCTURES		
1	BALCONY FOUNDATION PITS	15" diameter x 1.2m depth
2	OUTER COLUMN FOUNDATION PITS	15" diameter x 1.0m depth
3	INNER COLUMN FOUNDATION PITS	12" diameter x 0.9 m depth

All the pits shall be filled with B300 grade cement

Table # 5

TOP FIXED MULTISPAN GREEN HOUSE (8 M x 4 M) BAY ANTE-ROOM SPECIFICATIONS

SL NO	NAME OF PART	PART TECH SPECES	LENGTH IN MM	UNITS	QTY	WT IN KGS
1	Columns	Ø60	5500	Nos	3	49.5
2	Columns	Ø60	3000	Nos	2	18
3	Purline	Ø48	3500	Nos	2	17.36
4	Purline	Ø48	2800	Nos	1	6.944
5	Cross Bracing	Ø42	2500	Nos	2	10
6	Full Clamps	Ø60		Nos	4	
7	Full Clamps	Ø48		Nos	4	
8	L Cleat	40 X 40 X6		Nos	2	
9	Nuts & Bolts	M 10 X40		Nos	10	
10	Nuts & Bolts	M 8 X 100		Nos	8	
11	Galva Aluminium Profile			RM	24	
12	Zigzag Spring			RM	36	
13	Self Drilling Screws			Nos	150	
14	Poly Film	4.5 M	10 M	SQM	45	
15	Poly Corbonate Sliding Doors			Nos	2	
16	Labour Charges					

Table # 6

TOP FIXED MULTISPAN GREEN HOUSE (8 M x 4 M) BAY TRACTOR DOOR SPECIFICATIONS

Sl No	Name of part	Length in mm	Units	Qty	Wt in kgs
1	Outer Frame	25X25X3950	Nos	4	32
2	Outer Frame	25X25X1500	Nos	6	18
3	Door Inner frames	25X25X3950	Nos	4	32
4	Door Inner Frames	25X25X1450	Nos	6	16.8
5	Column	Ø 60 X 5500	Nos	2	33
6	Purlin	Ø 42 X 2500	Nos	3	15
7	Hinges		Nos	6	
8	Tower bolts		Nos	2	
9	Handle		Nos	1	
10	Labour Charges				

FIG. TRACTOR DOOR DESIGN

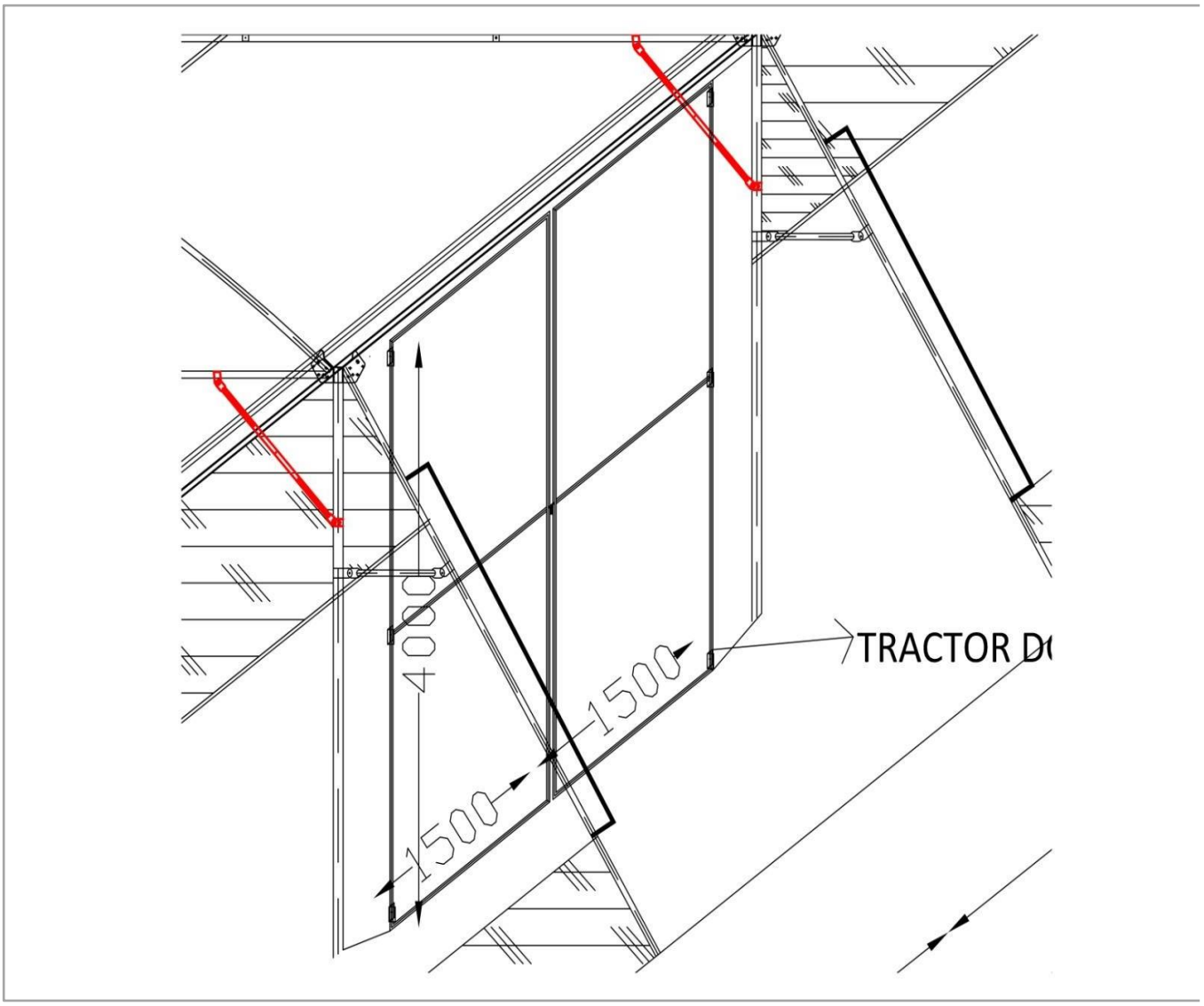


Table # 7

The Detail estimates and Technical Specification of Double Layer Semi - Automatic Retractable Pulley System

Model		Poly House / Net House	
Structural Material		G.I.Pipes/ Smart Connectors	
Sl.No.	DESCRIPTION	LENGTH	QTY
1	60 mm Double Layer Center Shaft	3650 mm	23 Pc
2	60 mm Foundation column pipe x 2 mm Thk	1,000 mm	12 Pc
3	60 mm Intermediate column pipe x 2 mm Thk	6,600 mm	12 Pc
4	60 mm Bottom Cord_Double Layer	3,810 mm	24 Pc
5	Chain Pulley assembly	INCLUDED	12 Pc
6	3 mm Wire Connector	INCLUDED	24 Pc
7	RHS 60x40x 2mm Thk	4070 mm	4 Pc
8	RHS 60x40x 2mm Thk	3980 mm	44 Pc
9	Black Pully Assembly (Flange Plate 120 PCD)	INCLUDED	48 Pc
10	2 inch Bearing Plate Assembly (2x Flange Plate 120 PCD)	INCLUDED	25 Pc
11	2.5 inch Omega Clamp	INCLUDED	52 Pc
12	2 inch Omega Clamp	INCLUDED	60 Pc
13	120 PCD Flange Plate for RHS	INCLUDED	12 Pc
14	120 PCD L Flange Plate	INCLUDED	12 Pc
15	2 inch Straight Connector	INCLUDED	12 Pc
16	3/g" x 120 Flange Serration Bolt	INCLUDED	29 Pc
17	3/g" x 80 Round Headed Square Neck Bolt	INCLUDED	48 Pc
18	60 mm Double Layer Intermediate column Pipe x 2 mm Thk	5000 mm	48 Pc
19	2 inch Omega Clamp	INCLUDED	96 Pc
20	3 mm x 6/7 Wire Rope	79 Mtr	24 Pc
21	Sandwich Clip	INCLUDED	540 Pc
22	Small Red Pulley	INCLUDED	270 Pc
23	Screen Clip Double	INCLUDED	2,160 Pc
24	Aluminium Saddle Clamp	INCLUDED	236 Pc
25	Aluminium Drive Clamp	INCLUDED	236 Pc
26	M6 Bolt x 70 mm	INCLUDED	236 Pc
27	M6 Nut	INCLUDED	236 Pc
28	19 mm OD Aluminium Guide Pipe	4,120 mm	216 Pc
29	Plastic 2.2 Superfil Wire	39.00 Mtr	240 Pc
30	3 mm Clamp	INCLUDED	234 Pc
31	Truss Clip 17 x 40	INCLUDED	180 Pc
32	SDS 1020	INCLUDED	112 Pc
33	3mm x 1/7 Wire Rope	98 Mtr	9 Pc

Table # 8

Core Specifications of MI Components for Polyhouse / Shadenet House.

Sl.No	Description of Items	Unit	Size of Shade Net House (sqm)		
			500	1008	2080
A	**Drip System**				
1	Main and Submain Line PVC 63 mm x 4 kg/cm2	Meter	36	48	70
2	Main Line PVC 75 mm x 4 kg/cm2	Meter	0	0	0
3	16mm LLDPE Lateral line CL-2	Meter	60	70	130
4	Inline 16mm, 1.3 to 2.4LPH @ 20-40 cm CL2	Meter	260	500	2000
5	Ball Valve 63 mm (Moulded Seal, Plain)	Nos.	2	2	2
6	Ball Valve 75 mm (Moulded Seal, Plain)	Nos.	0	0	0
7	Submain Flush Valve 40mm	Nos.	2	2	2
8	Submain Line for Flusing 40 mm X 6 kg	Meter	30	40	60
B	**Fogging Machine**				
1	Main and Sub-main Line PVC 50 mm x 6 kg/cm2	Meter	36	42	70
2	Main and Sub-main Line PVC 63 mm x 6 kg/cm2	Meter	0	0	210
3	16mm LLDPE Lateral line	Meter	250	450	900
4	4 way Fogger Assembly with HP LPD	Nos.	82	125	280
5	Ball Valve 50mm (Teflon Seal, Plain)	Nos.	2	1	1
6	Ball Valve 63mm (Teflon Seal, Plain)	Nos.	0	0	0
7	Submain Flush Valve 40mm	Nos.	2	2	2
8	GI Wire 2mm thick	Meter	200	350	800
9	Submain Line for Flusing 40 mm X 6 kg	Meter	36	42	60

C	**Filtration Unit**	Nos.	1	1	1	
1	Disc filter 25 m3/hr	Nos.	0	0	0	
2	Disc filter 40 m3/hr	Nos.	1	1	0	
3	Sand filter 10 m3/hr	Nos.	1	1	0	
4	Sand filter 25m3/hr	Nos.	0	0	1	
5	Sand filter 40 m3/hr	Nos.	0	0	0	
6	Manifold GI + GMV	Nos.	1	1	1	

Cost of Planting material & Cultivation of High Value Vegetables

Unit Cost: Rs.150/- per Sq.m
Subsidy (50%): Rs.75/- per Sq.m

Tentative unit cost for High Value Vegetables Plant Material for 2500 Sq.mt					
S.No	**Component**	**Unit**	**Qty**	**Rate (Rs.)**	**Total (Rs.)**
1	Fumigation	Sq.mt	2500	21.25	**53125**
	Formalin	Kg	200	125	25000
	Sheet				25000
	Labour				3125
	Sub Total				**53125**
2	Red Soil	Sq.mt	2500	40	100000
3	Sand	Sq.mt	2500	12.5	31250
4	Ploughing	Sq.mt	2500	1	2500
5	Rotovator	Sq.mt	2500	1	2500
6	Vermicompost	Sq.mt	2500	5	12500
7	Bed preparation Charges	Sq.mt	2500	10	25000
8	Fertigation	Sq.mt	2500	3	7500
9	PP Chemicals	Sq.mt	2500	2	5000
10	Planting Chrages	Sq.mt	2500	2.5	6250
11	Trellising Charges	Sq.mt	2500	5	12500
12	Intercultural operations	Sq.mt	2500	5	12500
13	Harvesting Charges	Sq.mt	2500	5	12500
14	Electricity Charges	Sq.mt	2500	2.5	6250
15	Watering Charges	Sq.mt	2500	5	12500
16	Packing Cost	Sq.mt	2500	5	12500
17	Transportation Cost	Sq.mt	2500	5	12500
18	Plant Material Cost		12500	4	50000
19	Watch & Ward charges	Months	6	3000	18000
	Total				**3,94,875**
	Total unit cost Limited to (2500 Sq.m)				**3,75,000**
	50% subsidy limited to (2500 Sq.m)				**1,87,500**

Cost of Planting material & Cultivation of High Value Flowers (Gerbera & Carnation)

Unit Cost: Rs.600/- per Sq.m

Subsidy (50%): Rs.300/- per Sq.m

Tentative unit cost for Gerbera Plant Material for 2500 Sq.mt					
S.No	**Component**	**Unit**	**Qty**	**Rate (Rs.)**	**Total (Rs.)**
1	Fumigation	Sq.mt	2500	21.25	**53125**
	a) Formalin	Kg	200	125	25000
	b) Sheet				25000
	c) Labour				3125
	Sub Total				**53125**
2	Red Soil	Sq.mt	2500	80	200000
3	Sand	Sq.mt	2500	12	30000
4	Ploughing	Sq.mt	2500	1	2500
5	Rotovator	Sq.mt	2500	1	2500
6	Vermicompost	Sq.mt	2500	15	37500
7	Bed preparation Charges	Sq.mt	2500	20	50000
8	Fertigation	Sq.mt	2500	10	25000
9	PP Chemicals	Sq.mt	2500	20	50000
10	Planting Chrages	Sq.mt	2500	5	12500
11	Intercultural operations	Sq.mt	2500	20	50000
12	Harvesting Charges	Sq.mt	2500	20	50000
13	Electricity Charges	Sq.mt	2500	5	12500
14	Watering Charges	Sq.mt	2500	5	12500
15	Packing Cost	Sq.mt	2500	10	25000
16	Transportation Cost	Sq.mt	2500	15	37500
17	Spacing	30 x 40			
	No of Plants	Nos	18750	25	468750
18	Watch & Ward charges	Months	12	3000	36000
		Sub Total			**11,02,250**
		Total			**11,55,375**
		LIMITED TO			**10,50,000**
	II ND YEAR				
19	Gap Filling		5000	25	125000
20	Fertigation	Sq.mt	2500	15	37500
21	PP Chemicals	Sq.mt	2500	20	50000
22	Intercultural operations	Sq.mt	2500	25	62500
23	Harvesting Charges	Sq.mt	2500	20	50000
24	Electricity Charges	Sq.mt	2500	10	25000
25	Watering Charges	Sq.mt	2500	5	12500

26	Packing Cost	Sq.mt	2500	15	37500
27	Transportation Cost	Sq.mt	2500	15	37500
28	Watch & Ward charges	Months	12	3000	36000
		Sub Total			**473500**
		LIMITED TO			**450000**
		GRAND TOTAL			**1628875**
	Total unit cost Limited to (2500 Sq.m)				**1500000**
	50% subsidy limited to (2500 Sq.m)				**7,50,000**

Tentative unit cost for Carnation Plant Material for 2500 Sq.mt					
S.No	**Component**	**Unit**	**Qty**	**Rate (Rs.)**	**Total (Rs.)**
1	Fumigation	Sq.mt	2500	21.25	**53125**
	Formalin	Kg	200	125	25000
	Sheet				25000
	Labour				3125
	Sub Total				**53125**
2	Red Soil	Sq.mt	2500	80	200000
3	Sand	Sq.mt	2500	12.5	31250
4	Ploughing	Sq.mt	2500	1	2500
5	Rotovator	Sq.mt	2500	1	2500
6	Vermicompost	Sq.mt	2500	15	37500
7	Bed preparation Charges	Sq.mt	2500	15	37500
8	Fertigation	Sq.mt	2500	10	25000
9	PP Chemicals	Sq.mt	2500	10	25000
10	Planting Chrages	Sq.mt	2500	5	12500
11	Intercultural operations	Sq.mt	2500	10	25000
12	Trellising Rods	Kgs	810	45	36450
13	G.I wire	Kgs	185	75	13875
14	Netting Charges	Sq.mt	2500	5	12500
15	Intercultural operations	Sq.mt	2500	20	50000
16	Harvesting Charges	Sq.mt	2500	20	50000
17	Electricity Charges	Sq.mt	2500	5	12500
18	Watering Charges	Sq.mt	2500	5	12500
19	Packing Cost	Sq.mt	2500	10	25000
20	Transportation Cost	Sq.mt	2500	10	25000
21	Watch & Ward charges	Months	12	3000	36000
22	Spacing				
	No of Plants	Nos	50000	10	500000
		Sub Total			**1172575**
		Total			**1225700**
		LIMITED TO			**1050000**

	II ND YEAR				
23	Gap Filling		15625	10	156250
24	Fertigation	Sq.mt	2500	15	37500
25	PP Chemicals	Sq.mt	2500	20	50000
26	Netting Charges	Sq.mt	2500	5	12500
27	Intercultural operations	Sq.mt	2500	25	62500
28	Harvesting Charges	Sq.mt	2500	20	50000
29	Electricity Charges	Sq.mt	2500	5	12500
30	Watering Charges	Sq.mt	2500	5	12500
31	Packing Cost	Sq.mt	2500	10	25000
32	Transportation Cost	Sq.mt	2500	10	25000
33	Watch & Ward charges	Months	12	3000	36000
		Sub Total			**479750**
		LIMITED TO			**450000**
		GRAND TOTAL			**1705450**
	Total unit cost Limited to (2500 Sq.m)				**1500000**
	50% subsidy limited to (2500 Sq.m)				**750000**

Cost of Planting material & Cultivation of High Value Flowers (Rose & Chrysanthemum)

Unit Cost: Rs.450/- per Sq.m

Subsidy (50%): Rs.225/- per Sq.m

Tentative unit cost for Chrysanthemum crop for 2500 Sq.mt					
S.No	**Component**	**Unit**	**Qty**	**Rate (Rs.)**	**Total (Rs.)**
1	Fumigation	Sq.mt	2500	21.25	**53125**
	Formalin	Kg	200	125	25000
	Sheet				25000
	Labour				3125
	Sub Total				**53125**
2	Red Soil	Sq.mt	2500	80	200000
3	Sand	Sq.mt	2500	12.5	31250
4	Ploughing	Sq.mt	2500	1	2500
5	Rotovator	Sq.mt	2500	1	2500
6	Vermicompost	Sq.mt	2500	15	37500
7	Bed preparation Charges	Sq.mt	2500	15	37500
8	Fertigation	Sq.mt	2500	10	25000
9	PP Chemicals	Sq.mt	2500	5	12500
10	Planting Chrages	Sq.mt	2500	5	12500
11	Trellising Rods	Kgs	810	45	36450
12	G.I wire	Kgs	185	75	13875
13	Netting charges	Sq.mt	2500	5	12500
14	Lighting arrangements along with bulb	Nos	150	400	60000

15	Intercultural operations	Sq.mt	2500	15	37500
16	Harvesting Charges	Sq.mt	2500	35	87500
17	Electricity Charges	Sq.mt	2500	10	25000
18	Watering Charges	Sq.mt	2500	5	12500
19	Packing Cost	Sq.mt	2500	5	12500
20	Transportation Cost	Sq.mt	2500	10	25000
21	Watch & Ward charges	Months	12	3000	36000
22	Spacing	20 x 30			
	No of Plants	Nos	37500	4	150000
	Sub Total				**870075**
	Total				**923200**
		LIMITED TO			**787500**
II nd Year					
23	Gap Filling		9375	4	37500
24	Fertigation	Sq.mt	2500	10	25000
25	PP Chemicals	Sq.mt	2500	10	25000
26	Intercultural operations	Sq.mt	2500	22	55000
27	Harvesting Charges	Sq.mt	2500	35	87500
28	Electricity Charges	Sq.mt	2500	10	25000
29	Watering Charges	Sq.mt	2500	5	12500
30	Packing Cost	Sq.mt	2500	5	12500
31	Transportation Cost	Sq.mt	2500	10	25000
32	Watch & Ward charges	Months	12	3000	36000
			Sub-Total		**341000**
		LIMITED TO			**337500**
			GRAND TOTAL		**1264200**
	Total unit cost Limited to (2500 Sq.m)				**1125000**
	50% subsidy limited to (2500 Sq.m)				**562500**

Tentative unit cost for ROSE Plant Material for 2500 Sq.mt					
S.No	**Component**	**Unit**	**Qty**	**Rate (Rs.)**	**Total (Rs.)**
1	Fumigation	Sq.mt	2500	21.25	**53125**
	Formalin	Kg	200	125	25000
	Sheet				25000
	Labour				3125
	Sub Total				**53125**
2	Red Soil	Sq.mt	2500	80	200000
3	Sand	Sq.mt	2500	12.5	31250
4	Ploughing	Sq.mt	2500	1	2500
5	Rotovator	Sq.mt	2500	1	2500
6	Vermicompost	Sq.mt	2500	15	37500

7	Bed preparation Charges	Sq.mt	2500	15	37500
8	Fertigation	Sq.mt	2500	10	25000
9	PP Chemicals	Sq.mt	2500	10	25000
10	Planting Chrages	Sq.mt	2500	5	12500
11	Intercultural operations	Sq.mt	2500	20	50000
12	Harvesting Charges	Sq.mt	2500	20	50000
13	Electricity Charges	Sq.mt	2500	5	12500
14	Watering Charges	Sq.mt	2500	5	12500
15	Packing Cost	Sq.mt	2500	10	25000
16	Transportation Cost	Sq.mt	2500	10	25000
17	Watch & Ward charges	Months	12	3000	36000
18	Spacing	30 x 30			
	No of Plants	Nos	21875	11	240625
	Sub Total				**825375**
		Total			**878500**
		LIMITED TO			**787500**
	II ND YEAR				
19	Gap Filling		6250	11	68750
20	Fertigation	Sq.mt	4000	10	40000
21	PP Chemicals	Sq.mt	4000	10	40000
22	Intercultural operations	Sq.mt	4000	22	88000
23	Harvesting Charges	Sq.mt	4000	20	80000
24	Electricity Charges	Sq.mt	4000	5	20000
25	Watering Charges	Sq.mt	4000	5	20000
26	Packing Cost	Sq.mt	4000	10	40000
27	Transportation Cost	Sq.mt	4000	10	40000
28	Watch & Ward charges	Months	12	3000	36000
		Sub Total			**472750**
		LIMITED TO			**337500**
		GRAND TOTAL			**1351250**
	Total unit cost Limited to (2500 Sq.m)				**1125000**
	50% subsidy limited to (2500 Sq.m)				**562500**

MULCHING

Mulching is a practice followed for conservation of moisture, to check weed growth and to improve the quality of Horticulture produce.

Thickness of Film:

In plastic mulching, the thickness of mulch film should be in accordance with type & age of crops. Economics suggest that the film thickness should be the minimum possible commensurate with desired life & strength. The recommended thickness of mulch films for different crops is as under:

Thickness (microns)	**Crops Recommended**
20-25	Annual - short duration crops
40-50	Biennial - medium duration crops
50-100	Perineal - long duration crops

Extent of Surface to be Covered under Film:

% Coverage	**Crops Recommended**
20-25	All creeper crops
40-50	Initial stage of orchard crops
40-60	Fruit crops & cucurbitaceous
70-80	Vegetables, Papaya, pineapple etc.
90-100	Soil Solarization

Mulching area should preferably be equivalent to the canopy of the plant (larger the canopy, larger the area of mulching and vice versa).

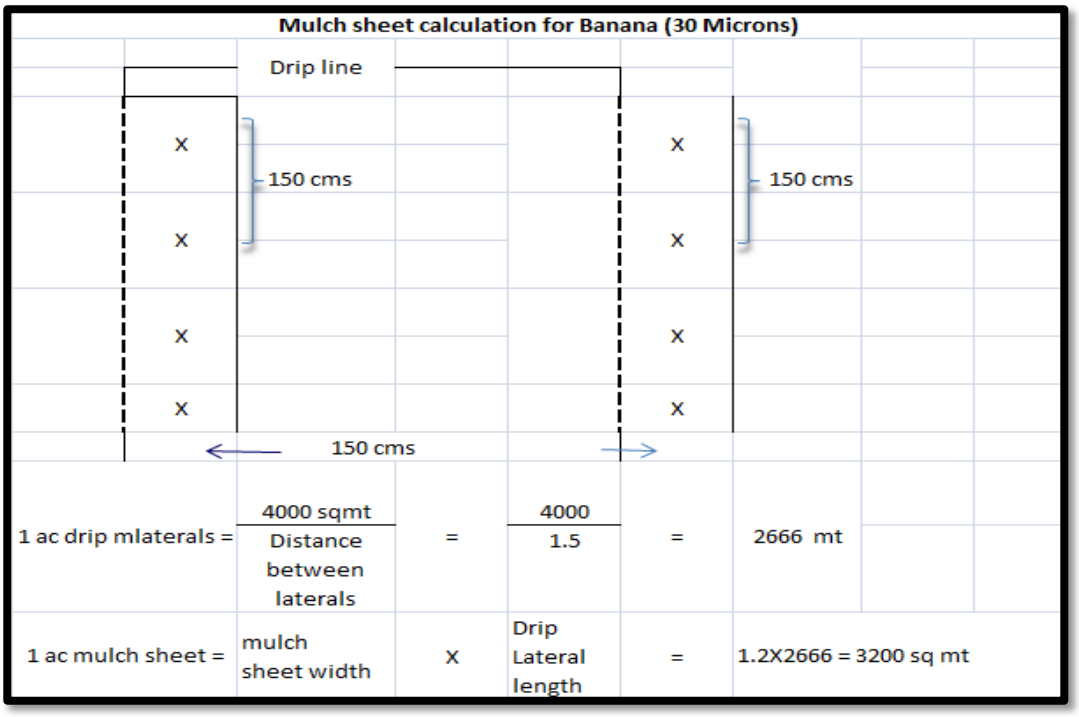
Calculation of Mulch Film Requirement (Approximately):

Thickness			Area coverage (m2/kg)	Weight (Gram/m2)
Micron	Gauge	mm		
7	28	0.007	144	6.9
20	80	0.02	54	18.4
25	100	0.25	42	23
40	160	0.04	26	38
50	200	0.05	21	46
100	400	0.10	11	93

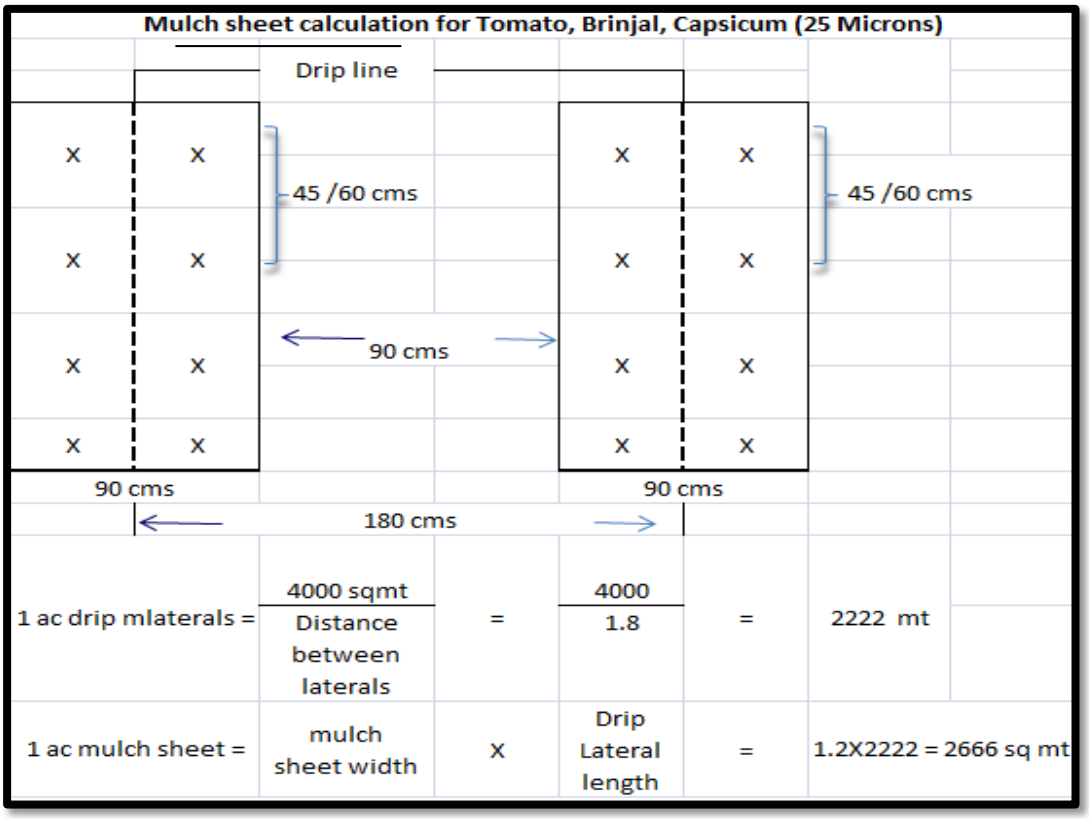
Indicative Cost of Plastic Mulching:

On the basis of 80% coverage of area under the film, indicative cost of mulching for Horticulture crops would be approximately Rs.40,000/- per ha.

Examples for calculation of requirement of Mulch Sheet :



Terms & Conditions:



Terms & Conditions:

1. Farmers once availed subsidy is not eligible.
2. 50% cost limited with maximum limit is 2 ha / beneficiary.
3. The selected beneficiaries should be given training programme on concept of Mulching, benefits of mulching, selection of mulch sheet, quantity required and gauge of mulch sheet.
4. *Farmers will be given choice to procure the mulching sheet of their own choice by incurring full cost of mulching material. After verification of the vouchers and physical verification in the field, the assistance will be online transferred to the farmers account as per the eligibility and cost norms.*
5. Only Horticulture Crops are eligible for assistance.
6. DMC approval to be obtained for identified beneficiaries and for final release of assistance.
7. The scheme shall be implemented for promoting intensive cultivation of vegetables in a cluster mode by giving due priority to SF / MF and SC & ST.
8. Documentation with photo graphs after laying out of mulch.
9. Proposals shall be sent to HoD for release of subsidy to the beneficiary through online transfer.

WORK FLOW & CHECK LIST FOR DOCUMENTS TO BE SUBMITTED FOR MULCHING

Sl.No.	Description	Documents to be submitted by / Action to be taken
1	Application Form –Format-I	Farmer
2	Pattadar Pass Book Copy	
4	District Mission Committee Approval	DHO
5	Organization of Training Programe to identified beneficiaries	HO / DHO
6	Issue of Administrative Sanction	DHO
7	Laying out of Mulching	Farmer
8	Submission of bills and raising of invoice	Farmer / HO
9	Constitution of Joint Inspection Committee	DHO
10	Joint Inspection Report – Format –VI	Committee Members
11	Obtaining DMC approval for sanction and release of assistance	DHO
12	Proposals to be submitted to DoH for release of subsidy	DHO
13	Online transfer of assistance to beneficiary	DHO

Format – VI

FORMAT TO CONDUCT FINAL AND JOINT INSPECTION OF MULCHING BY THE COMMITTEE UNDER PROTECTED CULTIVATION.										
Sl.No.	**Name of the Farmer & Address**	**Category**	**Village**	**Mandal**	**Survey No.**	**Area in Ha.**	**Crop**	**Expenditure incurred by the farmer (Rs.)**	**Subsidy recommended by the committee (Rs.)**	**Remarks**
1	2	3	4	5	6	7	8	9	10	11

Certificates:

1) This is to certify that the above farmers have laid Mulch Sheet as per the norms of MIDH.

2) This is to certify that all the original purchase bills of the items for expenditure incurred as mentioned in column no. 9 have been verified and found correct.

3) This is to certify that the above farmers are eligible to avail subsidy of Rs. _____/- as mentioned in column no. 10.

4) The subsidy amount of Rs. _____/- may be released

RSK Functionary ***HO*** ***DHO***

ANTI BIRD / ANTI HAIL NETS

Unit Cost: Rs.50/- per Sq.m.

Subsidy: Rs.25/- per Sq.m limited to 10000 Sq.m per beneficiary or prorate basis for smaller areas

S. No.	Particulars	Quantity	Unit cost (Rs.)	Total Cost per Ha.	Subsidy / Ha. (Rs.)
1.	Anti-bird net	60 (25-35 mm guage) per Ha.	550/- per Kg	33000	16500
2.	Bamboo poles/ local material	250 No's	Rs.60 each	15,000/-	7500/-
3.	Stitching wire	15 Kgs	Rs.600 per Kg.	9000	4500/-
4.	Labour charges			30,000	15,000/-
	Total cost			**87,000**	**43,500**

Fruit / Bunch covers

Objectives:

- **Protection from Pests and Diseases**: Shields fruits from insects, birds, and fungal infections.
- **Improved Quality**: Reduces blemishes, sunburn, and mechanical damage, ensuring better market value.
- **Enhanced Ripening**: Helps regulate temperature and humidity, leading to uniform ripening.
- **Reduced Chemical Use**: Minimizes the need for pesticides by acting as a physical barrier.
- **Extended Shelf Life**: Preserves freshness by reducing exposure to environmental stressors.

Unit Cost: Rs.50,000/- per Ha.

Subsidy: Rs.25,000/- per Ha. limited to 2 Ha. per beneficiary

S. No.	Crop	Component Details	Unit	Unit cost	Total Cost (Rs.)	Assistance amount (Rs.)
1	Mango	Fruit covers (20*28 Cms ; 53 GSM double layer) – 15000 nos.	Nos.	2.50	37,500	18,750
		Labour for tying of fruit covers, material etc. (lump sum)			12,500	6250
		Total			**50,000**	**25,000**
2	Banana	Cost of skirting bags (Bunch sleeves) – 2500 Nos.	Ha	15	37,500	18,750
		Labour for tying of bunch sleeves, material etc. (lump sum)	Ha		12,500	6250
		Total			**50,000**	**25,000**

Fencing

- Unit Cost: Rs.300/- per running metre.
- Subsidy (50%): Rs.150/- per running metre limited to 1000 running metres per beneficiary.
- The component should consist of 4 running lines with iron poles having distance of 10 feet between the poles.
- Eligibility : The component should be considered only in integration with other components of MIDH Scheme. Polyhouses / Shadenet houses / Perennial gardens (1^{st} year / 2^{nd} year) established established under MIDH during the current year should be considered.
- For One ha.
    - 640 running metres
    - 210 poles – 10 feet between the poles
    - Barbed wire -
    - Unit Cost: Rs.1,92,000/-
    - Subsidy (50%): Rs.96,000/-

Support systems for vegetable crops

Objective: The objective of a support system for crops in a polyhouse / shadenet house is to **enhance plant growth, optimize yield, and ensure efficient resource utilization**.

- **Structural Support**: Providing physical support to plants, especially climbers and high-yield crops, to prevent damage and improve space utilization.
- **Climate Control**: Regulating temperature, humidity, and light exposure to create an optimal growing environment.
- **Pest and Disease Management**: Reducing exposure to pests and diseases.

Unit cost : Rs.20,000/- per Ha.

Subsidy : Rs.10,000/- per Ha. (Maximum of 2 Ha. Per beneficiary)

S.No.	Item description	Amount (Rs.)
1	Nylon net / Nylon threads and rings for Creeper vegetables / indeterminate vegetable crops	20,000 per Ha.
	50% subsidy	**10,000 per Ha.**

Department of Horticulture – Government of Andhra Pradesh (MIDH Scheme)

Applicant photograph

Component:

1	Name of the Farmer	:	
2	Father / Husband‟s Name	:	
3	Village	:	
4	Mandal	:	
5	Category (SF/MF/OF)	:	
6	Category (SC/ST/BC/OC)	:	
7	Contact Number	:	
8	Total land (acres) ------	:	
9	Title deed registered sale deed with EC from Register (enclosed)	:	Yes/No
10	Land status (Own/ Lease)	:	
11	Land survey Number	:	
12	Crops grown at present		
13	Bank pass book details	:	
I	Name of the Bank	:	
ii	Branch name – IFSC code	:	
iii	Account Number	:	
iv	First page of bank pass book (enclosed)	:	Yes/No
14	Whether subsidy availed under this component Yes / No	:	Yes/No
15	Subsidy is allowed as per Govt. norms	:	Rs.
16	Non subsidy amount to be borne by farmer	:	Rs.

Signature of the Farmer

RSK Functionary

Horticulture Officer

INTEGRATED POST HARVEST MANAGEMENT GUIDELINES

Specific programmes which would be taken up under MIDH would include Establishment of Farm Gate Pack houses, Farm Gate Standalone Cold Storage, Integrated Pack houses,Pre-cooling units, Cold Rooms, Mobile Pre-cooling units, Cold Storage units, Collection Aggregation Centers, Refrigerated vans/containers, Non Pressurised Ripening Chambers, Pressurised Ripening Chambers, Technology induction/Modernisation of Cold Storage, , Primary/ Minimal Processing units, Solar Crop Dryer, Onion storage units, Secondary processing units and zero energy cool chambers. All these projects will be entrepreneur driven through commercial ventures for which Governmental assistance will be credit linked back-ended.

Subsidy in accordance with the cost norms given to PSUs and State Government agencies, Cooperatives, growers' association, farmers group, self-help groups, women farmers groups, recognized/registered by the DMCs, having at least 25 members, will also be entitled to avail assistance for such activities to the same extent. However, assistance need not be credit linked for such agencies but would be back ended subject to condition that they are able to meet their share of the project cost.

