

Human Resource Development of Agricultural Mechanization in India: Policy and Status



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Director

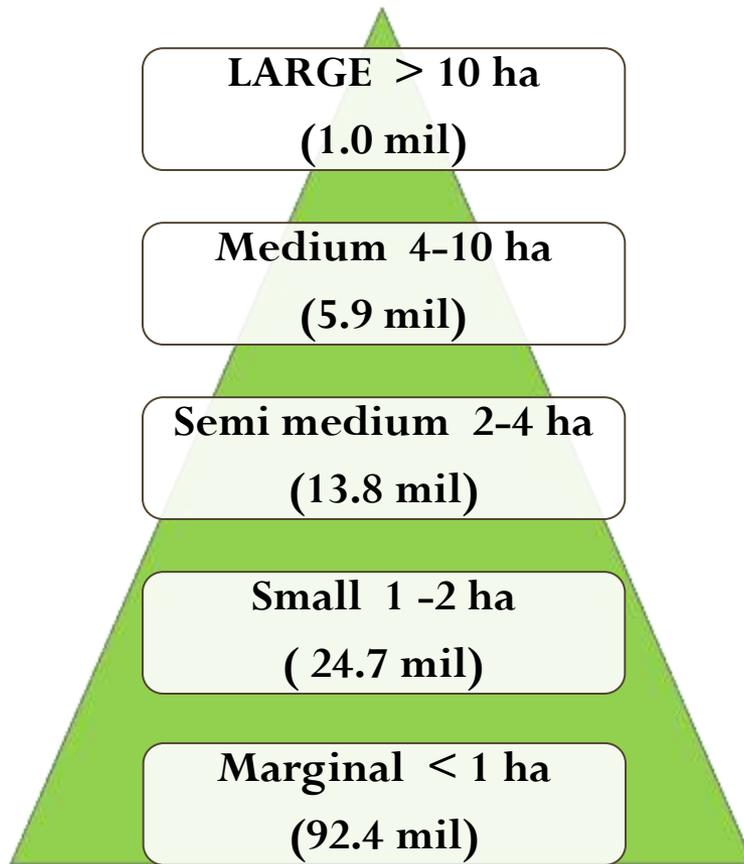
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Indian Agriculture

- **Net sown area: 140 million ha (42.6%)**
- **Agricultural workers - 263 million**
Employs about 52% of the work force
Provides livelihood to about 60% of the population
- **Contributes 13% to the Gross Domestic Product (GDP)**
- **Yearly production**
 - **Food grains – 264 million tonne (2013-14)**
 - **Fruits – 81 million tonne (2012-13)**
 - **Vegetables – 162 million tonne (2012-13)**
- **No. of land holdings – 138 million**

Indian Agriculture



- **Highest arable land** - 47% of total land against Avg. 11% in the world
- **Round the year cultivation** - 15 agro-climatic zones and 46 soil types suited for round the year cultivation
- **Ranks first in production of Pulses, Sorghum, Jute and allied fibers**
- **Second largest producer of Wheat, Rice, Groundnut, Tea, Fruits and Vegetables, Sugarcane**
- **Small fragmented land holdings, hill agriculture and shifting cultivation**
- **137.8 million cultivators, over 5.0% own > 4 ha. Avg farm land size < 1.15 ha**

Land holding size and no. of farmers

Bottom of Pyramid Country: Affordability and equipment size are key to success.

