



**Department of Farm Machinery and Power Engineering**  
**Dr. A. S. College of Agril. Engineering and Technology**  
**Mahatma Phule Krishi Vidyapeeth, Rahuri**  
**Tal. Rahuri 413 722, Dist. Ahmednagar (MS)**



Preamble:

The department has been engaged in development and dissemination of different technologies for mechanized farming of the crops grown in Maharashtra. In order to improve the mechanization in the jurisdiction of the University, research on development and testing of different implements has been undertaken by the Department. The Department has released various implements for farmers of the region viz. Jyoti multi crop planter- bullock drawn power tiller drawn and tractor drawn; Tractor drawn onion transplanter, self-propelled lucerne harvester, pedal operated ground decorticator, etc. The Department is working in technical collaboration with the industries for development as well as dissemination of knowledge on farm machinery. Memorandum of Understanding has been signed with Industries viz, M/s ASPEE Ltd., Mumbai, M/s. Mahindra & Mahindra Ltd. Mumbai, M/s. New Holland Fiat India (Pvt.) Ltd, Delhi, M/s. CLAAS India Ltd., Faridabad, M/s. Shravani Enterprises, Pune.

The faculty of the Department has guided 362 graduate students and 43 post graduate students on different aspects of farm mechanization. They have disseminated their research contribution by presenting 55 research papers in various national and international journals and conferences.

The Department conducts training programs on Farm Mechanization in general as well as for specific crops; for employees of Tractor Industries, Banks and Financial Institution; v machine operators and farmers Development, research and manufacturing of released machinery are done in collaboration with these industries.

The Department has completed one NATP project on Mechanization of Experimental Plots during 2002-2004. The performance of various field plot machines viz. single ear head thresher, multi-crop plot thresher, rotavator, tractor and bullock drawn puddler, hydro tiller, zero till drill, tractor drawn vegetable transplanter, multi- crop planter, self propelled reaper, mini combine, aero blast sprayer, riding type reaper, etc were tested and demonstrated on the field.

Presently, Government of Maharashtra has provided funds of Rs. 15.50 lakh for establishment of 'Testing Centre for Farm Machinery'. Farm Machinery Training and Testing Centre has been sanctioned under "RKVY" with outlay of Rs. 4.5 crores.

The Department has developed CAD Laboratory facility with PRO/ENGINEERE W/F 4.0 software installed on server and 25 clients.

Improved farm implements and machinery have enabled timeliness of farm operations, improved the utilization of inputs and reduced drudgery. This has led to enhanced productivity and reduction in the cost of produce. The net returns to the farmer have also increased, paving the way for expeditious adoption of farm machinery. Under the dynamic situation of changing cropping as influenced by local agro-socio-economic factors, identification of farm mechanization needs and development of need-based farm implements and machinery are of paramount importance.

Contact Details: Professor and Head,  
 Department of Farm Machinery and Power Engineering,  
 Dr. A S College of Agril. Engg. & Technology, MPKV, Rahuri  
 Tal. Rahuri 413 722 Dist. Ahmednagar (MS)  
 Phone: 02426 243140, e-mail : hodfmp.mpkv@gov.in

### Academic Programmes:

A) B. Tech. (Agril. Engg.)  
 Capacity of students: 64  
 Year of start: 1969

B) M.Tech (Department of Farm Machinery and Power Engineering)

Capacity of students: 5  
 Year of start: 1985

C) Ph.D (Department of Farm Machinery and Power Engineering)

Capacity of students: 2+1\*  
 Year of start: 2018-19  
 (\* in service candidate)

### Course Layout:

#### 1. B. Tech. (Agril. Engg.)

No.	Course No.	Title	Credits		
			T	P	Total
1	FMPE 111	Engineering Drawing	0	2	2
2	FMPE 112	Workshop Practice	0	1	1
3	FMPE 123	Workshop Technology	1	1	2
4	FMPE 234	Tractor and Automotive Engines	2	1	3
5	FMPE 235	Theory of Machines	2	0	2
6	FMPE 246	Tractor Systems and Controls	1	1	2
7	FMPE 247	Machine Design	1	1	2
8	FMPE 358	Farm Machinery and Equipment-I	1	1	2
9	FMPE 359	Auto CAD Applications	0	2	2
10	FMPE 3510	Tractor and Farm Machinery Operation and Maintenance	0	2	2
11	FMPE 3611	Farm Machinery and Equipment-II	1	1	2
12	FMPE 3612	Tractor & Farm Machinery Design	2	1	3
Total			12	13	25