Assistance for setting up of new cold storage/ CA Storage/ MA storage will be available to Type – I & Type – IICold Storage units with latest/new technologies, which are energy efficient with provision for insulation, humidity control, advanced cooling systems etc., The components have to be implemented in accordance to the NCCD- Engineering Guidelines & Minimum Sysytem Standards.

A) STEPS TO BE FOLLOWED IN GENERAL:

1) At the time of receiving the proposal from promoter at the DHO office

I. Application along with appraisal should be in prescribed format duly signed by the promoter. (ANNEXURE)

II. The documents to be submitted for that particular component are to be verified as per the check list.

III. All the project proposals should be numbered in print / ink with index showing the contents as mentioned in check list.

IV. Issue of acknowledgement to the promoter.

Title of the Land and copy of record of right:

The title of the piece of land on which the project is proposed to be set up should be in the name of applicant in the capacity of owner or lessee for minimum period of 10 years. In case of land leased, lease deed it should be registered with the Authority like office of Sub-Registrar, etc. A latest copy of record of right showing this fact should be enclosed with the application. Mortgaged land shall not be treated at par with lease even if the credit institution might have considered so. Similarly, Power of Attorney given by owner of land in favour of applicant shall not qualify him for benefit under the scheme.

2) Verification in DHO office

I. Application should be verified that all the columns are properly filled with the signature of the promoter.

II. The original documents are to be verified as per the check list and the check list should be duly signed by the DHO for onward submission to State cell.

III. If any documents are missing the promoter should be asked to submit the pending documents within one week.

IV. After receipt of all documents DHM approval has to be obtained.

V. The DHO should forward the project proposals in 2 sets (Cold Storages / Ripening Chambers / Primary Processing units / Reefer Vans) along with the check list duly signed by the DHO. If any documents are not required proper justification has to be given for not submitting the documents.

VI. As the bank consent letter, bank appraisal report and affidavit are most essential documents, the DHO should verify this documents with originals and DHO should attest the duplicate copies before submitting the project proposals to this office.

VII. Preliminary inspection and feasibility report by HO / DHO shall be done.

3) <u>Disbursement of Credit Linked Back Ended Subsidy After Issue of Administrative Sanction and Execution of The Project</u>

Credit linkage for projects upto Rs.30 Lakh may be optional and subsidy would be released in two instalments in TRA/Escrow/SRF accounts based on progress after the Joint inspection report when found satisfactory.

1) Credit linked back ended subsidy will be released by SHM in two installments. First instalment will be released on completion of civil works, installation of plant &machinery and receipt of satisfactory joint inspectionTeam Report (Preliminary report).
2) Second installment will be released after the project comes into commercial operation and receipt of satisfactory Joint Inspection Report report. The subsidy released by SHM to Bank/FI on behalf on individual units which are sanctioned is to be kept in the Separate account. The Adjustment of subsidy is to be done on the pattern of back ended subsidy wherein full project cost including the subsidy *amount but excluding* the margin money contribution from beneficiary is to be disbursed as Term loan by the Bank and the repayment schedule is to be drawn on the loan amount in such a way that the subsidy amount is adjusted after the Bank loan portion (excluding subsidy) is liquidated.
3) The subsidy admissible to the borrower under the scheme is to be kept in the Subsidy Reserve Fund *A/C* in the books of the financing Bank/ FI. No Interest is to be applied on the subsidy Portion by the Bank. The balance lying to the credit of the Subsidy Reserve Fund wil not form part of Demand andTime Liabilities for the purpose of SLR/CRR. Suitable instructions Issued in thisregard by the RBI from time to time are to be followed.
4) Preliminary inspection report in the prescribed format has to be submitted by DHO along with bank disbursement statement to state cell certifying that the

civil work is completed and Plant & Machinery is installed recommending for release of 1st installment Credit Linked Back ended subsidy.

5) Periodical inspection at different stages of execution.
6) DHOs have to give confirmation regarding the suggestions / remarks given by the technical consultant in techno economic viability report.
7) DHO should recommend for constitution of joint inspection team.

4) Joint Inspection

I. It is the responsibility of the DHO to coordinate with all the members as constituted in the team for conducting joint inspection.

II. The relevant proformas should be properly filled and subsidy is to be recommended for release.

5) MONITORING

I. The DHO should periodically visit and inspect the unit to see that whether the unit is being utilized for the purpose for which it is sanctioned.

GENERAL INSTRUCTIONS:

1. DHOs shall thoroughly scrutinize the Bank Term Loan sanction letter and Bank appraisal report as they are the main documents for sanction of Credit linked back Ended subsidy and submit DPRs in full shape along with all the documents required as per the check list.
2. DHOs shall thoroughly verify the genuinity of the documents submitted by the applicant.
3. DHOs shall apprise the guidelines to the Banker who sanctions the loan for the project and ensure that the Banker abide by the terms and conditions laid out by the Department while sanctioning the project since the provision of assistance under Post Harvest Management projects is Credit Linked back ended subsidy.
4. DHOs shall ensure that the Account number proposed for release of credit linked back ended subsidy is the "Subsidy Reserve Fund" Account of the bank and not the current account. Loan account or any other account of the firm.
5. DHOs shall monitor and ensure that the Banker adjusts the "Credit Linked Back Ended Subsidy" released to the "Subsidy Reserve Fund" Account of the bank pertaining to the project only after completion of prescribed lock-in period and after the term loan excluding the subsidy portion has been liquidated.

6. DHOs shall ensure that the adjustment of the "Credit Linked Back Ended Subsidy" to the term loan shall be done with prior permission of the Commissioner of Horticulture, A.P., Guntur.
7. DHOs shall take up periodical inspections (every month) at different stages of execution. After issue of Administrative sanction of the project and submit status report from time to time.
8. DHOs shall monitor the functioning of the unit from time to time even after release of 2nd instalment credit linked back ended subsidy of the unit. and in case of any discrepancies like seizure of the unit, sale of the unit, change of management proprietor, defunet unit the same shall be brought to the notice of the Commissioner of Horticulture. A.P., Guntur, along with his/her remarks as per the guidelines for initiating appropriate action.

PATTERN OF ASSISTANCE FOR POST HARVEST MANAGEMENT

S No	Component	Cost Norms / Unit Cost	Pattern of Assistance
I	**Integrated Post - Harvest Management**		
1	Farmgate packhouse (9x6 Mts) with Movable Handling Trolley, Sorting Table and Farm Gate Standalone Cold Storage	Rs.25.00 lakh	Assistance @ 50% admissible only.
2	Integrated Packhouse (18x22 Mts)	Rs.160.00 lakh	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
3	Collection aggregation centre (22x26 Mts)	Rs.320.00 lakh	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
4	Pre-cooling unit	Rs.5.00 Lakh / MT	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
5	Mobile pre-cooling unit	Rs.30.00 lakh	
6	**Cold Rooms**		

S No	Component	Cost Norms / Unit Cost	Pattern of Assistance
a	Cold Room Transit (30 MTs) (Option I) Decentralized cold storages based on solar technologies or hybrid running on batteries, solar PV panels, microcontrollers, etc. along with ante rooms, Thermal storages (all kinds), insulation, doors, necessary civil work and refrigeration systems.	Rs.52.00 lakh	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
b	Cold Room Transit (30 MTs) (Option II) In case of cold rooms based on Thermal storage type where electric energy is available for 8 hrs/day (No DG Sets are allowed)	Rs.30.00 lakh	Back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
c	Cold Room Transit (30 MTs) (Option III)The cold room transit are conventional cold rooms working on conventional refrigerants with ante rooms, insulation, doors necessary inside civil work and refrigeration systems.	Rs.15.00 lakh	Back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
d	Solar Power Cold Room - Photo Voltaic based system with battery and thermal storage	Rs.20.00 lakh	Back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
e	Cold room - Thermal storage type (PCM, Water) with auxillary batteries, cold room running on grid electricity (DG set not allowed	Rs.8.00 Lakh	Back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
7	**Cold Storages**		
a	Cold Storage - Type I : Designed mostly for single product storage where bulk and long term storage is preferred (max. of 5000 MT capacity).	Rs.9600/- per MT	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
b	Cold Storage - Type I - Onion	Rs.9600/- per MT	
c	Cold Storage - Type II : Designed mostly for multi product storage where bulk, short and long term storage is preferred as required.	Rs.12000/- per MT	
d	Cold Storage Type II - Controlled Atmosphere Storage (CA)	Rs.12000/- per MT	
e	ColdStorage Type-IV - (For Dry Spices & Raisins	Rs.9600/- per MT	

S No	Component	Cost Norms / Unit Cost	Pattern of Assistance
8	Technology induction/ modernization of Cold Storage (for refrigeration & insulation) (5000 MTs)	Rs.215.00 lakh (Rs.3000/MT for refrigeration and Rs.1800/ MT for insulation – for max. of 5000 MT capacity	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
9	Refrigerated Transport vehicles (14 MTs)	Rs.31.00 lakh	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
10	Primary/Minimal ProcessingUnit	Rs.35.00 lakh	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
11	Ripening Chambers (CS-3)		
a	Non-Pressurised Ripening Chamber also termed as CS-3	Rs.1.00 lakh/MT	Credit linked back-ended subsidy @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
b	Pressurised Ripening Chamber also termed as CS-3	Rs.1.20 lakh/MT	
12	Low-cost Onion/Garlic storage structure	5-25MT-Rs. 10,000/MT 25-500MT-Rs.8,000/MT 500-1000MT-Rs.6,000/MT	Back-ended assistance @ 50 % for a unit of the size from 5 to 1000 MT capacity on pro rata basis in all areas throughout country as per following details: 5-25 MT - 10000/MT 25-500 MT - 8000/MT 500-1000 MT - 6000/MT (Assistance will be credit linked in case if project cost is more than Rs. 30.00 lakh)
13	Pusa Zero energy cool chamber (100kg)	Rs 4,000 per unit	50% of the total cost .

S No	Component	Cost Norms / Unit Cost	Pattern of Assistance
14	Solar Crop Dryer (with 24 Hrs. Backup)	Rs.2.50 lakh /unit (70 Kg capacity and Rs. 3.50 lakh/unit (100 kg capacity)	Assistance @ 40% in General areas and 55% in the case of NE & Himalayan States, TSP areas, Hilly and Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
15	Integrated Cold Chain Project	Upto a maximum cost of Rs. 1000.00 lakh / per project.	Credit linked back-ended assistance @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.
16	Integrated Supply Chain Project	Upto a maximum cost of Rs 2000 lakh per project	Credit linked back-ended assistance @ 40% of eligible cost of project in General areas and 55% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.

- Assistance can also be availed for a combination of PHM infrastructure components by a beneficiary, within the prescribed norms of individual items. Assistance will be available to individuals, Group of farmers/growers/ consumers, Partnership/ Proprietary firms, Self Help Groups (SHGs), Farmers Producer Organization (FPOs), Companies, Corporations, Cooperatives, Cooperative Marketing Federations, Local bodies, Agricultural Produce Market Committees (APMC) & Marketing Boards and State Governments.
- Assistance will also be available for taking up cold chain components so as to integrate the activities into a single project.
- In the case of Cold storage / precooling units / ripening chambers, the split ACs / Window ACs are not permitted. The units should be properly insualted from all the sides and refrigeration system with compressors, condensors, machinery etc., should be installed scientifically.

ANNEXURE

Government of Andhra Pradesh

Department of Horticulture

Application form for availing assistance under _____ component under PHM-MIDH _____

A. Identification of the applicant:

Name of Promoter(s) along with Fathers / Husband name			
Name of Commercial Entity/ Enterprise			
Type of Commercial Entity (Proprietorship/Partnership / Pvt.Ltd/ Ltd /PSU/ State Undertaking)			
Postal address of Entity			
	Tel:	Mob.No :	E-mail
Present activity in brief			

B. Project Mile Stone:

Date for application for subsidy		
Date of Project Start		
Amount of Bank Loan Sanction (Rs.)		
Date of Bank Loan Sanction		
Last Approval / Inspection Status		
Name of Approving Body		
PAN Number registered with bank.		
If Project Commissioned	Date of completion certificate	Issuing Authority

C. <u>Project Identification:</u>

NameofProject			
Type of Project(please tick)	**New Project**	**Expansion**	**Modernisation**
Location of Project (complete address)	Address:	Village/Town:	
	District:	State:	
ManpowerEmployed (onrolls/oncontract)			
WhatBusinessmodelis used(rental,captive,partof supplychainservice,mixed)			
Yearsinbusiness			
ComponentsofProject submitted(pleasetick)	FarmgatePackhouse		
	Integratedpackhouse		
	ColdRoomTransit		
Checklistforindividual Data sheets submitted	ColdStorageUnitType:		
	1.CS-1		
	2.CS-1-Onion		
	3.CS-2		
	4.CS-2-CA		
	5.CS-4		
	RipeningChamber (CS-3)		
	ModernisationofRefrigeration		
	ModernisationofInsulation		
	RefrigeratedTransportVehicle		
	UndertakingforusingVacuumCooling		
	Undertakingfor InstallationofOnionColdStorage		
	Submittalforexpansion project		
	Others(pleasename)		
TypeofProductstobehandled (Frozen, Chill, Mild-chill)	**TemperatureZones**		
	<-18ºC	**0-10ºC**	**10-20ºC**

FARM GATE PACK HOUSE

The cold chain starts right at the moment of harvest. It is crucial for the farmer to quickly reduce the temperature of the freshly harvested produce to maintain its quality and shelf life. The most fundamental facility designed for these purposes is known as a Farm Gate Pack house.

A Farm Gate Pack house Unit refers to a facility designed to efficiently manage and handle farm produce from the point of harvest tostorage orfurther processing. This unit ensures that agricultural products are handled in a hygienic and organized manner, minimizing damage and maintaining quality.

Size: 9 x 6 Mts.

Unit Cost: Max of Rs. 25.00 Lakh.

Financial assistance: Max. of Rs.12.50 Lakh.

Key components include:

1. **Shed with Finished Concrete Floor**: The unit typically includes a well-constructed shedwith a durable, smooth concrete floor. The finished floor aids in maintaining cleanliness, provides a stable surface for handling equipment, and reduces contamination risks by ensuring easy cleaning and drainage.
2. **Movable Handling Trolley**: A critical feature of the unit is the use of movable trolleys designed to carry crates or boxes filled with produce. These trolleys facilitate the smooth transportation of goods from the farm fields to the handling unit, reducing manual labor and minimizing the risk of bruising or damaging the produce.
3. **Minimal Equipment**: Basic equipment such as **electrical ceiling fans** for ventilation and **lighting** to ensure adequate visibility are essential for maintaining a comfortable and functional working environment. These tools improve working conditions, especially in climates where excessive heat can degrade produce quality or affect worker productivity.
4. **Sorting Table**: These are normal table situated inside the farm gate packhouse for manual sorting and grading of produces by workers/growers. 3 sorting table of size 3’ x 2’ to be installed.

WORK FLOW:

S.No.	Steps	Action to be taken
A	**Before Sanction**	
1	Obtaining Project proposals from farmers	DHO
2	Scrutiny of the proposal as per check list	DHO
3	Obtaining DMC approval	DHO
4	Issue of administrative sanction	Dist. Collector
B	**After Sanction**	
5	To monitor the completion of the Pack House within 6 months	
6	Obtaining the required bills and scrutiny	DHO
7	Constitution of Joint inspection team for inspecting the Pack House obtaining photographs depicting all the components of pack house with joint inspection team.	DHO
8	Sending proposal along with joint inspection report to State cell for release of assistance	DHO
9	Release of assistance to farmers through online transfer	State /District cell

In respect of the Joint inspection, the DHO shall organize Joint inspection of the Pack House in presence of promoter duly constituting a committee with the following members:

1) District Horticulture Officer (concerned)
2) Horticulture Officer
3) Horticulture Engineer / MI Engineer

The joint inspection report should be sent in format with all necessary certifications.

The DHOs shall scrutiny the project proposals of pack houses at their level and maintain the proposals for record purpose in their office and need not forward to State cell. They are requested to obtain the DMC approval and send copy of DMC approval duly attesting and forward to Head Office along with Joint Inspection Report for release of subsidy.

Title of the land and copy of record of right

The title of the piece of land on which the project is proposed to be set up should be in the name of applicant in the capacity of owner or lessee for minimum period of 10 years. In case of land leased, lease deed it should be registered with the Authority like office of Sub-Registrar, etc. A latest copy of record of right showing this fact should be enclosed with the application. Mortgaged land shall not be treated at par with lease even if the credit institution might have considered so. Similarly, Power of Attorney given by owner of land in favour of applicant shall not qualify him for benefit under the scheme.

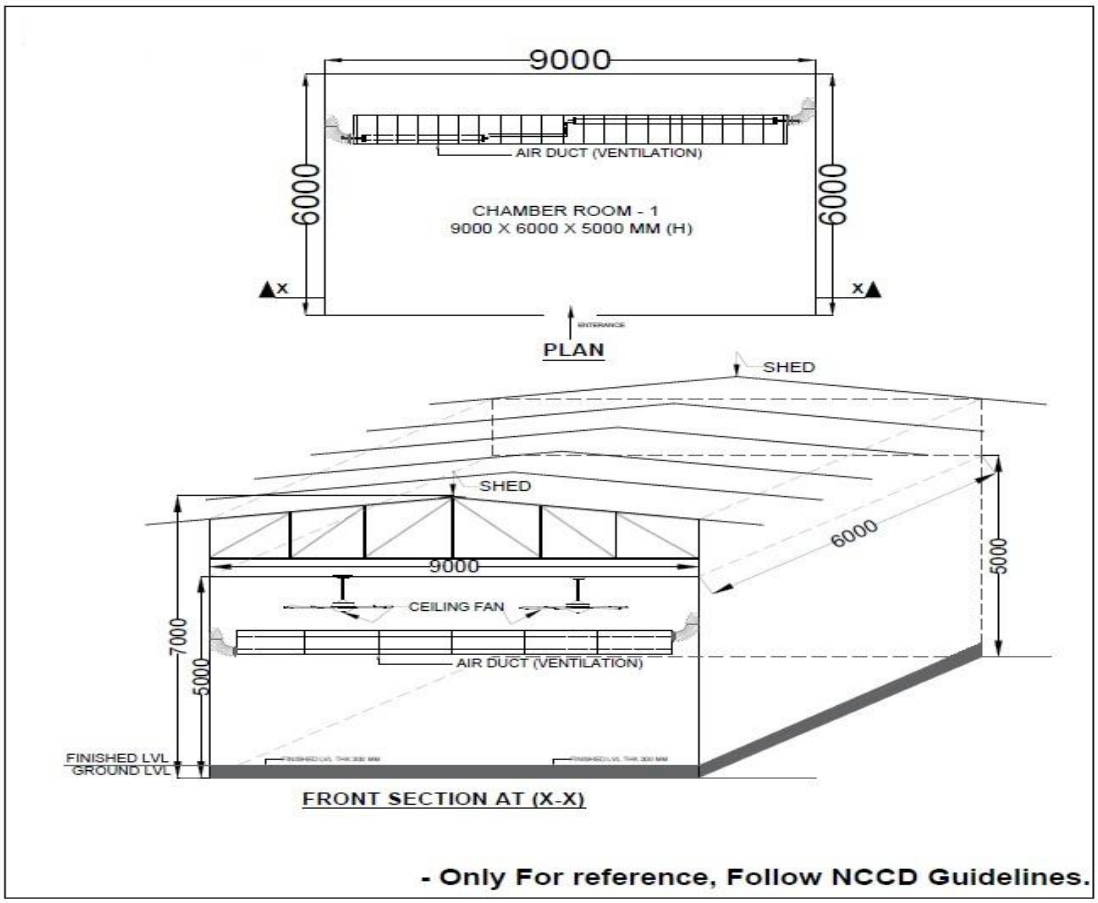
Annexure-I

COST BREAK UP FOR FARM GATE PACK HOUSE

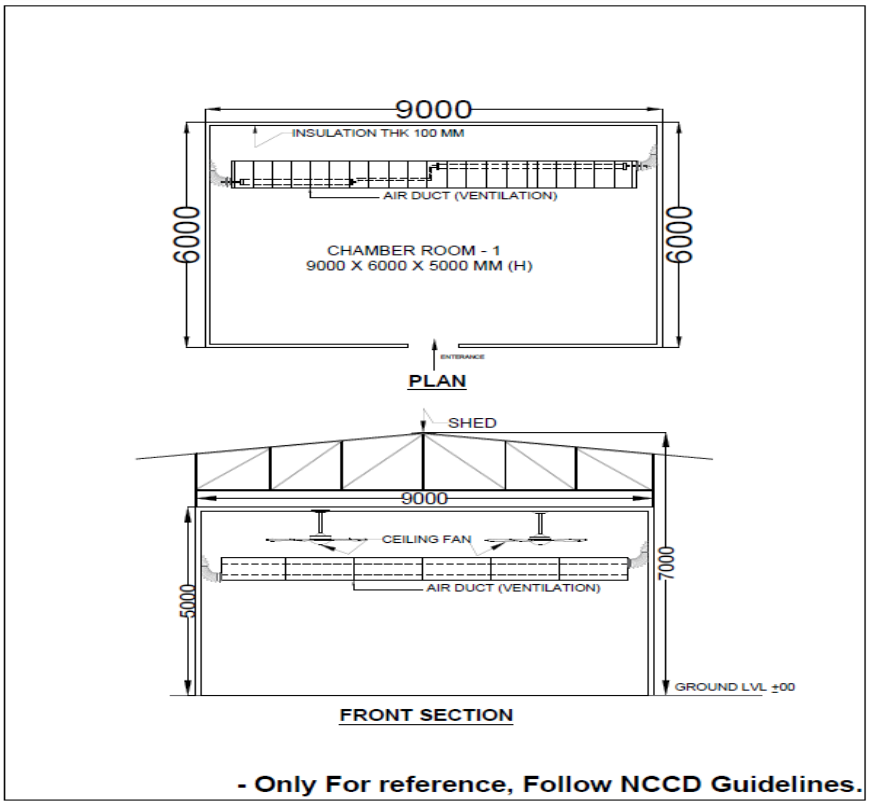
Requirements and Costing for a Farm gate Pack House						
Sl. No	**Detail of structure**	**Specifications/Details**	**Qty**	**Units**	**Unit rate (Rs)**	**Total Cost (Rs)**
A	Land	Near Metal road, near well, power pole etc	500	yds		Farmer's Own
B	Expenditure Item					
1	**Civil Structure**					
1.1	Site levelling etc	Levelling land and to make it motorable inside the premises	500	yds		400000
1.2	30X20' (9x6 Mts) Packing hall	30X20 ft with GI/Asbestos roof, Hard cement flooring, GI / Iron Windows, doors.	600	Sft		
2	**Mechanical**					
2.1	Packing /grading Table	4'X8' of GI or SS material, with 100mm side protection to stop roll off and with provision to drain water	1	Nos	14000	14000
2.2	Movable Trolleys		1	Nos.	5000	5000
2.3	Washing sheets (HDPE)	Of plastic of not less than 5' length and 2.6' ft width	1	Nos	3750	3750
2.4	Electronic Weighing Machine	To weigh upto 300 kgs with an accuracy of + or - 0.1 Kg with atleast 400X 600mm plat form	1	Nos	8000	8000
2.5	Desaping Units (for Mango growers only)	1.2 – 1.5mtr.(L)x0.8 – 1.0mtr.(W) x20cm (H);GI rods covered with ½"PVC Pipes	2	Nos.	1500	3000
2.6	Dhapoli Harvestors **(for Mango growers only)**		5	Nos.	400	2000
3	**Electrical**					
3.1	Meter with connection	Single Phase or three phase connection including deposit	1	No	6500	6500

3.2	Electrical Wiring with fuses, switches, holders, bulbs, fans etc.	5 Tube lights, 3 Fans with 2 Hrs. back up	1	Set	7000	7000
4	Water tank with support	Plastic "Sintex" or equivalent or cement based located at height either outside or with separate support of at least 2000 litres capacity	1	Nos	12500	12500
5	Other assets Small office table, three chairs, almairah, Wooden showels		1	LS	5000	5000
6	Plastic Crates	40 Ltrs. Capacity (25 kgs.)	60	Nos.	280	16800
7	Inverter (Optional)			1		
					TOTAL	**4,83,550**
Pattern of Assistance: Unit Cost LIMITED TO Rs.4,80,000/- (Rupees Four Lakh eighty thousand only) and assistance admissible is 50%						
5	**Add-On**					
	Farm Gate Standalone Cold Storage	The rationale is to provide short term storage which is able to help the farmer etc. in terms of curtailing the economic loss. In this case, in either of the three options only one can be chosen with capacity maximum upto 10MT/project-				
		OptionI: Solar Photo Voltaic based systemwith battery and thermal storage				Rs.20lakh/ project
		OptionII: Thermal Storage type (PCM, water) with auxiliary batteries, cold room running on gridwhereminimum8-10hrsofelectricityis available (DG Set not allowed)				Rs.8lakh/ project
		Option III: Cold Storage running on Bio-mass with either vapour absorption or adsorption technologies.				Rs.12lakh/ project
		Option IV: Conventional Cold Store running on grid electricity.				Rs.5lakh/ project
Pattern of Assistance: Unit Cost LIMITED TO Rs.20lakh (**Option I)** Rs.8lakh (**Option II)** Rs.12lakh (**Option III)** Rs.5lakh (**Option IV) and assistance admissible is 35% of unit cost**						

** **A farm-gate standalone cold room may be installed to enhance farm operations, management, and produce handling. However, <u>its installation is optional</u> and can be undertaken based on specific individual requirements.**



- Only For reference, Follow NCCD Guidelines.



- Only For reference, Follow NCCD Guidelines.

Sample Movable Trolleys

The plan drawing for construction of civil structure should be approved by the certified Civil Engineers.

FARMGATEPACKHOUSE

NOMENCLATURE: _____

S.No.	Description	Unit	Details
1	Name of the Produce	NA	
2	Room size	mxmxm	
3	Volof each room	m^3	
4	Total number of rooms	No.	
5	Total capacity of the facility	MT	
6	Room Temperature	°C	
7	Relative Humidity	%	
8	Produce loading rate	kg/day	
9	Produce incoming Temperature	°C	
10	Ambient Temperature	°C	
11	Pull DownTime	hr.	
12	Insulation-walls	mm	
13	Insulation-floor	mm	
14	Insulation-door	mm	
15	Insulation- ceiling	mm	
16	Type of ColdRoom	NA	
17	Technology	NA	
18	Refrigeration capacity	kW	
19	Type of Compressor	NA	
20	Evaporating Temperature	°C	
21	Condensing Temperature	°C	
22	Type of Evaporator	NA	
23	No. of Fans in Evaporator& Size of fans	No.&mm	
24	AirFlow	CMH/CFM	
25	Available grid connection at the site & type of phase/voltage	kW	
26	Solar Panel Capacity	kW	
27	Types & No. of solar panels	No.	
28	DG Set capacity, fuel (optional as required)	kW	
29	Type of thermal storage	NA	
30	Qty.of PCM	kgs.	
31	No. of thermal storages	No.	
32	No. of batteries & capacity & type of battery	No.&VAH &NA	
33	Electrical Load Connected on batteries	kW	
34	Type of fuel for bio-mass	NA	
35	Consumption rate of bio-mass	kg/hr.	

S.No.	Description	Unit	Details
36	Total Electrical load used in bio-mass technology	kW	
37	Refrigeration technology in bio- mass	NA	
38	Machine make &model and Number	No.	
39	Type of refrigeration system	NA	
40	Refrigerant Used	NA	
41	Secondary Refrigerant if used	NA	
42	Ante room size and capacity	mxmxm& MT	
43	Ante RoomTemp.and RH	°C&%	
44	Method of stacking	NA	
45	Total Power Consumption per Day	kWh/day	
46	Unit Rate per Day	Rs./unit	
47	Cost of Energy	Rs./day	
48	Movable Handling Trolley	NA	
49	Dimension of Sorting Table	mmxmmx mm	
50	Total no. of Sorting Table	No.	

Place…….. **Signature and**

Date…….. **Name of Applicant with seal**

Place……. Signature and

Date……. **Name & Seal of Consultant**

***Follow NCCD Guidelines for the purpose of installing coldroom. E.g.- Insulation, Doors, Floors, Strip Curtains, Ante Rooms, Volumetric Conversion, Refrigeration, etc.**

All mandatory rules and regulations (BIS,ISO,IS,MNRE,etc.)relevant to the item must be complied with.

Blank space should not be left. should indicate N/A at place which is not applicable

FORMAT TO CONDUCT FINAL AND JOINT INSPECTION OF **FARM GATE PACK HOUSE** BY THE COMMITTEE UNDER POST HARVEST MANAGEMENT COMPONENT OF MIDH.

Name of the Unit: ..... Place: ..... District: .....

As per project report				**As per the inspection and actual investment**				
Details	**Specifications/Details**	**Qty**	**Total Cost (Rs)**					
Civil Structure								
Site levelling etc	Levelling land and to make it motorable inside the premises	500						
30X20' Packing hall	30X20 ft with GI/Asbestos roof, Hard cement flooring, Windows doors of country wood.	600 sft.	400000					
Mechanical								
Packing /grading Table **(for Mango Growers only)**	4'X8' of GI or SS material, with 100mm side protection to stop roll off and with provision to drain water	1	14000					
Movable Trolleys		1	5000					
Washing sheets (HDPE)	Of plastic of not less than 5' length and 2.6' ft width	1	3750					
Electronic Weighing Machine	To weigh upto 300 kgs with an accuracy of + or - 0.1 Kg with at least 400X 600mm plat form	1	8000					
Desaping Units **(for Mango Growers only)**	1.2 – 1.5mtr.(L)x0.8 – 1.0mtr.(W) x20cm (H);GI rods covered with ½"PVC Pipes	2	3000					
Dhapoli Harvesters **(for Mango Growers only)**		5	2000					
Electrical								
Meter with connection	Single Phase or three phase connection including deposit	1	6500					
Electrical Wiring with fuses, switches, holders, bulbs, fans etc.	5 Tube lights, 3 fans, with 2 hrs backup	1	7000					
Water tank with support	Plastic "Sintex" or equivalent or cement based located at height either outside or with separate support of at least 2000 litres capacity	1	12500					
Other assets Small office table, three chairs, almairah, Wooden showels		LS	5000					
Plastic Crates	40 Ltrs. Capacity (25 kgs.)	60	16800					

Inverter (Optional)								
			4,93,800					
Pattern of Assistance: Unit Cost LIMITED TO Rs.4,80,000/- (Rupees Four Lakh eighty thousand only) and assistance admissible is 50%								
Add On								
Farm Gate Standalone Cold Storage	**Option I:** Solar Photo Voltaic based system with battery and thermal storage		Rs.20 lakh/ project					
	OptionII: Thermal Storage type (PCM, water) with auxiliary batteries, cold room running on Grid where minimum 8-10 hrs of electricity is available (DG Set not allowed)		Rs.8 lakh/ project					
	Option III: Cold Storage running on Bio-mass with either vapour absorption or adsorption technologies.		Rs.12 lakh/ project					
	Option IV: Conventional Cold Store running on grid electricity.		Rs.5 lakh/ project					
Pattern of Assistance: Unit Cost LIMITED TO Rs.20 lakh (**Option I)** Rs.8 lakh (**Option II)** Rs.12 lakh (**Option III)** Rs.5 lakh (**Option IV) and assistance admissible is 35% of unit cost**								

VHA / VAA / VSA **HO** **DHO**

BASIC DATA SHEET FOR FARM GATE PACK HOUSE

NOMENCLATURE: _____

S. No.	Description	Unit	Details /Description
1	Name of the Produce	NA	
2	Room size	m x m x m	Chamber 1: l x b x h; Chamber 2: l x b x h; so on
3	Vol of each room	Cu. mtr	Chamber 1 : ….. MT; Chamber 2 : ….. MT (Min. -5 MT, Max.-10MT)
4	Total number of room	No	
5	Total capacity of the facility	MT	
6	Room Temp	°C	
7	Relative Humidity	%	Depending upon the produce RH is to be maintained
8	Produce loading rate	Kgs./day	
9	Produce incoming Temp	°C	
10	Ambient Temp	°C	
11	Pull Down Time	Hrs	
12	Insulation- walls	mm	Follow BIS standards (min. Thickness not less than 100 mm)
13	Insulation- floor	mm	Follow BIS standards (min. Thickness not less than 80 mm)
14	Insulation- door	mm	Follow BIS standards (min. Thickness not less than 100 mm)
15	Insulation- ceiling	mm	Follow BIS standards (min. Thickness not less than 100 mm)
16	Type of Cold Room	NA	Please specify whether Solar based (Off-grid/On- Grid)/Bio-mass powered/Grid with thermal technology is being installed. At Farm gates conventional cold storages which work only onelectricity will not be allowed.
17	Type	NA	Please mention as described above
18	technology	NA	Mention Briefly about Type of Technology
19	Refrigeration capacity	kW	(including 10% Factor of Safety)
20	Type of Compressor	NA	Please specify type whether hermetic/semi-hermetic/scroll
21	Evaporating Temp	°C	
22	Condensing Temp	°C	

S. No.	Description	Unit	Details /Description
23	Type of Evaporator	NA	Please specify type
24	No. Of Fans in Evaporator/Size of fans	No./mm	
25	Air Flow	CFM/CMH	
26	Available grid connection at the site/type of phase/voltage	kW	Available connected load/ single phase/3-phase- give details
27	Solar Panel Capacity	kW	
28	Types & No. of solar panels	No.	Mono, etc.- please specify
29	DG Set capacity, fuel (optional as required)	kW	With catalytic convertor
30	Type of thermal storage	NA	Whether water/PCM
31	Qty of PCM	Kgs.	
32	No. of thermal storages	No.	In case of more than one room whether entire thermal storage capacity is accessible by all rooms. Please specify.
33	NO. of batteries and capacity/ type of battery	No./VAH/NA	Lithium-ion/lead, etc.
34	Electrical Load Connected on batteries	kW	
35	Type of fuel for bio- mass	NA	Specify type
36	Consumption rate of bio-mass	Kg/hr	
37	All Electrical load used in bio-mass technology	kW	Please specify total load or no. of batteries /capacity of the batteries in case electrical load is not used
38	Refrigeration technology in bio- mass	NA	Whether absorption or adsorption?
39	Machine make & model /Number	NA	
	Type of refrigeration system		

S. No.	Description	Unit	Details /Description
40		NA	Individual /centralised
41	Refrigerant Used	NA	R404A, R134A etc.
42	Secondary Refrigerant if used	NA	
43	Ante room size and capacity	L x b x h / MT	Follow BIS standards (min. Thickness not less than 60 mm)
44	Ante Room Temp	°C	
45	Method of stacking	NA	Boxes, crates, racks, double deep racks, pallets etc.
46	Total Power Consumption per Day	kWH	
47	Unit Rate per Day	Rs./unit	
48	Cost of Energy	Rs./day	
49	Movable Handling Trolley Details	NA	
50	Sorting Table Details	NA	

INTEGRATED PACK-HOUSE

An Integrated packhouse (IP) is a place structure where harvested produce is brought in from the nearby farms and prepared for transport and distribution to markets. Integrated Packhouse (IP) operations include cleaning, washing, weighing, precooling (if required), sorting & grading, treatments, packing, cooling, storage and dispatch to market.

Integrated Packhouse (IP) is the first link in the Cold chain and enables a farmer, producer etc to bring in his harvest for essential treatment ensure product quality and quantity. It enables assessment of market requirement by the farmer and thereby potentially reducing its losses during logistics of the produce to markets, distribution centres, hubs etc

An Integrated packhouse (IP) can serve as a hub for coordination and governance of a farm- packhouse (IP)-market organization in which market demand dictates production and packhouse (IP) activities (Figure 1).

ESSENTIALS OF INTEGRATED PACK HOUSE (IP) SETUP & OPERATION:

- To identify the pack house (IP) location for the produce i.e. coming into the packhouse (IP).

- Relevant data and information on the production area, type of produce, quality of produce, and connectivity of farm to the packhouse (IP) and target market or hubs should be properly recorded and known for utmost utilisation of the facility.

- A packhouse (IP) should be located close to the farm, should provide services to local farmers and should have facilities for pick and drop of produce by way of small or medium size reefer vehicles.

- A packhouse (IP) should be connected to good roads and should be covered properly to prevent from sun, rain and other contaminants from environment.

- A packhouse (IP) should be designed well with sufficient areas for loading and unloading bays. It should have adequate water and electricity supplies and the drainage system should be done in a very well manner and necessary water treatment plant should be usedwherever applicable.

- A packhouse (IP) should have all the necessary arrangements for safety and other desirables for the comfort of workers and other skilled professionals.

- A packhouse (IP) can have both straight line and L shaped or U shaped

packhouse (IP) operations.

❖ A pack house (IP) should also have a weigh scale at the receiving side of the pack house (IP).

❖ It may be connected to various numbers of collection centres of a farmer produce organisations or any other help groups which allows seamless connectivity of the produce to the packhouse (IP) in the shortest possible time thereby reducing post harvest losses.

A packhouse (IP) should have adequate no. of crates, bins & other types of Material Handling Equipment (MHE's), sorting grading tables, cold rooms, trimming machines (as per requirement), sorting, grading, weighing machines & packaging machines, drying machines (as per requirement), sizing machines (as per requirement) and sufficient ventilated space cooled to temperatures and humidity for human comfort to prevent produce from contamination and diseases.

