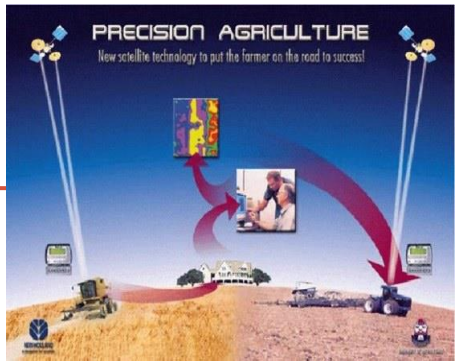
2ND REGIONAL FORUM ON SUSTAINABLE AGRICULTURAL MECHANIZATION

SERPONG, INDONESIA

CUSTOM HIRING OF AGRICULTURAL MACHINERY IN INDIA

9-11 SEPTEMBER 2014



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INDIAN AGRICULTURAL RESEARCH SYSTEM

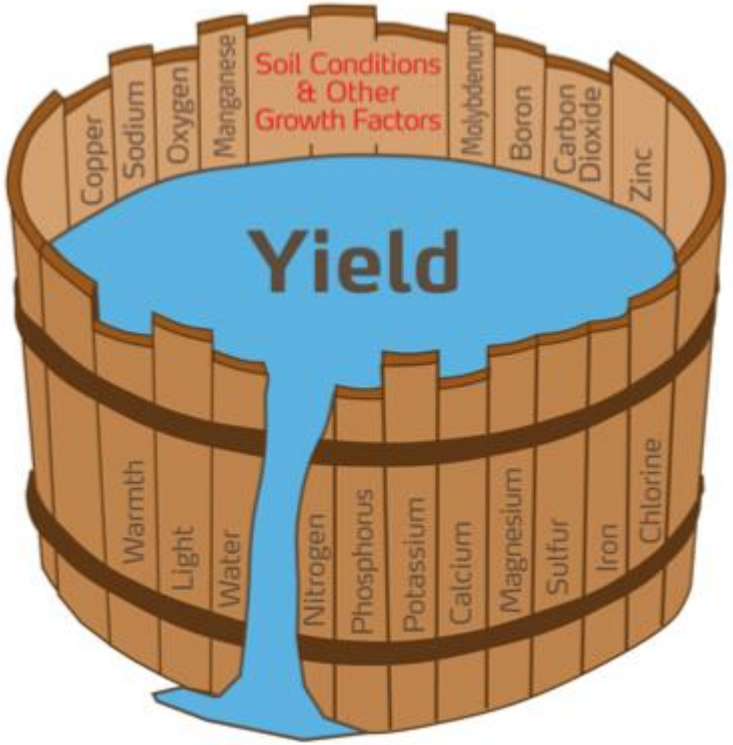
- ✓ 99 ICAR Institutes
- ✓ 70 Agricultural Universities
- ✓ 300 Regional Stations
- ✓ 563 Agriculture Colleges
- ✓ 639 KVKs (Agri. Science Centers)
- ✓ 60 All India Coordinated Research Projects
- ✓ 19 All India Network Projects
- ✓ 10 Mega Projects
- ✓ 16 Consortia Research platforms

Indian Agriculture Today
New inputs needed

Agricultural growth is controlled not by the total amount of resources available, but by the scarcest resource (limiting factor)

Mechanization is only about 40 - 45%

Power input is just 1.84 kW/ha



Agricultural produce processing is only 45%

MAJOR CHALLENGES FOR INDIAN AGRICULTURE

- ✓ Shortage of human labour
- ✓ Rising cost of farm inputs
- ✓ Climatic changes
- ✓ Diminishing profitability
- ✓ Drudgery in farm operations
- ✓ Second generation problems - degraded soils, depleting water resources and inappropriate utilization of agricultural residues/byproducts

Major Constraints for Farm Mechanization

- ✓ Resource poor farmers
- ✓ Lack of awareness
- ✓ Lack of skills
- ✓ Non-availability of farm machinery
- ✓ Costly and non-standardized farm machines
- ✓ Great diversity of agricultural commodities