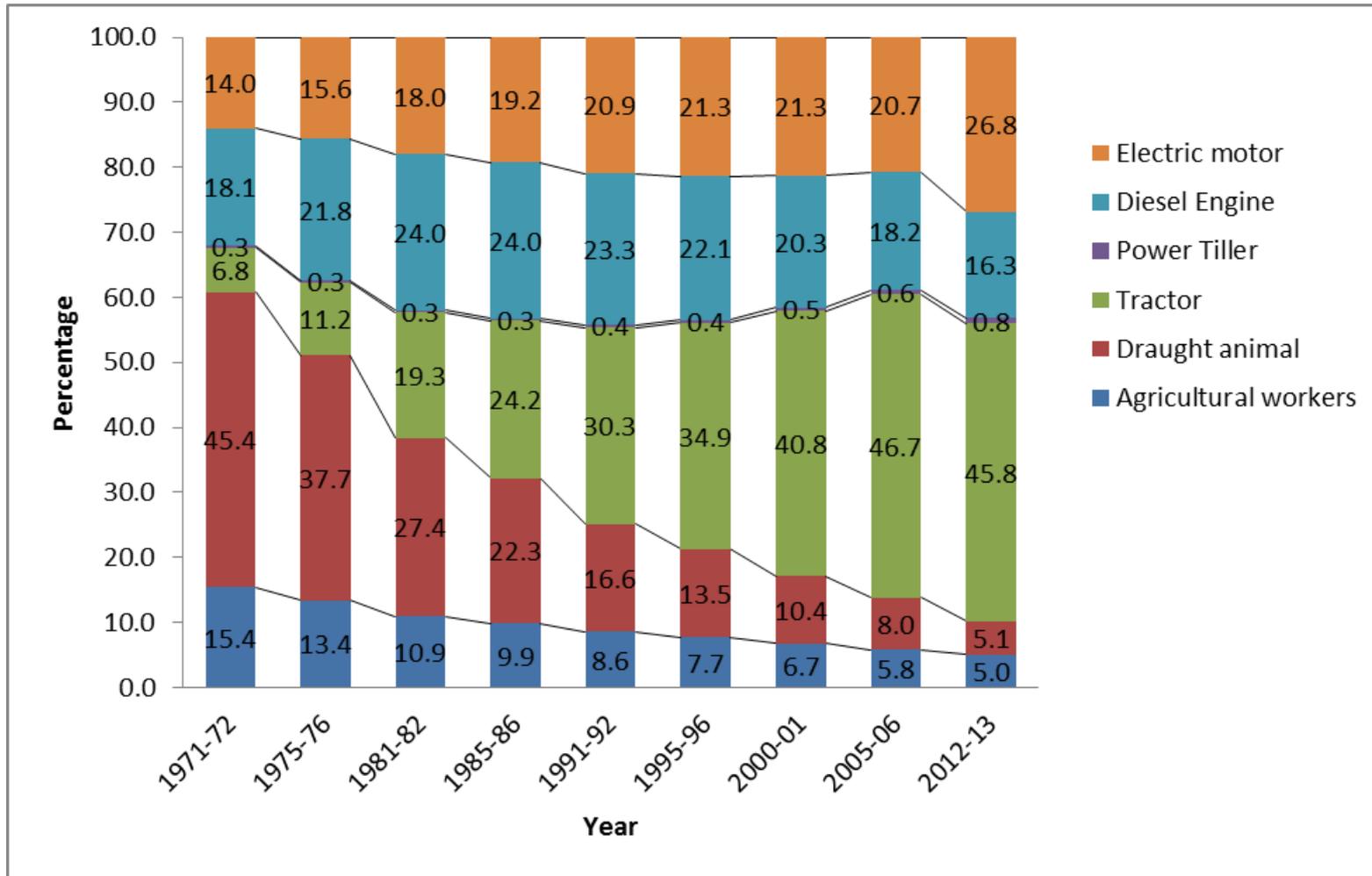


Power Availability on Indian Farms

Year	Cropping intensity, %	Productivity, t/ha	Power available, kW/ha	Power per unit production, kW/t	Net sown area per tractor, ha
1975-76	120	0.94	0.36	0.38	487
1985-86	127	1.18	0.58	0.49	174
1995-96	131	1.50	0.92	0.61	84
2005-06	132	1.65	1.50	0.91	47
2010-11	141	1.92	1.68	0.88	31
2012-13	141	2.06	1.84	0.89	30



