

National Mission on Agricultural Mechanization (NMAM)

Background:

Farm Mechanization has now become more crucial for catalyzing agricultural growth especially in the context of scarcity of farm labour and adverse impact of climate change. Farm mechanization in India, notwithstanding having strong and positive correlation with agricultural productivity, has only been able to achieve a meager growth rate of less than 5% in last two decades. Degree of farm mechanization expressed as a ratio of available mechanical power to cultivable area, now stands at about 1.65 kW/ha (2009-10 est), which is substantially low compared to developed countries (USA: 6+ Japan: 14+, Korea: 7+). Even among Indian States farm power availability widely varies. Whereas Punjab, Haryana, Western U.P. and western part of Rajasthan has higher than national average, for rest of the country especially in Eastern and North-East Regions, it is significantly low.

Financial reforms in 1990's, easy availability of institutional financing and capital subsidy especially on tractors initially propelled growth in farm mechanization. However, since 2007-08, there has been a visible slowdown in credit off-take to farm mechanization sector, which many believe due to financial institutions becoming cautious and putting stringent lending norms. With percentage of Non Performing Assets (NPA) or loan default still significantly high, this sector has been facing a stiff growth challenge. The reason for such default, among others, is economic 'unviable' nature of individual ownership of 'high value agriculture equipment' like tractors, power tillers etc.

Small and marginal farms (< 2 ha of farm size) remain at the core of Indian agriculture. However, mechanizing small and non-contiguous group of lands is against 'economies of scale' especially in operations like land preparation and harvesting. With continued shrinkage in average farm size, more and more farms will fall into adverse category thereby making individual ownership of agricultural machinery progressively more uneconomical.

The question to policy makers is not only how to leverage farm mechanization for enhancing agricultural productivity, but also, how to include the large community of small and marginal farmers into the fold of mechanized farming.

2. Farm Mechanisation in India: Current Policy Environment

Commercial Banks currently extend long-term credit for purchase of tractors and other farm machineries as per prevalent norms and against security and collateral. However, to reduce transaction cost, they prefer financing big ticket loan for equipments that is costly, has multiple utility or demand driven business model or organized dealer and service network and good resale value. As only Tractors and Combine Harvesters fit into this, institutional credit off take is heavily biased towards tractors and combine harvesters accounting for about 75% of total credit.

Dept. of Agriculture and Cooperation, Ministry of Agriculture, provides subsidy on agricultural equipment and implements to all categories of farmers under its various

Central Sector Schemes. However, subsidy to high value equipment like tractors, power tillers, often has bank linkages and thus excludes other than large farmers by default.

Besides, other structural issues like high procurement cost, adverse economies of scale, lower credit worthiness etc. have also resulted in automatic 'exclusion' of majority of small and marginal farmers in India from the benefit of farm mechanization. As a result, as NSSO sample survey reveals (2005), degree of farm mechanization has developed a stronger bias towards larger land holdings.

Thus, notwithstanding economically unviable to many farmers, current policy environment impress upon individual ownership of equipment, which provides limited opportunity for inclusive and healthy growth of farm mechanization.

The proposed Mission interventions proposes to fill the existing policy gaps and envisages an inclusive growth of farm mechanization by putting special emphasis on creating ownership of low-cost but multi-utility agricultural equipment among small and marginal farmers.

3. The Essence of the Proposed Intervention:

As an integral component of the effort of DAC to restructure and streamline all Agriculture Development Schemes in the XII plan, it is envisaged to have one integrated National Mission on Agricultural Mechanisation that would aim at catalyzing an accelerated but inclusive growth of agricultural mechanization in India.

The Mission objectives, strategies and interventions proposed are elaborated in the enclosed draft guidelines (**Appendix-A**).

The Mission provisions for continuation of following three ongoing XI plan interventions (Component 3(A)-(C)):

A. Promotion and Strengthening of Agricultural Mechanisation through Training, Testing and Demonstration: This component would cover the areas related to quality control, performance testing and field demonstrations of farm machineries and equipment. Further, a major activity of the component would be capacity building of stakeholders. This would be the continuation of ongoing XI plan scheme of same nomenclature that was re-structured in 2004-05.

B. Post Harvest Technology and Management (PHTM): Reduction of Post Harvest losses, management and value addition of agricultural produce at farm level are key issues which are needed to be given higher priority in the XII Five Year Plan. Thus, the ongoing scheme that was revised and reintroduced in 2007-2008 would be the part of the mission in XII plan too.