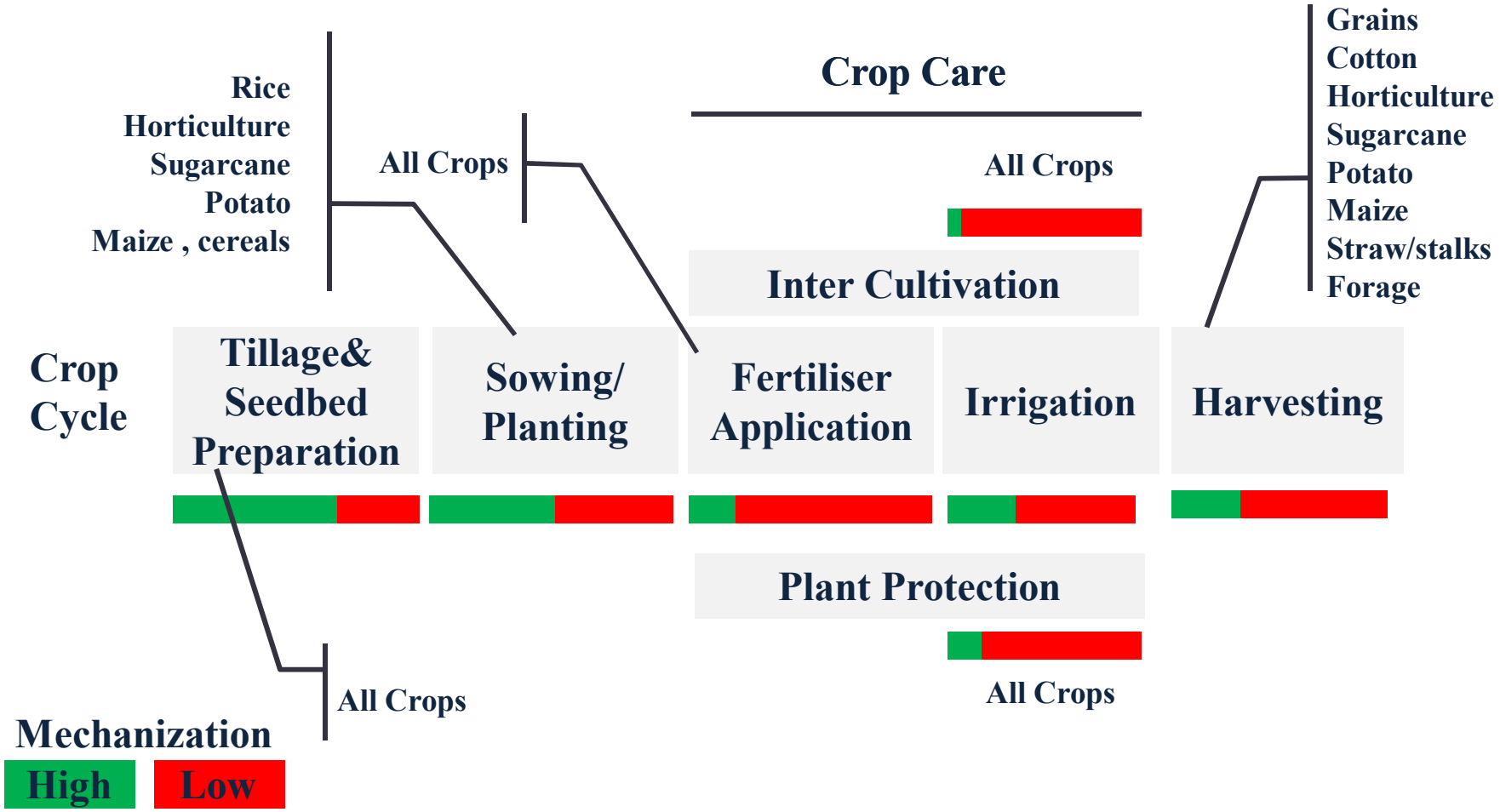
Constraints of Farm Machinery Industry

- ✓ Farm mechanization value chain is fragmented
- ✓ R&D institutions → manufacturers
- ✓ Marketing efforts/promotion policies
- ✓ Large gestation period
- ✓ Lack appropriate manufacturing facilities - inferior quality products
- ✓ Inadequate promotion programmes - not commensurate with the demand