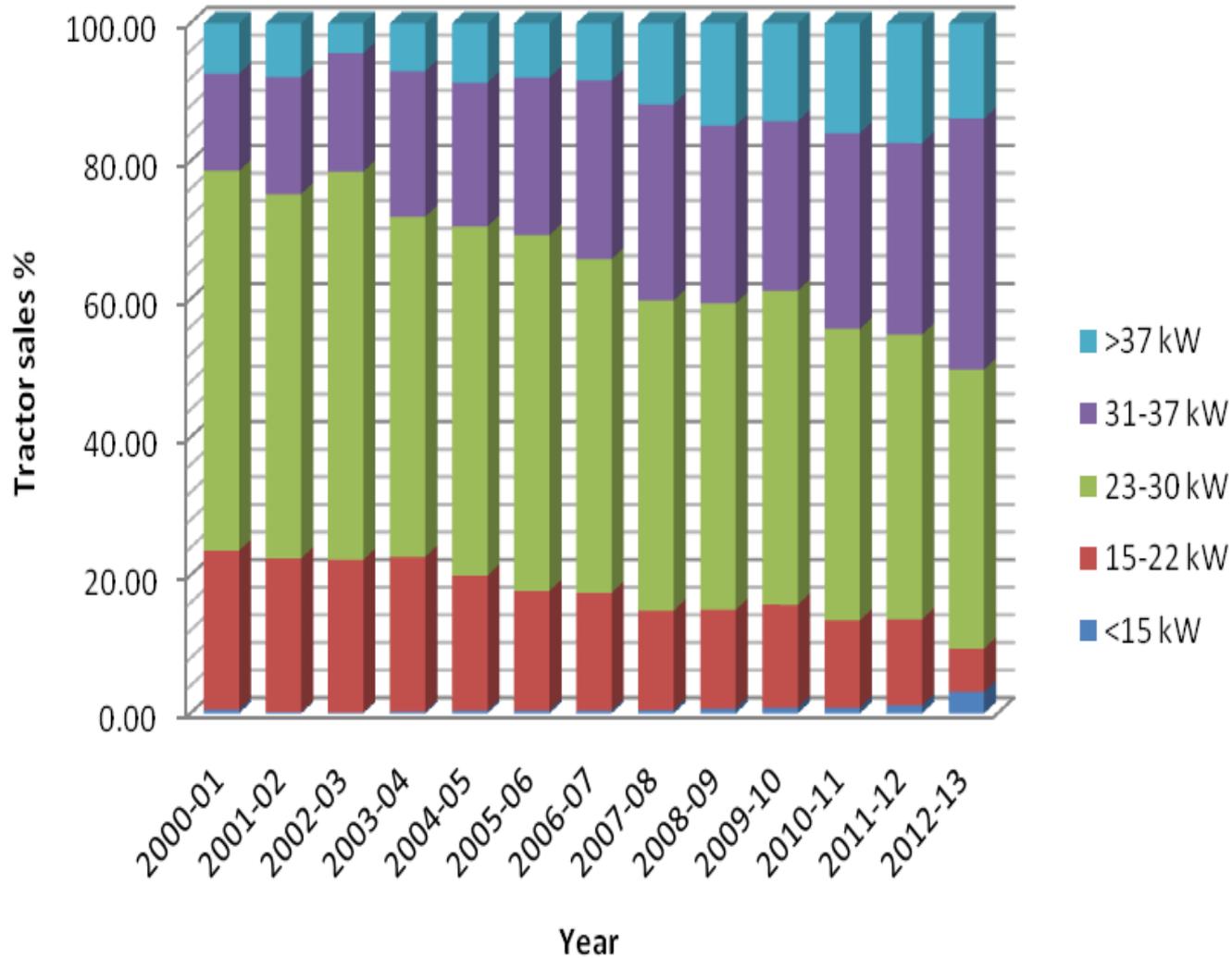
Trend in Farm Power Availability



Share of agricultural worker & draught animals came down from 60.8% in 1971-72 to 10.1% in 2012-13



Power Wise Sale Trend of Tractors



Human Resource Development in Agricultural Mechanization

Stakeholders of Mechanization

- Users (Farmers and Operators)
- Rural Artisans, including rural women
- Technical workers in manufacturing sectors
- Manufacturers
- Custom Hiring Entrepreneurs
- Subject matter specialists
- Students
- Trainers
- Faculty of Agricultural Mechanization



GOVERNMENT OF INDIA



Ministry of Agriculture

**Department of
Agriculture and Cooperation**

**Department of Agricultural
Research & Education/ICAR**

**Department of Animal
Husbandry & Dairying**

ICAR

CAU

SAUs



Human Resource Development at UG & PG Degrees and Diploma levels

- Higher Learnings (IITs, IARI, CIAE, NERIST, CAUs, etc.)
- State Agricultural Universities (34 nos., PAU, TNAU, CCHAU, GAU, UAS.....)
- Annual Intake Capacity
 - Under Graduate : 1400
 - M. Tech : 350
 - Ph. D. : 150
- Private Colleges
- Diploma in Agricultural Engineering



Human Resource Development at Entrepreneurs and Farmers levels

- Vocational and supporting education (NCERT, Industrial Training Institutes, less focused towards agricultural machinery as in other branches)
- Farmer's trainings through 641 Farm Science Centres
- State Governments through Department of Agriculture
- NGOs and Private Sectors
- Various R&D institutes, like CIAE, Bhopal, IARI, New Delhi, SAUs, etc.