C. Financial Assistance or Procurement Subsidy for Agriculture Machinery and Equipments: During XI plan, financial assistance under the scheme: Macro Management of Agriculture (MMA), is extended to 13 categories of agriculture equipments and machinery for effecting promotion of agricultural mechanisation to users especially among small and marginal farmers. With proposed phasing out of MMA

in XII plan, the existing component of the scheme, which are found to be popular nationwide, may be re-introduced under this mission.

Besides, National Mission on Agricultural Mechanisation (NMAM) proposed to include the following additional interventions that are already identified under the Mission document on National Mission For Sustainable Agriculture (NMSA):

D. Establishment of Farm Machinery Banks for Custom Hiring: With continued population growth and resulting further fragmentation of the land holdings, 'Custom Hiring' of farm machinery is the only alternative by which small and marginal farmers can reap the benefits of farm mechanization. Accordingly, NMSA envisaged setting up of 1000 such Farm Machinery Banks for Custom Hiring. This component of NAAM would provide suitable financial assistance for establishing 'Custom Hiring Centres' for agriculture machinery and implements for operation through Individuals, Self Help Group (SGH) or farmers' cooperatives formed preferably at Block level. Such groups would take representatives from small and marginal farmers and the Block level administration would facilitate to form such Self Help Groups. Beside, providing procurement subsidy, NMAM also proposes to create Credit Guarantee Fund and Venture Capital Fund for encouraging entrepreneurs to take up operating custom hiring centres as profession. A concept note in this regard is enclosed as **Appendix-B**. The Division has already engaged stakeholders especially NABARD on this issue.

E. Establishing Hi-Tech, High Productive Equipment Centres: Whereas, farm mechanisation in general plays a vital role for enhancing agricultural production and productivity, however, the need for Hi-Tech and High Productive Equipment such as Sugarcane Harvester, Combine Harvester, Laser Land Leveller etc. can further boosting agriculture productivity in near future. However, the prohibitive cost of these equipments renders it difficult for individual ownership. Therefore, NMSA has envisaged setting up of 100 such centres specifically targeting low productive belt of eastern and central India during XII plan.

F. Enhancing Farm Productivity at village level by introducing appropriate farm mechanisation in selected villages: It is often noticed that specific mechanisation issues arise based on variations in cropping system viz. Rice-Wheat, Rice-Rice, Rice Pulses, Pearl Millet-Wheat, Maize-Wheat etc., condition of natural resources and availability of rainfall. Thus, it calls for intensive and appropriate farm mechanisation practices that are customised at village level. Accordingly, NMSA has formulated an action plan for introducing appropriate farm mechanisation practices in 100,000 villages of low productive eastern and central India during XII plan.

G. Creating ownership of appropriate farm equipment among Small/Marginal farmers in eastern/north eastern region: Empirical data shows that the states belonging to Eastern and North-East regions are having relatively low farm power availability and thus these states are not able to leverage the advantages of farm mechanisation in enhancing agriculture production. However, these regions have higher potential for increasing food grain production on account of favourable conditions of natural resources and availability of groundwater. However, as mentioned earlier, the benefits of farm mechanisation usually exclude small and marginal farmers due to unaffordable cost of ownership of farm equipment and machineries. Accordingly, NMSA has

envisaged a special provision for extending input subsidy to small and marginal farmers through co-operatives in high-potential eastern region of India. 5000 farmers would be benefited during XII plan under this component of the mission.

Proposed outlay for this Mission during XII plan shall be Rs. 3500 crore (Enclosed as **Annexure-A**)