Current Status of Farm Machinery Industry

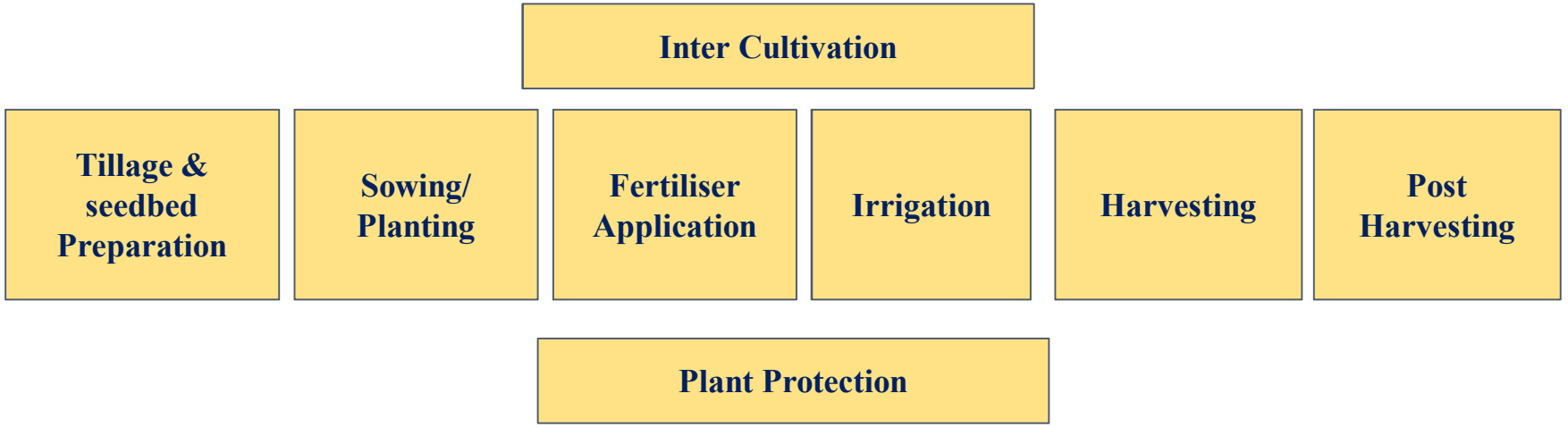
- ✓ Six decades of R&D - tools, implements and machines
- ✓ Farm machinery - Rs. 60,000/- crores
- ✓ 250 medium/large scale; 2,500 small scale; 15,000 tiny units
- ✓ Punjab, Haryana, Western UP, Tarai region of Uttarakhand, Gujarat, Maharashtra, Karnataka and TN
- ✓ In other parts availability of suitable farm machinery is a serious bottleneck

Status and Needs of Mechanization



Harvesting, crop care and seeding are top priorities for the farmer

Level of Farm Mechanization in India



Operation	Percentage
Soil working and seed bed preparation	40
Seeding and planting	29
Plant protection	34
Irrigation	37
Harvesting and threshing	60-70 percent for wheat and rice and <5percent for others