COMPONENTS OF INTEGRATED PACK HOUSE (IP):

A. **Receiving Area (Covered):**

- It is essential that while produce undergoes different operations the produce should be protected from physical damages, contamination and should be protected from direct sunlight, rain, dust, etc.
- The receiving area should have the facility to examine the damaged produce or any other typeof disease etc. which can result in incurring both financial as well as post harvest losses.
- Loading and un-loading docks shall be designed with RCC slab, roof or sheet roofing. The dock area to accommodate suitable sized office and toilet for staffs and workers.

B. **Weighing Scale:**

- Suitable capacity at the inward of packhouse (IP) compound should be installed to weigh the incoming and outgoing produce.

C. **Enclosed Sorting and Grading Area:**

- Sorting and grading is very vital part of the packhouse (IP) operation and helps in reduce post harvest losses. Sorting and Grading area generally is the area where the produce is received after un-loading on the dock for further process.
- This area should be enclosed with preferably civil construction with RCC

slab roof or pre-fabricated shed where adequate care is taken to ensure that no contamination happens from the roof through insects and birds excreta.

- It may be covered with some kind of false ceiling with sufficient energy efficient light, ventilation seamless movement of produce on the washing, sorting, packaging, line upto the transit cold storage or direct dispatch as the case may be.
- Sorting helps to remove damaged produce and meeting requirements which are essential for acceptable quality. It is usually the first step in the packhouse (IP).

D. **Precooling:**

- The precooling method is the technique where farm heat is removed to reduce themetabolic activity andthereby increasingtheshelf lifeof the produce. It canbeof various types like- hydro-cooling, ice-cooling, evaporativecooling, etc. depending upon the type and requirement of the produce.

E. **Transit Cold Room:**

- Refrigeration allows maintenance of required temperature and humidity levels inside the cold storages thereby enabling protection of both quality and against losses.

- The desired temperature and relative humidity are achieved through refrigeration equipments. These refrigeration equipments are operational both on non- renewable source of energy and as well as renewable (solar) sources of energy.

- While designing these packhouse (IP)s the focus Should be on energy efficiency, the use of refrigerants which have low GWP and are also climate friendly. Essential efforts should be put on mechanisation, Automation of the facility which allows sustainable development.

F. **Reefer Vehicle:**

- To promote the cold supply chain for connecting farms and produce handling units to integrated packhouse (IP)s and further distribution of the sorted, graded/ cold produce or direct deliveries of the finished produce as the case may be through an unbreakable cold chain into the market.

G. **Material Handling Equipment (MHE):**

- To enhance productivity and reduce contamination through human touch and

to further modernize the operations for handling more number of horticulture produce in shorter period of times in an efficient and timely manner.

H. **Receiving & Dispatching:**

- To facilitate receiving and dispatching on the docks suitable dock leveller systems are required to integrate the incoming and outgoing vehicles scientifically to the packhouse (IP).

- Essential care should be taken in handling the packed produce during the loading on to the reefer trucks. Material handling equipment should be used for easy and convenient method of loading the freshly sorted graded produce into the vehicle for market area.

- The docking dispatch area should be appx. 1.06 m from the road level and docking equipment should be used in the docks and differentiated from the packhouse (IP) area by means doors and walls. Suitable arrangement to be made for placing docking doors on the dock and connected to the packhouse (IP) through a insulated panels forming a kind of closed passage between dock door and entry of packhouse (IP).

Each pack-house, appraised under this component, should be equipped with the necessary equipment to facilitate mechanised sorting and grading conveyor system. Additionally, washing and weighing equipment can be added to prepare the product for packaging in special cases.

MINIMUM STANDARDS TO BE FOLLOWED:

- The indicative dimensions are **18m x 22m** with corner height of 5m and center height of 7m. These dimensions are exclusive of docking area and needs to be surrounded by covered dock area for loading un-loading on at least 2 sides. The inside of the packhouse (IP) needs to be maintained within comfort conditions of temperature and humidity and suitable Industrial air washers should be installed for this purpose.

- Docking area to be kept on two sides of the packhouse (IP) with a minimum width of 2m x 1.06 m (width x height). At the places of placing dock leveller system appropriate width to be considered for seamless installation of dock leveller system and movement of MHEs from inside the Packhouse (IP) through the dock into the reefer truck for loading-unloading.

- In case dock leveller systems are installed on one side then proper space should be maintained between the two dock leveller system to maintain uninterrupted

movement of produce for loading and unloading. In that case the width of the other side of the dock can be reduced to 1 m with provision of ramp and staircase arrangement with access shutter doors/ any other type of suitable door providing access into the enclosed sorting and grading area.

- Civil works involve the construction of 1.06 Mtr finish floor level raised platform. The finished floor should be kota stone/ epoxy or any other finished floor type. A proper level needs to be maintained inside the packhouse (IP) with drainage system for dispensing water.

- Superstructure and the foundation to be designed by licensed structural/civil engineer. And the design shall meet the BIS standards and relevant seismic zone norms for earthquake proof design.

- The Integrated Packhouse should have through put a capacity of minimum 15 MT upto 30MT and is equipped with facilities of a mechanised conveyor belt, sorting, grading units, washing, drying, and weighing. **(Min.oneno. 15MT chamber to be installed mandatorily**). It would be preferred to run these transit cold stores on DRE technology (De-centralized Renewable Energy) or Hybrid mode or thermal storage type or conventional cold rooms.

- A Pre-Cooling Unit is required, though it's only needed for certain produce. **20 m^3** will be considered per one MT to pre-cool the produce. Pre-coolers would not be allowed on DRE technology.

- The floor in the transit cold rooms should be of base concrete, with kota stone/ epoxy or any other finishedfloor typeinside thefloor chambers. Floor insulation slab preferably XPS (EPS not allowed) laid in two layers. The Floor should be cleaned, painted with black Japan paint and then laid with 1^{st} layer of vapour barrier which can be either 250 microns tarfelt sheet or polythene sheet of suitable thickness. The vapour barrier should be covered with 1^{st} layer of insulation and overlaid with 2^{nd} layer of insulation in a manner to cut the gaps in the firstlayer of insulation. The joints can be filled with suitable hot grade bitumen (80:25). The 2^{nd} layer of insulation is then covered with 2^{nd} layer of vapour barrier which would be upto 1 mm thick tar felt or poly felt sheets with 5 mm overlap on the walls.

- The laying of Trimix should be 75 MM to 100 MM thickness with any suitable finish like kota stone, epoxy etc. and anti-skid tapping. The floor level of the cold storage should match the floor level of the Integrated packhouse (IP) for easy movement of material as well as MHEs. In case of raised floor levels, a suitable graded ramp to be either fixed or made outside the door for mechanised

movement of the goods.

- ❖ The Cold Room should be installed in such a way that small HPTs/BOPTs can be used to load/un-load the material mechanically.

INSULATION & DOORS

- The cold room insulation should be PUF/PIR or any other new environment friendlyinsulating material of thickness min 100 mm. sandwiched in either pre-painted GI (0.45 mm Min. thickness) or SS (food grade SS-306) sheets.

- The insulated door should be either overlap or inline or sliding but of the same thickness as that of the panel with a view window on the door properly fitted along with heater for anti- condensation on the glass. The door should be fitted with strip curtains form inside with 0.5 mm overlap from SS hooks or hangers.

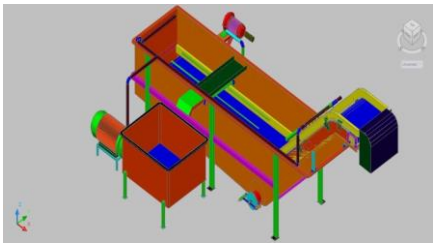
SUPPLY CHAIN

- One (1) no. Refrigerated transport vehicles of minimum load carrying capacity 1 MT andmax. upto 2 MT (either ICE or EV). The load carrying capacity of container is determined after subtracting the sum of (kerb weight of the chassis + container weight + weight ofReefer unit) from the Gross Vehicle Weight (GVW) of the chassis. This component is added to ensure seamless connectivity at primary level.

- The place for refrigeration machines, DG set (need base as per individual requirement), etc should be adjacent to the proposed enclosed packhouse (IP) with sufficient space for small vehicles to move in and out. D G Sets to be installed as per the norms and guidelines of respective Pollution Control Boards or as notified from time to time by Govt. Of India. The changes in the rules for any such components which may be listed under the polluting norms including DG Sets would be applicable as per revised norms issued by relevant regulatory authority state and central both as well as by NCCD.

- At least three storage pits for vegetable waste with proper methodology.

IMAGE OF CONVEYOR BELT



Design Guidelines:

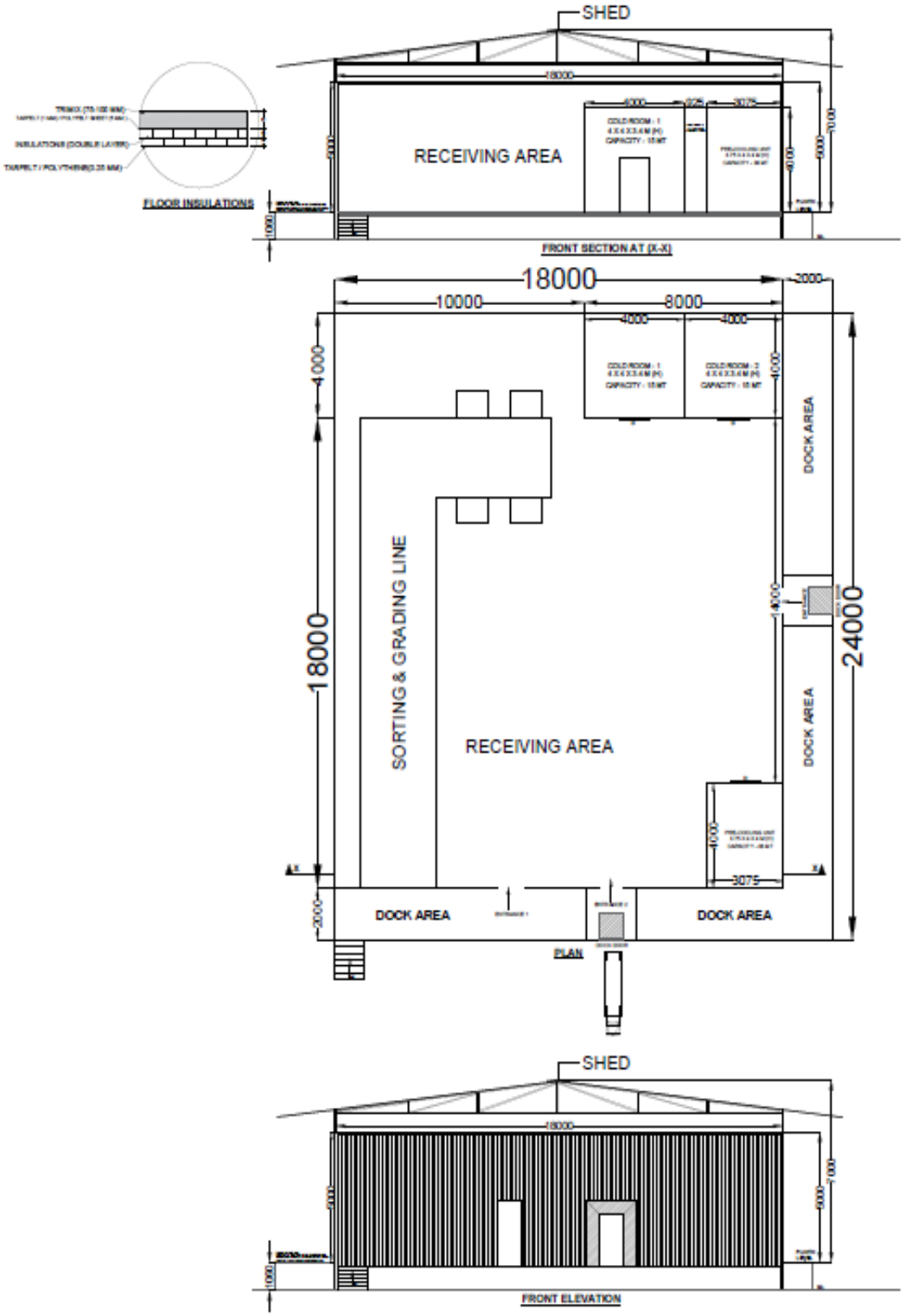
- Utilize Cam Lock Joints and Continued PUF (Polyurethane Foam) Panel insulation for Integrated Pack Houses. These panels should have a density of 40kg ± 2kg and a thickness of minimum 100 mm.
- Proper sanitation and safety measures to be taken for the welfare of the workers/staffs working.
- Prioritize a design that emphasizes low energy consumption.
- Consider the possibility of prefabricated and modular construction, eliminating the need for extensive civil work.

MANDATORYSUBSIDYCOMPONENTS:

DESCRIPTION & NAME	MAX. ALLOWABLE QTY	CAPACITY/UNITS/SIZES
Integrated Packhouse (IP) Integrated Pack house (IP) of size 18m x 22m with facilities of Receiving Area, weighing bridge, Washing, Enclosed Sorting and Grading Area with mechanized sorting/grading conveyor-based system. (refer point 1, and other relevant points)	Size of 18 mx 22m per project	Rs. 60lakh/ project
MaterialHandlingEquipment (MHE): Above1ton HPT	Max.2unit/ project	Rs. 20000/unit
Crates/Bins	Max.50MT/ project	Rs.2000/MT (max.50 MT allowed)
Dock Leveller System (DLS)	Max.2units/ project	Rs.8.4 lakh/unit
Precooling (if required) * (Based on requirement, not exceeding more than 3MTas cumulative capacity)	Max.3MT/ project	Rs. 5 lakh/MT
Cold Room Transit (Option I) Decentralised cold storages based on solar technologies or hybrid running on batteries, solar PV panels, micro controllers, etc. along with ante rooms, Thermal storages (all kinds), insulation, doors, necessary civil work and refrigeration systems.	Max.30MT (2 Chambers of 15 MT)	Rs. 26 lakh/chamber
Cold Room Transit (OptionII) In case of cold rooms based on Thermal storage type where electric energy is available for 8 hrs/day (No DG Sets are allowed) (refer point no. 6)	Max.30MT (2 Chambers of 15 MT)	Rs. 15 lakh/chamber

DESCRIPTION & NAME	MAX. ALLOWABLE QTY	CAPACITY/UNITS/SIZES
Cold Room Transit (OptionIII) The cold room transit are conventional cold rooms working on conventional refrigerants with ante rooms, insulation, doors necessary inside civil work and refrigeration systems.	Max.30MT (2 Chambers of 15 MT)	Rs.7.5 lakh/chamber
Reefer Vehicle of load carrying capacity of min. 1 MT upto 2 MT (EV or ICE) The load carrying capacity of container is determined after subtracting the sum of (kerb weight of the chassis + container weight + weight of Reefer unit) from the Gross Vehicle Weight (GVW) of the chassis.	1no.Vehicle of min. 1MT upto 2MT (Either1ICE based OR 1 EV based)	Rs. 12 lakh/vehicle Rs. 14 lakh/vehicle

INTEGRATED PACK HOUSE



- Only For reference & calculation, Follow NCCD Guidelines.

BASIC DATA SHEET FOR INTEGRATEDPACKHOUSE

NOMENCLATURE: _____

A. SHED AREADETAILS:

S.No.	Description	Unit	Details
1	Compound Area/Gated Plot Size	m x m	
2	Size of Shed	m x m x m	
3	Dimension of Dock Area	m x m	
4	a) Dock Leveler		
	i. Size	m x m x m	
	ii. Capacity	MT	
	iii. Make	NA	
	b) Dock Door		
	i. Size& Opening	m x m	
	ii. Type of Insulation &	mm	
	iii. Make	NA	
	c) Dock Shelter		
	i. Type of Dock Shelter	NA	
	ii. Vehicle Hazard Light	No.	
	iii. Size of Dock Shelter	m x m	
	d) Pack house shutter doors –Size &Number	m x m& No.	

B. INTEGRATED PACK HOUSE INTERNAL DETAILS:

S.No.	Description	Unit	Details
1	Washing Area Size	m x m	
2	Washing Type		
	I. Integrated with conveyor system	NA	
	II. Support washing tank with stirrer size	m x m	
3	Conveyor Capacity	MT/hr.	
4	Conveyor Size	m x m x m	
5	Type of Fruits conveyor can handle	NA	
6	Operating Method of Sorting/grading Unit	NA	
7	Total conveyor system electricity consumption	kWh	
8	Weighing Bridge Capacity	MT	
9	Dimensions of the weighing bridge	m x m	
10	MHE –HPT (capacity& make)	MT	
11	Number of MHE–HPT	No.	

12	MHE–BOPT (capacity &make)	MT	
13	Number of MHE–BOPT	No.	
14	Safe Working load of MHE	MT	

* Minimum no. of MHE –HPT to be installed- **2No**.for Collection Aggregation Centre.
* Minimum no. of MHE –BOPT to be installed-**1No**.for Collection Aggregation Centre.

C. PRE-COOLER DETAILS (if applicable):

S.No.	Description	Unit	Details
1	Size of the pre-cooler	m x m x m	
2	Produce to be pre-cooled	NA	
3	Pre-cooler capacity	MT	
4	Temperature and Relative Humidity	°C&%RH	
5	Insulation Thickness	mm	
6	No. of Doors& thickness	No. &mm	
7	Type of Pre-cooler Evaporator	NA	
8	Type of Condensing Unit	NA	
9	Capacity of the condensing unit	kW	
10	Loading per batch	MT/Batch	
11	Pull Down Time	hr.	
12	Air Flow inside the pre-cooler	CMH/CFM	
13	Evaporating Temp. of the pre-cooler	°C	
14	Ambient Temperature	°C	
15	Refrigerant Used	NA	
16	No. of Fans on the evaporator &size	No. &mm	
17	Whether forced draft or induced draft	NA	
18	No. of batches in a day	No.	
19	Type of stacking	NA	
20	Total Connected Power	kW	

D. COLDROOM DETAILS:

S.No.	Description	Unit	Details
1	Name of the Produce	NA	
2	Room size	mxmxm	
3	Volo feach room	m^3	
4	Total number of rooms	No.	
5	Total capacity of the facility	MT	
6	Room Temperature	°C	

7	Relative Humidity	%	
8	Produce loading rate	kg/day	
9	Produce incoming Temperature	°C	
10	Ambient Temperature	°C	
11	Pull Down Time	hr.	
12	Insulation-walls	mm	
13	Insulation-floor	mm	
14	Insulation-door	mm	
15	Insulation- ceiling	mm	
16	Type of Cold Room	NA	
17	Technology Used	NA	
18	Refrigeration capacity	kW	
19	Type of Compressor, make& model	NA	
20	EvaporatingTemperature	°C	
21	CondensingTemperature	°C	
22	Type of Evaporator, make&model	NA	
23	No. of Fans in Evaporator & Sizeof fans	No.&mm	
24	AirFlow	CMH/CFM	
25	Available grid connection at the site & type of phase/voltage	kW	
26	Solar Panel Capacity	kW	
27	Type & No. of solar panels	No.	
28	DG Set capacity (optionalas required)	kW	
29	Typeofthermalstorage	NA	
30	QuantityofPCM	kg	
31	No. of thermalstorages	No.	
32	No. of batteries, capacity & type of battery	No.&VAH &NA	
33	Electrical Load Connected on batteries	kW	
34	Type of fuel for bio-mass	NA	
35	Consumption rate of bio-mass	kg/hr.	
36	All Electrical load used in bio-mass technology	kW	
37	Refrigeration technology in bio-mass	NA	
38	Machine make & model & Number	No.	
39	Type of refrigeration system	NA	

40	Refrigerant Used	NA	
41	Secondary Refrigerant fused	NA	
42	Ante room size and capacity	mxmxm /MT	
43	Ante Room Temperature	°C	
44	Method of stacking	NA	
45	Total Power Consumption per Day	kWh	
46	Unit Rate per Day	Rs./unit	
47	Cost of Energy	Rs./day	

E. REEFER DETAILS:

S.No.	Description	Unit	Details
1	Type of Reefer Vehicle	NA	
2	Number of vehicles	No.	
3	Gross Vehicle Weight (GVW)of Chassis	MT	
4	Kerb Weight of Chassis	kg	
5	Weight of Reefer Unit	kg	
A	**TruckChassisDetails**		
1	Chassis number	NA	
2	Make and Model	NA	
3	Type of Vehicle (Diesel/CNG/ Electric/ Others)	NA	
4	Engine power	kW	
5	Rated payload–carrying capacity of vehicle	MT	
6	Outer dimensions of vehicle	mxmxm	
7	Drive Cabin details (withAC/ without AC)	NA	
8	Total number of tyres	No.	
B	**Insulated Container**		
1	Container dimensions	mxmxm	
2	Insulation Material Type	NA	
3	InsulationThermal Conductivity (K Factor)	W/m.K	
4	Insulation Thickness	mm	
5	Container Type (GRP/MS/ STEEL/OTHER)	NA	
6	Weightof Container	kg	
7	Name of Container Manufacturer	NA	
8	Year of Container manufacturing	NA	
9	Application (Chilled/Frozen)	NA	

C	RefrigerationUnit		
1	Make and Model number	NA	
2	Unit Type (Self Powered/ Vehicle Powered/Electric/Eutectic/Other)	NA	
3	Refrigerant used	NA	
4	Refrigeration capacity	kW	
5	Compressor Displacement	cm^3	
6	Defrosting system	NA	
7	Airflow	CMH/CFM	
8	Standby Motor Load	kW	
9	Diesel/electric auto-switchingused	NA	
10	Controls Type (Manual/Automatic)	NA	
D	**Telematics**		
1	Temperature remote Monitoring & Controlling device Type	NA	
2	GPS (Make and model)	NA	
E	**RegistrationDetails**		
1	Vehicle Registered as	NA	
2	State of Registration	NA	
3	RTO Office	NA	
4	RC Details	NA	
5	Any Other	NA	

* Minimum no. of Reefer vehicle offloads carrying capacity min.1MT upto 2 MT to be installed-**1 No**. for Collection Aggregation Centre.

F. AUTOMATED COMPUTERISED SYSTEM DETAILS:

S.No.	Description	Details
1	Type of Software used	
2	Name of the Software manufacturer	
3	Traceability system	
4	Labelling System & Printing details	
5	Certification details (if any)	

G. ELECTRICAL DETAILS:

S.No.	Parameters	Unit	Value	Power Utilization Ratio
1	Sanctioned Load by the Respective Board	kW		
2	Total Power Requirement at Peak Load Period	kWh		
3	Total Power Requirement at Holding Load Period	kWh		
4	Total Power Requirement at Lean Load Period	kWh		

Place…….. **Signature and**

Date…….. **Name of Applicant with seal**

Place……. **Name in Capital Letters**

Date…….Signature & Seal of Consultant

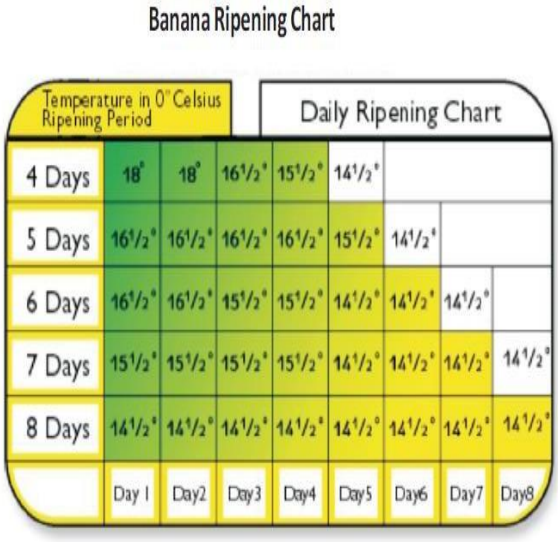
- **All mandatory rules and regulations (BIS, ISO, IS, MNRE, etc.) relevant to the item must be complied with.**
- **Please don't leave any space blank. Write N/A at place which is not applicable.**

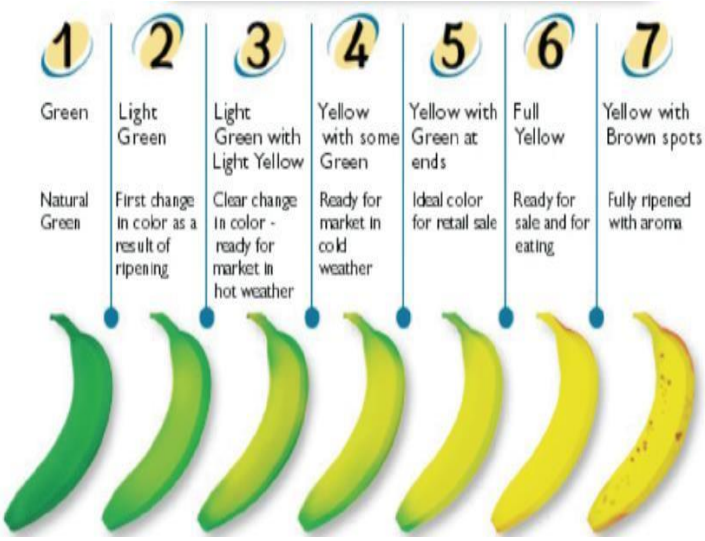
RIPENING CHAMBERS (COLD STORAGE TYPE-III)

Ripening chambers (Cold Storage Type-III / CS-3) are controlled environments by which certain fruits attain their desirable flavour, quality, colour and other textural properties. They facilitate the controlled ripening of fruits like Bananas, Mangoes, Papaya, Guava, Sapota etc. ensuring uniform ripeness.

Fruits are ripened with ethylene exposure at certain prescribed Temperature and Relative Humidity level of 90-95%. Following is broad guide for fruit ripening condition.

S. No.	Produce Details	Ethylene Concentration (ppm)	Ethylene Exposure Time (hours)	Ripening Temperature (°C)	Storage Temperature after ripening (°C)
1	Banana	100-150	24-48	15-18	13-14
2	Mango	100	24	20-22	10-13
3	Papaya	100	24-48	20-25	About at 7
4	Pears	100-150	24-72	18-22	About at 0° C
5	Tomato	100-150	24-48	18-20	12.5





Types & Components of Ripening Chambers

	Non-Pressurised Ripening	Pressurised Ripening
1	Building- CIVIL and PEB with docking area for loading/unloading.	Building-CIVIL and PEB with docking area for loading/unloading.
2	Receiving Area-comprising of area within the premises which allows receipt to fraw fruits for cutting, washing and crating. In case of bananas coming packed in CFB Boxes from the source, washing &crating would not be necessary.	Receiving Area-comprising of area within the premises which allows receipt to fraw fruits forcutting, washing and crating. Incase of bananas coming packed in CFB boxes from the source, washing &crating would not be necessary.
3	PUF insulated cold rooms, insulated floor, insulated doors, etc.	PUF insulated cold rooms, insulated floor, insulated doors, etc. The insulated cold rooms have a system of false ceiling or annular space created above the cold rooms which holds cooling coils placed in such a way that the air is sucked through these coils and routed into the cold room by way of spaces/cut outs in the cold room ceiling and pushing cold air through annular spaces between wall and palletised crates/ CFB boxes with or without air inlet locking system to isolate the boxes or pallets. The technical arrangement may vary and should be followed in accordance to design consideration of pressurized ripening system.
4	Ceiling mounted evaporators/ unit coolers, etc. for maintaining uniform air circulation, temperature, humidity.	Special air flow system running through the depth ofthe chamber mounted on the ceiling which generates desired static pressure and Allows suction from the centre.
5	Multi-compressor rack system/ individual condensing unit/ centralised chillers/ ammonia systems, etc.	Multi-compressorracksystem/individual condensing unit/ centralised chillers/ ammonia systems, etc.
6	Ethylene distribution system- ethylene generator or ethylene gas bank system.	Ethylene distribution system- ethylene generator or ethylene gas bank system.
7	Ventilation System – automatic to keep CO2 within limits with the help of CO2 analyser and controller Automatic Ventilation system works with a dual inlet/discharge dampers with fan to allow fresh air within the room when the concentration of CO2 exceeds the desired limit.	Ventilation System – automatic to keep CO2 within limits with the help of CO2 analyser and controller Automatic Ventilation system works with a dual inlet/discharge dampers with fan to allow fresh air within the room when the concentration of CO2 exceeds the desired limit. The placement etc. can vary and should be chosen as per requirement.
8	Crates/Bins etc.	Pallets, CFB boxes stacked in single or in multi tier system
9	HPTs	HPTs, Fork Lifts incase of multitier

	Non-Pressurised Ripening	Pressurised Ripening
10	Weigh scale, firmness tester, refractometer, sizer and callipers and produce knife.	Weighscale, firmness tester, refractometer, sizer and callipers and produce knife.
11	Electrical panels, lighting, earthing and power backup (DG Set)	Electrical panels, lighting, earthing and power backup (DG Set)
12	Ripening Management System (RMS)	Ripening Management System (RMS)

Essentials of RipeningChamber:

- To identify the Ripening Chamber location for the produce that is coming into the facility.
- Relevant data and information on the production area, type of produce, quality of produce, and connectivity and target market or hubs should be properly recorded and known for utmost utilisation of the facility.
- A Ripening Chamber should be connected to good roads and should be covered properly to prevent from sun, rain and other contaminants from environment.
- A Ripening Chamber should be designed well with sufficient areas for easy movement of MHEs. It should have adequate water and electricity supplies and the drainage system should be done in a very well manner and necessary water treatment plant should be used wherever applicable.
- A Ripening Chamber should have all the necessary arrangements for safety and other desirables for the comfort of workers and other skilled professionals.
- A Ripening Chamber should also have useful appliances and instruments such as weigh scale, firmness tester, refractometer, sizer and callipers and produce knife.

Minimum Guidelines to follow:

For Qualifying, the first criteria is that the applicant needs to make chambers of either equal sizes or different sizes of insulation not less than 60 - 120 mm of capacity maximum upto 300 MT.

The minimum chamber size should be 10MT and not exceeding 30MT per chamber.

11 cu. mtr. of storage space is considered equivalent to 1 MT of ripening capacity

DETAILED SPECIFICATIONS & GUIDELINES

1. Civil Construction:

- Super structure and foundation to be designed by certified structural/ civil engineer/ architect/ certified agency.
- The design shall meet all BIS standards and relevant seismic zone norms for earthquake proof design. The building can be constructed either with brick walls with RCC slab at top.
- In case pre-fabricated PUF/PIR panels are used directly as a boxin option after following necessary standards and safety protocols, PEB structures are allowed after due consideration to structural stability and design & certification of the building by a certified structural/ civil engineer/ architect/ certified agency.

2. PEB structure:

- The building should be constructed as per drawings and dimensions indicated. It is recommended to construct such facilities using steel construction/ Pre-Engineered construction confirming to the relevant BIS codes for live load as per IS 875 part– II, wind load as per IS 875 part-III, seismic load as per IS 1893 and other codes and standards as applicable.
- Also factors like wind, storms, lightning, thunderstorms, hail, heavy rains, snow, etc. should be taken in the safety designs and optimum care has to be taken on these factors to protect the ripening cold room from these hazards.
- Earthing pits, Earthing, Lighting arrestors need to be installed to ensure safety from electric hazards and protection against fire, etc. The steel structure component /construction sections to be fabricated confirming to relevant codes and standards of ASTM /BIS.

3. Thermal Insulation:

- Cold chambers have tobe insulated on walls, ceilings / roofs &floors with proper insulating material of adequate thickness, with provision for vapour barrier on outer side & proper cladding/ cover on inner side. The commonly insulation materials are:

Rigid Polyurethane foam	Chloro fluoro carbon (CFC) free and self-extinguishing and shall conform to IS 12436: 1988
Vacuum Insulated Panels	Conforming to BIS and IS standards
PIR PUF panels	Conforming to BIS and IS standard
PrePainted Galvanized Iron (PPGI)	The PPGI sheet shall have adequate thickness to withstand load and shall have zinc coating of min. 90 Gsm.
Flashing/Accessories	Made of PPGI sheet conforming to IS14246:2013
Walls&Ceiling	Rigid PUF panels/PIR/VIP
Floor	1. Laying of polythene sheet, min.250 microns, as vapour barrier 2. Fixing insulations labs in two layers with bitumen as adhesive for the first layer 3. Covering with tarfelt 4. Laying PCC/trimix of 75mm/ 100 mm thickness.

- The insulated door should be either overlap or inline or sliding or automatic doors but of the same thickness as that of the panel with preferably, a view window on the door properly fitted along with heater for anti condensation onthe glass. Thedoor should be fitted withstrip curtains form inside with 0.5 mm overlap from SS hooks or hangers. The outside of the door should be preferably fitted with air curtains of suitable capacity.
- Minimum door size recommended is 1mtr x 2 mtr (±5% variation would be accepted on the min recommended size, however the upper size can be selected as per requirement). The no. of doors would be equivalent to no. of mezzanine floors.

General Guidelines:

- With capacities divided in multiples of 10 MT upto 30 MT per chamber the internal height of the chamber should be restricted between 13 ft. to 14 ft.
- The no. of evaporators in non pressurized ripening system should be placed in such a way so as to cover atleast 70% of the wall on which evaporator/unit cooler is installed.

- ❖ One Ethylene generator required upto maximum capacity not exceeding more than 60MT. Two Ethylene generators required upto maximum capacity between 60 - 120 MT
- ❖ Ethylene Gas Bank system required for plant capacities exceeding 120 MT upto 300MT.

4. REFRIGERATION:

- ❖ Temperature and humidity to be designed to achieve prescribed ripening conditions. Generally, ripening temp. of various produces vary between 7-18°C and RH levels between 90-95%.

- ❖ Energy efficient refrigeration based systems need to be installed. For any operations which may require temperature condition and humidity condition upto 0°C refrigerants with GWPbetween 1000 to 1500 to be used.

- ❖ Air flow should be designed @ 2000 CFM per MT of storage.

5. ELECTRICAL INSTALLATIONS:

- ❖ Suitable OLTC step down transformers (as per requirement from discom) with earthing stations as per requirements, main power distribution panel for refrigeration lightning, automatic power factor correction panel (APFC), fire fighting equipments, etc.

- ❖ DG Sets equalling to the total requirement load in the cold storages. The type of DG sets should be considered as per applicable laws of pollution control board. Management System allowing real time temperature, humidity, lightening, energy usage, CO2 concentration levels – DISPLAY & CONTROL.

6. RENEWABLE ENERGY:

- ❖ The facility should be capable to generate atleast that much amount of the required energy which can run electrical lights, pumps (if possible), fan motors during holding period in daily operations from renewable sources of energy. The energy may be obtained by harnessing solar energy, wind energy, etc. and stored in auxiliary batteries if possible. (Batteries are not mandatory)

7. ADMINISTRATIVE BLOCK:

- ❖ The facility should have a separate admin block equipped with office room, rest rooms, and other amenities which are important to create a comfortable

working condition. Clean drinking water and toilets for workers and staff is very important to build in the facility.

8. SAFETY & HAZARD CONTROL:

Provision for handling accidental leakage of refrigerant:

- Ammonia sensors in cold chambers near ACUs & machineroom
- Emergency ventilation for machine room
- Safety release of refrigerant to water sump
- Ammonia masks
- First aid kit
- Instructions for handling emergencies
- It may be borne in mind that ethylene concentration above 27000 ppm may explode.

Fire protection:

- Fire sensors in cold chambers & machineroom.
- Dry& water-based fire fighting systems as per specs below.
- Sprinklers for high pressure receivers
  - Emergency lighting system: To be inverter based
  - Emergency alarm system: To be provided with switches near all cold store doors and
  - Alarms located in common public areas
  - Lightning arrestors for the building as per local regulations

- **Fire Fighting:** To be installed as per clearance and requirement of Fire Regulatory authority

Eg:- DRY TYPE

- DrychemicalpowdertypeKgCapwithISIMarkFireExtinguishercompletewithwall mounting bracket.
- CarbonDi-Oxide (CO2) type 4.5Kg. capacityFireExtinguishercompletewithwall mounting bracket.
- G.I. Fire Buckets
- M.S. Stand for Fire Buckets

9. RIPENING AGENTS:

- The facility should be equipped with Ripening Dosing System. Usually piped to share acrossmultiple chambers.

- The air flow should be designed in such way which will allow even spread of dosing gas, temperature control and ripening in the chambers.

- Ethylene may be introduced in ripening chambers in one of the three ways- by using independent ethylene generator with regulator; ethylene cartridges and ethylene-nitrogen mixture (5% ethylene + 95% nitrogen) cylinder.

10 VENTILATION SYSTEM:

- When fruits are ripening, they release carbon dioxide which will build up in a ripening room.

- The CO_2 production begins as the fruit ripens enters the "climacteric" phase, or the period whenbananas release ethylene and have an elevated rate of respiration (along with a great deal of other physiological changes).

- Respiration involves the uptake of oxygen, the release of carbon dioxide, and the breakdown of starches.

- Carbon dioxide concentrations above 1% (10,000 ppm) will retard ripening, delay the effects of ethylene and cause quality problems. Suitable venting system consisting of fans/dampers/open – shut valves should be installed to maintain CO_2 concentration below 5000 ppm.

- In ripening rooms ventilation may be automatic or manual. In case of ripening rooms with pallet isolation, ventilation may be provided by a roof mounted fan which is identical in specification to the pressure fans.

- In case of automatic forced air exhaust / ventilation system with ducting, a dual inlet / discharge damper operates in parallel with the fan to allow fresh air from outside to replace the air within the room when vent is required. Automatic exhaust fans (either timed or sensor based) or "flow-though" (constant) ventilation are provided at two locations (one near ceiling of chamber and another a little above floor level) in each chamber.