## 2. M. Tech. (Department of Farm Machinery and Power Engineering)

Sr. No.	Course Number	Course Title	Credits		
			T	P	T
A) Major Subjects (Min. 9 Credits)			T	P	T
1	FMPE-501*	Design Of Farm Power & Machinery System	3	1	4
2	FMPE-502*	Soil Dynamics In Tillage & Traction	2	1	3
3	FMPE-503*	Testing And Evaluation Of Tractor And Farm Equipment	2	1	3
4	FMPE-504	System Simulation And Computer Aided Problems Solving In Engineering	1	1	2
5	FMPE-507	Farm Machinery Dynamics Noise And Vibration	3	1	4
6	FMPE-508	Tractor Design	2	1	3
7	FMPE-509	Operational Research In Farm Power And Machine Management	2	1	3
8	FMPE-510	Ergonomics And Safety In Farm Operation	2	1	3
9	FMPE - 592	Special Problem	0	1	1
10	FMPE – 595 <sup>#</sup>	Industry/Institute Training	NC		
B) Minor Subjects (Min. 9 Credits)					
1	FMPE-505	Instrumentation And Stress Analysis	2	1	3
2	FMPE- 521	Computer Aided System Design	0	2	2
3	RES -501	Renewable Energy Sources	2	1	3
4	RES- 505	Agro Energy Audit And Management	2	0	2
5	RES- 506	Design And Analysis Of Renewable Energy Conversion Systems	3	0	3
6	RES -508	Alternate Fuels For IC Engine	2	1	3
7	PFE-502	Engineering Properties Of Biological Material	2	1	3
8	BSCT-501	Computer Graphics	2	1	3
C) Supporting Courses ( Min. 5 Credits)					
1	FMPE-531	Pesticides application techniques	2	1	3
2	FMPE-532	Advanced manufacturing technology	2	1	3
3	STAT- 511	Statistical methods for applied Sciences	2	1	3
4	MATHS-502	Methods of Numerical Analysis	1	1	2
5	FMPS-505	Research methodology	0	1	1
D) Seminar					
1	FMPE-591	Master's seminar	0	1	1
E) Master's Research					
1	FMPE- 599	Master's research	0	20	20

F) Non Credit Compulsory Courses					
1	PGS -501	Library and information services	0	1	1
2	PGS -502	Technical writing and communication skill	0	1	1
3	PGS -503 (e-course)	Intellectual property and its management in agriculture	1	0	1
4	PGS -504	Basic concept in laboratory techniques	0	1	1
5	PGS -505 (e-course)	Agricultural research, research ethics and rural development Programmes	1	0	1
6	PGS -506 (e-course)	Disaster management	1	0	1
Total			42	45	87

\* Compulsory #Minimum of three weeks

### Ph. D. (Department of Farm Machinery and Power Engineering)

Sr. No.	Course No.	Course Title	Credits		
			T	P	T
A) Major Subjects (Min Credits :15)					
1	FMPE601*	Advances in Farm Machinery and Power engineering	3	1	4
2	FMPE602*	Simulation modeling in Farm Machinery and Power Engineering	2	0	2
3	FMPE603	Energy conservation and Management in Farm Machinery and Power Engineering	2	0	2
4	FMPE604	Computer Aided Analysis and Design of Farm Machinery	2	1	3
5	FMPE605	Machinery for natural resource management and precision farming	3	1	4
6	FMPE606	Advances in Hydraulics and Electro Pneumatic controls	2	0	2
7	FMPE 607	Advances in Ergonomics	2	1	3
8	FMPE 693*	Special problem	0	1	1
9	FMPE694*	Case study	0	1	1
* Compulsory course					
B) Minor Subjects (Min Credits : 8)					
1	FMPE 621	Mechanism Analysis and Synthesis	3	0	3
2	FMPE 622	Experimental Stress Analysis	2	1	3
3	AE 503	Applied Instrumentation	2	1	3
4	STAT 609	Operation Research	2	1	3
5	RES 622	Design and analysis of renewable energy conversion system	2	1	3
6	RES 623	Energy Management and Planning	2	1	3
7	RES 624	Agro energy audit and management	2	0	2
C) Supporting Subjects (Min Credits : 5)					
1	AE 502	Similitude in Engineering	2	1	3
2	MATHS 601	Mathematical Modeling and Software Application	1	2	3