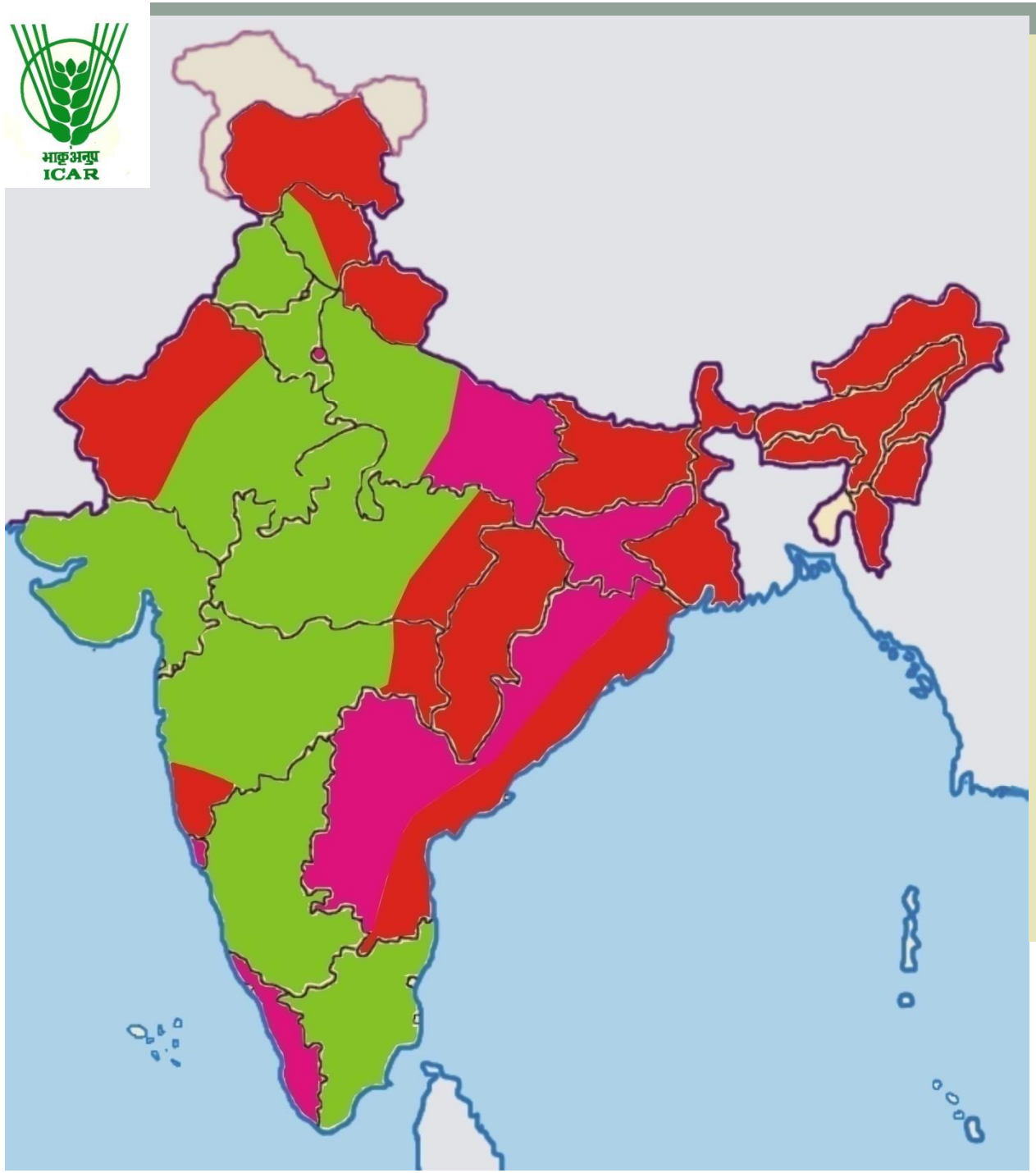
Overall about 45%

Contribution of Agricultural Mechanization

Benefits	Value
Saving in seed	15-20%
Saving in fertilizer	15-20%
Saving in time	20-30%
Reduction in labour	20-30%
Increase in cropping intensity	5-20%
Higher productivity	10-15%
→ Reduction in drudgery of farm workers especially that of women workers	

Status of Farm Mechanization Industry in India

Equipment manufacturers	No. of units
• Agricultural tractors	22
• Power tillers	5
• Irrigation pumps	600
• Plant protection equipment	300
• Combine Harvester	48
• Reapers	60
• Threshers	6000
• Seed Drills and planters	2500
• Diesel oil engines	200
• Plough, cultivators, harrows	5000
• Chaff cutter	50
• Rural artisans	>1 million



Green

LARGE NUMBER

Pink

MEDIUM NUMBER

Red

Deficient availability of manufacturers

Status &Need of mechanization of crops (Food grains, oilseeds, pulses, spices, cotton, sugarcane)

Number of deliverables

Operation	Plains			Hilly Region			Precision farming machines
Prime Mover	Manual	Animal drawn	Tractor/ power tiller/ self propelled/ power operated	Manual	Animal	Tractor/ power tiller/ self propelled/ power operated	Power operated
Seed bed preparation							
Sowing / planting/ transplanting/fertilizer appli	1		10	1			3
Irrigation & drainage		1	5				3
Weeding/ Herbicide application/ Intercultivation			3				3
Fertilizer/ manure/ agro chemical Application			2				6
Spraying			3				1
Harvesting			5				2
Threshing			2				1
Special package of equip		4	3		4	2	
Other machines/ systems	1		5	1		1	