- This also evacuates the ethylene after the desired exposure period and helps to maintain CO_2 concentration low (below 5000 ppm) during the ripening cycle for proper ripening. In such cases, opening and shutoff actuators/ valves control is affected by CO_2 sensor and timer device.

SUBSIDY COMPONENTS DETAIL

S. No.	Non-PressurisedRipening	PressurisedRipening	Cost Norm
1	Building- CIVIL and PEB with docking area for loading / unloading.	Building-CIVILandPEB with docking area for loading / unloading.	
2	ReceivingArea-comprisingof area within the premises which allows receipt of raw fruits for cutting, washing and crating.	Receiving Area- comprising of area within the premises which allows receipt of raw fruits for cutting, washing and crating.	
	In case of bananas coming packed in CFB boxes fromthe source, washing & crating would not be necessary.	In case of bananas coming packed in CFB boxes from the source, washing & crating would not be necessary.	**NON-PRESSURISED CHAMBER** Rs.1lakh per MT upto 300 MT per project per beneficiary. **PRESSURISEDCHAMBER** Rs.1.20lakhper MT upto 300 MT per project per beneficiary.
3	PUF insulated cold rooms, insulated floor, insulated doors, etc.	PUF insulated cold rooms, insulated floor, insulated doors, etc. The insulated cold rooms have a system of false ceiling or annular space created above the cold rooms which holds cooling coils placed in such a way that the air is sucked through these coils and routedintothecoldroomby way of spaces/cut outs in the cold room ceiling and pushing cold air through annular spaces between wall and palletised crates/ CFB boxes with or without air inlet locking system to isolate the boxes or pallets.	
		The technical arrangement may vary and should be followed in accordance to design consideration of pressurized ripening system.	
4	Ceiling mounted evaporators/ unit coolers, etc. for maintaining uniform air circulation, temperature, humidity.	Special air flow system running through the depth of the chamber mounted on The ceiling which generates desired static pressure and allows suction from the centre.	
5	Multi-compressor rack system/individual condensing unit/ centralised chillers/ ammonia systems, etc.	Multi-compressor rack system/ individual condensing unit/centralised chillers/ammonia systems, etc.	
6	Ethylene distribution system-ethylene generator or ethylene	Ethylene distribution system-ethylene generator or ethylene	

	gas bank system.	gas bank system.	
7	Ventilation System – automatic to keep CO2 within limits with the help of CO2 analyser and controller Automatic Ventilation system works with a dual inlet/discharge dampers with fan to allow fresh air withinthe room when the concentration of CO2 exceeds the desired limit.	Ventilation System – automatic to keep CO2 within limits with the help of CO2 analyser and controller Automatic Ventilation system works with a dual inlet/discharge dampers with fan to allow fresh air within the room when the concentration of CO2 exceeds the desired limit. The placement etc.can vary and should be chosen as per requirement.	
8	Crates/Bins etc.	Pallets, CFB boxes stacked in single orin multitier system	
9	HPTs	HPTs, Fork Lifts incase of multi tier	
10	Weigh scale, firmness tester, refractometer, sizer and callipers and produce knife.	Weigh scale, firmness tester, refractometer, sizer And callipers and produce knife.	
11	Electrical panels, lighting, earthing and power backup (DG Set)	Electrical panels, lighting, earthing and power backup (DG Set)	
12	Ripening Management System (RMS)	Ripening Management System (RMS)	

- Cost would be Rs.1Lakh/MT or 1.2Lakh/MT (as applicable) irrespective of solar, thermal bank, bio-mass or conventional grid powered technology used.

SUBMITALS along with DPR/Application:

1. Basic Data Sheet
2. Heat Load Calculation Sheet.
3. Drawings:
4. Technical Performance Data Sheets of proposed Refrigeration Equipments, etc. to be installed, to be submitted from the respective equipment manufacturer.
5. Energy Efficiency Sheet:

Note:

i. Follow relevant BIS Codes on safety and Standards
ii. Please provide relevant structural safety certificate from certified structural engineer, certified architects, certified agencies or certified person relevant to building norms.
iii. Fire safety norms to be followed as per relevant BIS codes and Standards. Clearance certificate to be provided.
iv. Environmental Clearance certificate to be provided as per requirement and relevant codes and standards.
v. In conventional ripening storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range 0° C and above.
vi. Use of inverter compressor / Digital compressor/ compressors with capacity control/reciprocating or screw compressors with microprocessor based controls should be used with choice of natural refrigerants/ refrigerants as described above should also beconsidered to promote energyefficiencyand sustainable development

NOTE-Add-onComponent:

To promote renewable energy, applicant can also avail component Alternate Technology as an add-on component

BASIC DATA SHEET

RIPENINGCHAMBER(CS-3)

NOMENCLATURE: _____

A. COMPONENTDETAILS:

S.No.	Description	Units	Chamber1	Chamber2	Chamber3
A	**Capacity Details**				
1	Holding Capacity	MT			
2	Room Volume	m^3			
3	Room Size	mxmxm			
4	Number of ripening rooms	No.			
5	Peak ambient temperature	°C			
B	**Pallets**				
1	Size of Pallet	mmxmm x mm			
2	Size of crate/box	mmxmm x mm			
3	Crates/boxes per pallet	No.			
4	Pallets in each chamber	No.			
5	Number of tiers	No.			
6	Pallet LiftingSystem	NA			
C	**RipeningParameters**				
1	Ripening room temp.	°C			
2	Relative Humidity	%RH			
3	CO_2 concentration	PPM			
4	Ethylene concentration	PPM			
5	Airflow	CMH/CFM			
6	Product incoming temp.	°C			
7	Pulldown period	hr.			
D	**Insulationdetails**				
1	Walls, ceiling and partition (material, PP/SS &thickness)	mm			
2	Floor-Type (material & thickness of insulation)	mm			
3	Area of Floor Insulation	m^2			
4	No. of Layers of floor insulation	No.			
5	Finish floor Type	NA			
6	Density of Insulation	Kg/m^3			
7	Exterior wall construction (material and type)	NA			
E	**Doors**				
1	Size of door	mmxmm			
2	Type of door used	NA			
3	Total number of doors	No.			
4	Emergency measures (alarm, exit system)	NA			
F	**Refrigeration load**				
1	Estimated refrigeration load per	kW			

	chamber				
2	Total refrigeration load	kW			
G	**Refrigeration system/Condensing Unit Details**				
1	Refrigerant used	NA			
2	Refrigeration system	NA			
3	Refrigeration capacity	kW			
4	Capacity of Compressors	kW			
5	Total No. of Condensing Units / with or without compressors	No.			
6	COP of refrigeration system	NA			
7	Number of Evaporators	NA			
8	Air flow	CMH/CFM			
9	Static pressure & fan rating	Pa&kW			
10	Manufacturer name	NA			
H	**Ripening system**				
1	Ethylene applicator (Make)	NA			
2	Portable or Centralized	NA			
3	Number of cylinders	No.			
4	Capacity per cylinder	m^3			
5	Type of controller and Ethylene range	NA			
6	CO_2 exhaust system	NA			
7	Humidifier system details	NA			
I	**Electrical load**				
1	Lighting load	kW			
2	Refrigeration load	kW			
3	Any other miscellaneous load	kW			

B. ELECTRICALDETAILS:

S.No.	Parameters	Unit	Value	PowerUtilisation Ratio
1	Sanctioned Load by the Respective Board	kW		
2	Total Power Requirement at Peak Load Period	kWh		
3	Total Power Requirement at Holding Load Period	kWh		
4	Total Power Requirement at lean period	kWh		

Place..... **Signature and**

Date..... **Name of Applicant**

Place.....Name in Capital Letters

Date..... **Signature & Seal of Consultant**

*****Follow NCCD Guidelines for the purpose of installing Ripening Chamber. E.g.- Insulation, Doors, Floors, Strip Curtains, Ante Rooms, Volumetric Conversion, Refrigeration, etc.

Please add or subtract columns as per proposed number of chambers for the project.

All mandatory rules and regulations (BIS, ISO, IS, MNRE, etc.) relevant to the item must be complied with.

Please don't leave any space blank. Write N/Awhere not applicable.

COLD ROOM TRANSIT

The transit cold room (previously known as Cold Room Staging) is used for storage of produce with required temperature and humidity conditions either in a packhouse, Collection & aggregation centre or along with Farm Gate Packhouse. These cold storages are the initial points in the cold chain used to enhance shelf life, protect the quality, etc. and vitally form the arrangement before transit to markets, or distribution centres or to retail, etc. These cold rooms are defined as transit cold rooms since they play role very immediately after the harvest and before the transit actually begins. These are used as short term storages.

- **Classification:**

  TypeS-1:10MTto30MT Capacity

  TypeS-2:30MTto100MT Capacity

  TypeS-3:

- Ripening Chambers-In the multiples of 10MT or15 MT (Max.capacity as per MIDH norms) This nomenclature is applicable when Ripening chambers are installed with solar based photo voltaic system/ bio-mass/ thermal storage system. (Refer Ripening Chambers guidelines)

Options:

- Solar based system: Solar Photo Voltaic Module array.
- Hybrid: These kinds of cold stores have both the option to run on available solar based power and on grid electricity when solar power is unavailable.
- Conventional: These cold storages are usual conventional storages running solely on grid electricity.
- Thermal Storage: The electrical energy from the grid powers the compressor to generate cooling. The cooling generated from the refrigeration system is stored in the thermal energy storage in phase change material (PCM). The thermal energy storage can simultaneously charge and provide cooling in the cold room. During a power cut the thermal energy storage can provide cooling inside the cold storage to maintain the temperature. There is a small battery bank to run the auxiliary components of the system such as system controls, evaporator fans, pumps, etc.

- Bio-mass: The system uses agricultural waste (biomass) to power the refrigeration process, making it an eco-friendly and cost-effective solution for post-harvest storage. Unlike the vapour compression cycle, no compressor is used. The compressor is replaced by a three-step process achieved by the adsorber/absorption, and the desorber. The operation of vapour adsorption cycle is based on the ability of porous solids (the adsorbent) to adsorb vapour (refrigerant) when at low temperature, and to desorb it when heated. The hot water that drives the adsorption cycle is produced by the combustion of biomass in the hot water generator or utilizing other heat generating sources.

- Phase Change Materials, Synthetic refrigerants or Natural Refrigerants as heat transfer medium to achieve desired cooling effect.

1. Capacity: Cold RoomTransit

S.No.	Description	Max. allowed capacity
1	Farm gate Standalone cold room in multiple of 10MT (available as add-on with Farm Gate Packhouse)	10 MT
2	Cold Room Transit in Integrated Packhouse in multiple of 15 MT	30 MT
3	Cold Room Transit in Collection & Aggregation center in multiple of 15 MT	60 MT
4	Standalone Cold Room Transit in multiples of 15MT	30 MT

AVAILABLE OPTIONS	CAPACITY	COST NORM
Cold Room Transit (Option I) Decentralised cold storages based on solar technologies or hybrid running on batteries, solar PV panels, microcontrollers, etc. along with ante rooms, Thermal storages (all kinds), insulation, doors, necessary civil work and refrigeration systems. Refer Solar cold based cold storage for details	Max.30 MT (2 chambers of15MT)	**Rs.52.00 lakh/ 30 MTs**
Cold RoomTransit (OptionII) In case of cold rooms based onThermal storage type where electric energy is available for 8 hrs/day (No DG Sets are allowed)	Max.30 MT (2 chambers of15MT)	**Rs.30.00 lakh/ 30 MTs**
Cold RoomTransit (OptionIII) The cold room transit are conventional cold rooms working on conventional refrigerants with ante rooms, insulation, doors necessary inside civil work and refrigeration systems.	Max.30 MT (2 chambers of15MT)	**Rs.15.00 lakh/ 30 MTs**

Preferred to run these transit cold stores either on DRE technology (De-centralised Renewable Energy) or Hybrid mode or thermal storage type or conventional cold rooms.

The component "Cold Room Transit" comprises:

❖ **Insulated Room:** The transit cold room insulation should be PUF/PIR/VIP (excluding EPS) or any other new environment friendly insulating material of thickness min 100 mm. sandwiched in either pre-painted GI (0.45 mm Min. thickness) or SS (food grade SS-306) sheets. The height of the cold room is restricted between 3.8 m or 3 m as applicable.

❖ Civil works involve the construction of 1.06 Mtr finish floor level raised platform. The finished floor should be kota stone/ epoxy or any other finished floor type. A proper level needs to be maintained inside the packhouse (IP) with drainage system for dispensing water.

❖ The floor in the transit cold rooms should be of base concrete, with kota stone/ epoxy or any other finishedfloor typeinside thefloor chambers. Floor insulation slab preferably XPS (EPS not allowed) laid in two layers. The Floor should be cleaned, painted with black Japan paint and then laid with 1st layer of vapour barrier which can be either 250 microns tarfelt sheet or polythene sheet of suitable thickness. The vapour barrier should be covered with 1st layer of insulation and overlaid with 2nd layer of insulation in a manner to cut the gaps in the first layer of insulation. The joints can be filled with suitable hot grade bitumen (80:25). The 2nd layer of insulation is then covered with 2nd layer of vapour barrier which would be upto 1 mm thick tar felt or poly felt sheets with 5 mm overlap on the walls.

❖ The laying of Trimix should be 75 MM to 100 MM thickness with any suitable finish like kota stone, epoxy etc. and anti skid tapping. The floor level of the cold storage should match the floor level of the Integrated packhouse (IP) for easy movement of material as well as MHEs. In case of raised floor levels a suitable graded ramp to be either fixed or made outside the door for mechanised movement of the goods.

❖ The Cold Room should be installed in such a way that small HPTs/BOPTs can be used to load/un-load the material mechanically.

❖ The insulated door should be either overlap or inline or sliding but of the same thickness as that of the panel with a view window on the door properly fitted alongwith heater for anti- condensation on the glass. The door should be fitted with strip curtains form inside with 0.5 mm overlap from SS hooks or hangers.

❖ **Associated Refrigeration Equipment:** This includes the refrigeration system necessary to maintain the desired temperature within the transit cold storage and cold

room transit (staging).

❖ The specific equipment selection (compressors, condensers, evaporators) will depend on factors like target temperature, desired cooling rate, and ambient conditions. This is the core component responsible for removing heat from the product. The transit cold room refrigeration unit normally is a ceiling suspended which allows movement of cold moist air within the stacked produce uniformly and rapidly.

❖ The units should be designed with good air flow (not less than 50-80 cfm per ton of storage, and air throw designed upto the length of the room, the fan grill designed in such a way that it allows air to escape in all the direction at the outlet of the fan to create uniform air movement).

❖ Electronic expansion valves (wherever necessary) should be used to control the temp difference between the refrigerant inlet temp and the coil temperature so as to maintain optimum and required humidity inside the chamber electronically.

❖ Keeping in view the sustainable development the selection of refrigerant should be done carefully and importantly those refrigerants with low GWP and ODP should be used.

❖ In conventional storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range 0° C and above. The selection of the type of the compressor should be done with care depending upon the capacity of the compressor at the desired conditions it has to achieve, its working envelope, and serviceability should be kept in mind while choosing the desired unit.

❖ Inverter compressors / digital compressors / compressors with capacity control which allows optimization of capacity as required thereby lowering the energy cycle cost are encouraged and preferred.

❖ The condensing unit/ condensers/ heat exchangers should be designed with the proper refrigeration capacity with safety factors and keeping in view the ambient conditions, condensing temperature in case air cooled condensers are used.

❖ Wherever possible and depending upon the wet bulb approach either water cooled condensers or air cooled condensers with adiabatic cooling should be used to augment the refrigeration capacity and help in reducing the energy costs thereby promoting sustainable development in the cold chain sector.

❖ In some configurations, an additional ante-room might be incorporated before these transit cold rooms. This creates a multi-stage buffer zone, further minimizing temperature fluctuations within the main cold room. The ante rooms are basically

insulated rooms- min. 60 mm PUF insulation, floor insulation to be done same way as cold rooms with insulated doors of any type- inline, overlap, sliding. The ante room should allow the door opening ofthe transit cold rooms within the ante room with sufficient movement within to allow goods movement through MHEs (HPT, BOPT, etc.) without hindering opening of staging cold room doors. The ante rooms can also be installed with refrigeration unit optionally to prevent thermal shock to the produce during loading and unloading.

❖ Material handling is defined as those equipments which allow movement of product/producewithin the warehouse/packhouse.These equipments are essential in terms of allowing the produce to move rapidly and compliment the stacking elements like shelves, racks, bins, pallets to allow maximum storage capacity, faster product access, and allow scientific inventory control.

Design Considerations:

- **Humidity Control:** Maintaining optimal humidity levels within the cold room transit is crucial to prevent moisture loss and wilting of fruits and vegetables. Humidification systems may be integrated into the refrigeration design.
- **Temperature Control:** The target temperature range for the cold room transit will depend on the specific produce being stored. However, it should generally be slightly higher than the main cold storage area to minimize temperature fluctuations upon access.

NOTE/ESSENTIALS:

❖ All mandatory rules and regulations (BIS, ISO, IS, MNRE, etc.) relevant to the item must be complied with.

❖ In conventional storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range 0° C and above.

❖ Use of inverter compressor / Digital compressor/ compressors with capacity control with choice of refrigerants as described above should also be considered to promote energy efficiency and sustainable development.

❖ Under farm gate packhouse only 10 MT cold storage per project is allowed as an add- on component.

❖ Under Cold Room Staging (C-6), BIO-MASSTechnologyis also applicablefor subsidy. Under this component Max. 30 MT capacity in multiple of 15 MT is allowed. For BIO- MASS Technology cost norm of Rs. 14 lakh per chamber of 15 MT is applicable.

#ODP is Ozone Depletion and GWP signifies Global Warming Potential

BASIC DATA SHEET FOR COLD ROOMS

S.No.	Description	Unit	Details
1	Name of the Produce	NA	
2	Room size	mxmxm	
3	Vol of each room	m^3	
4	Total number of rooms	No.	
5	Total capacity of the facility	MT	
6	Room Temperature	°C	
7	Relative Humidity	%	
8	Produce loading rate	kg/day	
9	Produce incoming Temperature	°C	
10	Ambient Temperature	°C	
11	Pull Down Time	hr.	
12	Insulation-walls	mm	
13	Insulation-floor	mm	
14	Insulation-door	mm	
15	Insulation- ceiling	mm	
16	Type of Cold Room	NA	
17	Technology Used	NA	
18	Refrigeration capacity	kW	
19	Type of Compressor, make & model	NA	
20	Evaporating Temperature	°C	
21	Condensing Temperature	°C	
22	Type of Evaporator, make & model	NA	
23	No. of Fans in Evaporator & Size of fans	No.&mm	
24	Air Flow	CMH/CFM	
25	Available grid connection at the site & type of phase/voltage	kW	
26	Solar Panel Capacity	kW	
27	Type & No. of solar panels	No.	
28	DG Set capacity (optional as required)	kW	
29	Type of thermal storage	NA	
30	Quantity of PCM	kg	
31	No. of thermal storages	No.	
32	No. of batteries, capacity & type of battery	No.&VAH &NA	
33	Electrical Load Connected on batteries	kW	
34	Type of fuel for bio-mass	NA	
35	Consumption rate of bio-mass	kg/hr.	
36	All Electrical load used in bio-mass technology	kW	
37	Refrigeration technology in bio-mass	NA	

S.No.	Description	Unit	Details
38	Machine make & model & Number	No.	
39	Type of refrigeration system	NA	
40	Refrigerant Used	NA	
41	Secondary Refrigerant if used	NA	
42	Ante room size and capacity	mxmxm /MT	
43	Ante RoomTemperature	°C	
44	Method of stacking	NA	
45	Total Power Consumption per Day	kWh	
46	Unit Rate per Day	Rs./unit	
47	Cost of Energy	Rs./day	

SOLAR BASED COLD ROOM / STORAGE

In areas lacking grid access or facing frequent outages, maintaining a cool environment for perishables poses a significant challenge. Off-grid cold storage systems powered by solar energy offer a robust and technically sophisticated solution. This chapter delves into the intricate workings, components, and design considerations for such systems.

Key Components and Their Technical Specifications:

A well-designed off-grid solar-powered cold storage system comprises several critical components, each playing a vital role:

- **Solar Panels:** These panels are typically made of monocrystalline or polycrystalline silicon. They come in various wattages, with higher wattage panels offering increased energy output per unit area. The system design considers factors like solar irradiance levels in the specific location to determine the number of panels required. The Solar Cold Storages should incorporate PV (Photovoltaic) Array of 4 KWp to 12KWp.

- **Solar Charge Controller:** This intelligent device plays a crucial role in regulating the charging process for the battery bank. It prevents over charging, which can damage batteries and shorten their life span. Maximum Power Point Tracking (MPPT) controllers are preferred, as they optimize power output from the solar panels under varying weather conditions. This should work with high efficiency (above 95%)

- **Battery Bank:** Deep-cycle batteries, typically lead-acid or lithium-ion, are used for energy storage. Their capacity (Amp-hours) determines the amount of energy they can store and for how long they can power the refrigeration unit during periods of low solar generation. Battery selection considers factors like depth of discharge (DoD) - the usable portion of the battery's capacity - and ambient temperature, which can impact battery performance. This should be designed for 2-3 days of autonomy.

- **Inverter:** This device converts the stored DC battery power into AC electricity usable by the refrigeration unit. Selection criteria include inverter efficiency, output power rating to meetthe refrigeration unit's peak demand, and pure sine wave output for compatibility with sensitive equipment.

- **RefrigerationUnit:** High- efficiency, DC-powered refrigeration units are specifically designed for off-grid cold storage systems. They utilize technologies like variable speed compressors and efficient evaporator and condenser coils to minimize energy consumption.

- **Thermal Mass (Optional):** In some systems, a thermal mass like large water tanks can

be integrated for additional cooling storage capacity. This stored coolness can help supplement the refrigeration unit during peak cooling demand periods. The thermal mass material's specific heat capacity and the tank's size determine its effectiveness.

- **Thermal Energy Storage:** Several thermal energy storage (TES) technologies can be integrated into off-grid cold storage systems:

- **Phase ChangeMaterials (PCMs):** These specialized materials absorb and release heat during phase transitions (solid to liquid or vice versa). PCMs can be incorporated into panels within the cold room walls or integrated into a separate storage tank. The selection of PCMs considers the desired operating temperature range for the cold storage.

- **Chilled Water Storage:** Large, insulated water tanks are used to store cool water generated by there frigeration unit during off-peak periods. This chilled water can then be circulated through the cold room during peak cooling demand periods, reducing the load on the refrigeration unit.

- **Ice Slurry Storage:** In this method, a mixture of water and ice is stored in a tank. Theice slurry provides a high cooling capacity due to the latent heat of fusion of ice. This option is particularly suitable for applications requiring very low storage temperatures.

The optimal TES technology selection depends on factors like the desired storage temperature range, available space, and system budget.

System Design and Considerations:

- Designing an off-grid cold storage system requires careful consideration of various technical factors to achieve optimal performance and efficiency.

- **Storage Capacity and Cooling Load:** Off-grid cold storage systems powered by solar energy are particularly well-suited for remote locations lacking reliable grid access, the cold stores maybe setup inthis regard upto 10MT running fully on solar and upto 60MT running in hybrid mode.

- **Insulation:** The size and thermal insulation quality of the cold room significantly impact the required cooling power. Higher insulation R-values reduce heat transfer into the storage space, lowering the cooling load. Generally, PUF panels of 100 mm or equivalent is used.

- **Energy Consumption and System Sizing:** The refrigeration unit's energy consumption

(measured in Watt-hours per day) needs to be balanced with the solar panel output (Watt- hours per day) and battery storage capacity. This ensures the system can maintain desired temperatures throughout the day and night.

- **Local Climate and Solar Irradiation:** The amount of solar energy available in the specific location is crucial. Solar irradiance data, typically measured in peak sun hours per day, is used to determine the optimal number of solar panels required for sufficient energy generation. Exact values to be referred as per the guidelines published by MNRE.

- **Load Profile and Battery Bank Sizing:** Understanding the anticipated usage patterns, including peak cooling demand periods, is essential. This information helps determine the appropriate battery bank capacity to ensure enough energy storage is available during periods of low solar generation.

- **Sophisticated system design software canbe employed to model energy consumption, battery bank behavior, and system performance under various operating conditions. Consulting with experienced solar system designers is highly recommended to ensure a system configuration tailored to your specific needs and location.**

BASIC DATA SHEET FOR SOLAR COLD ROOMS

S.No.	Description	Unit	Details
1	Name of the Produce	NA	
2	Room size	mxmxm	
3	Volo feach room	m^3	
4	Total number of rooms	No.	
5	Total capacity of the facility	MT	
6	Room Temperature	°C	
7	Relative Humidity	%	
8	Produce loadingrate	kg/day	
9	Produce incoming Temperature	°C	
10	Ambient Temperature	°C	
11	Pull DownTime	hr.	
12	Insulation-walls	mm	
13	Insulation-floor	mm	
14	Insulation-door	mm	
15	Insulation- ceiling	mm	
16	Type of Cold Room	NA	
17	Technology Used	NA	
18	Refrigeration capacity	kW	
19	Type of Compressor, make & model	NA	
20	Evaporating Temperature	°C	
21	Condensing Temperature	°C	
22	Type of Evaporator, make & model	NA	
23	No. of Fans in Evaporator & Size of fans	No.&mm	
24	AirFlow	CMH/CFM	
25	Available grid connection at the site & type of phase/voltage	kW	
26	Solar Panel Capacity	kW	
27	Type & No. of solar panels	No.	
28	DG Set capacity (optional as required)	kW	
29	Type of thermal storage	NA	
30	Quantity of PCM	kg	
31	No. of thermal storages	No.	
32	No. of batteries, capacity & type of battery	No.&VAH &NA	
33	Electrical Load Connected on batteries	kW	
34	Type of fuel for bio-mass	NA	
35	Consumption rate of bio-mass	kg/hr.	
36	All Electrical load used in bio-mass technology	kW	
37	Refrigeration technology in bio-mass	NA	

S.No.	Description	Unit	Details
38	Machine make & model & Number	No.	
39	Type of refrigeration system	NA	
40	Refrigerant Used	NA	
41	Secondary Refrigerant if used	NA	
42	Ante room size and capacity	mxmxm /MT	
43	Ante RoomTemperature	°C	
44	Method of stacking	NA	
45	Total Power Consumption per Day	kWh	
46	Unit Rate per Day	Rs./unit	
47	Cost of Energy	Rs./day	

REFER VAN

Refrigerated Transport is transferring the produces in maintained temperature and humidity conditions. This is very important segment to keep our cold chain intact. The refrigerated transport is usually carried on roadways on Electric or I.C. Engine based vehicles.

- **Please note that all subsidies on the reefer will be based on "The Load Carrying Capacity of the Container" only.**
- The load carrying capacity of container is determined after subtracting thesum of kerb weight of the chassis + container weight + weight of Reefer unit from the Gross Vehicle Weight (GVW) of the chassis.

Sample Calculation Sheet:

S.No.	DESCRIPTION	WEIGHT IN KGS	WEIGHT IN MT
1	GROSS VEHICLE WEIGHT (GVW) OF CHASSIS	16000	16
2	KERB WEIGHT OF CHASSIS	5000	5
3	CONTAINER WEIGHT	2000	2
4	WEIGHT OF REEFER UNIT	600	0.6
5	LOAD CARRYING CAPACITY OF REEFER TRUCK	8400	8.4

SUBSIDY COMPONENTS DETAIL:

Component Description	NHM
Max.Vehicle capacity	4 MT and upto max.14 MT
Cost	For the purpose of calculation Rs.3.45 lakhs /MT would be considered. The cost would b ecalculated On the pro-rata basis from 4 MT Upto max. of 14 MT.

❖ The beneficiary cannot claim more than 70MT in one application (e.g.- 14MT x 5 no. vehicles) and after submitting due usage of vehicles - purpose of transporting horticulture produce, names of the produce transported, Reefer RCs, insurance, etc. at the time of new application can apply for another 5no.vehicles (e.g.- 14MTx5no. vehicles) under the same name and style. The max. capping is as follows:

- 4MT-6MT: Max.11vehicles in batches of two application
- 6MT–9MT: Max.11vehicles in batches of two application
- 10MT–14MT: Max.10 vehicles in batches of two application

❖ Mission can support Refrigerated Transport between 4MT upto 14MT.

❖ The new technologies should be promoted and capacities to be derived on the basis of **the Load Carrying Capacity of the Container**.

❖ The vehicle should be equipped with GPS enabled systems and telematics for access and control.

❖ Liquified N_2 technology, etc. will also be admissible.

BASIC DATA SHEET – REFER TRANSPORT

S.No.	Description	Unit	Details
A	**Truck Chassis Details**		
1	Chassis number	NA	
2	Make and Model	NA	
3	Type of Vehicle (Diesel/CNG/ Electric/ Others)	NA	
4	Engine power	kW	
5	Rated payload–carrying capacity of Vehicle	MT	
6	Outer dimensions of vehicle	mxmxm	
7	Driver Cabin details (withAC/ without AC)	NA	
8	Total number of tyres	No.	
B	**Insulated Container**		
1	Container dimensions	mxmxm	
2	Insulation Material Type	NA	
3	Insulation Thermal Conductivity	W/m.K	
4	Insulation Thickness	mm	
5	Container Type (GRP/MS/ STEEL/OTHER)	NA	
6	Weight of Container	kg.	
7	Name of Container Manufacturer	NA	
8	Container manufacturing year	Year	
9	Application (Chilled/Frozen)	NA	
C	**Refrigeration Unit**		
1	Make and Model number	NA	
2	Unit Type (Self Powered/ Vehicle Powered/Electric/Eutectic/Other)	NA	
3	Refrigerant used	NA	
4	Refrigeration capacity	kW	
5	Compressor Displacement (CC)	cm^3	
6	Defrosting system	NA	
7	Airflow	CMH/CFM	
8	Standby Motor Load	kW	
9	Diesel/electric auto-switching used	NA	
10	Controls Type (Manual/Automatic)	NA	
D	**Telematics**		
1	Temperature remote Monitoring & Controlling device Type	NA	
2	GPS (Make and model)	NA	
E	**Registration Details**		
1	Vehicle Registered as	NA	
2	State of Registration	NA	
3	RTO Office	NA	

S.No.	Description	Unit	Details
4	RC Details	NA	
5	Any Other	NA	
F	**Details of Existing Vehicles**		
1	No. of vehicles availed previously	No.	
2	Capacity of availed vehicles	MT	
3	Date of claiming previous subsidy	NA	
4	Board/Organization from where subsidy released	NA	

Place…….. **Signature and**

Date…….. **Name of Applicant**

Place……. **Name in Capital Letters**

Date……Signature &Seal of Consultant

All mandatory rules and regulations (BIS, ISO, IS, MNRE, etc.) relevant to the item must be complied with.

COLD STORAGE

The DHO concerned shall submit the project proposal in 2 sets (one in original and one in duplicate) with all the documents as per check list along with application as prescribed by the MIDH along with his recommendations for placing the project proposal in the SLEC meeting for approval.

The project proposal should be numbered in print / ink with index showing the contents as mentioned in check list.

Bank appraisal is different from bank consent letter, wherein the project is discussed and appraised in a more detailed manner for sanction of loan amount. Each bank will be having its own proforma of appraisal.

As per the directions of the MIDH the projects shall be recommended as per the following component wise cost.

Sl.No.	Item	% Of the project cost (range)
1	Civil construction	50 – 55
2	Thermal insulation	10 – 15
3	Refrigeration system	20 – 25
4	Electrical system	10 – 15

Calculation of Capacity for Subsidy:

3.4 Cubic meters (cum) / 120 Cubic feet (cft). of chamber volume shall be considered equivalent to 1 (One) MT of storage capacity.

Title of the land and copy of record of right

The title of the piece of land on which the project is proposed to be set up should be in the name of applicant in the capacity of owner or lessee for minimum period of 10 years. In case of land leased, lease deed it should be registered with the Authority like office of Sub-Registrar, etc. A latest copy of record of right showing this fact should be enclosed with the application. Mortgaged land shall not be treated at par with lease even if the credit institution might have considered so. Similarly, Power of Attorney given by owner of land in favour of applicant shall not qualify him for benefit under the scheme.

- As the following documents are mandatory the ADH shall obtain the same for seeking techno viability advice before placing the project in SLEC:

1. Layout of the proposed cold storage unit in accordance to the statutory building by laws and building codes and standards duly approved by a registered architect and structural engineer.

2. Technical data sheets of each equipment namely compressors, condensers, cooling towers, Air cooling units giving general layout, dimensions, material of construction, rated capacity, operating parameters and COP duly certified by respective equipment manufactures with respect to relevant codes and standards.

- The project proposal received in State cell from the ADH with all the above required documents shall be forwarded to the technical consultants for Techno economic Viability study.
- The project proposals that are economically and technically viable shall be placed before the SLEC for approval.
- After SLEC approval, the Commissioner of Horticulture will issue Administrative Sanction proceedings to the applicant unit.
- **"Old projects which are complete and have started commercial production should not be recommended to NHM just for reimbursement of subsidy".**
- **The projects appraised at District Level with due diligence, subsidy should be commensurate with promoter's share and in no case, subsidy should exceed the term loan sanctioned by the lending bank. The loan amount should be higher than the subsidy amount.**
- The ADHs after receiving the in-principal sanctions, shall inspect the site and submit the preliminary report in the mentioning the status and progress of the project work duly recommending for the release of 1st installment subsidy to the concern bank.
- Basing on the preliminary report of the ADH concerned the State cell shall release 1st installment subsidy to the concerned bank of the promoter through online transfer.
- After completion of the project, the ADH shall recommend through a letter for joint inspection of the project along with bank disbursement statement / completion letter from Banker.
- After obtaining permission from state office, the ADH shall conduct Joint Inspection with the following committee members:

  - Sr. Officer from Commissionerate / Project Director, APMIP / DDH of the

concerned district.

- ❖ Technical Consultant
- ❖ DHO concerned.
- ❖ Horticulture officer concerned.
- ❖ Horticulture Engineer
- ❖ Promoter
- ❖ Banker

The committee shall submit Joint inspection report in the prescribed Formats for Cold Storage and based on the recommendations of the Committee, the final installment of the subsidy shall be released to the concerned bank of the promoter.

COLD STORAGE TYPE-I

A cold storage under type-1 category (CS-1) are aligned for long term bulk storage for storing of produce in bags, bulk or lots for the purpose of catering to off season demands. The produce canbe brought from either packhouses or directly from farms.

The produce/commodity classification is as per the attached List below.