Annexure-A

Annual Plan (2015-17)							
Name of Ministry/ Department: Mechanisation & Technology Division							
Statement of Outlays & Outcome Targets (2015-17)							
Name of the Scheme: National Mission on Agricultural Mechanisation (NMAM)							
S.No.	Name of Sub-Scheme/Programme	Objective/Outcome	Quantifiable Deliverables	Proposed Timeline	New/Continue/Annual	Proposed Outlay in X	Remarks
1	2	3	4	5	6	7	8
1	Promotion & Strengthening of Agricultural Mechanisation through Training Testing & Demonstration	Quality control, performance testing and field demonstration of farm machinery and equipment. Capacity building of stakeholders.	Training 12,000 trainees per annum. Demonstration: 400 per annum. Testing 300 equipment per annum.	5 years	Business As Usual	100	This would be the continuation of ongoing XI plan scheme of same nature/structure that was re-structured in 2004-05.
2	Post Harvest Technology and Management	Reduction of Post Harvest losses, management and value addition of agricultural produce at farm level.	Demonstration: 400 per annum. Establishment of PHT units: 100 per annum.	5 years	Business As Usual	100	Ongoing scheme that was revised and reintroduced in 2007-2008.
3	Financial assistance or Prorated Subsidy for selected Agriculture Machinery and Equipments	Promoting agricultural mechanisation by enabling individual users to own appropriate agricultural machinery and equipment.	@ Rs. 150 crore per annum.	5 years	Business As Usual	750	During XI plan, financial assistance under the scheme Micro Management of Agriculture (MMA), is extended to 13 categories of agriculture equipments and machinery for effecting promotion of agricultural mechanisation to users, especially among small and marginal farmers. With proposed phasing out of MMA in XII plan, the existing component of the scheme, which are found to be popular nationwide, may be re-introduced under this mission.
4	Establishment of farm Machinery Banks for Custom Hiring	Providing suitable financial assistance for establishing Custom Hiring Centres for agriculture machinery and implements for operation through Individually Self Help Group (ISHG) or farmers' cooperative societies preferably at Block level. Through procurement subsidy, Venture Capital Funding or Credit Guarantee Fund.	Target: 500 Centres @ unit cost of Rs. 0.3 Crores/ Centre (Through Subsidy) and Rs. 140 crore for funding through VCF/CGF.	5 Years	New Item	500	This component is an identified intervention under National Mission For Sustainable Agriculture.
5	Establishing Hi-Tech Productive Equipment Centres Target Low Productive Agricultural Regions	The need for Hi-Tech and High Productive Equipment such as Sugarbeet Harvester, Combine Harvester, Laser Land Leveller etc. for further boosting agriculture productivity in near future. However, the prohibitive cost of these equipments renders difficult for individual ownership. Thus this component will provide financial assistance for establishing Custom Hiring Centres comprising these equipment. Through procurement subsidy, Venture Capital Funding or Credit Guarantee Fund.	Target: 500 centres @Rs. 1 Crore/ Centre	5 Years	New Item	500	This component is an identified intervention under National Mission For Sustainable Agriculture.
6	Enhancing Farm Productivity at Village Level by introducing appropriate farm mechanisation in selected villages.	Introducing appropriate farm mechanisation practices in 2000 villages of low productive eastern, north-eastern and central India through suitable financial assistance for creating ownership of farm equipment.	Target: 10,000 Village @ 10 lakh/Village	5 Years	New Item	1000	This component is an identified intervention under National Mission For Sustainable Agriculture.
7	Input Subsidy to Small/marginal Farmers through cooperatives in North-Eastern region for adopting suitable farm mechanisation.	Special provision for extending input subsidy to small and marginal farmers through co-operatives in high-potential eastern region of India.	Target: 50,000 farmers @ Rs. 1 lakh/farmer	5 Years	New Item	300	This component is an identified intervention under National Mission For Sustainable Agriculture.
						Total for XI Plan	Rs. 2600 Crores
						Out of above:	
						Business As Usual	Rs. 1000 Crores
						Provisions under NMBA	Rs. 2600 Crores

**NATIONAL MISSION ON AGRICULTURAL MECHANIZATION
(NMAM)**

**ANNEXURE - A
(Refer to Component No-I, Appendix-A)**

Illustrative list of equipment for Procurement and Demonstration of newly developed agricultural / horticultural equipment at farmers' fields.

S. No	Name of Equipment/ Machine
1.	Self propelled/Engine operated Machine :- Crop Reaper, fodder harvester, Reaper-cum-binder, Paddy Transplanter and Power operated Cono weeder, Power weeder and any other similar Self Propelled Machines like sugarcane harvesters, cotton picker, low land rice weeder, Light weight power tiller (weight 55-65 kg) with attachments etc.
2.	Specialised Tractor/Power Tiller Driven Equipment:- Rotavator, Pulverising roller attachment to tiller, Zero-till-Seed Drill (Paddy-wheat, Paddy-pulse, Soyabean-pulse, maize-pulse, combination etc.), Raised Bed Planter, Inclined plate planter, strip till drill, Roto till seed-cum-fertiliser drill, Power tiller operated seed-cum-fertiliser drill, Sugarcane cutter-cum-planter, Pneumatic planter, Garlic planter, Happy seeder, Tractor drawn single row sugarcane cutter, RBS cane planter, Tractor operated vegetable transplanter, Onion transplanter, Multi crop planters for small seeds, Potato planter, Three row weeder, Potato digger (east and North East Region), Root crop harvester, Groundnut digger, New CIAE(ICAR) designed straw reaper, Posthole digger, Power tiller mounted reaper in hilly region/north east region, Tractor front mounted reaper, Tractor operated cotton picker
3.	Other Miscellaneous Equipments:- Grain cleaner-cum-grader, Solar dryers, stubble shaver, mobile platform type fruit harvester, Mat type paddy nursery growing setup, mini rice mill(stationary/portable), etc.
4.	Manually operated specific implements/tools:- Seed planter/Crop planter in hilly/North East Region, Gender friendly tool kit/ Power Bush cutter, Power pruner, in hilly/North East Region, Low land rice seeder, garlic planter
5.	Animal driven specific implements:- Crop reaper, Bullock drawn screw type water pump, potato digger in hilly areas or any other machines developed by SAUs/Research Institutions/State Government/locally popularised.
6.	All types of Animal driven tool carrier
7.	Tractor/power tiller operated:- Reversible plough, rotary plough, subsoiler /chisel plough, Sugar cane Leafs/ crop residue shrouding machine
8.	Multi crop Power Threshers
9.	Diesel /kerosene /gasoline /Electric pump sets:- Upto 50x50 mm size for hilly/North East Region, Southern states
10.	High Precision Sprinklers