	Available, possibility of improvement, needs to be demonstrated
	Normally, the operation is done using conventional tools OR the power source is not used for this operation/ system, OR not applicable
	Available for some crop or in some parts of country, needs refinement, feasibility trials in other parts/ crops
	Need development/ refinement

Custom Hiring -The Core Issues

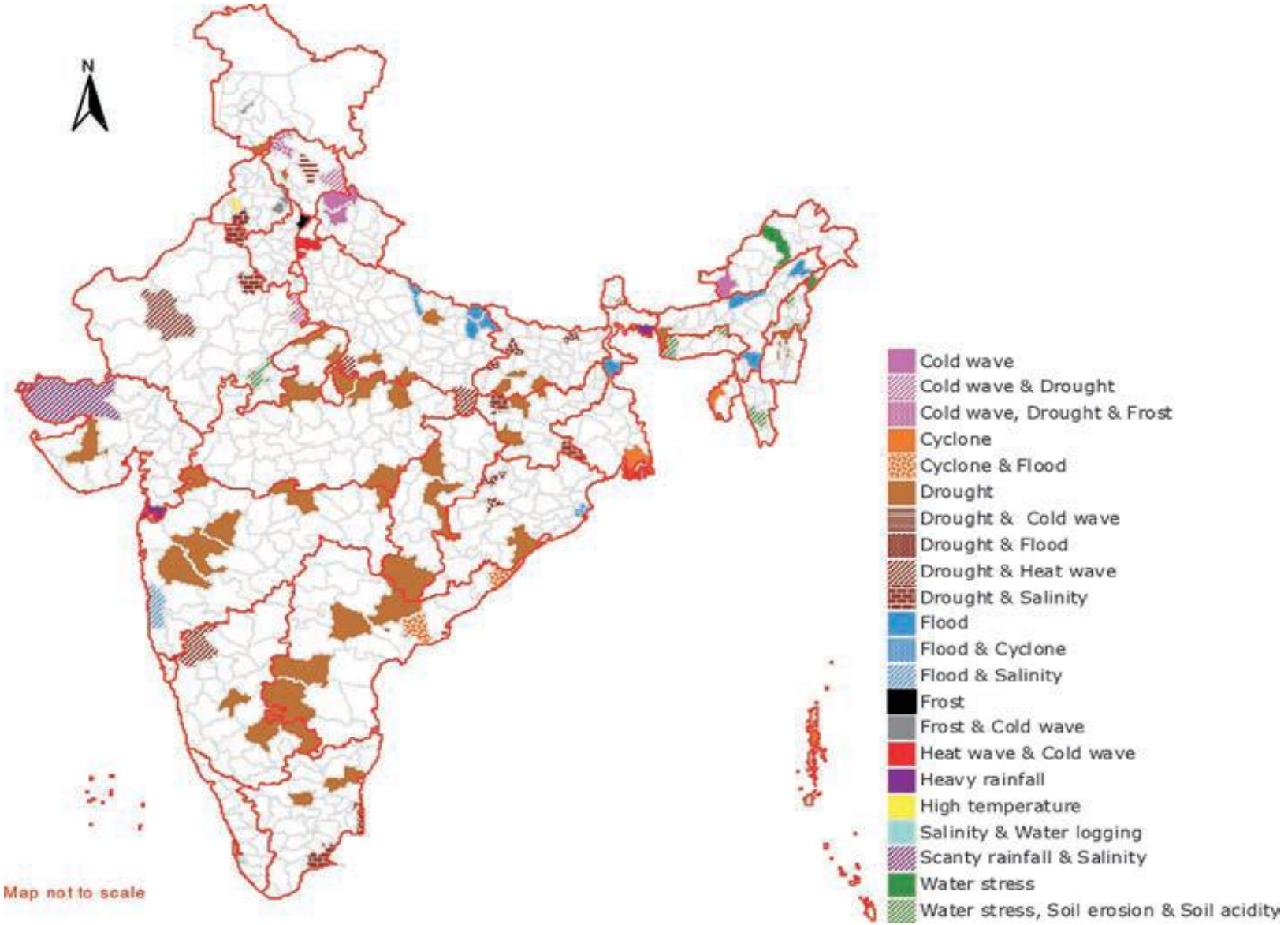
- Adverse ôEconomies of Scaleô
- Weak financial strength of majority of farmers (SMF)
- Lack of access to credit to Rural Entrepreneurs for setting Custom Hiring Centre
- Need for promoting appropriate Farm Equipment: Region and crop specific, indigenous technology