3	PFE 605	Agricultural waste and byproduct utilization	2	1	3
4	MATHS 602	Optimization Techniques	1	1	2
5	STAT 531	Data Analysis using Statistical Packages	2	1	3
6	AE 605	Project Planning and Implementation	2	1	3
D) Seminar					
1	FMPE 691	Doctoral seminar I	0	1	1
2	FMPE 692	Doctoral seminar II	0	1	1
E) Doctoral Research					
1	FMPE 699	Doctoral research	0	45	45
F) Non credit Compulsory Courses (Optional*)					
1	PGS 501	Library and Information Services	0	1	1
2	PGS 502	Technical Writing and Communication Skills	0	1	1
3	PGS 503 (e-course)	Intellectual Property And Its Management In Agriculture	1	0	1
4	PGS 504	Basic Concepts in Laboratory Techniques	0	1	1
5	PGS 505 (e-course)	Agricultural Research, Research Ethics and Rural Development Programmes	1	0	1
6	PGS 506 (e-course)	Disaster Management	1	0	1
Total			44	68	112

## Laboratories:

### A) Farm Power Laboratory

Sr. No.	Instrument / Equipment	Purpose
1	Tractor systems cut models	used for conducting the practical's of the UG/PG students
2	Engine systems cut models	used for conducting the practical's of the UG/PG students
3	Dynamometers	used for conducting the practical's of the UG/PG students

### B) Plant Protection Laboratory

Sr. No.	Instrument / Equipment	Purpose
1	Orient hand rotary duster Maruti foot sprayer Aspee Napsak Gatpr rocking sprayer Aspee backpack Aspee bolo power operated	used for conducting the practical's of the UG/PG students
2	Maruti hand compression sprayer Maruti pressure retaining sprayer	
3	Scraper model Gawler crane model Trencher (Bucket model) Dumper model Control panel for above bulldozer	

	Buldozer	
4	<p>a) Cut model of power operated aspee bolo.</p> <p>b) Cut model of orient hand rotary duster.</p> <p>c) Cut model of maruti foot sprayer without suction &amp; discharge line.</p> <p>d) Gator rocking sprayer without suction &amp; discharge line.</p> <p>e) Maruti hand compression sprayer 14 lit. capacity without discharge line.</p> <p>f) ASPEE knapsack sprayer 16 lit.capacity without discharge ling.</p> <p>g) ASPEE backpack sprayer without discharge ling.</p> <p>h) ASPEE PV bucket sprayer without discharge ling.</p> <p>i) Shutoff piston (valve) without strainer</p> <p>j) Trigger cutoff valve without strainer</p> <p>k) Pressure regulator cum trigger cutoff.</p> <p>l) Trigger cutoff clock.</p> <p>m) Duromsit spray nozzle NMD.</p> <p>n) Adjustable nozzle BAN.</p>	used for conducting the practical's of the UG/PG students
5	Cut model Sikar knapsack sprayer 16 lit. Capacity without discharge line.	
6	<p>Diaphran sprayer with accessories.</p> <p>1) M 35 Diaphran power sprayer and acc. (Improved pump)</p> <p>2) With Honda engine GK 200</p> <p>3) 15 mm outplori PVC hose 3 m.</p> <p>4) Tank mixer online filter.</p> <p>5) 300 mm handle spray gun.</p>	