Skill Development in Mechanization

Four Farm machinery Training and Testing Institute(s)

- CFMTTI, Budni
- NRFMTTI, Hisar
- SRFMTTI, Ananatpur
- NERFMTTI, Assam



General employment pattern of AE-graduates

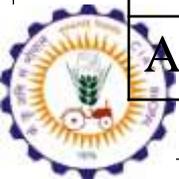
- NAARM, Hyderabad conducted a study in year 2011

Institution	Range	Average
Academic Institutions	5-20%	8%
Development Departments	10-30%	20%
Industrial Departments	20-30%	25%
Field Oriented Jobs	10-25%	25%
Financial Institutions	5-10%	10%
Others	10-20%	12%



Requirement of Agricultural Engineering Graduates in India

Discipline	Supply – 2010	Demand 2020	Gap
Agriculture	15949	25000	9051
Horticulture	1465	8618	7153
Forestry	716	1832	1116
Veterinary	2683	7672	4989
Fishery	433	2614	2181
Dairy	310	3315	3005
Agricultural Engineering	1507	3256	1749
Agricultural Biotechnology	734	1039	305
All	23797	53346	29549



Strengthening of AE Education

- Accreditation of degree courses by UGC/AICTE/ICAR
- Deans' Committee Recommendations / AICTE norms for reorienting course and curricula.
- Uniform course and syllabus at PG level
- Infrastructure improvement in terms of labs, computers, pilot plants, training in field operation etc., (ICAR, UGC and and other organizations)
- Summer/Winter Schools for faculty in frontier area (sponsored by ICAR/AICTE)
- World Bank funded projects (NAIP & NAEP)
- Combat in-breeding for faculty positions
- Encouragement through assistanceships, fellowships, awards, etc.
- Grading of educational institutions



Regional Cooperation in AE Education

What is happening:

- Technical assistance in development of educational institutions
- Encouraging foreign students in educational institutes
- Training for African-Asian Rural Development Organization (AARDO) participants
- Training foreign faculty and scientists
- Sharing of lecture notes and class room video
- Collaborative research programmes
- Infrastructure development for manufacturing and training



Estimate of training needs

- Agricultural Engineers with strong background of design and marketing in manufacturing sectors
- Diploma and Industrial Training Institutes (ITIs)
- Trained operators for tractors, power tillers and agricultural machinery
- Rural artisans for manufacturing of small agricultural machinery & tools
- Repair and Maintenance workers
- Trained technicians in organized manufacturing sectors
- Training on custom hiring of agricultural machinery



Trainings Offered by FMTTI(s)

Sl. No.	Course	Duration
1	USER LEVEL COURSES	
U1	Appropriate Mechanization Technology for Energy Management in Agriculture	4 week
U2	Selection, Operation, Safety and Maintenance of Improved Agricultural Machinery	6 week
U3	Operation, maintenance and Management of power tiller	2 week
U4	Training Program on Agro Processing & value addition Equipments	2 week
U5	Gender friendly Equipments for Women Farmers	3 days
U6	Utilization of Non-conventional Energy Sources in Agriculture	1 week
U7	Water Management Through sprinkler and drip Irrigation & Water saving devices	1 week
U8	Selection, Operation, and Maintenance of Plant Protection Equipments	1 week
U9	Selection, Operation, and Maintenance of improved Harvesting & Threshing machines	2 week
U10	Selection, Operation, and Maintenance of Hand Pump	1 week
U11	Selection, operation and maintenance of Agril. Machinery for dry land agriculture	2 week
U12	Crop Specific machinery	2 week



Training Offered by FMTTI(s)