Individual Ownership Vs Custom Hiring

- ✓ Key question is how to cater to marginal and small farmers who aggregate to > 80% of cultivators

Custom Hiring of Farm Machines

- ✓ Early decades of nineteenth century
  - ✓ 30-inch (diameter) steam thresher
- ✓Mid-1960 - organized custom hiring
  - ✓ Agro-Industries Corporation (AIC) established
  - ✓ 1970s to 1990s - land development and tillage
- ✓1971 ï GOI scheme to set up Agro-Services Centres
- ✓1990s - in a limited way under NATP and NAIP
- ✓2005 ï AICRP (FIM) ï 24 centres
- ✓2010 - NICRA - 100 Agriculture Science Centres (KVKs)
  - ✓ in drought/ flood/ hill area and difficult situations
  - ✓ centres managed by farmers through
  - ✓ Village Climate Risk management Committees.



Selected 100 Districts for Custom Hiring Centres

Advantages

✓ Available extension network and technical expertise of KVKs are utilized

✓ By forming Farm Machinery Service Centres/ Farmers Committee, requirement of individual village/ agro-climatic zone is assessed and use of equipment is tailor made as per requirement/ demand.

✓ Revenue generation is ploughed back to the society.

✓ Operation repair, maintenance aspects are taken care of.

Impact of Mechanization on Selected Operations

Farm equipment	Cost of unit, Rs. in lakh	Cost of operation, Rs./ha	Net saving in Rs./ year/unit	Benefit cost ratio CH (MI)*	Pay-back period, years
Tractor mounted rotavator	0.8-1.2	1400	56,250	1.8 (3.0)	2
Laser land leveler	4.00	1700	1,10,000	1.9 (3.0)	3
Post hole digger	0.60	1500	50,000	3.0 (4.0)	1.5
Zero till drill	0.3-0.35	750	35,000	2.0 (3.0)	1

* CH: Custom hiring based BC ratio; (MI): BC ratio taking in view all benefits of the Mechanization Intervention

Supporting Policies Needed for

- ✓ Promotion of custom hiring of farm equipment, high capacity machines and entrepreneurship models
- ✓ R&D for farm machinery through Public Private Partnership
- ✓ Quality manufacturing and after sales support for reliability of farm machinery
- ✓ Farm Machinery Promotion Centres for availability of need based farm equipment
- ✓ Extending more subsidies on precision farm machinery
- ✓ Identifying Farm machinery Custom hiring centres as small scale industry
- ✓ Treating community development of small farm holdings with mechanized agriculture as social responsibility

Supporting Policies

- ✓ Strengthening existing Custom Hiring Centres
- ✓ Sub-Mission on Agricultural Mechanization
- ✓ CRP on Farm Mechanization and Precision Farming

Sub-Mission on Agricultural Mechanization (SMAM)

- ✓ Period : 2012 -2017
- ✓ Outlay : US$ 350 million
- ✓ Small & Marginal Farmers - at core of interventions
- ✓ Special emphasis on ótreaching the unreachedô
- ✓ Cater to ótadverse economies of scaleô
- ✓ by promoting óCustom Hiring Servicesô
- ✓ through óthe rural entrepreneurshipômodel.
- ✓ Aim - catalyzing an accelerated but inclusive growth of agricultural mechanization in India

SMAM will Provide assistance for Promotion and strengthening of agricultural mechanization through

- ✓ Training, testing and demonstration (100%)
- ✓ Post harvest technology and management (50-100%)
- ✓ Procurement of selected agriculture machinery and equipment ((50%)
- ✓ Establishment of farm machinery banks for custom hiring (50%)
- ✓ Establishing hi-tech productive equipment centres (50%)
- ✓ To target low productive agricultural regions and assistance for increasing farm mechanization (80%)
- ✓ Creating ownership of equipment among SMFs in eastern / NE regions (100%).