11.	Drip Irrigation
12.	High Precision Plant Protection Equipments.
	(i) Manual/animal operated sprayers
	(ii) Power operated/self-propelled sprayers
	(iii) Tractor mounted sprayers for tall crops such as cotton, pigeon pea, sugarcane etc.
	(iv) Tractor operated Aero-blast sprayer
	(v) Tractor operated Air assisted horizontal/vertical boom sprayer
	(vi) Orchard sprayers for grapes, pomegranate etc.

ANNEXURE - B
(Refer to Component No-2, Appendix-A)

Illustrative list of equipment for Establishment of units for transfer of primary processing technology, value addition, low cost scientific storage, packaging units and technologies for bi-product management in the production catchments AND for Procurement and Demonstration of newly developed /appropriate Post Harvest Technologies.

S. No	Name of Equipment/ Machine
A.	PRIMARY PROCESSING TECHNOLOGY – VALUE ADDITION EQUIPMENTS
1.	Grain Cleaner, Grader, De-stoning, Weighing and package of different food crops
2.	Complete Paddy Rice processing unit: Paddy Cleaner, Grader De-stoning, Rice Milling, De-Husking, Bran, Grading of Rice, Policing and Packing, etc.
3.	Food processing of fruits and vegetables like potato Chips making, drying of vegetables/fruits, juice extracting and their packaging etc.
4.	Pulses (all types of gram) Grain Cleaner, Grader, De-stoning, Dal making, polishing, weighing and package of different pulse crops
5.	Processing of Soybean (Milk, paneer, biscuits and flakes etc.)
6.	Manual/ bullock operated / 1-2 horse power any type of prime mover operated grain cleaner-cum-grader
7.	Stationary/mobile mini rice mill and mini dal mill
8.	Stationary/mobile mini chips maker (Potato, banana, jackfruit etc.)
9.	All type of dehusker (Groundnut, areca nut, peanut, coconut, sunflower, etc.
10.	Maize Sheller, maize thresher
11.	Manually operated double stage hanging type, cleaner and grader.
12.	All type of peeler (Potato, pineapple, other fruits, vegetables)
13.	Cool Chambers upto 2 ton capacity.
14.	Chaff/bhusa densifying machine(fodder block making machine)
15.	Manual/power chaff cutter 1 kW capacity.
16.	All types of baler
17.	Urea bracketing machine
18.	Oil mill crop specific
19.	All types of crop dryers
20.	Mini grain like gram, maize, sunflower, batley, wheat, jawar, paddy etc. backing machine (Pop-corn making), Dry spice Powder making machines (Chilly, Turmic, Dhaniya, Aamchoor, etc. at farm level).

ANNEXURE - C
(Refer to Component No-4, Appendix-A)

Illustrative list of equipment for establishment of Farm Machinery Banks for Custom Hiring