COMMODITY SPECIFICATIONS

FRUITS

TYPE-I F (upto2°C):

Sl.No.	***Products***	***Temp***	***Humidity***	***Holding Time***
1	Apples	0-2° C	90-95%	1-6 months
2	Apricot	-0.5- 0°C	90-95%	1-3 Weeks
3	Blackberry	-0.5-0°C	90-95%	3-6 days
4	Blueberry	-0.5- 0°C	90- 95%	10-18 days
5	Cherries (sour)	0°C	90- 95%	3-7 days
6	Cherries (sweet)	-1-0°C	90- 95%	2-3 weeks
7	Grapes	-0.5-0°C	90- 95%	1-6 months
8	Kinnow	1°C	95%	2-4 weeks
9	Kiwi	0°C	90- 95%	3-5 months
10	Litchi	1-2°	0.95	3-5 weeks
11	Orange (FLhumidareas)	1 -2°C	85- 90%	8-12 weeks
12	Peaches	-0.5-0°C	90- 95%	2-4 weeks
13	Pears	-1.5-.0.5°C	90-95%	2-7 months
14	Plum	-0.5-0°C	90-95%	2-5 weeks
15	Raspberry	-0.5-0°C	90-95%	3-6 days
16	Strawberry	0-1°C	90-95%	7-10 days

TYPE- II F (2°C – 5°C):

Sl. No.	***Products***	***Temp***	***Humidity***	***Holding Time***
1	Cranberry	2-5°C	90-95%	8-16 weeks
2	Tangerine	3-6°C	85-90%	2-4 weeks
3	Pomegrenate	5°C	90-95%	2-3 months

TYPE-IIIF(5°C–10°C)

Sl.No.	***Products***	***Temp***	***Humidity***	***Holding Time***
1	Guava	5-10°C	90%	2 -3 weeks
2	Melons	5-10°C	85-90%	2-3 weeks
3	Avocado	5-8° C	85-90%	2-4 weeks
4	Papaya	7-13°C	85-90%	1-3 weeks

5	Dragon Fruit	4-10°C	90-95%	2-3 weeks
6	Pineapples	7-13° C	85-90%	2-4 weeks

TYPE-IVF(above10°C) :

Sl.No.	*Products*	*Temp*	*Humidity*	*Holding Time*
1	Passion fruit	10	85-90%	3-4 weeks
2	Rambutan	12	90-95%	1-3 weeks
3	Mango	12-13°C	85-90%	14-21 days
4	Banana	12-15°C	80-95%	14-21 days
5	Custard Apple	13°C	90-95%	2-4 weeks
6	Jackfruit	13°	85-90%	2-4 weeks

VEGETABLE

TYPE-I Vg (upto 2°C):

Sl.No.	*Products*	*Temp*	*Humidity*	*Holding Time*
1	Carrot (Bunched)	0°C	98-100%	10-14 days
2	Carrot (Topped)	0°C	98-100%	3-6 Months
3	Cauliflower	0°C	95-98%	3-4 weeks
4	Corn	0°C	95-98%	5-8 days
5	Garlic	0°C	65-70%	6-7 months
6	Mint	0°C	95-100%	2-3 weeks
7	Lettuce	0°C	98-100%	2-3 weeks
8	Mushroom	0°C	90%	7-14 days
9	Radish	0°C	95-100%	1-2 months
10	Spinach	0°C	95-100%	10-14 days
11	Sprouts	0°C	95-100%	5-7 days
12	Turnip Root	0°C	95%	4-5 months
13	Beet (Bunched)	0°C	98-100%	10-14 days
14	Beet (Topped)	0°C	98-100%	4 Months
15	Broccoli	0°C	95-100%	10-14 days
16	Cabbage (early)	0°C	95-100%	3-6 weeks
17	Cabbage (late)	0°C	95-100%	5-6 months
18	Peas	0-1°C	90-98%	1-2 weeks
19	Shallot	0-2°C	65-70%	1-2 weeks
20	Water Chestnut	1-2°C	85-90%	2-4 months
21	Onion	1-3°C	60-65%	4-6 months

TYPE-II Vg (2°C - 5°C):

Sl.No.	*Products*	*Temp*	*Humidity*	*Holding Time*
1	Oregano	0-5°C	90-95%	1-2 weeks
2	Tamarind	2-7°C	92-95%	3-4 weeks
3	Tomato	3-4°C	85-95%	10 weeks
4	Beans	4-7°C	95%	7-10 days
5	Potato (some varieties)	2-4°C	90-95%	5-10 Months

TYPE-III Vg (5°C - 10°C):

Sl.No.	*Products*	*Temp*	*Humidity*	*Holding Time*
1	Potato (late)	4-12°C	90-95%	5-10 Months
2	Potato (early)	10-15°C	90-95%	10-14 days
3	Chilli	5-10°C	85-95%	2-3weeks
4	Olives	5-10°C	85-90%	4-6weeks
5	Okra	7-10°C	90-95%	7-10days
6	Squash (courgette)	7-10°C	95%	1-2weeks

TYPE-IV Vg(Above 10°C) :

Sl.No.	*Products*	*Temp*	*Humidity*	*Holding Time*
1	Bitter Gourd	10-12°C	85-90%	2-3weeks
2	Cucumber	10-12°C	85-90%	10-14days
3	Eggplant	10-12°C	90-95%	1-2weeks
4	Lemon	10-13°C	85-90%	1-6months
5	Watermelon	10-15°C	90%	2-3weeks
6	Pumpkin	12-15°C	50-70%	2-3months
7	Squash (calabash)	12-15°C	50-70%	2-3months
8	Ginger	13°C	65%	6 months
9	Sweet Potato	13-15°C	85-95%	4-7months
10	Onion	25-29°C	60-65%	4-6months

TYPE- S (4°C - 10°C) :

Sl.No.	*Products*	*Temp*	*Humidity*	*Holding Time*
1	Dry Spices	4-7°C	65-75%	8-9months
2	Raisins	4-10°C	75-85%	6-12months

Essentials of Cold Storage Type-I (CS-1):

i. To identify the cold storage location for the produce that is coming into the store.

ii. Relevant data and information on the production area, type of produce, quality of produce, and connectivity and target market or hubs should be properly recorded and known for utmost utilisation of the facility.

iii. A Cold Store should be located close to the farm, should provide services to local farmers and should have facilities for pick and drop of produce by way of large or medium size reefer vehicles.

iv. A Cold Store should be connected to good roads and should be covered properly to prevent from sun, rain and other contaminants from environment.

v. A Cold Store should be designed well with sufficient areas for loading and unloading bays. It should have adequate water and electricity supplies and the drainage system should be done in a very well manner and necessary water treatment plant

should be used wherever applicable.

vi. A Cold Store should have all the necessary arrangements for safety and other desirables for the comfort of workers and other skilled professionals.

vii. A Cold Store may also have a weighscale at the receiving side. (Optional)

viii. It may be connected to various numbers of aggregation centres, etc. of a farmer produce organisations or any other help groups which allows seamless connectivity of the produce to the Cold stores in the shortest possible time thereby reducing post harvest losses.

Minimum Guidelines to follow:

Cold Storage Construction Features:

- Foundation/slab/columns/pillars/PEB structure-Civil construction/PEB
- Insulation/refrigeration-Cold Chambers (Max.capacity 4999 MT~5000 MT)
- Insulation/finish floor etc: - Floor
- Mezzanine/pallets/racks/crates/bins/bagsetc.-Inter-floors
- Insulated doors/strip curtains/air curtains-Doors
- Insulation-Ante room
- Compressors/condensers/pressure vessels/heat exchangers/electrical panels/power factor banks etc. -Machine rooms
- Dock levelers/dock shelters/dock doors etc.-Loading/unloading areas
- Transformers/DG set/Earthing/Light/lightning arrestors etc.-Electrical installations
- Conveyor belts/lifts etc.–Mechanisation
- Micro processors/data loggers/IoT/alternate energy etc. Automation & energy efficiency
- CCTV/parking areas/Office block/Convenience areas–Administrative block
- Fire fighting equipments/fire exits/firedoors-Safety & Hazard control

1. Civil Construction: Super structure and foundation to be designed by certified structural/ civil engineer/ architect/ certified agency. The design shall meet all BIS standards and relevant seismic zone norms for earth quake proof design. The building can be constructed either with brick wallswith RCC slab at top. However, in case pre-fabricated PUF panels are used directly as a box in/out option after following necessary standards and safety protocols, brick walls can be eliminated from the civil construction after due consideration to structural stability and design & certification of the building by a certified structural/ civil engineer/ architect/ certified agency.

Note:

- Super structure and foundation to be designed by certified structural/civil

engineer/ architect/ certified agency.

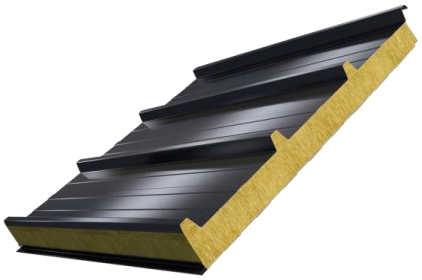
- Certification of the building by a certified structural/civil engineer/architect/ certified agency should be furnished while applying for subsidy.

Special consideration with reference to hanging arrangement of unit coolers from bottom of the PUF insulated ceiling panel with RCC slab on top of it-

- Prevent condensation and water leakages through gaps into the cold storage.
- Provision of cat walks for maintenance of pipes, controls, etc. in case of pipes running around the building.
- Installation of ceiling PUF panels below the RCC slab with minimum gap between the slab and the panel.
- Provision of inverted beams in the slabs allowing plain RCC slab from the bottom.
- Provision of water proofing with chemicals, etc. to prevent water seepage from RCC slab ontothe PUF insulated ceiling of the cold room.
- Special kind of runners, running along side the building to allow holding of the PUF panels.
- Extension of RCC slab around the building to prevent rain water to hit the panel directly and causing see page and damage.
- Sunken floors for laying and fixing of floor insulation in the areas where insulation is to be done.
- Thermal barriers to be made between all cold rooms and ante rooms
- The floor levels need to be in level at all the places for easy movement of MHEs.
- Use of material handling lifts which can accommodate both BOPTs and HPTs from basement (in case basement is done) upto the top floor.
- Each mezzanine floor inside the cold chamber to be connected through doors to the ante room at the same level of the mezzanine floor or to a landing area at the same level as that of mezzanine with easy access to fire exits as well as allowing movement of material handling equipments from lifts to the mezzanine floor.
- Two stair cases to be made at appropriate ends allowing movement of goods as well as acting as easy escape points. One staircase to be isolated with the cold storage area/ante rooms byfire rated doors which should be ISI/BIS marked for 120 minutes integrity and 30 minutes insulation.

PEB structure: The building should be constructed as per drawings and dimensions indicated. It is recommended to construct such facilities using steel construction/ Pre-Engineered construction confirming to the relevant BIS codes for live load as per IS 875 part– II, wind load as per IS 875 part-III, seismic load as per IS 1893 and other codes and standards as applicable. Also factors like wind, storms, lightning, thunderstorms, hail, heavy rains, snow, etc. should be taken in the safety designs and optimum care has to be taken on these factors to protect the cold room from these hazards. Earthing pits, Earthing, Lighting arrestors need to be installed to ensure safety from electric hazards

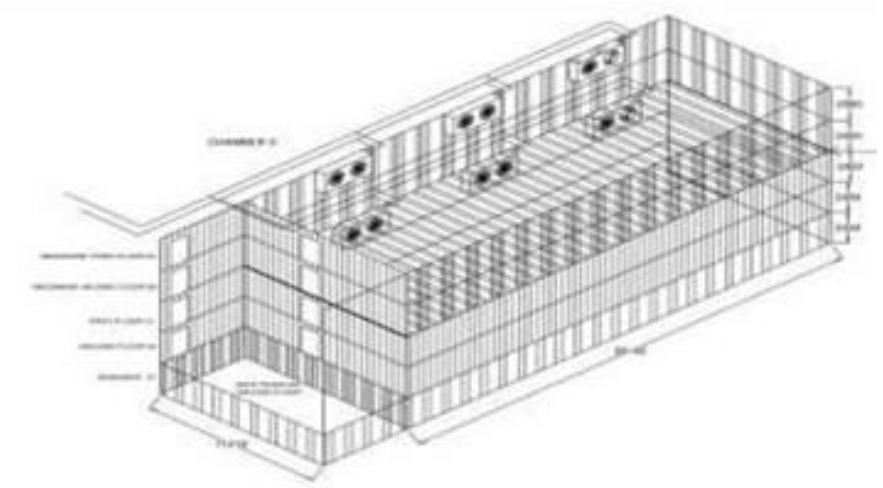
and protection against fire, etc. The steel structure component /construction sections to be fabricated confirming to relevant codes and standards of ASTM /BIS.



In case of PEB, roof insulated panels as per BIS guidelines can be also installed with plain ribbed sheets from inside and corrugated sheets from the outside with minimum 120 mm + 30mm thickness of the insulated panel. Care needs to be taken in ensuring that this kind of installation uses proper thickness of the panel and does not allow condensation or water dripping due to some part ofthe PEB structure inside the cold storage and some outside thereby causing thermal shock and allowing leakages. The building should be constructed as per drawings and dimensions indicated confirming to relevant codes and standards of BIS, IS.

Note: **Mezzanine bifurcation inside the chambers would not amount to single chamber and would be considered as 1 chamber from to bottom unless there is proper bifurcation inside the chamber and fulfilling all the criteria in terms of hard flooring, insulated flooring, dedicated refrigeration unit and access doors from the respective floor and connectivity to lifts and fire exits.**

The certifying agency, person etc. relevant to the line of work giving the clearance fit for construction will provide document duly signed and stamped.



2. Cold Chambers:(QUALIFICATIONFORCS-1)

Rule no.	Minimum Storage Capacity (MT)	Maximum Storage Capacity (MT)	MIDH/NHM Configuration
1	500	4999 ~ 5000	The combination of capacity of chambers in a project can be divided between min. capacity of 500 MT and up to a max. capacity of 1500MT (per chamber).

- The cold chamber is a box of specific size which is constructed with the help of insulation of different thicknesses to maintain temperature, humidity, etc. inside that cold chamber referred to as a cold storage. This cold storage is meant for storing different types of fruits and vegetables and other horticulture products which may or may not require pre-cooling depending upon the requirement to preserve the freshness, quality and shelf life.
- These cold storages require adequate refrigeration, air circulation, proper stacking and storage arrangements to achieve the required conditions for maintaining product temperature and other required conditions like humidity, CO_2levels, Ethylene levels, etc. to enhance the shelf life of the produce.
- Efficiency and performance in such stores is vital and depends upon various factors like appropriate storage system, optimizing space, allowing uniform air circulation through the produce, requirement of stock rotation if necessary. This is

abundantly important to consider in design so as to allow the economic viability of the cold store as it allows reduction in energy bills, less wastage and maintaining the quality of the produce.

- The cold storage consists of components which have been categorized for the purpose of submission in the applications for the purpose availing subsidy following the below specified minimum standards and guidelines under various components:

DETAILED SPECIFICATIONS

1. **Cold Store Building**- Ingeneral, under CS type-I (CS-1) both civil as well as PEB structures are allowed confirming to relevant BIS codes, fire safety guidelines as per state regulations and BIS standards applicable to buildings.

Sl.No.	Description	Remarks
1	Cold Store Building	The total height of the building including dock or foundation should not be more than 20 mtrs.
		The height of the dock should be not less than1.06mtr or as required from the finished road level
		In case of PEB structure holding cold rooms with boxes inside the PEB columns (Box-in type), special Z runners/support should be placed at every 3 to4mtr. Around these structure from the dock level for holding the wall insulation panels securely and tightly. Sufficient space should be provided outside of the foundation of PEB columns in and around dock/platform.
		In case of Basements for buildings with PEB structure or civil, the total height of the basement and the building (outer) should not exceed more than 20m.The individual height of the basement in this case should not exceed 5.2 m. with 1.06 m of the basement above the ground level with RCC slab acting as a table top/roof of the basement and floor for the cold storage above it. The basement needs to be constructed with due approval and clearances from the authorities and utmost care to be taken to prevent any water leakages/seepages inside the basement for which proper water proofing with latest methods needs to done on the outside of the retention walls inside the basement and other necessary areas. Proper Justification should be provided whenever basements are created and due approval for use of basement in cold storages should have proper approval and clearance from all the relevant authorities like planning, fire safety, etc. In case of table top structures, the floors should be insulated to prevent condensation in the basement floors. No basement floors with access from road level would be allowed in cold storages. However, the fire safety exits should go upto the basement floor and care should be taken during construction which does not allow flooding of the basement. Wherever

		possible use modern construction technologies, types of beams and columns suitable for setting up of cold storage should be implemented in construction. The design should be innovative with appropriate measures taken to ensure use of space with design of sunken floors, inverted beams, as required to allow maximum utilisation of space, minimum cutting of insulation panels, and easy installation for reducing gaps between the joints and preventing loss of cold, disallowing condensation and other problems. Appropriate care to be taken inside the cold storage flooring and use of technology, expansion joints, resins, epoxy, to create smooth floor level and prevent cracking of the floors thereby, not allowing moisture and water to travel upto insulation and creating efficiency issues as well as hazards to building. Suitable grade of concrete like M25, M28, M30, etc. with block testing should be done as per standards and guidelines.
		For all types of construction atleast 1mandatory service lift/conveyor material hoist system/ mechanized material handling conveyors should be operational from the basement upto the top floor along with 2 stair cases on two sides of the building which can be used for loading as well as fire exits. One stair case of the two needs to be placed at the end of the loading/un-loading ante rooms with closure at one end with a fire rated safety door at each floor.
		Preferably, a cat walk should be designed & provided to access areas above the cold storages. These areas should preferably include ventilation fans and special under-deck insulation to lower temperatures in these areas, reducing heat in filtration from the top and improving overall energy efficiency but not mandatory.
		While designing it should be considered to leave appropriate space for movement of fire trucks around the building, loading/unloading trucks, space for utilities like transformers, DG sets, in such a way that it does not hinder operations and possess threat to human safety and well being.

2.**Thermal Insulation:** Cold chambers have to be insulated on walls, ceilings / roofs & floors with proper insulating material of adequate thickness, with provision for vapour barrier on outer side & proper cladding/ cover on inner side. The commonly insulation materials are:

Rigid Polyurethane foam	Chloro fluoro carbon (CFC) free and self-extinguishing and shall conform to IS 12436: 1988.
Vacuum Insulated Panels	Conforming to BIS and IS standards
PIRPUF panels	Conforming to BIS and IS standards
Pre-Painted Galvanized Iron (PPGI)	The PPGI sheet shall have adequate thickness to with stand load and shall have zinc coating of min. 90 Gsm.

Flashing/Accessories	Made of PPGI sheet conforming to IS 14246:2013

Walls & Ceiling: Rigid PUF panels/PIR/VIP

Floor

1. Laying of polythene sheet, min.250 microns, as vapour barrier
2. Fixing insulations labs in two layers with bitumenas DHO essive for the first layer
3. Covering with tar felt
4. Laying PCC/trimix of 75mm/ 100mm thickness

For Insulated Panel Structure:

Walls & Ceiling

1. Perimeter of the plinth to be in level for panel installation
2. Panels to have camlock or tongue/grove joints
3. Sheet metal flashing to be provide do nall concrete/ wall ceiling joints internally& externally.PVC coving or concrete curbing to be provided on wall - floor joints.
4. Horizontal Tie bracings to be provided between vertical wall panels & external columns, to take care of wind loads
5. Adequate numbers of Pressure relief ports to be provided on all chambers with electrical connection

Minimum insulation thickness for various insulation materials

Type of insulation	Material		Wall		Ceiling/ roof U value = 0.24 W/m²K	Floor U value = 0.29W/m²K
			External U value = 0.27W/m²K	Partition U value = 0.58W/m²K		
	ρ Density Kg/m³	K (at 10 °C) W/mK	Thickness m m	Thickness m m	Thickness m m	Thickness m m
EPS	15	0.036	150	75	150	125
PUF	32	0.023	100	50	100	100
XPS*	30-35	0.025*	100	50	100	100
Phenolic foam ***	50	0.026	100	50	125	100
Mineral wool ***	48	0.033	125	50	125	100
Bonded fibre glass/ glass wool***	32	0.033	125	50	125	100

3.FLOOR:

1) The floor in the cold rooms should be of base concrete, with kota stone/ epoxy or any other finished floor type inside the floor chambers. Floor insulation slab preferably XPS (EPS not allowed) laid in two layers. The Floor should be cleaned, painted with black japan paint and then laid with 1st layer of vapour barrier which can be either 250 microns tar felt sheet or polythene sheet of suitable thickness. The vapour barrier should be covered with 1st layer of insulation and overlaid with 2nd layer of insulation in a manner to cut the gaps in the first layer of insulation. The joints can be filled with suitable hot grade bitumen (80:25). The 2nd layer of insulation is then covered with 2nd layer of vapour barrier which would be upto 1 mm thick tar felt or poly felt sheets with 5 mm overlap on the walls.

2) The laying of Trimix should be 75 MM to 100 MM thickness with any suitable finish like kota stone, epoxy etc. or any other finish floor. The floor level of the cold storage should matchthe floor level of the cold store for easy movement of material as well as MHEs. In case of raised floor levels a suitable graded ramp to be either fixed or made outside the door for mechanised movement of the goods.

3) The Cold Room should be installed in such a way that small HPTs/BOPTs can be used to load/un-load the material mechanically.

INSULATION & DOORS:

1) The cold room insulation should be PUF/PIR or any other new environment friendly insulating material of thickness min 100 mm. sandwiched in either pre-painted GI (0.45 mm Min. thickness) or SS (food grade SS-306) sheets.

2) The insulated door should be either overlap or in line or sliding but of the same thickness as that of the panel with a view window on the door properly fitted alongwith heater for anti- condensation on the glass. The door should be fitted with strip curtains form inside with 0.5 mm overlap from SS hooks or hangers. The outside of the door should be fitted with air curtains of suitable capacity.

3) Minimum door size recommended is 1mtr x 2 mtr (± 5% variation would be accepted on the min recommended size, however the upper size can be selected as per requirement). The no. of doors would be equivalent to no. of mezzanine floors.

4. ANTE ROOMS:

- Ante Rooms should be designed on each floor and shall be designed to accommodate stair case, hoists, lifts, fire exits, as per local norms and regulations as applicable on the type of building. Suitable design innovations should be incorporated to accommodate certain an cillaries in the seante rooms however, not jeopardizing the safety of the human.

- Each ante room should have doors leading to the cold rooms on every floor. The inner walls of the cold rooms canserve asthewalls forthe anterooms. The ceiling of theante room should beclosed with 60 mm PUF panel insulation, and the ends should be sealed as much as possible (though not mandatory). However, the side facing the fire exit must be fully enclosed and fitted with fire exit doors.

5. REFRIGERATION:

- Energy efficient refrigeration based systems need to be installed.
- For any operations which may require temperature condition and humidity condition upto 0°C and above refrigerants with GWP between 1000 to 1500 to be used.
- Individual systems would not be allowed above capacitieswhich are 2000 MT or more. In case of any further expansion more than 2000 MT, the same rule shall apply. And no individual refrigeration units for the expansion would be allowed. For further details on expansion.

6. LOADING/UNLOADING AREA:

- Loading and unloading docks shall be designed with RCC slab roof or sheet roofing and these should be wide enough to allow loading and unloading simultaneously when the loading/un-loading area should be bifurcated from the cold room ante rooms by an insulated sliding door.

7. ELECTRICAL INSTALLATIONS:

- Suitable step down OLTC transformers (if required) with earthing stations as per requirements, main power distribution panel for refrigeration lightning, electric hoists and lifts, automatic power factor correction panel (APFC), fire fighting equipments, etc.

- DG Sets, 1 small and 1 big equalling to the total requirement load in the cold storages. The type of DG sets should be considered as per applicable laws of pollution control board.

8. MECHANISATION:

- Appropriate Lifts/ conveyors/ electrical hoists with wire ropes, a steel fabricated cage with guides, and openable doors should be provided for material handling for managing the goods.

- Material movement can be facilitated using BOPTs for easier access to storage areas on the mezzanine floors, with the materials being transported from hoist, lifts, conveyer etc. through the ante room of the respective mezzanine floor into cold store.

9. UNIFIED CONTROL SYSTEM/AUTOMATION:

- Suitable configuration of electrical panels with micro processors, and HMIs, to be installed on the electrical panels with suitable sensors where, analog input received from all the equipments that is consuming electrical energy is converted into digital output for the purpose of bringing in energy efficiency into the building management system, These micro processors should be operated with static IPs and allow control and visualisation of cold room temperatures, humidity and other necessary parameters remotely by the authorised person.
- The microprocessor panel should also control necessary work done in terms of compressors for automatic operations and thereby, reducing the power consumption on the compressors, evaporator fans, pumps, condenser fans, etc. to bring in suitable energy efficiency into the facility.
- The IoT based systems should be installed for real time monitoring, tracking and surveillance of the facility remotely. This system is also equipped with early hazard detection and alarm activation protocols.

10. RENEWABLE ENERGY:

- The facility should be capable to generate atleast that much amount of the required energy which can run electrical lights, pumps (if possible), fan motors during holding period in daily operations from renewable sources of energy. The energy may be obtained by harnessing solar energy, wind energy, etc. and stored in auxiliary batteries if possible. (Batteries are not mandatory)

11. ADMINISTRATIVE BLOCK:

Every cold store should have a separate admin block equipped with office room,

12. SAFETY & HAZARD CONTROL:

Provision for handling accidental leakage of refrigerant:

a. Ammonia sensors in cold chambers near ACUs & machine room
b. Emergency ventilation for machine room

c. Safety release of refrigerant to water sump
d. Ammonia masks
e. First aid kit
f. Instructions for handling emergencies

Fire protection

a. Fire sensors in cold chambers & machine room.
b. Dry & water based firefighting systems as per specsbelow.
c. Sprinklers for high pressure receivers

Emergency ligting system: To be inverter based

Emergency alarm system: To be provided with switches near all cold store doors and alarms located in common public areas

Lightning arrestors for the building as per local regulations

FireFighting: To be installed as per clearance and requirement of Fire Regulatory authority E.g.-

DRY TYPE

- Dry chemical powder type5.0 Kg Cap with ISI Mark Fire Extinguisher complete with wall mounting bracket.
- Carbon Dioxide (CO2) type 4.5Kg. capacity Fire Extinguisher complete with wall mounting bracket.
- G.I. Fire Buckets
- M.S. Stand for Fire Buckets

WATER BASED

- 2 sets of Water supply pumps.
- 2 sets Fire fighting pumps
- G.I. piping, class C with necessary fittings &valves
- Rubber Hose reel
- Canvas Hose pipe
- M.S. Fabricated hosebox with key

MANDATORY SUBSIDY COMPONENTS:

DESCRIPTION & NAME	Max. ALLOWABLE QTY./CAPACITY	COST

i. **Cold Storage type –I (CS-1)** are cold storages designed mostly for single product storage where bulk and long-term storage is preferred. They are normally seen in brick and mortar structure; however, an applicant can also develop it under the pre-engineered building (PEB). It is further stated that all the building safety norms, stability certificates from architects or authorized agencies or certified person relevant to building norms, etc. electrical safety and earthing, fire safety norms as per applicable regulations, use of fire exit doors at places of exits, plant room safety norms, environmental clearances, handling areas, loading docks, PPE kits, hygienic storage spaces and storing methods, HACCP norms and regulations, FSSAI norms and mandated clearances, office and convenience areas (restrooms, parking, etc.) shall be considered as general requirement for the purpose of development of the cold store facility under this category. The list of BIS standards has been attached to be followed at all the relevant places. Consisting of: i. **Construction:** Foundation/ slab/ columns/ pillars/ PEB structure ii. **Insulation:** Walls, Ceiling, Floors, etc. iii. **AllrefrigerationUnits** iv. **Electrical Installations:** Transformers/DG Sets, VFDs, etc. v. **Administrative Block:** CCTV/parking areas / Office block/ Convenience areas vi. **Safety & Hazard control:** Firefighting equipments/ fire exits/ fire doors- as per norms and conditions of the building	ForCivil Construction of capacity upto 4999MT~5000 MTcapacity	Rs. 9600/MT
	For PEB Construction of capacity upto 4999MT~5000 MTcapacity	Rs. 12,000
CO_2 scrubber with CO_2 monitoring system for removal of CO_2 Mandatory for those produces generating lot of CO_2 Eg: Potatoes, Onions, Apples etc.,	Max.1 system/ project	Rs.10 Lakh / system
Unified Control System-PLC, BMS, IoT, Remote monitoring, etc.	Max.1system/ project	Rs.5 lakh/system
Conveying/Hoist system/Material Service lifts for material handling of suitable capacity in the anteroom with provision of unloading on common landing near and outside cold rooms. (upto 5000 MT) (refer point no. 9- MECHANISATION)	Max.1system/ project	Rs.5lakh/system
Dock Leveller System comprising of: (components of 1 set) A. Dock Leveller B. Dock Door C. Dock Shelter Vehicle Barrier/Hit Alarm	Max.2sets	Rs. 8.4lakh/set
Material Handling Equipments: HPT 1 ton and above BOPT 1ton and above	Max.4 units Max 2unit	Rs.20000/unit Rs.1.5lakh/

		unit
Doors	Max.20 doors/ project	Rs.25000/ Door
Automated computerised system with software for generating QR/bar code labelling, farmers details, date of arrival, variety of the crop at the time of arrival, etc.	Max.1system/ project	Rs.3.5 lakh /system

Submitals with DPR application:

1. **Basic Data Sheet**
2. **Heat Load Calculation Sheet Drawings** Enclose sketch with Plan layout and sections showing storage chambers and floor heights clearly.
3. Technical Performance Data Sheets of proposed Refrigeration Equipments, etc. to be installed, to be submitted from the respective equipment manufacturer.
4. **Energy Efficiency Sheet**

NOTE:

i. Follow relevant BISC odeson safety and Standards
ii. Please provide relevant structural safety certificate from certified structural engineer, certified architects, certified agencies or certified person relevant to building norms.
iii. Fire safety norms to be followed as per relevant BIS codes and Standards. Clearance certificate to be provided.
iv. Environmental Clearance certificate to be provided as per requirement and relevant codes and standards.
v. In conventional storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range 0° C and above.
vi. Use of inverter compressor / Digital compressor/ compressors with capacity control/reciprocating or screw compressors with micro processor based controls should be used with choice of natural refrigerants/ refrigerants as described above should also be considered to promote energy efficiency and sustainable development

**Bunker Coil System is no tallowed in any type of Cold storage and no assistance / subsidy would be provided for any of the cold storage types with bunker coil system.*

NOTE-Add-on Component: To promote renewable energy, applicants can also avail the component "Alternate Technology" as an add-on component.

BASIC DATA SHEET

COLD STORAGE
(CS-1/CS-1-Onion/CS-2/CS-2-CA/CS-4)

A. COLD STORE CHAMBER & PRODUCE DETAILS:

S.No.	Description	Unit	Chamber 1	Chamber 2	Chamber 3	Chamber 4
1	Name of the Produce	NA				
2	Room size	mxmxm				
3	Capacity of each room	MT				
4	Number of Platforms per chamber	No.				
5	Type of platform used	NA				
6	Room Temperature	°C				
7	Relative Humidity	%RH				
8	Produce incoming Temp	°C				
9	Storage Unit Used (Bags, crates, carton, bulk heap, etc.)	NA				
10	Total no. of storage Unit	No.				
11	Weight per storage unit	kg				
12	Produce loading rate	kg/day				
13	Pull DownTime	hr.				
14	Loading Period	Days or weeks				
15	Maximum Storage Period	Weeks or months				
16	Total capacity of the facility	MT				
17	Ambient Temperature	°C				
18	Refrigerant Used	NA				
19	Secondary refrigerant if used	NA				
20	Ante room size and capacity	mxmxm /MT				
21	Ante RoomTemp	°C				
22	CO_2 Concentration Control	PPM				
23	Fresh Air Changes	Changes/ day				
24	Air Flow Rate	CMH/CFM				
25	Description of Fresh Air Ventilation System	NA				
26	Humidification controls	NA				
27	Type of Defrost	NA				

B. BUILDING & CONSTRUCTION DETAILS:

S.No.	Description	Unit	Details
1	Type of building construction	NA	
2	External/Internal Walls of cold Chambers	NA	
3	Roof Specification	NA	
4	Lighting Fixtures	NA	
5	Compound Area Specification	NA	
6	Machine room area and height	m^2&m	
7	Generator room area and height (if applicable)	m^2&m	
8	Admin Block area and height	m^2&m	
9	Describe Handling, receiving area (covered, open shed)	m^2&m	

C. INSULATION DETAILS:

S.No.	Description	Unit	Details
1	Type of Insulation	NA	
2	Density of Insulation	kg/m^3	
3	Insulation-walls & U-Value	mm &W/m^2K	
4	Insulation-floor & U-Value	mm &W/m^2K	
5	Insulation-door & U-Value	mm &W/m^2K	
6	Insulation-ceiling & U-Value	mm &W/m^2K	
7	Thermal Conductivity	W/m.K	
8	Fire Resistance of Insulation	NA	
9	Water Absorption after 24hr. immersion	%by mass	
10	Water vapour transmission rate	ng/Pa.sm	
11	Material of Sheet	PP/SS	
12	Sheet thickness	mm	
13	Joining of panels	NA	
14	Area of Floor Insulation	m^2	
15	No. of Layers of floor insulation	No.	
16	Type of vapour barrier on floor insulation	NA	
17	Number of layers of Vapour barrier	No.	
18	Finish floor Type	NA	

D. DOOR DETAILS:

S.No.	Description	Unit	Details
1	Type of Door	NA	
2	No. of Doors per chamber	No.	
3	Total no. of Doors	No.	
4	Total no. of Ante Room Doors	No.	
5	Thickness of Door	mm	
6	U-Value	W/m^2K	
7	Heater Tapes/Door Frame	NA	
8	Size of Door	mxm	
9	Door Skin type	NA	
10	Handle type	NA	
11	View Port	mmxmm	
12	Type of Curtain used	NA	
13	Number of Strip/Air curtains	No.	

E. HEAT LOAD CALCULATION:

S.No.	Refrigeration Load	During Loading (kW)	During Holding (kW)
1	Transmission Load (kW)		
2	Product Load (kW)		
3	Lighting load		
4	Occupancy load		
5	Infiltration Load (kW)		
6	Ventilation/Fresh Airload (kW)		
7	Equipment Load-Evap. Fan motors, MHEs etc.		

Total Load	Peak Period (kW)	Holding Period(kW)
Compressor Operation Hours/Day	Pull Down Period	
	Holding period	
	Defrosting Period	

F. REFRIGERATION EQUIPMENT DETAILS:

I. COMPRESSOR DETAILS

S. No.	Description	Unit	COMPRESSOR 1	COMPRESSOR 2	COMPRESSOR 3
1	Compressor Type	NA			
2	Make & Model	NA			
3	Compressor Capacity at design conditions	kW			
4	Refrigerant used	NA			
5	Saturation Suction Temperature	°C			
6	Design Ambient Temperature	°C			
7	Total Cooling Capacity	kW			
8	RPM	RPM			
9	Status of compressors (Working/Standby)	NA			

II. CONDENSER DETAILS

S.No.	Description	Unit	Details
1	CondenserType	NA	
2	Make & Model	NA	
3	No. of stands/rows	No.	
4	Diameter of coils/tubes	mm	
5	Heat Rejection Capacity at Design conditions	kW	
6	Condensing Temperature	°C	
7	Waterin/out Temperature	°C	
8	Pump Motor rating	kW	

III. COOLING TOWER DETAILS (if applicable):

S.No.	Description	Unit	Details
1	Cooling Tower Type	NA	
2	Make & Model	NA	
3	Quantity	No.	
4	Dry Bulb & Wet Bulb Temperature	°C	
5	Cooling Capacity	kW	

6	Waterin / out Temperature	°C	
7	Fan & Pump Capacity	CMH/LPS	

IV. PRESSURE VESSELS DETAILS:

S.No.	Description	Unit	Details (Low Pressure)	Details (High Pressure)
1	Type of Vessel	NA		
2	Refrigerant	NA		
3	Operating Temp & Pressure	°C&Bar		
4	Construction Shell, Dish Ends & Nozzles	NA		
5	Thickness of vessel	mm		
6	Total Refrigeration load	kW		
7	Holding Volume	m^3		

Note: The design and testing of the pressure vessel should comply with ASME SecVIII Div1.

V. EVAPORATOR DETAILS

S.No.	Description	Unit	Details
1	Make & Model	NA	
2	Number of cooling units/chamber	No.	
3	Numberof Fans/cooling units	No.	
4	Cooling capacity/chamber	kW	
5	Room Temperature	°C	
6	Evaporating Temperature	°C	
7	DeltaT(ΔT)	°C	
8	Refrigerant used	NA	
9	Total no. of evaporators installed in facility	No.	
10	Total no. of evaporators installed in Ante Room	No.	
11	AirFlow Rate	CMH/CFM	
12	Fin Spacing	mm	

G. DOCK LEVELER SYSTEM DETAILS:

S.No.	Description	Unit	Details
A	**DOCK LEVELERS**		
1	Name of Manufacturer and model	NA	
2	Platform size	mxm	
3	Max.vertical Liftup & down	mm	
4	Load capacity	MT	
5	Plinth height of facility	m	
6	Standard safety provisions	NA	
7	Emergency stop switch (Yes/No)	NA	
8	Dock pit dimensions	m	
B	**DOCK DOORS**		
1	Manufacturer and model	NA	
2	Dimension of Door opening	mxm	
3	Loading area temperature	°C	

S.No.	Description	Unit	Details
4	Insulation-material, thickness and U value.	mm &W/m^2 K	
5	Safety Provision	NA	
C	**DOCK SHELTER**		
1	Name of Manufacturer and model	NA	
2	Dimensions	mxmxm	
3	Sealing Material & type	NA	
4	Size/Dimension of Bumper	mxmxm	
5	Safety Provision	NA	

H.CO_2 SCRUBBER DETAILS:

S.No.	Description	Unit	Details
1	CO_2 Scrubber make & model	NA	
2	Justify the use of CO_2 Scrubber for the proposed commodity*	NA	
3	Monitoring System for removal of CO_2	NA	

Please ensure that CO_2 Scrubber is only used for those commodities which generates lot of CO_2, e.g. Potato, Onion, Apple etc.