Objectives of Farm Machinery Banks for Custom Hiring

- ✓ To promote mechanization in districts with low farm power availability
- ✓ To facilitate hiring services of various agricultural machinery/implements applied for different operations.
- ✓ To expand mechanized activities during cropping seasons in large areas especially in small and marginal holdings.
- ✓ To Introduce improved/newly developed agricultural implements and machines in crop production

Objectives of Hi-Tech, High Productive Equipment Hub for Custom Hiring

- ✓ To promote utilization of hi-tech, high value machines for higher productivity
- ✓ To provide hiring services for various high value crop specific machines applied for different operations.
- ✓ To expand mechanized activities during cropping seasons to cover large areas
- ✓ To involve manufacturers for setting up of such centres

Financial Outlay, Capital Subsidy limit & Target

✓ **Farm Machinery Bank:** Minimum amount of project cost would be US$ 0.016 million and the maximum would be US$ 0.1 million. If the cost is more than US $ 0.1 million, the subsidy would be restricted to US$ 0.04 million.

✓ **Hi-tech and High-Productive Equipment Hub:** Minimum amount of project cost would be US$ 0.16 million and the maximum would be US$ 0.41 million. If the cost is more than US$ 0.41 million, the subsidy would be restricted to US$ 0.16 million.

✓ **Target:** Establish a minimum of 1000 farm machinery banks/ hi-tech equipment hubs during the next 3 years. The total capital subsidy component for the scheme US$ 84 million.

CRP ON FARM MECHANIZATION & PRECISION FARMING

To bring technology developers, manufacturers, and entrepreneurs together for:

- ✓ **Strengthening the expertise and infrastructure of R&D and manufacturing in the area of farm mechanization**
- ✓ **Addressing the issues of quality manufacture, testing and standardization - AMDCs**
- ✓ **Developing custom-hiring models and entrepreneurs for facilitating the spread of farm mechanization**
- ✓ **Providing incubation facilities for expanding the manufacture of farm machines**
- ✓ **Broad based demonstration and awareness programmes**

CRP on Farm Mechanization & Precision farming

- ✓ Outlay – US$ 13.6 million
- ✓ Development and commercialization of 25 need based implements and machines
- ✓ Modification and adoption of 100 implements and machines
- ✓ Establishment of 10 AMDCs (4 – level A + 6 – level B)
- ✓ Capacity building of manufacturers for quality up gradation
- ✓ Improvement in quality manufacturing of equipment through commercial testing of farm equipment
- ✓ Tested models of farm machinery availability through custom hiring and farm machinery resource centres

CRP on Farm Mechanization & Precision farming

- Training of 22,740 farmers and rural entrepreneurs
- Training of 1,080 village artisans
- Setting up of 34 FMBs and FMRCs
- Training of 1,000 custom hiring service providers
- Facilitating the establishment of 200 farm machinery manufacturing units
- Organization of 125 academia-industry interactions for commercialization of newly developed implements and machines
- Demonstration of farm machinery over 50,000 ha area and assessment of impact on productivity and profitability

AGRICULTURAL MECHANIZATION DEVELOPMENT CENTRE

- ✓ **Identify mechanization gaps and act as repository of database for the region.**
- ✓ **Manufacture and supply of prototypes of improved farm tools and equipment needed in the region**
- ✓ **Refine and adapt tools and equipment as per the regional needs.**
- ✓ **Maintain an inventory of farm machinery manufactured elsewhere in the country and make it available to the farmers**

Agricultural Mechanization Development Centre

- ✓ **Establish linkages with farmers, entrepreneurs, manufacturers and line departments including funding institutions**
- ✓ **Provide incubation for entrepreneurship development in manufacturing.**
- ✓ **Promote agricultural mechanization through KVKs in the region.**

Social and Economic Benefits

- ✓ Motivation to mechanize is driven by a wish to
  - ✓ Increase a familyôs food security
  - ✓ Increase household income
  - ✓ Improve the quality of life