S. No	Name of Agriculture Machinery & Equipment
1.	Tractors up to 40 hp PTO
2.	Power Tillers with suitable implements
3.	Combine Harvesters (Tractor operated or Self Propelled)
4.	Laser guided land leveller
5.	Land Preparation Implements (Tractor/Power Tiller operated): M.B. Plough, Reversible M. B. plough, Disc plough, Rotavator, Mounted and trailed type disc harrow, Cultivator, Sub soiler, chisel plow
6.	Paddy Transplanters (Self Propelled/engine operated or walk behind)
7.	Multi crop Inclined plate planter, Raised bed planter, Seed-cum-fertilizer drill, Zero Till Seed-cum-fertilizer drill, Sugarcane cutter planter, Cotton planter, Potato planter
8.	Self-propelled Power Weeder, Light weight power tiller with attachments
9.	Knapsack Sprayer, Knapsack Power Spray, Self-propelled high clearance sprayer, Aero-blast sprayer, Tractor mounted air assisted horizontal/vertical boom sprayer,
10.	Self-propelled/engine operated vertical conveyor reaper, Self-propelled/engine operated reaper binder, Tractor mounted vertical conveyor reaper, Tractor operated Straw baler
11.	Tractor/Power tiller operated root crop harvesters, Potato digger, Groundnut digger, Garlic digger, Ginger digger etc.
12.	Multi-crop threshers, Axial-flow paddy thresher
13.	Post-hole digger, Shrub Master
14.	Diesel Engine + Pump/Generator Set
15.	Pick Up Truck for transporting agricultural produces
16.	Poly House equipment
17.	Water Lifting Devices , Micro Irrigation Set (Drip, Sprinkler)
18.	Horticulture Tools (Manual/power operated)
19.	Fodder block making machine

ANNEXURE - D
(Refer to Component No-5, Appendix-A)

Illustrative list of equipment for establishment of **Hi-Tech, Hi Productive Equipment Centre for Custom Hiring.**

S. No	Name of Equipment/ Machine
1.	Self-propelled combine harvester(wheeled or Track type)
2.	Sugarcane Harvester (Tractor powered)
3.	Self propelled Sugarcane Harvester(Single Row or two Rows)
4.	Row Sugarcane planter (Semi-automatic/automatic)
5.	Self propelled/tractor drawn Cotton planter
6.	Tractor operated multi crop inclined plate planters, Raised bed planters, pneumatic planters
7.	High ground clearance Self Propelled high capacity sprayer, Aero blast sprayers, Air assisted boom type sprayers, Orchard sprayers for grapes & pomegranate
8.	Cotton Picker (Self Propelled or tractor Powered)
9.	Rotary type 8 Row Self propelled Paddy Transplanter
10.	Automatic Mat type Nursery growing setup
11.	Tractor drawn Laser guided land leveller
12.	Tractor drawn/ Self Propelled Straw Baler
13.	Front loader and Back hoe with high capacity 70 hp tractor or self propelled

ANNEXURE - E
(Refer to Component No-6, 7, Appendix-A)

Illustrative list of equipment for Enhancing Farm Productivity at village level by introducing appropriate farm mechanisation in selected villages and and Creating ownership of appropriate farm equipment among Small/Marginal farmers in eastern/north eastern region.

S. No	Name of Equipment/ Machine
1.	Mini tractor less than 15 hp with implements from tillage to threshing and transportation
2.	Power Tiller with standard attachments/implements
3.	Self-propelled Rice Transplanter (Walk behind type), Four rows or eight rows
4.	Self-propelled/engine operated Reaper, Tractor front mounted reaper
5.	Power Weeder and light weight power tiller (35-65 kg weight) with suitable attachments
6.	Paddle operated/flow through paddy thrasher
7.	Power Multi Crop thresher up to 7 hp
8.	Animal drawn implements: Improved plough, puddler, seed-cum-fertiliser drill, bhakar, bund former, 3 tyne cultivator, pulverizing roller, disk harrow, potato digger, multi-tool carrier, olped thresher, water pump and other similar implements.
9.	Cono weeder
10.	Knapsack sprayer, Power sprayer
11.	Hand rotary duster
12.	Post Harvest Equipments: Mini dal mill, Rubber roller rice Sheller, Groundnut decorticator, Mini flour mill of 1 to 2 hp, Mini rice mill, Sheller/de-husker (Groundnut, sunflower, coconut, maize etc.)
13.	Winnowing(Manual/1 hp electric operated/ engine operated)
14.	Horticulture tool kits (manual & power operated)
15.	Powered bush cutter/pruner/root crop harvester/diggers
16.	Manual /self propelled earth auger
17.	Vegetable seed Extractor
18.	Improved crop tools kit (sickles, spade, axe, knife, crowbar, kudali, etc.)
19.	Mat type nursery growing setup (Plastic tray 25 set/ Plastic moulded cups tray(For growing plant material)
20.	Manual & animal operated seed drills & planters
21.	Engine Pump set up to 3kW(Electric/kerosene/fuel operated)
22.	Rotary tiller (Tractor/power tiller operated)
23.	Sugarcane Trash Shredder Machine (Tractor & power tiller operated)