I. **CONVEYING/HOIST SYSTEM DETAILS:**

S.No.	Description	Unit	Details
1	Make & Model	NA	
2	Load carrying capacity	kW	
3	Any other Specification	NA	

J. **MATERIAL HANDLING EQUIPMENT DETAILS:**

S.No.	Description	Unit	Details
1	Make & Model of HPT	NA	
2	Load carrying capacity of HPT	kW	
3	Number of HPTs	No.	
4	Make & Model of BOPT	NA	
5	Load carrying capacity of BOPT	kW	
6	Number of BOPTs	No.	
7	Make & Model of Fork Lift	NA	
8	Load carrying capacity of Fork Lift	kW	
9	Number of Fork Lifts	No.	
10	Mast height	m	
11	Turning Radius	m	
12	Any other Specification	NA	

***** Minimumno.of MHE –HPT to be installed- **2 No**. for Cold Storage (CS-1&2) & **1No**.for Cold Storage (CS-2-CA).

***** Minimumno.of MHE –BOPT to be installed- **1 No**. for Cold Storage.

K. **Automated Computerized System Details**: -

S.No.	Description	Unit	Details
1	Type of Software used	NA	
2	Name of the Software manufacturer	NA	
3	Traceability system	NA	
4	Labelling System & Printing details	NA	
5	Certification details (if any)	NA	

To be filled only if Controlled Atmosphere is used:(Mention NA if not applicable)

L. **CA GENERATOR DETAILS:**

S.No.	Description	Unit	Details
A	**Nitrogen Generator**		
1	Make and Model number	NA	
2	Type	NA	
3	Estimated volume of Nitrogen/chamber	m^3	
4	Total capacity of Generator	m^3/hr.	
5	Free Volume	m^3	
6	Nitrogen Buffer Tank capacity	m^3	
7	Capacity of breather bags (if installed)	m^3	
B	**CO_2 Absorber**		
1	Make and Model Number.	NA	
2	Total capacity of Absorber	kg	
3	Control Valves	NA	
4	Number of CO_2 Absorber	No.	
C	CA Analyser	NA	
D	**Gas Tightening System**		
1	CA Primer Details for walls & floor	NA	
2	Film/Fleece material and thickness	mm	
3	Details of Elastomeric paint used	NA	
4	Estimated volume of paint used per room	L	

To be filled only if Controlled Atmosphere is used:(Mention NA if not applicable)

M. **CA DOORS:**

S.No.	Description	Unit	Details
1	Name of Manufacturer	NA	
2	Size of the door (Height, Width, Leaf Thickness)	m,m,mm	
3	Insulation material thickness along with its 'U- value'	mm &W/m^2 K	
4	Sealing type	NA	
5	Viewing ports	NA	
6	Emergency Door release fitted (Yes/No)	NA	

*To be filled only if Controlled Atmosphere is used:(Mention NA if not applicable)

N. ADVANCED GRADER DETAILS:

S.No.	Description	Unit	Details
1	Produce	NA	
2	Dimensions of the machine	mxmxm	
3	Weight Sorting/Grading	NA	
4	Colour Sorting /Grading	NA	
5	Optical/Acoustic Diameter Grading	NA	
6	IQS (Intelligent quality Sorting/Grading)	NA	
7	Safety Precautions	NA	
8	Output capacity	Units/hr.or MT/hr.	
9	Name of manufacturer	NA	
10	Year of manufacturing	year	
11	Place of Origin	NA	

O. STACKING SYSTEM DETAILS:

S.No.	Description	Unit	Details
A	**Bins**		
1	Name of Manufacturer	NA	
2	Material of construction	NA	
3	Load capacity	kg	
4	Storage volume	mxmxm	
5	Stacking Height	m	
B	**Pallets**		
1	Material & working load	MT	
2	Dimensions	mxmxm	
3	Number of cartons per pallet	No.	
4	Type of access	NA	
C	**Racking System/Vertical Stacking**		
1	Name of Manufacturer	NA	
2	Type of system (selective pallet/double deep, pushback, etc.)	NA	
3	Material of construction	NA	
4	Number of tiers	No.	
5	Net storage capacity	MT	

P. INTEGRATED SPECIALISED PACKAGING MACHINES DETAILS:

S.No.	Description	Unit	Details
1	Briefly describe about the Integrated Specialised Packaging Machines proposed	NA	
2	Name of Manufacturer	NA	
3	Capacity of machine	pkts/hr.	
4	Year of manufacturing	year	
5	Place of Origin	NA	

8	Labelling System on boxes (Yes/No)	NA	
9	Through put capacity	MT	

Q. **SAFETY PROVISION DETAILS:**

S.No.	Description	Details
1	Fire Fighting equipment installed as per Fire safety standards of State Fire Department	
2	Handling measures for Refrigerants & Leaks installed.	
3	Safety devices–LP/HP cutouts, safety valves, shutoff valves etc., installed	
4	Emergency lighting in Cold chambers & other areas installed	
5	Lightening arrestors installed(Y/N)	
6	Any other safety provisions (describe)	

Place…….. **Signature and**

Date…….. **Name of Applicant**

Place……. **Name in Capital Letters**

Date……. **Signature & Seal of Consultant**

***Follow NCCD Guidelines for the purpose of installing cold storage. E.g.- Insulation, Doors, Floors, Strip Curtains, Ante Rooms, Volumetric Conversion, Refrigeration, etc.**

Please add or subtract columns as per proposed number of chambers for the project.

Please submit Basic Datasheet for Energy Efficiency along with the datasheet for cold storages.

COLD STORAGE TYPE-I- ONION

Cold Storage Type-I can also be utilized for the special purpose of storing onions inbulk. Thefacility should be constructed in a similar manner to CS-1, with a different set of specific components to onion storage. All other constructional details should follow the specifications outlined for CS-1, as described in the previous chapter.

Thedetailsareasfollows:

DESCRIPTION&NAME	**Max. ALLOWABLE QTY./CAPACITY**	**COST**
Cold Storage type –I - Onion (CS-1-Onion) are cold storages designed for onion storage where bulk and long term storage is preferred. They are normally seen in brick and mortar structure, however, an applicant can also develop it under the pre-engineered building (PEB). It is further stated that all the building safety norms, furnishing of stability certificates from architects or authorized agencies or certified person relevant to building norms, etc. electrical safety and earthing, fire safety norms as per applicable regulations, use of fire exit doors at places of exits, plant room safety norms,environmental clearances, handling areas(receiving shed), PPE kits, hygienic storage spaces and storing methods,HACCP norms and regulations, FSSAI norms and mandated clearances, office and convenience areas (restrooms, parking, etc.) shall be considered as general requirement for the purpose of development of the cold store facility under this category. The list of BIS standards has been attached to be followed at all the relevant places, Consisting of:	For Civil Construction of capacity upto4999MT~5000 MTcapacity	Rs. 9600/MT
	For PEB Construction of capacity upto4999MT~5000 MTcapacity	Rs. 12,000
i. **Construction:** Foundation/ slab/ columns/ pillars/ Receiving Area or shed/ PEB structure		
ii. **Insulation:** Walls, Ceiling, Floors, etc.		
iii. **AllrefrigerationUnits**		
iv. **Electrical Installations:** Transformers/DGSets, VFDs, etc.		
v. **Administrative Block:** CCTV/ parking areas / Office block/ Convenience areas vi. **Safety&Hazardcontrol:** Fire fighting equipments/fireexits/fire doors-as per norms and conditions of the building		
Ventilation system#	Max. upto 5000 MT/ project	Rs. 3000/MT

DESCRIPTION&NAME	Max. ALLOWABLE QTY./CAPACITY	COST
Specialised Stacking System appropriate for Onions*	Max. upto 5000 MT/ project	Rs. 2000/MT
CO2 SCRUBBER with CO2 MONITORING SYSTEM FOR REMOVAL OF CO2 Mandatory only for those produces generatinglotofCO2. E.g.-potato,onions, apples, etc	Max. 1 system/ project	Rs.10lakh/ system
Unified Control System-PLC, BMS, IoT, Remote monitoring, etc.	Max.1system/ project	Rs. 5 lakh/system
Conveying/Hoist system/Service lifts for material handling of suitable capacity in the anteroomwithprovisionofunloadingon common landing near and outside cold rooms. (upto 5000 MT)	Max.1system/ project	Rs. 5 lakh/system
Doors	Max.20doors/ project	Rs.25000/door
Automated computerised system with software for generating QR/bar code labelling, farmers details, date of arrival, variety of the crop at the time of arrival, etc.	Max.1system/ project	Rs. 3.5 lakh/system

SUBMITALS along with DPR/ Application:

1. **Basic Data Sheet:**
2. **Heat Load Calculation Sheet**.
3. **Drawings**:
4. TechnicalPerformanceDataSheetsofproposed Refrigeration Equipments, etc. to be installed, to be submitted from the respective equipment manufacturer.
5. **Energy Efficiency Sheet:**
6. Refer and submit below undertaking

UNDER TAKING FOR INSTALLATION OF ONION COLD STORAGE

This is to submit that I Mr./Mrs./M/S.…… is setting up an……MT Onion Storage at (Address) …….....for store onions under CS-I onion from NHM/MIDH/NHB.

Details	Description
Type of store-Nomenclature	CS-Ionion
Name of Applicant and address	
Capacity (in MT)	
Temp/RH (°C/%)	
Details of Refrigeration Unit (Give what type of refrigeration system you are using.)	
VentilationSystem	
1.Type	
2.Make	
3.Airflow CFM	
4.No. of air change (No)	
5.Fan/Type (No/Type)	
6.Motor (kW)	
DefineTechnology and how you are designing ventilation system (Give all necessary details/drawings and write details of ventilation systems and how it would improve quality of onions in 200 words.)	
Onion Stacking System (Give all necessary details/drawings and how movement of air has been designed specific to onion through this stacking system in 200 words.)	

I submit that details provided are correct to my knowledge and storage is being constructed for the purpose of storing Onions.

Signature

NOTE:

i. Follow relevant BISC odeson safety and Standards
ii. Please provide relevant structural safety certificate from certified structural engineer, certified architects, certified agencies or certified person relevant to building norms.
iii. Fire safety norms to be followed as per relevant BIS codes and Standards. Clearance certificate to be provided.
iv. Environmental Clearance certificate to be provided as per requirement and relevant codes and standards.
v. In conventional storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range0° C and above.
vi. Use of inverter compressor / Digital compressor/ compressors with capacity control/reciprocating or screw compressors with micro processor based controls should be used with choice of natural refrigerants/ refrigerants as described above should also beconsidered to promote energyefficiencyand sustainable development

NOTE-Add on Component: To promote renewable energy, applicant can also avail component Alternate Technology as an add-on component.

In order to promote storing of Onions, Storage under category CS-1-Onion has been introduced. Ventilation system canbe availed by submitting details of the special ventilation processadoptedby the applicant in addition to the use of refrigeration equipments controlling and achieving required temperature and humidity. The applicant needs to provide details of the equipment, methodology and integration of the ventilation system with the other components to synchronize the operation inside the onion store.

* In order to promote storing of Onions, Storage under category CS-1-Onion has been introduced. Stacking system canbeavailed by submitting details of stacking pattern adopted by the applicant. It is not a mezzanine floor/normal racking system and provision of stacking system as a component is to allow stacking of onions in a way which allows free movement of huge quantity of air through onion stocks in the onion stores to prevent sprouting, water losses and shrinkages.

Bunker Coil System is not allowed.

COLD STORAGE TYPE-II
(MULTI-COMMODITY / MULTI TEMPERATURE)

A cold storage under type-II category (CS-2) are aligned for long term bulk storage for storing of multi-produce in bags, bulk or lots for the purpose of catering to off season demands.

This type of storage can also be equipped with Controlled Atmosphere type storage for keeping in produces like apples, etc.

Essentials of Cold Storage Type-II (CS-2):

To identify the cold storage location for the produce that is coming into the store.

i. Relevant data and information on the production area, type of produce, quality of produce, and connectivity and target market or hubs should be properly recorded and known for utmost utilisation of the facility.

ii. A Cold Store should be located close to the farm, should provide services to local farmers and should havefacilities for pickand drop of produce by wayoflargeormediumsize reefer vehicles.

iii. A Cold Store should be connected to good roads and should be covered properly to prevent from sun, rain and other contaminants from environment.

iv. A Cold Store should be designed well with sufficient areas for loading and unloading bays. It should have adequate water and electricity supplies and the drainage system should bedone in a very well manner and necessary water treatment plant should be used wherever applicable.

v. A Cold Store should have all the necessary arrangements for safety and other desirables for the comfort of workers and other skilled professionals.

vi. A Cold Store may also have a weigh scale at the receiving side. (Optional)

vii. It may be connected to various numbers of aggregation centres, etc. of a farmer produce organisations or any other help groups which allows seamless connectivity of the produce to the Cold stores in the shortest possible time thereby reducing post harvest losses.

Minimum Guidelines to follow:

Cold Storage Construction Features:

- Foundation/slab/columns/pillars/PEB structure-civil foundation/dock/Cold StoreArea/PEB
- Insulation/refrigeration-Cold Chambers (Max.capacity4999MT)
- Insulation/finish floor etc.-Floor
- Mezzanine/pallets/racks/crates/bins/bagsetc.-Inter-floors
- Insulated doors/strip curtains/air curtains-Doors
- Insulation-Anteroom
- Compressors/condensers/pressurevessels/heat exchangers/electrical panels/power factor banks etc. -Machine rooms
- Dock levelers/dock shelters/dock doors etc.-loading/unloading areas
- Transformers/DGset/Earthing/Light/lightning arrestors etc.-Electrical installations
- Conveyor belts/lifts etc.–Mechanisation
- Microprocessors/data loggers/IoT/alternate energy etc.- Automation & energy efficiency
- CCTV/parkingareas/Officeblock/Conveniencеareas–administrativeblock
- Fire fighting equipments/fireexits/firedoors-Safety&Hazardcontrol
- Controlled Atmosphere-CA

1. **Civil Construction for PEB**:

❖ The foundation has to be designed by certified structural/ civil engineer/ architect/ certified agency. The design shall meet all BIS standards and relevant seismic zone norms for earthquake proof design.

❖ The building can be constructed with RCC slab as tabletop with foundations for PEB structure, docking bays, packaging areas and cold rooms under a suitable Pre-Fabricated shed.

Note:

- Super structure and foundation to be designed by certified structural/civil engineer/ architect/ certified agency.
- Certification of the building by a certified structural/civil engineer/architect/ certified agency should be furnished while applying for subsidy.

In case of pre-fabricated PUF panels when used directly as a Box-In option after following necessary standards and safety protocols, necessary safety and stability certification of the building should be done by a certified structural/ civil engineer/ architect/ certified agency.

Special consideration with reference to hanging arrangement of unit coolers from bottomofthe PUF insulated ceiling panel with PEB shed, purlins, etc. on top of it-

- Prevent condensation and water leakages through gaps into the cold storage.
- Provision of cat walks for maintenance of pipes, controls, etc. in case of pipes running around the building.
- Installation of ceiling PUF panels below the PEB shed, purlins, etc. with minimum gap between the purlins and the panel.
- Provision of load bearing on the shed structure, especially designing of purlins and trusses.
- Provision of water proofing with chemicals, etc. to prevent water see page from any civil construction onto the PUF insulation or the PUF insulated ceiling of the cold room.
- Special kind of runners, running along side the building to allow holding of the PUF panels.
- Sunken floors for laying and fixing of floor insulation in the areas where insulation is to be done.
- Thermal barriers to be made between cold rooms and ante rooms
- The floor levels need to be in level at all the places for easy movement of MHEs.
- Use of material handling lifts which can accommodate both BOPTs and HPTs from basement (in case basement is done) upto the top floor.
- Each mezzanine floor inside the cold chamber to be connected through doors to the ante room at the same level of the mezzanine floor or to a landing area at the same level as that of mezzanine with easy access to fire exits as well as allowing movement of material handling equipments from lifts to the mezzanine floor.
- The landing areas of the ante rooms should be constructed appropriately to handle loads either in civil or in structure with all necessary safety and BIS standards.
- Two stair cases to be made at appropriate ends allowing movement of goods as well as acting as easy escape points. One staircase to be isolated with the cold storage area/ante rooms byfire rated doors which should be ISI/BIS marked for 120 minutes integrity and 30 minutes insulation.

PEB structure:

- The building should be constructed as per drawings and dimensions indicated. It is recommended to construct such facilities using steel construction/ Pre-Engineered construction confirming to the relevant BIS codes for live load as per IS 875 part– II, wind load as per IS 875 part-III, seismic load as per IS 1893 and other codes and standards as applicable.
- Also factors like wind, storms, lightning, thunderstorms, hail, heavy rains, snow, etc. should be taken in the safety designs and optimum care has to be taken on these factors to protect the cold room from these hazards. Earthingpits, Earthing, Lighting arrestors need to be installed to ensure safety from electric hazards and protection against fire, etc. The steel structure component /construction sections to be fabricated confirming to relevant codes and standards of ASTM /BIS.
- Care needs to be taken in ensuring that this kind of installation uses proper thickness of the panel and does not allow condensation or water dripping due to some part of the PEB structure inside the cold storage and some outside thereby causing thermal shock and allowing leakages. The building should be constructed as per drawings and dimensions indicated confirming to relevant codes and standards of BIS, IS.
- In case of truss roof, provisions to be made for fixing insulated panels to the ceiling and support of the cooling unit from the trusses in case of ceiling suspended evaporators/ unit coolers/ cooling units.
- Special attention should be given to the hanging arrangement of unit coolers from the trusses to prevent condensation and water leakage through gaps into the cold storage. Joints at the top and access areas should be sealed. Ideally, a catwalk should be provided between the insulated boxand the bottom of the PEB structure sheeting, along

with ventilation fans. Additionally, specialunder-deck insulation should be included to lower temperatures in these areas, thereby reducing heat infiltration from the top and contributing to improved energy efficiency.

2. Cold Chambers: (QUALIFICATION FOR CS-2):

Rule no.	Minimum Storage Capacity (MT)	Maximum Storage Capacity (MT)	Balance Storage Capacity other than fixed 6 chambers (MT)	MIDH/NHM Configuration
1	1500 **(min.6 Chamber x 250MT= 1500MT)***	4999 ~ 5000	3500	The applicant has to construct min. 6 chambers of capacity less than 250 MT totaling to 1500 MT capacity. For the balance capacity of 3500 MT, the combination of capacity of chambers in a project can be divided between min. capacity of 500 MT and up to a max. capacityof1500MT (perchamber).

Note: Mezzanine bifurcation inside the chambers would not amount to single chamber and would be considered as 1 chamber from to bottom unless there is proper bifurcation inside the chamber and fulfilling all the criteria in terms of hard flooring, insulatedflooring, dedicated refrigeration unit and access doors from the respective floor and connectivity to lifts and fire exits.

The cold chamber is a box of specific size which is constructed with the help of insulationof different thicknesses to maintain temperature, humidity, etc. inside that cold chamber referred to as a cold storage. This cold storage is meant for storing different types of fruits and vegetables and other horticulture products which may or may not require pre-cooling depending upon the requirement to preserve the freshness, quality and shelf life.

These cold storages require adequate refrigeration, air circulation, proper stacking and storage arrangements to achieve the required conditions for maintaining product temperature and other required conditions like humidity, CO2 levels, Ethylene levels, etc. to enhance the shelf life of the produce.

Efficiency and performance in such stores is vitaland depends upon various factors like appropriate storage system, optimizing space, allowing uniform air circulation through the

produce, requirement of stock rotation if necessary. This is abundantly important to consider in design so as to allow the economic viability of the cold store as it allows reduction in energy bills, less wastage and maintaining the quality of the produce.

The cold storage consists of components which have been categorized for the purpose of submission in the applications for the purpose availing subsidy following the below specified minimum standards and guidelines under various components:

DETAILEDSPECIFICATIONS

1. **Cold Store Building-** In general, under CS type-II (CS-2) as PEB structures are allowed confirming to relevant BIS codes, fire safety guidelines as per state regulations and BIS standards applicable to buildings.

Sl. No.	Description	Remarks
1	Cold Store Building	The total height of the building including dock or foundation should not be more than 18 mtrs.
		The height of the dock should be not less than1.06mtr or as required from the finished road level
		In case of PEB structure holding cold rooms with boxes inside the PEB columns (Box-in type), special Z runners/supports should be placed at every 3~4 mtr. around these structure from the dock level for holding the wall insulation panels securely and tightly. Sufficient space should be provided outside of the foundation of PEB columns in and around dock/platform.
		The PEB building should be constructed as per drawings and dimensions indicated. It is recommended to construct such facilities using steel construction/ Pre-Engineered construction confirming to the relevant BIScodes for live load as per IS 875 part – II, wind load as per IS 875 part-III, seismic load as per IS 1893 and other codes and standards as applicable. Also factors like wind, storms, lightning, thunderstorms, hail, heavy rains, snow, etc. should be taken in the safety designs and optimum care has to be taken on these factors to protect the cold room from these hazards.
		The design should be innovative with appropriate measures taken to ensure use of space with design of sunken floors, inverted beams, as required to allow maximum utilisation of space, minimum cutting of insulation panels, and easy installation for reducing gaps between the joints and preventing loss of cold, disallowing condensation and other problems. Appropriate care to be taken inside the cold storage flooring and use of technology, proper expansion joints resins, epoxy, to create smooth floor level and prevent cracking of the floors thereby, not allowing moisture and water to travel upto insulation and creating efficiency issues as well as hazards to building. Suitable grade of concrete example M25, M28, M30 etc. with block testing should be done as per standards and guidelines.
		For all types of construction atleast 1 mandatory service lift/ conveyors/ material hoisting system should be operational from the table-top dock uptothe top floor alongwith 2 stair cases on two sides of the building which can be used for loading as well as fire exits. One stair case of the two needs to be placed at the end of the loading/un-loading ante rooms with closure at one end with a rated fire safety door at each floor.

		Preferably, a catwalk should be designed & provided to access areas above the cold storages. These areas should preferably include ventilation fans and special under-deck insulation to lower temperatures in these areas, reducing heat infiltration from the top and improving overall energy efficiency but not mandatory.
		While designing it should be considered to leave appropriate space for movement of fire trucks around the building, loading/unloading trucks, space for utilities like transformers, DG sets, in such a way that it does not hinder operations and possess threat to human safety and well being.

2. **Thermal Insulation:** Cold chambers have to be insulated on walls, ceilings / roofs & floors with proper insulating material of adequate thickness, with provision for vapour barrier on outer side & proper cladding/ cover on inner side. The commonly insulation materials are:

Rigid Polyurethane foam	Chloro fluoro carbon (CFC) free and self-extinguishing and shall conform to IS 12436: 1988.
Vacuum Insulated Panels	Conforming to BIS and IS standards
PIRPUFpanels	Conforming to BIS and IS standards
Pre-Painted Galvanized Iron (PPGI)	The PPGI sheet shall have adequate thickness to withstand load and shall have zinc coating of min. 90 Gsm.
Flashing/Accessories	Made of PPGI sheet conforming to IS14246:2013

Walls & Ceiling: Rigid PUF panels/PIR/VIP

Floor

1. Laying of polythene sheet, min.250 microns, as vapour barrier
2. Fixing insulations labs in two layers with bitumen as DHOesive for the first layer
3. Covering with tar felt
4. Laying PCC/trimix of 75mm/ 100mm thickness

ForInsulatedPanel Structure:

Walls&Ceiling

1. Perimeter of the plinth to be in level for panel installation
2. Panels to have camlock or tongue/grovejoints

3. Sheet metal flashing to be provided on all concrete / wall ceiling joints internally & externally. PVC coving or concrete curbing to be provided on wall - floor joints.
4. Horizontal Tie bracings to be provided between vertical wall panels & external columns, to take care of wind loads
5. Adequate numbers of Pressure relief ports to be provide do nall chambers with electrical connection

Minimum insulation thickness for various insulation materials

Type of insulation	Material		Wall		Ceiling/ roof U value = 0.24 W/m²K	Floor U value = 0.29W/m²K
			External U value = 0.27W/m²K	Partition U value = 0.58W/m²K		
	ρ Density Kg/m³	K (at 10 °C) W/mK	Thickness m m	Thickness m m	Thickness m m	Thickness m m
EPS	15	0.036	150	75	150	125
PUF	32	0.023	100	50	100	100
XPS#	30-35	0.025#	100	50	100	100
Phenolic foam ***	50	0.026	100	50	125	100
Mineral wool ***	48	0.033	125	50	125	100
Bonded fibre glass/ glass wool***	32	0.033	125	50	125	100

1. FLOOR:

i. The floor in the cold rooms should be of base concrete, with kota stone/ epoxy or any other finished floor type inside the floor chambers. Floor insulation slab preferably XPS (EPS not allowed) laid in two layers. The Floor should be cleaned, painted with black japan paint and then laid with 1st layer of vapour barrier which can be either 250 microns tarfelt sheet or polythene sheet of suitable thickness. The vapour barrier should be covered with 1st layer of insulation and overlaid with 2nd layer of insulation in a manner to cut the gaps in the firstlayer of insulation. The joints can be filled with suitable hot grade bitumen (80:25). The 2nd layer of insulation is then covered with 2nd layer of vapour barrier which would be upto 1 mm thick tar felt or poly felt sheets with 5 mm overlap on the walls.

ii. The laying of Trimix should be 75 MM to 100 MM thickness with any suitable finish like kota stone, epoxy etc. or any other finish floor. The floor level of the cold storage should matchthe floor level of the cold store for easy movement of material as well as MHEs. In case of raised floor levels a suitable graded ramp to be either fixed or made outside the door for mechanised movement of the goods.

2. INSULATION & DOORS:

- The Cold Room should be installed in such a way that small HPTs/BOPTs can be used to load/un-load the material mechanically.

- The cold room insulation should be PUF/PIR or any other new environment friendlyinsulating material of thickness min 100 mm. sandwiched in either pre-painted GI (0.45 mm Min. thickness) or SS (food grade SS-306) sheets.

- The insulated door should be either overlap or inline or sliding but of the same thickness as that of the panel with a view window on the door properly fitted alongwith heater for anti- condensation on the glass. The door should be fitted with strip curtains form inside with 0.5 mm overlap from SS hooks or hangers. The outside of the door should be fitted with air curtains of suitable capacity.

- Minimum door size recommended is 1mtr x 2 mtr (± 5% variation would be accepted on the min recommended size, however the upper size can be selected as per requirement). The no. of doors would be equivalent to no. of mezzanine floors.

3. ANTE ROOMS:

Ante Rooms should be designed on each floor and shall be designed to accommodate stair case, hoists, lifts, fire exits, as per local norms and regulations as applicable on the type of building. Suitable design innovations should be incorporated to accommodate certain an cillaries in the seante rooms however, not jeopardizing the safety of the human.

The inter floors in the ante rooms to have doors to each cold room on each floor. The cold room inner walls can act as ante room walls. The ante room ceiling shall be closed with 60 mm PUF panel insulation and ends closed as far as possible (not mandatory) however, the side on the fire exit side needs to be closed and fitted with fire exit doors.

4. REFRIGERATION:

Energy efficient refrigeration-based systems need to be installed. For any operations which may require temperature condition and humidity condition upto 0°C refrigerants with GWP between 1000 to1500 to be used. Individual systems would not be allowed above capacities which are 2000 MT or more. In case of any further expansion other than 2000 MT, the same rule shall apply. And no individual refrigeration units for the expansion would be allowed. For further details on expansion please refer chapter no. 23 (Expansion & Modernisation)

5. LOADING/UNLOADING AREA:

Loading and unloading docks shall be designed with RCC slab roof or sheet roofing and these should be wide enough to allow loading and unloading simultaneously when the

loading/un-loading area should be bifurcated from the cold room ante rooms by an insulated sliding door.

6. ELECTRICAL INSTALLATIONS:

Suitable step down OLTC transformers (if required) with earthing stations as per requirements, main power distribution panel for refrigeration lightning, electric hoists and lifts, automatic power factor correction panel (APFC), fire fighting equipments, etc.

DG Sets, 1 small and 1 big equalling to the total requirement load in the cold storages. The type of DG sets should be considered as per applicable laws of pollution control board.

7. MECHANISATION:

Appropriate Lifts/ conveyors/ electrical hoists with wire ropes, a steel fabricated cage with guides, and openable doors should be provided for material handling for managing the goods. Material movement can be facilitated using BOPTs for easier access to storage areas on the mezzanine floors, with the materials being transported from hoist, lifts, conveyer etc. through the ante room of the respective mezzanine floor into cold store.

8. UNIFIED CONTROL SYSTEM/AUTOMATION:

Suitable configuration of electrical panels with microprocessors, and HMIs, to be installed on the electrical panels with suitable sensors where, analog input received from all the equipments that is consuming electrical energy is converted into digital output for the purpose of bringing in energy efficiency into the building management system, These microprocessors should be operated with static IPs and allow control and visualisation of cold room temperatures, humidity and other necessary parameters remotely by the authorised person. The microprocessor panel should also control necessary work done in terms of compressors for automatic operations and thereby, reducing the powerconsumption onthe compressors, evaporator fans, pumps, condenserfans, etc. to bring in suitable energy efficiency into the facility.

The IoT based systems should be installed for real time monitoring, tracking and surveillance of the facility remotely. This system is also equipped with early hazard detection and alarm activation protocols.

9. RENEWABLE ENERGY:

The facility should be capable to generate atleast that much amount of the required energy which can run electrical lights, pumps (if possible), fan motors during holding period in daily operations from renewable sources of energy. The energy may be obtained by harnessing solar energy, wind energy, etc. and stored in auxiliary batteries if possible. (Batteries are not mandatory)

10. ADMINISTRATIVE BLOCK:

Every cold store should have a separate admin block equipped with office room, rest rooms, and other amenities which are important to create a comfortable working condition. Clean drinking water and toilets for workers and staff is very important to build in the facility.

11. SAFETY&HAZARD CONTROL:

Provision for handling accidental leakage of refrigerant:

- Ammonia sensors in cold chambers near ACUs & machineroom
- Emergency ventilation for machine room
- Safety release of refrigerant to water sump
- Ammonia masks
- First aid kit
- Instructions for handling emergencies

Fire protection

- Fire sensors in cold chambers & machineroom.
- Dry & water based fire fighting systems as per specs below.
- Sprinklers for high pressure receivers
- Emergency lighting system: To be inverter based
- Emergency alarm system: To be provided with switches near all cold store doors and alarms located in common public areas

Lightning arrestors for the building as per local regulations

Fire Fighting: To be installed as per clearance and requirement of FireRegulatory authority

e.g.-

DRY TYPE

i) Dry chemical powder type 5.0Kg Cap with ISI Mark Fire Extinguisher complete with wall mounting bracket.
ii) CarbonDi-Oxide (CO2) type 4.5Kg. capacity Fire Extinguisher complete with wall mounting bracket.
iii) G.I. Fire Buckets
iv) M.S. Stand for Fire Buckets

WATER BASED

i) 2 sets of Water supply pumps.
ii) 2 sets Fire fighting pumps
iii) G.I. piping, class C with necessary fittings & valves
iv) Rubber Hose reel
v) Canvas Hose pipe
vi) M.S. Fabricated hose box with key

SUBSIDY COMPONENTS DETAIL:

DESCRIPTION & NAME	Max. ALLOWABLE QTY./CAPACITY	COST
Cold storages designed for controlled atmosphere storage where bulk, short and long term storage is preferred as required. These storages should be equipped with all necessary equipments to maintain and monitor the required concentration of N2, CO2 and O2 levels along with temperature and humidity control. They are normally seen in pre engineered building and certain areas like dock, plant rooms, offices, convenience areas can be constructed with brick and mortar and integrated with the PEB. It is further stated that all the building safety norms, stability certificates from architects or authorized agencies or certified person relevant to building norms, etc. electrical safety and earthing, fire safety norms as per applicable regulations, use of fire exit doorsat places of exits, plant room safety norms, environmental clearances, handling areas, loading docks, PPE kits, hygienic storage spaces and storing methods, HACCP norms and regulations, FSSAI norms and mandated clearances, office and convenience areas (restrooms, parking, etc.) shall be considered as general requirement for the purpose of development of the cold store facility under this category. The list of BIS standards has been attached to be followed at all the relevant places. Consisting of: i. **Construction:** Foundation/ slab/ columns/ pillars/ PEB structure ii. **Insulation:** Walls, Ceiling, Floors, etc. iii. **All refrigerationUnits** iv. **Electrical Installations:** Transformers/DGSets, VFDs, etc. v. **Administrative Block:** CCTV/parking areas / Office block/ Convenience areas. vi. **Safety & Hazard control:** Fire fighting equipments/ fire exits/ fire doors- as per norms and conditions of the building	For PEB Construction of capacity upto 4999 MT~5000MTcapacity	Rs. 12,000
CO2 SCRUBBER with CO2 MONITORING SYSTEM FOR REMOVAL OF CO2 Mandatory only for those produces generating lot of CO2, E.g.-potato, onions, apples, etc	Max.1system/ project	Rs. 10 lakh/system
Unified Control System-PLC, BMS, IoT, Remote monitoring, etc.	Max. 1system/ project	Rs.5lakh/system

Conveying/Hoist system/Material Service lifts for material handling of suitable capacity in the anteroom with provision of unloading on common landing near and outside cold rooms. (upto5000MT)(refer point no.7)	Max. 1 system/ project	Rs.5 lakh / system
Dock Leveller System comprising of: (components of 1 set) A. Dock Leveller B. Dock Door C. Dock Shelter Vehicle Barrier/HitAlarm	Max.2sets	Rs.8.4 lakh/set
Material Handling Equipments: HPT above 1 ton BOPT1ton and above	Max.4 units Max 2unit	Rs. 20000/unit Rs. 1.5lakh/unit
Doors	Max. 20doors/project	Rs.25000/ door
Automated computerised system with software for generating QR/bar code labelling, farmers details, date of arrival, variety of the crop at the time of arrival, etc.	Max.1system/ project	Rs.3.5 lakh/system

SUBMITALS along with DPR/Application:

1. **Basic Data Sheet:**
2. **Heat Load Calculation Sheet:** Enclosed detail basis of heat load calculation.
3. **Drawings**: Enclose sketch with Plan layout and sections showing storage chambers and floor heights clearly.
4. Technical Performance Data Sheets of proposed Refrigeration Equipments, etc. to be installed, to be submitted from the respective equipment manufacturer.
5. **Energy Efficiency Sheet**

Note:

i. Follow relevant BISC odeson safety and Standards
ii. Please provide relevant structural safety certificate from certified structural engineer, certified architects, certified agencies or certified person relevant to building norms.
iii. Fire safety norms to be followed as per relevant BIS codes and Standards. Clearance certificate to be provided.
iv. Environmental Clearance certificate to be provided as per requirement and relevant codes and standards.
v. In conventional storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range 0° C and above.
vi. Use of inverter compressor / Digital compressor/ compressors with capacity control/reciprocating or screw compressors with micro processor based controls should be used with choice of natural refrigerants/ refrigerants as described above should also be considered to promote energy efficiency and sustainable development Bunker Coil System is not allowed.

MODERNISATION OF COLD STORAGE

A. MODERNISATION

In recent years, the modernization of refrigeration technology has become a critical focus in the cold chain industry. This approach aims to significantly improve the energy efficiency and safety of refrigeration systems, particularly in cold storage facilities that play an essential role in preserving food and other perishable products. Modernizing these systems not only enhances operational efficiency but also contributes to a reduction in carbon footprint, aligning with global efforts toward environmental sustainability.

This chapter explores how modernization initiatives in cold storage facilities are contributing to a more energy-efficient and environmentally friendly cold chain. It discusses the upgrades to evaporators, compressors, and associated refrigeration components, as well as considerations for enhancing insulation. These improvements not only support energy savings but also ensure DHOerence to food and product safety standards.

MODERNIZATION OF REFRIGERATION COMPONENTS

Modernizing the refrigeration components of cold storage facilities involves upgrading key elements such as evaporators, compressors, and flow control valves. By implementing these changes, cold storage operators can achieve substantial improvements in both energy efficiency and operational safety.

1. *Evaporators*

Traditional open-tube evaporators are often energy-intensive and may not meet current food safety standards. Upgrading to more efficient evaporator types, such as plate or finned evaporators, can reduce energy consumption while improving the consistency ofcooling performance. These modern evaporators are designed to provide optimal thermal transfer, ensuring that products are stored at the ideal temperature. Enhanced efficiency also reduces the strain on other refrigeration components, leading to further energy savings.

2. *Compressors*

Compressors are central to the functionality of refrigeration systems, but older models are typically less energy-efficient. Modern compressors, equipped withtechnologies that allow for variableloads, can adjust theiroutput based onthe current cooling requirements of thefacility. This design not only reduces energy consumption but also

extends the lifespan of the compressor by minimizing unnecessary operation. High-efficiency compressors can also support both full and partial load operations, which add flexibility in managing energy consumption during different phases ofdemand.

3. *Control and Safety Valves*

The modernization of refrigeration systems often includes upgrading flow control valves, regulation valves, safety valves, and pressure relief valves. Modern valves enable more precise control over the refrigeration cycle, enhancing the efficiency and safety of the system. Updated pressure relief valves, in particular, are essential for maintaining safe operating conditions by preventing pressure build-up, which could otherwise result in system failure or safety hazards.

4. *Automation with PLC/microprocessor-based monitoring and controls.*

Modernizing cold storage facilities with PLC (Programmable Logic Controller) or microprocessor- based monitoring and control systems significantly enhances operational efficiency and precision. These automated systems allow for real-time monitoring and control of temperature, humidity, and energy use, ensuring optimal storage conditions while minimizing human intervention. By providing detailed data analytics, predictive maintenance capabilities, and remote management, these technologies support both energy efficiency and consistent product quality, contributing to a more sustainable and reliable cold chain.

ENHANCING ENERGY EFFICIENCY AND SAFETY THROUGH IMPROVED INSULATION

While modernization may not focus solely on replacing existing insulation, it emphasizes enhancing the thermal barrier where it can significantly reduce energy consumption. Effective insulation is critical for maintaining stable temperatures within cold storage facilities, as it minimizes heat gain from external sources, thereby reducing the load on refrigeration systems.

Using advanced insulation materials such as vacuum-insulated panels or high-density polyurethane or PUF can dramatically reduce energy loss, allowing facilities to maintain desired temperatures more efficiently. When upgrading insulation, modern materials that meet or exceed current standards are preferable, as they offer improved performance over conventional insulationsolutions.

Operational Maintenance

Insulation in operational cold storage facilities should be periodically inspected and upgraded as needed to maintain efficiency. Facilities should integrate insulation maintenance into their standard operational practices, ensuring that walls, doors, and

other thermal barriers retain their efficacy over time. However, modernization efforts should focus on installing insulation that can demonstrably reduce energy usage in alignment with facility upgrades.

Cost Components:

1. Refrigeration: The cost norm applicable is as per present cost norms byNHM/NHB.

The component "Modernisation of Refrigeration" may include the following items:

a) Up-gradation of Evaporators.
b) Up-gradation of Compressors.
c) Replacement of Refrigeration Valves including Electronic Expansion valves
d) AutomationwithPLC/micro processor based monitoring and controls.

Modernisation must result in a change to more efficient refrigeration system which brings at least 5% reduction in energy consumption of the subject facility. Each up-gradation case must submit existing energy consumption patterns.

2. Insulation: The cost norm applicable is as per present cost norms byNHM/NHB.

This does not limit the cold-chain facility from utilising more insulation as per requirement or from sourcing equipment with other options.