Economic benefits

- ✓ Increasing the efficiency of labour
- ✓ Reducing costs
- ✓ Increasing the area cultivated
- ✓ Undertaking more timely production
- ✓ Improving the quality of cultivation
- ✓ Increasing yields
- ✓ Adopting crop diversification
- ✓ Reducing harvest and post-harvest losses
- ✓ Earning a rental income through hiring farm-power services to others

Social and Economic Benefits

Social benefits

- ✓ Reducing drudgery and workloads (particularly for women)
- ✓ Improving safety
- ✓ Gaining prestige
- ✓ Encouraging youth and more innovative people to remain in rural areas and work on the land.

Challenges and Constraints Faced

Challenges

- ✓ Virtual or real consolidation of the widely fragmented and scattered land holdings in many parts of the country.
- ✓ Extend benefit of mechanisation to all cropping systems including rice and horticultural crops.
- ✓ Need to enhance the average farm power availability to minimum 2.5 kW/ha to assure timeliness and quality in field operations.
- ✓ To achieve higher production levels, the quality of operations like seedbed preparation, sowing, application of fertilizer, chemicals and irrigation water, weeding, harvesting and threshing will have to be improved by using precision and efficient equipment.

Challenges and Constraints Faced

Constraints

- ✓ High initial cost often prohibits individual ownership especially amongst small, small and medium farm holds.
- ✓ Lack of knowledge in the aspects of operation, maintenance and repair of equipment, often, restricts the use of farm machinery.
- ✓ Repair and maintenance under individual ownership coupled with lack of space for shelter also constraints the use.

Solutions and Suggestions

Strategies

- ✓ Need of incentives and policy support for adoption, development and promotion of farm mechanization technologies particularly suitable for dry land farming, horticulture and orchards, hill agriculture, sugarcane harvesting, cotton picking, rice production etc.
- ✓ The farm machinery banks may be established for machines being manufactured elsewhere in the country and supplied to users/ farmers.
- ✓ Banks need to develop hassle free loan origination and disbursement process for tractors and farm machinery on individual ownership basis or custom hiring basis.
- ✓ Manufacturing units that are set-up in areas with lower mechanization needs to be supported by extending tax and duty sops.
- ✓ There is a need to innovate custom service or a rental model by institutionalization for high cost farm machinery such as combine harvester, sugarcane harvester, potato combine, paddy transplanter, laser guided land leveller, rotavator etc.
- ✓ Large-scale rural entrepreneurship for custom hiring operation of agricultural machinery needs to be developed at a faster pace.

Solutions and Suggestions

Role the Govt. can play

In order to underpin initiatives at the household level and to support the infrastructure, governments have to ensure that there is an enabling policy environment to achieve:

- ✓ A vibrant economy with a well-developed private sector to deliver and sustain mechanization inputs
- ✓ A profitable agriculture sector with access to markets (domestic and international), effective demand for food products, opportunities for value-adding through processing, fair trade, and production of niche products
- ✓ A diverse economic base in rural areas to enable farming households to generate income off-farm to invest in agriculture
- ✓ Affordable mechanization inputs conforming to national standards

Solutions and Suggestions

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Solutions and Suggestions

Role the Private Sector can play

✓ Private sector in India is capable and offering quality products at competitive prices. The basic machinery and implements are available. However, we are importing many specialized machinery. The private sector needs to indigenize these for bringing down the cost, provided the volumes are of economic scale.

✓ They need to help promote the formation of farm cooperatives which eventually increases the scope of uses of bigger farm machinery and result in minimum wastage of resources.

✓ Even the concept of contract farming with the help of private sector will go a long way in increasing farm output and hence the earning of the farmer.

✓ They need to provide funding for improving farm irrigation levels especially in states like MP, Rajasthan, Maharashtra and Gujarat, etc. The improvement in irrigation facilities will enable the farmers to go for multiple cropping and hence there will be need of more machines.

✓ They need to promote crop specific and location specific, indigenous technologies which are not only cheap and affordable, but also more useful than the mass produced machines.

✓ The private sector needs to come forward and encourage the concept of custom hiring among the farming community in order to enhance earnings.


THANK YOU ALL