Sl. No.	Course	Duration
2	TECHNICIAN LEVEL COURSES	
T1	Repair and overhauling of Stationery engines and tractors	6 week
T2	Repair & overhauling of power tillers	2 week
T3	Establishment and management of agricultural machinery repair and maintenance workshop	4 week
T4	Study & Repair of Hydraulic system in Agriculture Machines	4 week
T5	Repair and maintenance of Auto Electrical equipments and Battery re-conditioning	3 week
T6	Repair, maintenance & rewinding of Electrical motors, and submersible pumps for agricultural use	3 week
T7	Operation & maintenance of Land shaping and Development machinery	4 week
T8	Repair, maintenance & overhauling of diesel pumping sets	2 week
T9	Maintenance, repair and installation of Combine Harvesters and Straw Reaper	3 week
3	MANAGEMENT LEVEL COURSES	
M1	Testing and Evaluation of Farm Machinery	1 week
M2	Agriculture Machinery Management	1 week

Training Offered by FMTTI(s)

Sl. No.	Course	Duration
M3	Export Management of Agricultural Machinery	1 week
M4	Instrumentation for Farm Machinery Testing and Evaluation	1 week
M5	Entrepreneurship development to establish custom hiring agro-service centre	8 week
M6	Farm machinery management for dealers / traders / manufacturers, etc.	1 week
4	ACADEMIC LEVEL TRAINING PROGRAMME	
A1	Practical Training programme on Farm Power & Machinery for Degree/Diploma Engineering Students	4 week
A2	Practical Training programme on Farm Power and Machinery for ITI & vocational courses for 10+2 Students	4 week
5	AWARENESS COURSES THROUGH MULTIMEDIA SYSTEM	
AW1	Centrally sponsored schemes for subsidy on Agricultural Machinery, Agri-Business and Agri clinics	1 to 2 days
AW2	Straw Management in Agriculture	1 day
AW3	Safety in Agricultural Machinery	1 day
AW4	Adaptation of new technology machinery - publicity	1 day
AW5	Bankers training programme for financing agric. machinery	1 day

Training Offered by FMTTI(s)

Sl. No.	Course	Duration
6	Training Programme For Rural Youth Under Swarn Jayanti Gramin Swarojgar Yojana	As per requirement of sponsoring organization
7	Training programme for Foreign National as per requirements under Bilateral programme.	10-18 weeks
8	Special Training programme on Utilization, operation, maintenance and repair of Agril. Machinery for Defence personnel sponsored by Director General of Resettlement. (U-2 + T-1)	12 weeks
9	Need based Training Programme on Farm Mechanization	As per requirement of sponsoring organization



Number of trainees by NERFMTTI, Assam

Year	Target	U Level course	T level course	M level course	A level course	AW level course	TT level course	SJG SY	NB level course	DF level course	TEL level course	Appr.	Total
2005-06	600	155	0	0	25	0	349	113	0	0	0	3	645
2006-07	600	270	17	0	55	0	276	51	0	0	0	2	671
2007-08	700	155	58	0	123	11	320	67	0	0	0	1	735
2008-09	700	136	12	0	72	0	471	18	10	0	0	5	724
2009-10	700	296	36	0	114	0	92	0	133	0	0	1	672
2010-11	800	467	63	0	85	0	99	0	97	0	0	0	811
2011-12	800	357	171	0	167	0	0	0	119	0	0	2	816
2012-13	800	439	139	0	193	0	0	0	28	0	0	3	802
2013-14	800	267	196	0	204	0	0	0	159	0	0	3	829



Sub Mission on Agricultural Mechanization (SMAM)

Initiated by Department of Agriculture and farmers welfare in April 2014 during 12th Five year plan:

- **Promotion and Strengthening of Agricultural Mechanization through Training, Testing and Demonstration**
- **Demonstration, Training and Distribution of Post Harvest Technology and Management (PHTM):**



Challenges in Skill Development

- Inadequate infrastructure to support large scale training programmes
- Course curriculum of various agencies involved in imparting skill varies considerably.
- Missing need assessment of training
- Coordination and linkage in skill development agencies is missing.
- No policy framework in skill development
- Limited number of institutions and trainers
- Limited financial resources
- Lack of database on trained manpower



Strategies and Approach

- Policy framework in HRD and skill development
- Need assessment in different sectors
- Identification of expertise, facilities and gap
- Infrastructure support at various levels of skill development
- Development and strengthening of more number of institutions
- Networking of various stakeholders and institutions
- Development of Course curricula, knowledge and information sharing
- Audio-visual materials and e-learning solutions



Thank You