The insulation used should be CFC and preferably HCFC free material with minimal negative impact to the environment. Insulation modernisation must require a change to a more efficient thermal barrier (compare material 'U'values between existing and proposed barrier) to result in at least 5% reduction in energy consumption. In case of cold stores where the existing insulation is older than 20 years, and the facility is operating to commercial capacity, this component can also be availed. Insulation cost will be evaluated at published rates. This component does not apply towards movable barriers such as swing doors, sliding doors, hinged doors and other openings including rubber joints.

<u>Essentials For Modernisation:</u>

Cold Storages under any type which have been constructed previously-

1. Refrigeration: The cost norm applicable is as per present cost norms by NHM/NHB. The component "Modernisation of Refrigeration" may include the following items:

a) Up-gradation of Evaporators.
b) Up-gradation of Compressors.
c) Replacement of Refrigeration Valves including Electronic Expansion valves
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Modernisation must result in a change to more efficient refrigeration system which brings at least 5% reduction in energy consumption of the subject facility. Each up-gradation case must submit existing energy consumption patterns.

2. Insulation: The cost norm applicable is as per present cost norms byNHM/NHB.

   This does not limit the cold-chain facility from utilising more insulation as per requirement or from sourcing equipment with other options.
   The insulation used should be CFC and preferably HCFC free material with minimal negative impact to the environment. Insulation modernization must require a change to a more efficient thermal barrier (compare material 'U' values between existing and proposed barrier) to result in at least 5% reduction in energy consumption. In case of cold stores where the existing insulation is older than 20 years, and the facility is operating to commercial capacity, this component can also be availed. Insulation cost will be evaluated at published rates. This component does not apply towards movable barriers such as swing doors, sliding doors, hinged doors and other openings including rubber joints

   COST NORMS:

COMPONENT	DESCRIPTION	COST
Modernisation for Refrigeration	Modernisation for Refrigeration with latest technologies including refrigeration plant and associated equipments with the refrigeration system to reduce energy consumption.	Rs.120 lakh/ project
	Unified Control System–PLC, BMS, IoT, Remote Monitoring, etc.	Rs.5lakh/ project
Modernisation for Insulation &Doors	The insulation used should be CFC and preferably HCFC free material with minimal negative impact to the environment. Insulation modernisation must require a change to a more efficient thermal barrier (compare material 'U'values between existing and proposed barrier) to result in at least 5% reduction in energy consumption. EPSisnot allowed.	Rs.120 lakh/ project

SUBMITALS along with DPR/Application:

1. **Basic Data Sheet:**

2. **Heat Load Calculation Sheet:** Enclose detail basis of heat load calculation.

3. **Drawings**: Enclose sketch with Plan layout and sections showing storage chambers and floor heights clearly.

4. Technical Performance Data Sheets of proposed Refrigeration Equipments, etc. to be installed, to be submitted from the respective equipment manufacturer.

5. **Energy Efficiency Sheet**

Note:

i. Follow relevant BISC odeson safety and Standards
ii. Please provide relevant structural safety certificate from certified structural engineer, certified architects, certified agencies or certified person relevant to building norms.
iii. Fire safety norms to be followed as per relevant BIS codes and Standards. Clearance certificate to be provided.
iv. Environmental Clearance certificate to be provided as per requirement and relevant codes and standards.
v. In conventional storage, Refrigerants having potential for Ozone Depletion# and GWP ranging more than 1500 (like R22, R404A etc.) are not allowed for temperature range 0° C and above.
vi. Use of inverter compressor / Digital compressor/ compressors with capacity control/reciprocating or screw compressors with microprocessor based controls should be used with choice of natural refrigerants/ refrigerants as described above should also be considered to promote energyefficiencyand sustainable development.

BASIC DATA SHEET FOR ENERGY EFFICIENCY

1. **Proposed List of Electrical Equipment Installed:**

S. No.	Equipment	Make & Model	Quantity	Capacity of Transformer
1	Transformer			
2				

S. No.	Equipment	Make & Model	Quantity
1	Compressor		
2	Evaporator		
3	Mechanized Conveyors/Lifts		
4	Sorting & Grading Lines		
5	Ammonia Pumps		
6	CA Generator		
7	Water Pumps		
8	Mechanized Doors		
9	Ventilation Fans		
10	Lights		
11	Air Curtains		
12	D.G. Set		
13	CO_2 Scrubber		
14	Recovery Wheel		
15	Dock Levelers		

2. **Electrical Load Details:**

	Unit (kW)	Value	Power Utilization Ratio
Sanctioned Load by the Respective Board		Please specify load that you are going to install	
Total Power Requirement at Peak Load Period			Power requirement at peak load / Total Sanctioned Power
Total Power Requirement at Holding Load Period			Power requirement at holding load / Total Sanctioned Power
Total Power Requirement at Lean Load Period			Power requirement at Lean load / Total Sanctioned Power

3. Equipment Details:

Table 1:

Equipment	Rating of connected motor	Refrigeration capacity (kW)	Designed Evaporating Temp. or (SST)	Power Consumption (kW)	Motor output at Peak Load (kW)	Motor output at Holding Load (kW)	Motor output at Lean Load (kW)
Compressor 1							
Compressor 2							
Compressor 3							
Total Connected Load							

Table 2:

Equipment	Rating of connected motor	Refrigeration capacity (kW)	Designed Evaporating Temp. or (SST)	Power Consumption (kW)	Motor output at Peak Load (kW)	Motor output at Holding Load (kW)	Motor output at Lean Load (kW)
Evaporator 1							
Evaporator 2							
Evaporator 3							
Total Connected Load							

Table 3:

Equipment	Rating of connected motor	Unit	capacity	Power Consumption (kW)	Motor output at Peak Load (kW)	Motor output at Holding Load (kW)	Motor output at Lean Load (kW)
Ammonia Pump 1							
Ammonia Pump 2							
Water Pump 1							
Water Pump 2							
Total Connected Load							

Table 4:

Other Equipment	Power Rating	Average Power Consumption Per Day
Mechanized Conveyors/ Lifts		
Mechanized Doors		
Ventilation Fans		
Electrical Lights		
Air Curtains		
Recovery Wheel		
Dock Levelers		
N_2 Generator		
Sensors & Analyzers		
Control System		
CO_2 Absorber		
Sorting & Grading Line		
***Please add more equipment as per installations.**		

Table 5:

Equipment	Make & Model	Capacity	Efficiency	Consumption of Diesel on full Load
D.G. Set				

Automation & Controls:

Component	Remarks	Description	Make & Model
VFD / Electronic Technology for Compressors	Please ensure VFDs/ Microprocessor panel for energy efficiency of overall plant (compressors / fan / condensers / pumps etc.) should be installed and described thoroughly in design	Please specify the Upper limit & Lower limit of the Frequency	
Power Factor Controller			
PLC Control & Data Acquisition	1. Processor system 2. Number of Input (IU)/ Number of Output (OU) 3. Type of Report generation		
IoT based monitoring system			
Senser based temperature control & alert			
Measurement Systems			
SMS & Email Alerts			
Online Stock details			
Online Air Monitoring System			
Monthly Inventory report			
Monthly monitoring Data logger sheet			
Phone app			
Inventory Day report			
***Please add more equipment as per installations.**			

All mandatory rules and regulations (BIS, ISO, IS, MNRE, etc.) relevant to the item must be complied with.

Please don't leave any space blank. Write N/A where not applicable

LOW COST ONION STORAGE STRUCTURE

REQUIREMENTS

For effective long storage of onion the parameters essential to be looked after are the bulb size, choice of cultivars, cultivation practices, time of harvest, field curing, removal of tops, drying, grading, packing, storage conditions (optimum storage range of relative humidity 65% to 70% with the temperature ranging between 25°C to 30°C).

Salient Features of Improved Storage Structures are:

1. Construction of structure on a raised platform to prevent moisture and dampness due to direct contact of bulbs with thesoil.
2. Use of Mangalore tile type roof or other suitable materials to prevent built up of high insidetemperature.
3. Increased centre height and more slope for better air circulation and preventing humid micro climate insidegodown.
4. Providing bottom and side ventilations for free and faster air circulation and to avoid formation of hot and humid pockets between the onionlayers.
5. Avoid direct sunlight or rain water falling on onion bulbs to reduce sun scald, fading of colour and qualitydeterioration.
6. Maintenance of stacking height to avoid pressurebruising.
7. Periodical disinfection of structures and premises to checkrottage.
8. Cost effectiveness of structures is based on utilization of locally available material for theconstruction.

PATTERN OF ASSISTANCE :

Capacity	Unit Cost (Rs.)	Assistance
5-25 MTs	Max.of Rs.10000/MT for 25 MTs (on prorata basis for small units)	50% of Unit Cost
25-500 MT	Rs.8000/MT	
500-1000 MT	Rs.6000/MT	

TECHNO - FINANCIAL PARAMETERS AFDOPTED FOR WORKING OUT THE ECONOMICS OF A 25 MT ONION STORAGESTRUCTURE

1	Land requirement	6.5 m X 7.0 m
2	Storage space requirement	4.5 m X 6.0 m
3	Technology preferred	Natural or forced ventilation maintaining a temperature between 25 and 30 o C with a relative humidity range of 65 to 70 %.
4	Clearance of storage platform from the ground	60 cm
5	Height of the storage platform	90 to 150 cm

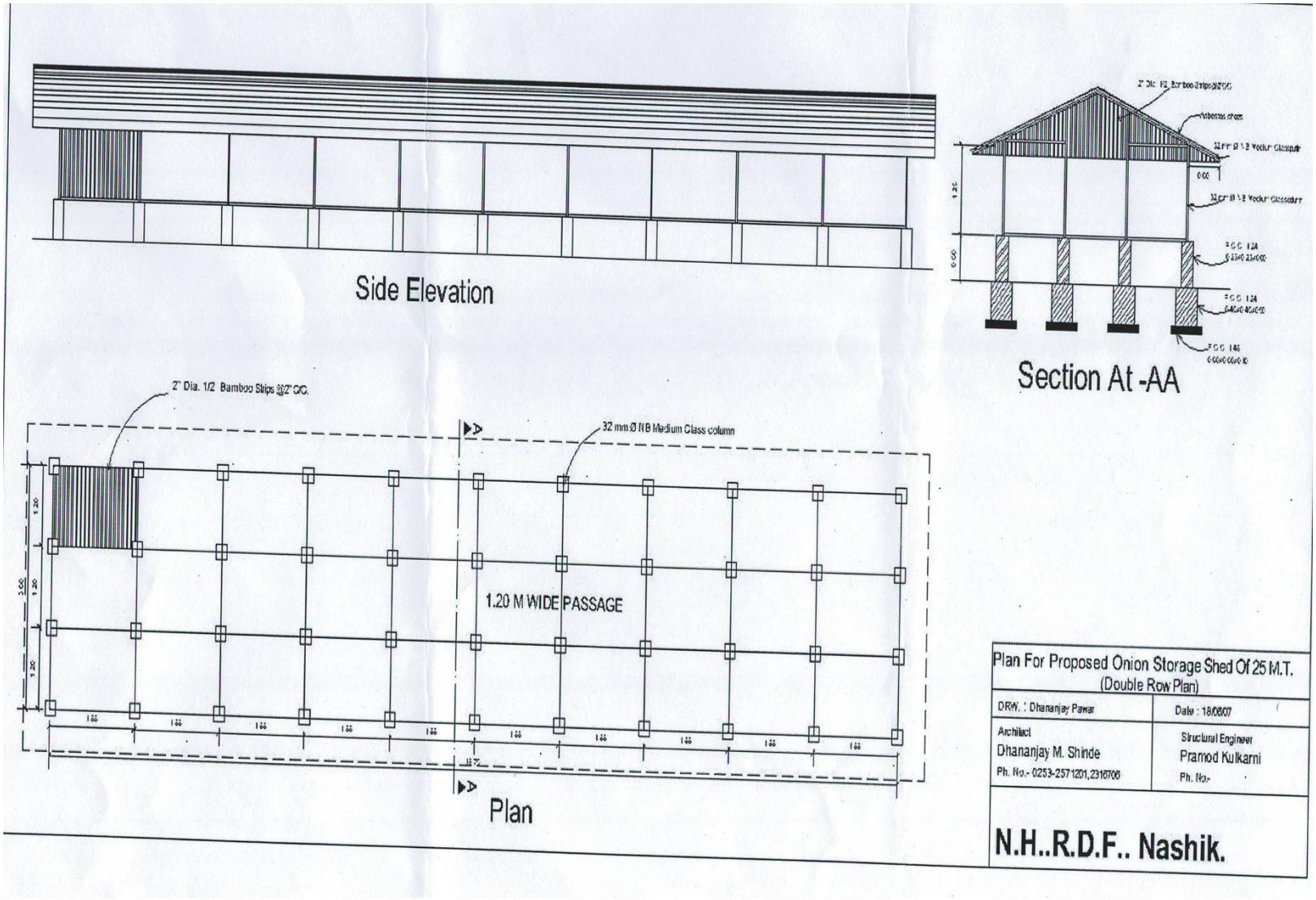
COST ESTIMATE

Name of the work: Construction of Multi Purpose Onion Pack House

Est. Rs. 3.00 Lakhs

Sl. No	Description of work	No.s	Measurements L	B	D	contents	Rate / Per	Amount
1	2	3	4	5	6	7	8	9
	for footings	1 x 1	1.80	cum @	75.00	135.00		
	columns	1 x 1	1.78	cum @	70.00	125.00		
	Plinth beams	1 x 1	2.54	cum @	75.00	191.00		
	for stair case	1 x 1	0.48	cum @	75.00	36.00		
						0.4870	63826.00	31083.00
						M.T.s	1 M.T.	
8	Structurctural Steel Work				Kgs	1500	72	108000.00
9	Structurctural Steel Work Front face Extended				Kgs	60	72	4320.00
10	Structurctural Steel Work for Additional second layer				Kgs	120	72	8640.00
11	A/C Sheet Roofing				Sq M	104	240	24960.00
12	A/C Sheet Roofing for Additional second layer				Sq M	12.48	240	2995.00
13	A/C Sheet Ridges				Rmt	16.25	144	2340.00
13	A/C Sheet Ridges for Additional second layer				Rmt	1.950	144	281.00
14	2'' dia 4/2 bamboo Strips @3'' C/C				Rmt	1818	30	54540.00
15	Unforcen Items if Any							201.00
	TOTAL Estimate Cost of 25MT Capacity of Low Cost Onion Storage Structure							300000.00

Limited to Rs.2,50,000/- per 25 MTs


Side Elevation
Section At -AA
2" Dia. 1/2 Bamboo Strips @2" C/C.
32 mm Ø NB Medium Class column
1.20 M WIDE PASSAGE
Plan
Plan For Proposed Onion Storage Shed Of 25 M.T.
(Double Row Plan)
DRW. : Dhananjay Pawar
Date : 18/08/07
Architect
Dhananjay M. Shinde
Ph. No.- 0253-2571201,2316706
Structural Engineer
Pramod Kulkarni
Ph. No-
N.H..R.D.F.. Nashik.

APPLICATION FOR AVAILING ASSISTANCE / SUBSIDY UNDER MIDH

(COMPONENT: ONION STORAGE STRUCTURE)

Name of the Scheme: **Post Harvest Management**

1	Name of the Farmer	**:**
2	Father / Husband Name	**:**
3	Caste (SC/ST/BC/OC)	**:**
4	Address:	**:**
	Phone / Cell No.:	**:**
5	Land records with Extent in Acres / Ha.	**:**
	(Copy of Pass Book / Adangal)	
6	Source of Irrigation (Open well / Bore well / Canal)	**:**
7	Name of the Financing Bank, Loan Amount Proposed	**:**
8	Whether any Govt. Subsidy availed previously	**:**
9	Any other relevant information	**:**

Declaration

I, _____

declare that the particulars furnished above are true to the best of my knowledge and I promise that the benefit obtained from State MIDH Cell will be used for the purpose for which it is given and in case of misuse I am liable for any action deemed to be fit by Govt. of A.P., including recovery of the subsidy amount with 12% interest to the Government.

Enclosures: 1. Affidavit
2. Pattadar Pass Book
3. Detailed Project Estimate by Civil Engineer (Regd. No. along with Seal)

Signature of the Farmer / Entrepreneur.

Recommendations of the Horticulture Officer: _____

RSK functionary **Horticulture / MI Engineer** **Horticulture Officer** **DHO**

FORMAT TO CONDUCT FINAL AND JOINT INSPECTION OF **ONION STORAGE STRUCTURE** BY THE COMMITTEE UNDER POST HARVEST MANAGEMENT COMPONENT OF MIDH, AP.

Name of the Unit: ..... Place: ..... District: .....

As per project report				As per the inspection and actual investment				
Details	**Specifications/Details**	**Qty**	**Total Cost (Rs)**					

Certificates:

1) This is to certify that Sri./ Smt. _____ has established Onion Storage structure as per project report and norms of MIDH.

2) This is to certify that all the original purchase bills of the items mentioned above have
been verified and found correct.

3) This is to certify that Sri./ Smt. _____ is eligible to avail subsidy of Rs. ..... and the same may be released.

Promoter RSK functionary Horticulture / MI Engineer Horticulture Officer DHO Senior Officer

PRIMARY / MINIMAL PROCESSING UNITS

Processing of horticultural produce and value addition is an important activity. While primary / minimal processing units are promoted under MIDH, large scale processing units are promoted by Ministry of Food Processing Industries (MFPI), out of their ongoing Schemes.

Application form along with all required documents as per the check list has to be forwarded to State cell for taking approval from SLEC. After receiving of administrative sanction, DHO has to submit Preliminary Inspection Report. After the unit is completed DHO has to recommend for joint inspection of the unit.

The DHO shall conduct joint inspection with the members constituted by this office and the joint inspection reports have to be submitted in prescribed format. Based on the recommendations of the Committee, the final installment of the subsidy shall be released to the concerned bank of the promoter through DBT

Unit Cost: Rs.35.00 Lakh/unit

Assistance @ 35%: Rs.12.25 Lakh/unit

LIST OF ACTIVITIES - QUALIFY AS PRIMARY/SECONDARY/TERTIARY UNITS

Category	Primary / Minimal processing activities	Secondary processing activities	Tertiary processing activities
Fruits & Vegetables	Harvesting, Sorting, Washing, Peeling, Cutting, Slicing, Grating, Shredding, Seed Removal	Blanching, Juicing, Pureeing, Drying (dehydration), Freeze-drying, Concentrating, Cooking, Flavoring, Preserving, Pickling, Packaging	Canning, Bottling, Fermentation, Freezing (IQF), Mixing (for sauces, chutneys), Cooking (soups, sauces), Pasteurization, Packaging (retort pouches, jars, cans), Blending for Smoothies, Sauces
Spices (incl.	Harvesting, Drying,	Grinding,	Blending (spice

Chilli, Turmeric, Ginger, Tamarind)	Grinding, Sorting, Cleaning, Sieving, Stemming	Powdering, Paste Making, Extraction of Essential Oils, Pulverizing, Mixing, Blending, Dehydrating, Roasting	mixes), Emulsifying (dressings, sauces), Pickling, Concentrating (sauces), Bottling, Pasteurizing, Marinating, Mixing for Seasoning Packs, Packaging for ready-to-use seasonings, flavor blends, and oleoresin extraction
Nuts, and Coconut	Harvesting, De-shelling, Sorting, Cleaning, Grading, Sun-drying, Peeling, Crushing	Cold-pressing, Expeller Pressing, Oil Refining, Powdering, Roasting, Grinding (for paste), Desiccating, Dehydration, Mixing with flavors	Blending (spreads, butters), Candying, Beverage Formulation (coconut water, vegan milk), Emulsifying (for creams), Drying, Flavoring (masala powders), Fermentation, Packaging for snacks, oils, nut-based products
Cocoa	Harvesting, Fermentation, Drying, Roasting, Cracking (to produce nibs)	Grinding, Pressing (for cocoa butter), Liquefying (for cocoa liquor), Blending (with milk/sugar for chocolate), Powdering	Molding (chocolates), Tempering, Conching, Enrobing (coating nuts/fruits), Blending for syrups and beverages, Baking (cakes, pastries), Packaging (bars, spreads), Mixing for lotions/cosmetics

Food processing categories - Based on the Products

Category	Primary Products	Secondary Products	Tertiary products
Fruits & Vegetables	Whole, Peeled, Cuts & Slices, Trimmed Fruits/Vegetables, Grated, Shredded, De-pitted, Seeded	Pulps, Juices, Flakes, Chips, Purees, Concentrates, Diced/Cubed, Powders, Paste, Dried (e.g., raisins, apricots), Candies, Jellies, Pickled Vegetables, Preserved Products	Ketchups, Jams, Soups, Pickles, IQF products, Vegetable Blends, Chutneys, Canned Soups, Dressings, Fermented Vegetables, Fruit Bars, Snack Packs, Salad Dressings, Cocktail Mixes, Smoothies, RTC, RTE products.
Nuts & Coconut	De-shelled, Graded Seeds/Nuts, Dried Oilseeds/Nuts, Peeled, Halved, Shredded (for coconut), Sprouted Seeds	Edible Oils (Refined & Cold-pressed), Oil Cakes (for animal feed), Dehydrated Coconut, Desiccated Coconut, Nut Powders, Nut Butters (e.g., peanut butter), Paste (e.g., almond paste)	Chutneys, Pickles, Nut Candies, Coconut Milk, Vegan Milks, Coconut Water, Coconut Flour, Coconut Cream, Masala Powders, Nut-based Snacks, Energy Bars, Nut Cheese, Flavored Nut Butters, Coconut Yoghurt, Protein Powders, Nut-based Desserts
Spices (incl. Chilli, Turmeric, Ginger, Tamarind)	Dried Whole Spices (Pepper, Cinnamon Sticks), Ground Spices, Dehydrated Spice Flakes, Dried Herbs, Stemmed	Spice Powders (e.g., chilli powder, turmeric powder), Spice Pastes, Flakes (garlic, onion), Pulps (e.g., tamarind), Essential Oils, Dried Herb Mixes, Infusions (e.g., ginger tea, turmeric latte)	Sauces (e.g., hot sauces), Pickles, Spice Extracts (Oleoresins), Spice Blends (Garam Masala, Curry Powder), Chutneys, Salad Dressings, Marinades, Spice Rubs, Spice Paste Sachets, Dips (e.g., salsa), Flavored

			Oils, Seasoning Mixes for Snacks
Cocoa	Raw Cocoa Beans, Fermented & Dried Beans, Roasted Beans, Cocoa Nibs	Cocoa Butter, Cocoa Powder, Cocoa Mass, Cocoa Liquor, Cocoa Paste	Chocolate (bars, chips, spreads), Cocoa-based Confectioneries, Hot Cocoa Mixes, Chocolate Syrup, Cocoa Butter Products (e.g., lotions, cosmetics), Chocolate-flavored Beverages, Chocolate Chips, Cocoa Extracts, Chocolate-coated Nuts, Cakes & Pastries

CASHEW NUT PROCESSING UNIT

Cashew Processing

Stage 1 -DRYING

The raw cashew nuts are procured from the local farmers and local market. These cashew nuts are dried in the sun for a period of two days and are then stored in the gunny bags for processing through the year. The process of sun drying helps in removal of excess moisture thus resulting in longer storage. The processing of cashew nut is a four stage process, each designed to produce quality edible cashew kernel.

Stage 2 - Steam Roasting

The outer shell of the raw cashew nuts has to be removed to produce the edible cashew kernel. The outer shell of the cashew is very hard and it contains a corrosive oil which is harmful for human consumption. The process of steam roasting helps in removal of this hard shell with minimal effort. The raw cashew nuts are put in a drum connected to a mini boiler. The steam from this mini boiler is passed over the cashew nuts placed in the drum for a period of 10 -15 minutes. These cashew nuts are left in the drum for 20 minuets for proper roasting. The roasted cashew nuts are then taken out of the drum and placed in the open air for a period of around 12 hours to let them cool down and help in removal of the cashew shells.

Stage 3 - Shell Cutting

The roasted cashew nuts are then taken to the cutting department to remove the outer shell. This is a complex process and requires highly skilled labor to get maximum unbroken kernel output. This process required each cashew nut to be individually placed between blades of the machine operated manually to remove the outer shell. This process results in production of cashew kernel with soft inner shell. These nuts are then placed in a oven which is constantly maintained at a temperature of about 60 degrees for a period of 24 hours to make the inner shell brittle.

Stage 4 -HOT CHAMBER

In this stage, cashew kernels are heated to 70-85 degree centigrade. The main purpose of this heating is to eliminate moisture and gumming between cashew kernels.

Stage 5 – Peeling

The inner shell of the kernel has to be removed to produce the white nuts. The peeling process is designed to remove this inner soft shell after the kernel is removed from the oven. The kernel is used for peeling after it is left in the open for a period of 12 hours. This cooling helps in peeling process. Each nut is individually peeled to get white nuts. These white nuts are then sent to the grading department.

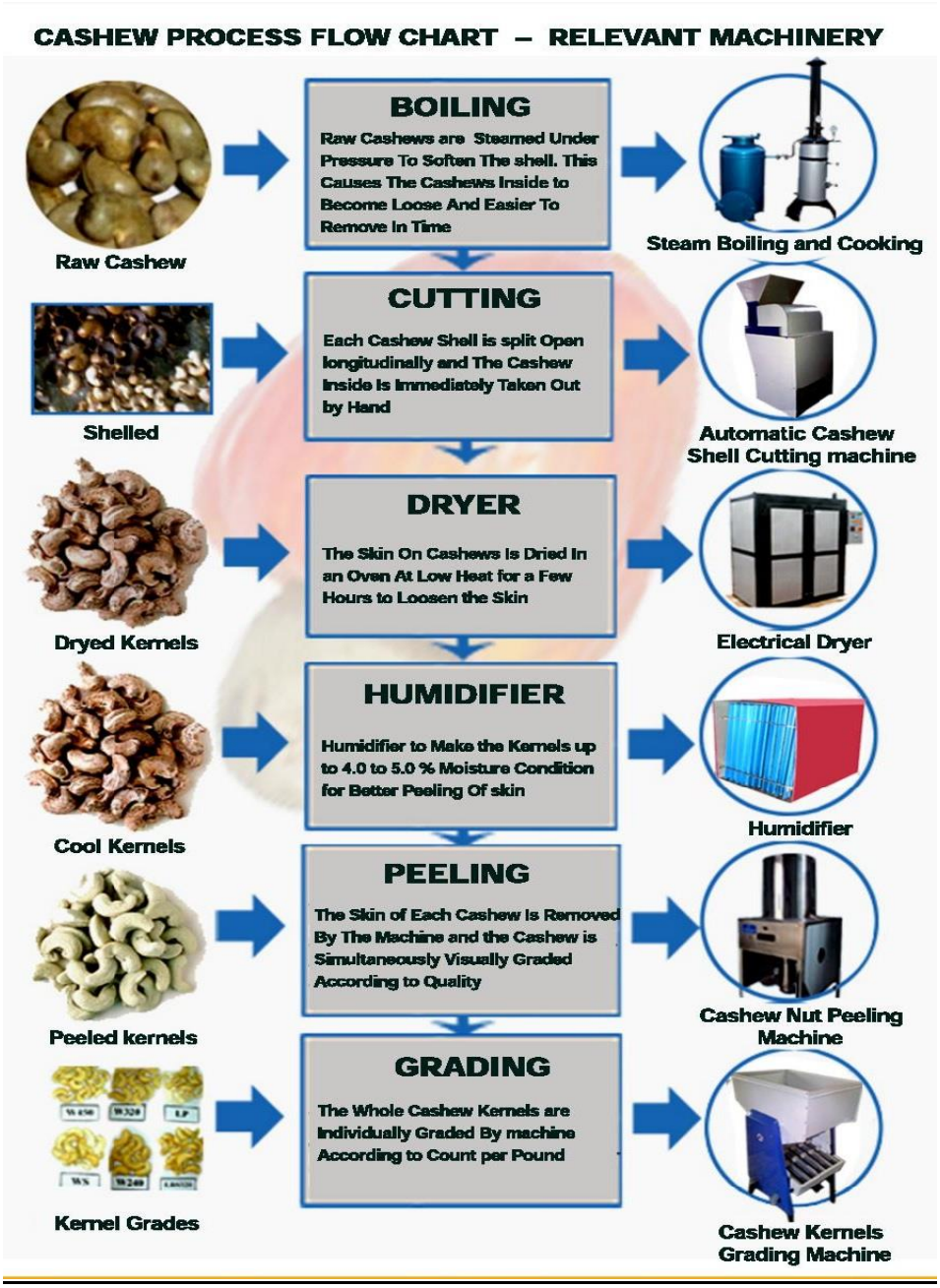
Stage 6 – Grading

The process of grading is designed to sort the white cashew kernel into different grades. The white kernel is divided into two main types wholes and pieces. The wholes are further divided into 15 grades and the pieces are divided into 9 main grades. The process of sorting wholes and the pieces is based on the size, color and texture of the nuts. The sorting is done based on the set international sizes. These nuts are then once again placed in the oven to make the nuts crispier before they are sent to the packaging department.

Stage7 - Packing

Cashew Kernels are fumigated before packing. Then, it is passed through a cleaning line, where dead insects, foreign particles, if any are removed. Finishing touches are given to grades by removing lower grades.

1. The cashew kernels are packed into plastic bags of different sized for sale in local market and in tins of 10kgs for sending to other markets.
2. Cashew kernels are packed in controlled atmosphere. Ambient air is removed and replaced with CO2 and Nitrogen gasses.


CASHEW PROCESS FLOW CHART – RELEVANT MACHINERY
Raw Cashew
BOILING
Raw Cashews are Steamed Under Pressure To Soften The shell. This Causes The Cashews Inside to Become Loose And Easier To Remove In Time
Steam Boiling and Cooking
Shelled
CUTTING
Each Cashew Shell is split Open longitudinally and The Cashew Inside Is Immediately Taken Out by Hand
Automatic Cashew Shell Cutting machine
Dryed Kernels
DRYER
The Skin On Cashews Is Dried In an Oven At Low Heat for a Few Hours to Loosen the Skin
Electrical Dryer
Cool Kernels
HUMIDIFIER
Humidifier to Make the Kernels up to 4.0 to 5.0 % Moisture Condition for Better Peeling Of skin
Humidifier
Peeled kernels
PEELING
The Skin of Each Cashew Is Removed By The Machine and the Cashew is Simultaneously Visually Graded According to Quality
Cashew Nut Peeling Machine
Kernel Grades
GRADING
The Whole Cashew Kernels are Individually Graded By machine According to Count per Pound
Cashew Kernels Grading Machine

Cashew Processing Unit

Scheme-1:

S.No	ITEM	Quantity	Unit Cost (Rs. in lakhs)
1.	Boiler	1	**35.00**
2.	Cooker	1	
3	Cutting tables	5-10	
4	Steam/Electric dryer (Hot Chamber)	1	
5	Peeler along with compressor	1	
6	Cool Chamber (Humidifier)	1	
7	Grading tables	5-10	
8	Shed (Shed amount can be considered if the machinery cost is less than Rs.25.00 lakhs)	1	

Any other machinery will also be considered in addition to the machinery mentioned above for Modernization provided with New Term Loan as a pre-requisite and the eligible subsidy maybe given @ 35% i.e., Rs.12.25 lakhs.

The maximum subsidy of 35% will be provided for each of the above schemes and the additional cost should be borne by the promoter concerned. The subsidy will be provided to only those units which have not availed Govt. assistance in the past.

The new schemes mentioned above will be of great help for Cashew Industry which is otherwise in the threat of closure due to the norms of Pollution Control Board.

Establishment of Minimal Processing Unit

S.No	Description	Indicative Percentage (%)	Max. Amount (Rs. in lakhs)
1.	Civil Works	45-50	16.50
2.	Plant & Machinery	40-45	16.00
3.	Electrical Items	5-10	2.50
	TOTAL		**35.00**

The DHOs/DDHs are also requested to follow the guidelines scrupulously without any deviation and submit the DPRs to this office. They are also requested to keep in mind the following points before forwarding any proposals to this office.

1. The DHO should forward the project proposals in 2 sets (Spiral Bound) along with the check list duly signed by the DHO.
2. Application should be verified thoroughly and ensure that all the columns are properly filled along with the signature of the promoter.
3. DHM approval has to be obtained for every and every project proposal.
4. The DHO should verify whether all the original essential documents viz., Bank consent letter / sanction letter, Bank appraisal report and Promoter's affidavit are submitted along with DPR and DHO should attest the duplicate copies before forwarding the same to this office.

BASIC DATA SHEET FORCASHEW PROCESSING UNIT

CIVIL Works - Shed Specifications (Shed Size = 40' x 30' (or) 60' x 20' = 1200 sq. ft)					
Sl. No.	**Description**	**Length (ft)**	**Width (ft)**	**Unit**	**Area (Sq. ft) / Quantity**
1	PCC Platform with 1.5' plinth height (Concrete Flooring)			Sq. ft	1200
2	Shed (Iron Gutters, truss and purlin & GI / Asbestos Roof sheets) (22' centre height and 17' wall height)			Sq. ft	1200
3	17' height wall (9 inch thickness) all-round the shed – Cost includes Bricks + Cement+ Sand + Mason Charges				
4	Two Rolling Shutters of size 8' x 8'	8'	8'	Nos	2
5	Six Glazed M.S. Windows of size 5' x 3' with 10mm square guard bars at 150mm c/c including hardware and 4mm glass	5'	3'	Nos	6

Machinery Details					
Sl. No	**Item**	**Machine Details**		**Motor**	
		Make	**Capacity (Kg / Hr)**	**Make**	**Capacity (HP / KW)**
1	Raw Cashew Grader				
2	Steam Boiler With Cooker				
3	Electrical Oven				
4	Automatic Cashew Shell Cutting Machine				
5	Cashew Nut Peeling Machine				
6	Air Compressor				
7	Kernel Separator				
8	Grading Machine				
9	Humidifier				
10	Laboratory Equipment				
11	Weighing Scale				
12	Sealing Machines				
13	Fire Safety Equipment				

Electrical Equipment			
Sl No	**Item**	**Capacity**	**Quantity**
1	Electrical Supply & Transformer		
2	Cables, Wires, Lights & Fans		
3	Generator		

Total Project Cost = ± Rs 35.00 Lakhs

CHECK LIST

S. No.	DESCRIPTION	REMARKS
1.	Application Form along with Appraisal Report	
2.	Basic Data Sheet with Complete Technical Aspects	
3.	Detailed Project Report MIDH Guidelines	
4.	Bank Sanction Letter along with appraisal Report	
5.	Approval from Gram Panchayat / Municipality / Town Planning	
6.	SSI Registration Certificate	
7.	Fire Department Approval	
8.	PAN Card Copy of the unit	
9.	Electricity Approval	
10.	DMC Approval	
11.	Promoter’s Affidavit as per Prescribed Format	
12.	Land Document	
13.	Land Conversion Certificate	
14.	Certificate from Civil Design Engineer	
15.	Certificate from Bank for Non-Availing Subsidy from any other State/Central Govt. Department.	
16.	Insurance of the Fixed Assets	

APPLICATION FOR AVAILING ASSISTANCE / SUBSIDY UNDER MIDH

(COMPONENT: PRIMARY / MINIMAL PROCESSING UNIT)

Name of the Scheme: **Post Harvest Management**

1	Name of the Farmer	**:**
2	Father / Husband Name	**:**
3	Caste (SC/ST/BC/OC)	**:**
4	Address:	**:**
	Phone / Cell No.:	**:**
5	Land records with Extent in Acres / Ha.	**:**
	(Copy of Pass Book / Adangal)	
6	Source of Irrigation (Open well / Bore well / Canal)	**:**
7	Name of the Financing Bank, Loan Amount Proposed	**:**
8	Whether any Govt. Subsidy availed previously	**:**
9	Any other relevant information	**:**

Declaration

I, _____

declare that the particulars furnished above are true to the best of my knowledge and I promise that the benefit obtained from State MIDH Cell will be used for the purpose for which it is given and in case of misuse I am liable for any action deemed to be fit by Govt. of A.P., including recovery of the subsidy amount with 12% interest to the Government.

Enclosures: 1. Affidavit
2. Pattadar Pass Book
3. Detailed Project Estimate by Civil Engineer (Regd. No. along with Seal)

Signature of the Farmer / Entrepreneur.

Recommendations of the Horticulture Officer: _____

Horticulture / MI Engineer **Horticulture Officer** **DHO**

Preliminary Inspection Report for PRIMARY / MINIMAL PROCESSING UNIT

Date of Inspection :

A Component :

B **Details of Project** :
(i) Name of the project :
(ii) Address for communication with telephone No. :

C **Project Location with Address** :
(i). Survey No :
(ii). Village :
(iii). Mandal :

D Constitution (Individual/ Joint Individual/Partnership Firm/ Company. :

E (i) Proposed Activity :
(ii) Type :
(iii) Proposed type of cooling system :

F Name of the Promoter :

G **<u>Present physical status of the project :</u>**
I. Construction started or not :
(i) Land development status/boundary/road :
(ii) Connecting road to the plot :
(iii) Stage of cold store building civil/pre engineered as on inspection date :
(iv) Type of produce to be stored

Promoter Horticulture / MI Engineer Horticulture Officer DHO

FORMAT TO CONDUCT FINAL AND JOINT INSPECTION FOR **PRIMARY / MINIMAL PROCESSING UNITS** BY THE COMMITTEE UNDER POST HARVEST MANAGEMENT COMPONENT OF MIDH, A.P.

1) GENERAL INFORMATION

1) Name of the Unit with full address (Sy. No. / Area / Village / District) :
2) Date of Issue of Administrative Sanction :
3) Name of CEO of Company / Managing Director :
4) Constitution: Individual / Group of Individuals / Society / Partnership Firm / Pvt. Ltd. Company / Public Ltd. Company : : :
5) Date of Inspection of the Project :
6) Name & Designation of the Committee members :
   (a)
   (b)
   (c)
   (d)
7) Name of the Bank (with Full address & Phone & Fax No.) : :
   a) Subsidy reserve fund account no. :
8) Date of start of the project :
9) Date of Completion of the project :
10) a) Date & amount of Sanction of Term Loan :
    b) Repayment Period :
11) Land Details
    i. Whether land is in the name of promoter : Yes / No
    ii. Whether land is a Regd. Lease land for Minimum 10 years in favour of applicant (in case of lease) : Yes / No

Name & Signature Applicant	**Name & Signature of Expert**	**Name & Signature of Inspecting Officer (Bank)**	**Name & Signature of DHO concerned from MIDH**	**Name & Signatureof of Senior Officer**

II.

CIVIL Works		As per DPR			As per Jt. Inspection	
Sl. No.	**Description**	**Length (ft)**	**Width (ft)**	**Unit**		
1	PCC Platform with 1.5' plinth height (Concrete Flooring)			Sq. ft		
2	Shed (Iron Gutters, truss and purlin & GI / Asbestos Roof sheets) (22' centre height and 17' wall height)			Sq. ft		
3	17' height wall (9 inch thickness) all-round the shed – Cost includes Bricks + Cement+ Sand + Mason Charges					
4	Two Rolling Shutters of size 8' x 8'	8'	8'	Nos		
5	Six Glazed M.S. Windows of size 5' x 3' with 10mm square guard bars at 150mm c/c including hardware and 4mm glass	5'	3'	Nos		

Machinery Details

Sl. No	**Item**	**As per DPR**		**As per Jt. Inspection**	
		Make	**Capacity (Kg / Hr)**	**Make**	**Capacity (HP / KW)**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10	Weighing Scale				
11	Sealing Machines				
12	Fire Safety Equipment				

Electrical Equipment			
Sl No	**Item**	**As per DPR**	**As per Jt. Inspection**
1	Electrical Supply & Transformer		
2	Cables, Wires, Lights & Fans		
3	Generator		

Sl. No.	Particulars	Project Cost		Actual investment as per the joint inspection team		Remarks
		As per project report	As appraised by Banker			
1	2	3	4	5	6	7
1	**Means of Finance**					
1.	Capital					
2.	Term Loan from Bank					
3.	Subsidy / Margin Money/ Un-Secured Loans					
	Total:					

Note: A certificate from CA may be obtained

Certificates:

1) This is to certify that Sri./ Smt. _____ has established the Primary Processing Unit as per project report.
2) This is to certify that Sri./ Smt. _____ is eligible to avail subsidy of Rs. _____/- and the same may be released to M/s. _____ as final installment.

Name & Signature of Applican | **Name & Signature of Expert** | **Name & Signature of Inspecting Officer (Bank)** | **Name & Signature of DHO concerned** | **Name &Signature of Senior Officer from MIDH**

FORMAT

(On Letter head of the CA)

To

The Mission Director & Commissioner of Horticulture,
Govt. of Andhra Pradesh,
GUNTUR.

We have examined the books of accounts and other relevant records maintained by M/s. / Shri / Smt. _____(Name of the Beneficiary) at its office situated at _____(Address of project) for_____(Project activity). These accounts are maintained by the Company's management, partners of the firm / proprietor of the concerned / grower / NGO / and our responsibility is to verify the truth and fairness of these records and verification of amount expensed for acquisition / construction of fixed assets / establishment and other expenditure.

We conducted our work in accordance with the Audits and Accounting Standards generally accepted in India. Those Standards require that we plan and perform our verification to obtain reasonable assurance about whether these accounts are true and fair are free of material misstatement. A verification included examining on 100% basis, evidence audit includes examining, on a test basis assessing the accounting principles used and significant estimates made by the grower, as well as evaluating the overall financial statement presentation. We believe that our audit provides reasonable basis of our opinion.

We verify that

a) We have obtained all the information and explanation that to the best of our knowledge and belief were necessary for the purpose of our verification.

b) In our opinion, proper books of accounts as required by law have been kept by the Company / firm / sole proprietorship concern / grower / NGO for the financial period _____and these books of account represent true and fair view of the transaction entered into by the Company / firm / sole proprietorship concern / grower / NGO.

c) In our opinion, the Company / firm / sole proprietorship concern / grower / NGO has incurred a capital expenditure amounting to Rs. _____ (Rupees _____only) for acquisition / construction of fixed assets and the same is being reflected properly in the books of accounts. The valuation made of major components of the project and whole project is tabulated as follows:

Establishment of Project:

S. No.	Component	Proposed Expenditure as per LOI	Cost as appraised by Bank before term loan sanction	Cost assessed by CA	Remarks
1					
2					
3					
	TOTAL				

Total :

_____

MEANS OF FINANCE

S. No.	Item	Project Cost as per DPR	Project Cost as per Appraisal Report	Actual Cost
1	Promoter's Equity			
2	Term Loan			
3	Unsecured Loan			
4	Grant from NHM			
5	Others			
	TOTAL			

We recommend Rs. …… as the cost of the whole project.

Signature and Seal of C.A. with Membership No.

Date:

FORMAT

(Forwarding letter of Bank for Conducting JIT)
Name &Full Address of the FI/Bank (on letter head)

To
The Mission Director & Commissioner of Horticulture,
Govt. of Andhra Pradesh,
Public Gardens, Nampally,
GUNTUR

Subject : Request for Joint Inspection of the project

Sir,

MIDH, A.P., had released Rs……as credit linked back-ended subsidy in respect of project of_____Village District State Vide letter no……..As per instruction,the subsidy amount has been kept in Subsidy Reserve Fund account of the bank and interest benefit is being passed on to the beneficiary. Now project is complete as per original proposal and we have also disbursed full Term loan sanctioned for the above mentioned project. In addition to documents submitted by bank at the time of claim of subsidy such as copy of the Appraisal Note, Term Loan sanction letter, copy of Record of Right, following documents required for Joint Inspection are being submitted with the request to conduct Joint Inspection of the project to decide final subsidy claim.

S. No	Particulars	Enclosed or Not
1	Details of date-wise release of term loan	
2	Completion certificate by Bank/FIs	
3	Undertaking from promoter (as prescribed by NHM)	
4	Extractofsubsidyreservefundaccountofbankinwhichestimatedsubsidy has been kept	

It is certified that the original of above documents and documents submitted at the time of subsidy claim by bank pertaining to the project share kept in Bank/FI, which can be shown at the time of random monitoring by the Department or any agency authorized by the Department.

(Seal and Signature of the Bank's Officer)

Name:_____
Name of the Bank:
Address:
Phone/Fax/Mobile No.: _____
Place: _____
Date: _____

TECHNOLOGY INDUCTION & MODERNISATION OF COLD CHAIN (ALTERNATE TECHNOLOGY – SOLAR PV PANELS)

Unit Cost: Rs.35.00 Lakhs
Subsidy (35%): Rs.12.25 Lakhs

No. 318/38/2018-GCRT
Government of India
Ministry of New & Renewable Energy
***

Block No. 14, CGO Complex,
Lodi Road, New Delhi
Date: 18th August 2021

ORDER

Subject: Benchmark costs for Grid-connected Rooftop Solar Photo-voltaic systems for the financial year 2021-22 -reg.

I am directed to convey the approval of competent authority for issuing of the benchmark costs for Grid-connected Rooftop Solar Photo-voltaic Systems for the financial year 2021-22 as under:

For General Category States/UTs:

System Capacity range	Upto 1 kW	>1kW upto 2 kW	>2kW upto 3 kW	> 3kW upto 10 kW	>10 kW upto 100 kW	> 100kW upto 500 kW
Benchmark cost (Rs./kW)	51100	46980	45760	44640	41640	39080

For Special Category States/UTs (i.e. North-Eastern States including Sikkim, Himachal Pradesh, Uttarakhand, Jammu and Kashmir, Ladakh, Andaman and Nicobar and Lakshadweep islands):

System Capacity range	Upto 1 kW	>1kW upto 2 kW	>2kW upto 3 kW	> 3kW upto 10 kW	>10 kW upto 100 kW	> 100kW upto 500 kW
Benchmark cost (Rs./kW)	56210	51670	50330	49100	45800	42980

2. The above benchmark cost includes cost of Solar PV panels (with domestic cell and modules), inverter (single/3 phase wherever applicable), balance of system e.g. cable, switches/ circuit breaker/ connectors/ junction box, mounting structure, earthing, lightening arrester, and civil works, installation & commissioning, CMC for 5 years, transportation, insurance, applicable taxes, etc. The above benchmark costs are excluding of net metering cost and battery back-up costs.

3. The benchmark cost for year 2021-22 will be applicable for all LoAs to be issued/empanelment of vendors to be done by the state implementing agencies, under Ph-II of rooftop solar programme of MNRE, after 10 days from the date of issuance of this benchmark cost notification.

18.08.2021

(Hiren Chandra Borah)
Scientist D
E Mail: hiren.borah@nic.in

CHECK LIST FOR PHM COMPONENTS

S.No	Description	Remarks
1	Application form	
2	Basic Data sheet with complete technical specifications	
3	Detailed Project Report as per MIDH Guidelines	
4	Partnership deed	
5	Land Documents (Sale deed/ Lease deed)/pattadhar pass book copy	
6	Firm Registration Certificate	
7	Bank Sanction Letter	
8	Bank Appraisal letter	
9	Approval from Gram Panchayat	
10	Land Conversion	
11	Approval from Pollution control board	
12	Fire Department approval with drawings	
13	Pan card of Firm	
14	KYC Documents of all the partners	
15	Electricity Approval	
16	VAT/CST Registrations	
17	Affidavit for non availing of subsidy	
18	Affidavit or letter from banker or DIC for non availing of subsidy.	
19	Declaration by Engineer	
20	Insurance Certificate	

FOOD PROCESSING

SECONDARY PROCESSING UNITS FOR VALUE ADDITION

Unit Cost: Rs.100.00 Lakhs

Assistance (35%): Rs.35.00 Lakhs (Credit linked back ended assistance).

- 35% in General areas and 50% in Scheduled areas.

LIST OF ACTIVITIES-QUALIFY AS SECONDARY PROCESSING UNITS

Category	Secondary processing activities
Fruits & Vegetables	Blanching, Juicing, Pureeing, Drying (dehydration), Freeze-drying, Concentrating, Cooking, Flavoring, Preserving, Pickling, Packaging
Spices (incl. Chilli, Turmeric, Ginger, Tamarind)	Grinding, Powdering, Paste Making, Extraction of Essential Oils, Pulverizing, Mixing, Blending, Dehydrating, Roasting
Nuts, and Coconut	Cold-pressing, Expeller Pressing, Oil Refining, Powdering, Roasting, Grinding (for paste), Desiccating, Dehydration, Mixing with flavors
Cocoa	Grinding, Pressing (for cocoa butter), Liquefying (for cocoa liquor), Blending (with milk/sugar for chocolate), Powdering

MARKETING INFRASTRUCTURE

GUIDELINES

S. No.	Component	Unit	Unit cost (Rs. In Lakh)	Assistance (Rs. In Lakh)	Pattern of Assistance
1	Rural Primary Market / Apni Mandies	No	25.00	10.00	Back-ended 40% of the capital cost of project in general areas and 55% in Scheduled areas
2	Retail Markets / Outlets (environmentally controlled)	No	20.00	7.00	Back-ended 35% in General areas and 50% in scheduled areas
3	Static / Mobile Vending Cart / Platform with Cool Chamber	No	0.30	0.15	50% of unit cost.
4	Modified retail refer van with retail counter (to be linked with Integrated Pack house)	No	Rs. 20.00 lakh with loading capacity of 3 MT	7.00	Assistance @ 35% in General areas and 50% in the case of NE & Himalayan States, Scheduled areas, vibrant villages, Andaman & Nicobar and Lakshadweep Islands.

RURAL PRIMARY MARKETS/APNI MANDIES

The horticulture crops namely fruits, vegetables and flowers etc. are perishable in nature and need immediate disposal for providing remunerative prices to the farmers. For efficient marketing facilities to orchardist at the local level, NHM provides Back-ended subsidy @ **40**% of the capital cost of project to panchayats, societies, private entrepreneurs and local bodies for establishment of Rural Primary Markets and Apni Mandies. The identified items of infrastructure for Rural Primary Markets/Apni Mandies are as under.

Rural Primary Markets/Apni Mandies

1. Office building
2. Auction/drying platforms - two to three per market
3. Water supply & sanitary arrangements as per requirement.
4. Grading equipment
5. Weighing equipment
6. Wastage disposal system
7. Boundary wall and internal roads

CHECK LIST

S. No.	DESCRIPTION	REMARKS
1.	Application Form along with Appraisal Report	
2.	Basic Data Sheet with Complete Technical Aspects	
3.	Detailed Project Report MIDH Guidelines	
4.	Partnership Deed (MoU)	
5.	Land Document (Sale Deed / Lease Deed / Pattadar Pass Book copy)	
6.	Firm Registration Certificate	
7.	Bank Sanction Letter along with appraisal Report	
8.	Approval from Gram Panchayat / Municipality / Town Planning	
9.	Land Conversion Certificate	
10.	SSI Registration Certificate	
11.	Fire Department Approval with drawings	
12.	PAN Card Copy of the unit	
13.	Electricity Approval	
14.	KYC documents of all the Partners	
15.	DMC Approval	
16.	Promoter’s Affidavit as per Prescribed Format	
17.	Certificate from Bank for Non-Availing Subsidy from any other State/Central Govt. Department.	
18.	Insurance of the Fixed Assets	

Format for submission of Application for Rural Primary Market and Apni Mandies.

1. Name of the Rural Primary Market/ Apni Mandi.

2. Ownership of Market.

3. Location
   a) District
   b) Tahsil

4. a) Whether the market is located in Tribal/ Hilly area (Attach documentary proof)

   b) Whether the market has availed financial Assistance for development from Central

   Sector Projects, full details of assistance Received.

   c) Frequency at which the market is operating i.e. daily, bi-weekly, etc. If seasonal, then give number of days the market function during the season.

   d) Whether the market is regulated.

      i) If so, the name of the Market Committee under which it is functioning.

      ii) If not regulated, the name of the local body managing it.

   e) Whether the market is served by roads linking with the regulated market.

5. Present annual arrivals (Last financial year)

Sl. No.	Name of the Facility	No. / Area & Capacity	Cost per unit	Total Cost
A	Office-cum-Godown			
B	Auction/Drying platform			
C	Water & Sanitary arrangements			
D	Grading & weighing equipments			
E	Boundary wall			
	Total cost of the Project			

11. Sources of financing the project.

1. Contribution from promoters/ own fund
2. Contribution from state/ Marketing board
3. Central assistance _____

Total _____

If additional funds are required over and above of Central Assistance, the sources from which these would be met i.e. own funds, State marketing Board, Bank, Loan, contribution of promoter, contribution from members of society and panchayat etc. may be indicated with documentary proof.

12. Financial position of the Market Committee under which the rural primary market is functioning or to which it will be linked.

Last financial year **(Rs. in lakhs)**

Year	Opening Balance	Income during the year	Total	Expenditure during the year	Closing balance (surplus or deficit)
1	2	3	4	5	6

13. Rate of market fee levied, if any.

Signature

Chairman

Committee / local body

Place:

Date:

Signature of SHM

Place:

Date:

Note:-

1. A lay out plan of the market according to the scale indicating therein in the facilities Already available and proposed to be provided in the market may be enclosed.
2. Copy of the UC of the market which has already received Central Assistance under the erstwhile scheme of CA for which UC has been furnished.

PRELIMINARY INSPECTION REPORT FOR RURAL PRIMARY MARKET / APNI MANDIS

Date of Inspection :

A Component :

B **Details of Project** :
(iii) Name of the project :
(iv) Address for communication :
with telephone No. :

C **Project Location with Address** :
(i). Survey No :
(ii). Village :
(iii). Mandal :
D Constitution (Individual/ Joint :
Individual/Partnership Firm/ :
Company. :
E (i) Proposed Activity :
(ii) Type :
(iii) Proposed type of cooling :
system
F Name of the Promoter :

G **<u>Present physical status of the project:</u>**
I. Construction started or not :
(i) Land development
status/boundary/road :
(ii) Connecting road to the plot :
(iii) Stage of unit building civil / :
pre-engineered as on
inspection date :
(iv) Type of produce to be
stored

Promoter Horticulture / MI Engineer Horticulture Officer DHO

FORMAT TO CONDUCT FINAL AND JOINT INSPECTIONFOR RURAL PRIMARY MARKET / APNI MANDIS BY THE COMMITTEE UNDER POST HARVEST MANAGEMENT COMPONENT OF MIDH, A.P.

1) GENERAL INFORMATION

1) Name of the Unit with full address :

   (Sy. No. / Area / Village / District)

2) Date of Issue of Administrative Sanction :

3) Name of CEO of Company / Managing Director :

4) Constitution: Individual / Group of Individuals / :
   Society / Partnership Firm / Pvt. Ltd. Company / :
   Public Ltd. Company :

5) Date of Inspection of the Project :

6) Name & Designation of the Committee members :

   (a)

   (b)

   (c)

   (d)

7) Name of the Bank (with Full address & :
   Phone & Fax No.) :

   a) Subsidy reserve fund account no. :

8) Date of start of the project :

9) Date of Completion of the project :

10) a) Date & amount of Sanction of Term Loan :

    b) Repayment Period :

11) Land Details

    i. Whether land is in the name of promoter : Yes / No

    ii. Whether land is a Regd. Lease land for : Yes / No
    Minimum 10 years in favour of applicant
    (in case of lease)

Name & Signature of Applicant (Bank)	Name & Signature of Expert	Name & Signature of Inspecting Officer from MIDH	Name & Signature of DHO concerned	Name & Signature of Senior Officer

FORMAT

(Forwarding letter of Bank for Conducting JIT)
Name &Full Address of the FI/Bank (on letter head)

To
The Mission Director & Commissioner of Horticulture,
Govt. of Andhra Pradesh,
Public Gardens, Nampally,
GUNTUR

Subject : Request for Joint Inspection of the project

Sir,

MIDH, A.P., had released Rs……as credit linked back-ended subsidy in respect of project of_____Village District State Vide letter no…….. As per instruction,the subsidy amount has been kept in Subsidy Reserve Fund account of the bank and interest benefit is being passed on to the beneficiary. Now project is complete as per original proposal and we have also disbursed fullTerm loan sanctioned for the above mentioned project. In addition to documents submitted by bank at the time of claim of subsidy such as copy of the Appraisal Note, Term Loan sanction letter, copy of Record of Right, following documents required for Joint Inspection are being submitted with the request to conduct Joint Inspection of the project to decide final subsidy claim.

S. No	Particulars	Enclosed or Not
1	Details of date-wise release of term loan	
2	Completion certificate by Bank/FIs	
3	Undertaking from promoter (as prescribed by NHM)	
4	Extract of subsidy reserve fund account of bank in which estimated subsidy has been kept	

It is certified that the original of above documents and documents submitted at the time of subsidy claim by bank pertaining to the project share kept in Bank/FI, which can be shown at the time of random monitoring by the Department or any agency authorized by the Department.

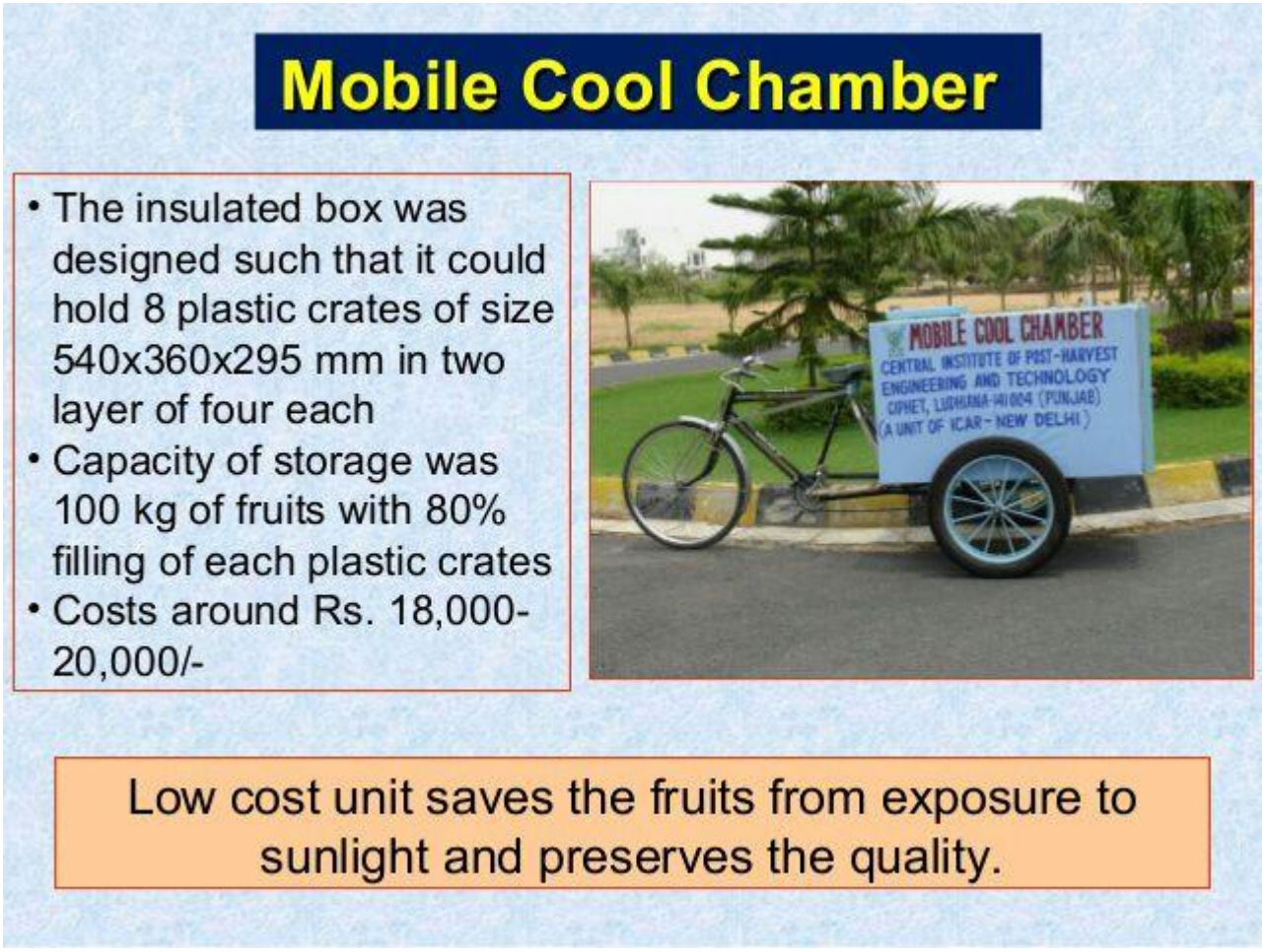
(Seal and Signature of the Bank's Officer)

Name:_____
Name of the Bank:
Address:
Phone/Fax/Mobile No.: _____
Place: _____
Date: _____

STATIC / MOBILE VENDING CART / PLATFORM WITH COOL CHAMBER

PATTERN OF ASSISTANCE: **Unit Cost Rs.30,000/- per unit**

Subsidy @ 50% of the unit cost.



APPLICATION FOR AVAILING ASSISTANCE / SUBSIDY UNDER MIDH

(COMPONENT: STATIC / MOBILE VENDING CART / PLATFORM WITH COOL CHAMBER)

Name of the Scheme: **Post Harvest Management**

1	Name of the Farmer	**:**
2	Father / Husband Name	**:**
3	Caste (SC/ST/BC/OC)	**:**
4	Address:	**:**
	Phone / Cell No.:	**:**
8	Whether any Govt. Subsidy availed previously	**:**
9	Any other relevant information	**:**

Declaration

I, _____

declare that the particulars furnished above are true to the best of my knowledge and I promise that the benefit obtained from State MIDH Cell will be used for the purpose for which it is given and in case of misuse I am liable for any action deemed to be fit by Govt. of A.P., including recovery of the subsidy amount with 12% interest to the Government.

Enclosures: 1. Affidavit
2. Pattadar Pass Book

Signature of the Farmer / Entrepreneur.

Recommendations of the Horticulture Officer: _____

RSK functionary Horticulture / MI Engineer **Horticulture Officer** **DHO**

PRELIMINARY INSPECTION REPORT FOR STATIC / MOBILE VENDING CART / PLATFORM WITH COOL CHAMBER

Date of Inspection :

A Component :

B **Details of the unit** :
(i) Name of the beneficiary :
:
(ii) Address for communication with telephone No. :

C **Project Location with Address** :
:
(i). Survey No :
(ii). Village :
(iii). Mandal

D Constitution (Individual / Joint Individual. :
:
:

E (i) Proposed Activity :
:
(ii) Type :

(iii) Proposed type of cooling System

F Name of the Promoter :

G **<u>Present physical status of the unit :</u>**

Promoter Horticulture / MI Engineer Horticulture Officer DHO

FORMAT TO CONDUCT FINAL AND JOINT INSPECTIONFOR STATIC / MOBILE VENDING CART / PLATFORM WITH COOL CHAMBER BY THE COMMITTEE UNDER POST HARVEST MANAGEMENT COMPONENT OF MIDH, A.P.

1) GENERAL INFORMATION

1) Name of the Unit with full address :
   (Sy. No. / Area / Village / District)
2) Date of Issue of Administrative Sanction :
3) Name of the beneficiary :
4) Constitution: Individual / Group of Individuals :
5) Date of Inspection of the Unit :
6) Name & Designation of the Committee members :
   (a)
   (b)
   (c)
   (d)
8) Name of the Bank (with Full address & Phone & Fax No.) : :
9) Date of start of the unit :
10) Date of Completion of the unit :

Name & Signature of Applicant	Name & Signature of Expert	Name & Signature of Inspecting Officer (Bank)	Name & Signature of DHO concerned	Name & Signature of Senior Officer from MIDH

SPECIAL INITIATIVES – BANANA FRUIT CARE ACTIVITY

Unit Cost: Rs.55,000/- per Ha.
Assistance (50%): Rs.25,500/- per Ha.

Fruit Care Activities for Banana Crop:

The details of allowed assistance for Fruit care activities in Banana						
						Rs.in Lakh
S.No	**Component Head**	**Component Details**	**Unit**	**Unit cost**	**Assistance allowed**	**Assistance amount**
1	Fruit Care	Labour for performing specific fruit care activities for quality production - Bud injection, Fruit obstacle removal, De flowering, Bunch Spray, Removal of false hand, placement of skirting bags, Ribboning	Ha	0.20	50%	0.10
		Cost of skirting bags (Bunch sleeves)	Ha	0.30	50%	0.15
		Cost of Ribbon	Ha	0.01	50%	0.005
		Chemicals for BI & Bunch spray	Ha	0.01	To be borne by farmer	
		BI/BS Pump, Lances and Needles	No	0.03	To be borne by farmer	
		Sub Total		**0.55**	50%	0.25500

* Allowed assistance for Fruit care activities for 1 Ha is Rs. 0.25500 lakhs

POLLINATION SUPPORT THROUGH BEE KEEPING

Objective:

- To constitute a resource of sustainable income generation to the rural and tribal farmers.

Pattern of assistance:

As per the GOI operational guidelines the pattern of assistance is given below.

Item	Unit	Cost Norms	Assistance (Rs.in Lakh)	Pattern of Assistance
i. Production of nucleus stock (Public Sector)	No	20.00	20.00	100% of the cost
ii. Production of bee colonies by bee breeder.	No	10.00	4.00	40% of cost for producing min. of 2000 colonies / year
iii. Honey bee colony	No	0.04	0.016	40% of cost limited to 50 colonies/beneficiary
iv. Bee Hives	No	0.02	0.008	
v. Equipment including honey extractor (4frame), food grade container (30 kg), net, including complete set of Bee keeping equipment.	No	Rs.20,000/set	0.08	40% of the cost limited to one set per beneficiary.

- To ensure that the assistance goes to genuine beneficiaries, a survey has to be conducted for selection of area which is potential for beekeeping activities and pollination support programme through bee keeping.
- Seminar at district / state level to create usefulness of beekeeping amongst the farmers / beekeepers / entrepreneurs, unemployed youth, women and those belonging to the marginalized communities and SCs & STs and officials from state and central departments concerned may be conducted.

- Participants who are genuinely interested in taking up beekeeping as a source of livelihood may be given seven days training.
- Organisation of seminars and trainings may be entrusted to any of the Member Beekeeping & Honey Societies /Firms / Companies of NBB / State Beekeeping Extension Centre, Vijayrai.
- Maximum permissible financial assistance under MIDH as per prescribed cost / assistance for honey bee colonies, bee hives and beekeeping equipments supply of material through trainer society / firm / company may be provided to the beneficiaries those are actually willing to take up bee keeping as a livelihood.
- Total no of colonies & Hives and one set equipments for which assistance is available per beneficiary is limited to 50 only.
- The Assistance may be given to the trained individual/ in groups (SHGs / FIGs etc).
- Beneficiaries are free to purchase colonies & Hives from any member Organisations/Societies of NBB/trainer society. Beekeeping and honey societies registered under cooperative act.
- It should be ensured that all the equipment are BIS standards and made of stainless steel/ Food Grade Plastic / Quality wood.
- Beekeepers provided with financial assistance may be directed to get their bee colonies from breeders registered with NBB on individual / group basis.
- Further they may be formed into Self Help Groups or Farmer Producer Organisations or Farmer Producer Companies as in the case may be and get registered.
- Their activities in beekeeping be monitored with scientific and technical inputs from time to time through the Bee keeping and Honey Society/ Firm / company which provided training to them.
- The beneficiary should take up this activity where abundant flora is available.
- The DHO are not permitted to inter change the budget allocation between subcomponent and should claim the subsidy as per the indications given for each component.

- The procurement of the required beekeeping equipment shall be from the list of approved firms of National Bee Board (enclosed) are available for subsidy and if not, the beekeeping equipment shall be procured locally as per the guidelines with the approval of concern District Collectors.
- The Field Staff (VHAs/VAAs/MPEOs) and Horticulture Officer is responsible for proper inspection, certification of invoice, and obtaining digital photograph of farmers along with material supplied on subsidy in their Jurisdiction.
- They should strictly follow the SC/ST allocations.
- Priority should be given to SF/MF and women farmers, landless farmers also.

HUMAN RESOURCE DEVELOPMENT

Objectives:

- Training the farmers, field level workers and officers.
- Providing appropriate training to the farmers for adoption of high yielding varieties of crops, farming systems, new technologies.
- To familiarize the farmer about the production practices being followed by progressive farmers.

Item	Unit	Cost Norms		Pattern of Assistance
		Unit Cost	Assistance	
A. Training / Exposure visit of farmers				
i. Within State	No	Rs.1000/day per farmer including transport	Rs.1000/day per farmer including transport	Assistance @ 100% of the prescribed cost norms. For a maximum period of 5 days
ii. Outside State	No	Project based as per actuals	100% of the cost	Assistance @ 100% as per actuals. For a maximum period of 7 days including journey time
iii. Outside India	No	Upto a maximum of Rs. 1.50 lakh / participant	Upto a maximum of Rs.1.50 lakh / participant	Assistance @ 100% as per actuals. For a maximum period of 7 days including journey time
B. Training/ Study tour of Officers /Technical staff/ Field functionaries				
i. Within the State	No	Rs.300 /day per participant plus TA/ DA, as admissible	100% of the cost	Assistance @ 100% of the prescribed cost norms
ii. Study tour to outside States/ UTs (group of minimum 5 participants	No	Rs.1000 /day per participant plus TA/ DA, as admissible	100% of the cost	
iii. Outside India	No	Upto a maximum of Rs. 1.50 lakh per participant as per actual.	Upto a maximum of Rs. 1.50 lakh per participant as per actual.	Project Based. Assistance @ 100% of economic air/rail travel. Course fee cost to be funded under Mission Management. (Proposal will be considered by MIDH Division, DA&FW Only)

Guidelines for Horticulture Mechanization

Objective:

- Improve farm efficiency and reduce the drudgery of the horticulture workforce.
- Increase the reach of mechanization to small and marginal farmers, particularly in regions with low farm power availability.
- Raise awareness among stakeholders through demonstrations, capacity-building activities, and targeted Information, Education, and Communication (IEC) strategies.

Implementation Procedure:

- Selection of beneficiaries should be conducted transparently through **Grama Sabhas**.
- Selected beneficiaries must be registered on the **Suraksha Portal** and to be approved by the District Mission Committee (DMC).
- The farmers/beneficiaries will have their liberty to choose any machine /equipment and its variants depending on their requirements/choice within the empanelled manufacturers.
- Field Staff (VAA/VHA/VSA/MPEO) should select the farmers with horticulture crop holdings only.
- Priority should be given to the farmers who haven't availed of a subsidy earlier.
- SC, ST, women farmers, and small & marginal farmers to be given priority.
- Field Staff (VAA/VHA/VSA/MPEO) should complete selection, documentation, and registration in a time-bound manner to ensure timely grounding of the component.
- Horticulture Officers (HOs) will scrutinize applications as per the guidelines.
- If the equipment cost is **higher than the approved cost**, the excess must be borne by the farmer.

- If the equipment cost is **lower than the approved cost**, the subsidy will be calculated on the **lower price** (approved cost or actual price, whichever is less).
- Empanelled companies must have equipment tested by FMTTI (Farm Machinery Training and Testing Institute), Garladinne (A.P.) or a DAC-designated institute.
- Farmers shall pay the full cost to the authorized dealer and submit vouchers/bills along with bank account details (Account Number, IFSC) to the HO for subsidy release.
- For tractors and power tillers, RC books must be marked: *"Supplied on Government subsidy of Horticulture Department; not transferable or for sale."*
- During disbursement, HO shall take a digital photo with the farmer, machinery and dealers/Representative of the firm (for tractors & power tillers).
- HOs must maintain the beneficiary data with all the details of the implements/machinery distributed.
- DHOs/HOs must ensure engraving or painting of supply details (year, batch number, scheme name and other specifications etc.,) on each implement/ machinery at a visible location.
- Do not exceed the assigned targets.
- Strict adherence to SC/ST ratios.
- DHO should conduct random verification of mechanization components.
- Release subsidy directly to the farmer via online transfer.
- Undertake publicity and campaigns to promote mechanization.
- Document and disseminate success stories.
- Ensure geo-tagging of the component using the **Krishi Mapper App**.
- Submit success stories, photographs, and videos (high-resolution) in soft and hard copies.
- DHOs/ADsH must thoroughly examine documents submitted by HOs before releasing assistance.

- After approval by the competent authority, DHOs/ADsH will process the release of subsidy to beneficiaries.

COST NORMS OF FARM MACHINERY /PP EQUIPMENT

I. Tractor 2 WD (up to 20 PTO HP):

1.	Total permissible cost	:	Rs. 4.00 lakh/ unit
2.	Maximum permissible subsidy for Other beneficiaries (40%)	:	Rs. 1.60 lakh/ unit.
3.	Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%)	:	Rs. 2.00 lakh/ unit

II. Tractor 4 WD (up to 20 PTO HP):

1.	Total permissible cost	:	Rs. 4.90 lakh/ unit
2.	Maximum permissible subsidy for Other beneficiaries (40%)	:	Rs. 1.96 lakh/ unit.
3.	Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%)	:	Rs. 2.45 lakh/ unit

III. Power Tiller (8 BHP & upto 11 BHP):

1.	Total permissible cost	:	Rs. 2.00 lakh/ unit
2.	Maximum permissible subsidy for Other beneficiaries (40%)	:	Rs. 0.80 lakh/ unit.
3.	Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%)	:	Rs. 1.00 lakh/ unit

IV. Power Tiller (above 11 BHP):

1.	Total permissible cost	:	Rs. 2.40 lakh/ unit
2.	Maximum permissible subsidy for Other beneficiaries (40%)	:	Rs. 1.00 lakh/ unit.
3.	Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%)	:	Rs. 1.20 lakh/ unit

V. Plant Protection Equipments:

a. Powered Knapsack Sprayers/Power operated Taiwan sprayer (Capacity above 16 lts)

1. Total permissible cost : Rs. 0.20 lakh/ unit
2. Maximum permissible subsidy for Other beneficiaries (40%) : Rs. 0.08 lakh/ unit.
3. Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%) : Rs. 0.10 lakh/ unit

b. Tractor Operated sprayer (boom type)

1. Total permissible cost : Rs. 0.82 lakh/ unit
2. Maximum permissible subsidy for Other beneficiaries (40%) : Rs. 0.33 lakh/ unit.
3. Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%) : Rs. 0.41 lakh/ unit

c. Tractor Operated sprayer (air carrier/assisted)

1. Total permissible cost : Rs. 2.76 lakh/ unit
2. Maximum permissible subsidy for Other beneficiaries (40%) : Rs. 1.10 lakh/ unit.
3. Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%) : Rs. 1.38 lakh/ unit

d. Tractor Operated Electro statics Sprayer

1. Total permissible cost : Rs. 5.00 lakh/ unit
2. Maximum permissible subsidy for Other beneficiaries (40%) : Rs. 2.00 lakh/ unit.
3. Maximum permissible subsidy for SC/ST, SF/MF/Women beneficiaries (50%) : Rs. 2.50 lakh/ unit