	6) M-15 lance. 7) Twist free attachment. 8) 10 mm PVC spray. 9) Turbo 400 spraying gun. 10) Turbine spraying gun. 11) Reductions gear box for spray gun.	
7	Manual Knapsack Sprayer Model KP-100 capacity 16 liter.	Used for conducting the practical's of the UG/PG students.
8	Rack and pinion model	
9	Spur gear model	
10	Inter connected gear.	
11	Epicyclical gear.	
12	Apparatus for study of crank and connecting rod mechanisms.	
13	Governor model with rotor.	
14	Apparatus for study of Cam and Tappet mechanisms.	
15	Belt joints.	
16	Apparatus for study of Cam and Tappet mechanisms.	
17	Pendulum pump mechanisms.	
18	Oscillating cylinders mechanisms.	
19	Rotary cylinder mechanisms.	
20	Slotting link mechanisms.	
21	White worth Quick return motion.	
22	Dynamic Balancing apparatus for Rattling masses.	
23	Dynamic Balancing apparatus.	
24	Hydraulic dynamometer.	
25	Aspee Knapsack sprayer.	
26	Aspee Backpack sprayer Hi-Tech.	
27	Aspee V-2007 sprayer pump.	

### C) Tractor systems and Harvester Training Laboratory

Sr. No.	Instrument / Equipment	Purpose
1	Classs Combine Harvester	Used for conducting the practical's of the UG/PG students.
2	John Deere Tractor cut Modal	

### D) Farm Machinery

Sr. No.	Instrument / Equipment	Purpose
1	Groundnut digger shaker	used for conducting the practical's of the UG/PG students
2	Potato digger	
3	Maharashtra token yantra 7 furrow opener.	
4	Blade leveler.	
5	Disc plough.	
6	Reversible MB plouhh	
7	Field cultivator Micromic international model No. 9, 7 and 9 <sup>th</sup> . Heavy spring teet, 9" spacing.	
8	Duplex hopper seed planter (2 rows)	
9	Ridger furrow (3 bottom)	
10	Power sprayer and accessories SIGMA Tractor mounded	
11	Chaff cutter	
12	Manure spreader Micromic international model No. 10	
13	Two bottom plough (Popular)	
14	MB plough with 2 bottom with 2 rubber wheel	
15	Disc harrow trailing type No. 23 A	
16	Escort subsoiler	
17	Paddy thresher foot operated m/c. No. 520	
18	Kisan sathi grain planter	
19	Olped wheat thresher with 20 disks and transporat wheel	
20	Sugarcane planter (BECO mech)	
21	4 wheel 6 tones capacity tractor trolley chassis No. 4275.	



22	Cultivator 9 tynes spring loaded mounted type for kirloskar tractor	Used for conducting the practical's of the UG/PG students
23	Disc harrow with 14 disl mounted type for Kirloskar tractor	
24	Kisan sevak Delux model thresher and accessories	
25	a) Krishi Udyog Jyoti Planter. b) Bhavani make 2 bottom MB plough	
26	a) Jyoti make multicrop thresher suitable to operate on 3 or 5 HP along with wheat concave as per leaflet enclosed, type LTE. b) Bajra concave suitable for above. c) Jyoti make chaffcutter.	
27	Rope winding machine	
28	Seed drill for furrow tubular. Seed drill 3 furrow angular. Balweer razer plough bullock drawn. KU Wakhar Bullock drawn.	
29	Sugarcane earthing up Equipment bullock drawn Ajanta No. 1 Ajanta No. 2 Ajanta No. 3 Ajanta No. 4	
30	Sunflower thresher (M.Tech project without electric motor)	
31	Shivaji multipurpose farming machine	
32	Phule sunflower thresher Multipurpose hoe.	
33	Peg tooth weeder	
34	Power operated groundnut thresher. Tie rider.	
	Massey Ferguson seed drill C-3637 Nine tine tiller (MF 38-10) 3985 seeding attachment.	

35	1) Groundnut decorticator. 2) One row planter 3) Garbage collector	Used for conducting the practical's of the UG/PG students
36	Spike tooth harrow.	
37	Pakar-land (Spiral coil)	
38	Chisel plough (cultivator stiff tooth 55)	
39	Edwards rod weeder.	
40	Wheel mounted offset disk harrow 20 disks.	
41	Vibra shank cultivator including angle adjusting lever.	
42	New tractor MF 1035 DI MH-17/C-3254.	
43	Reverse and forward blade popular PSW.	
44	Popular PSW nine tine automatic seed drill.	
45	HOLD ON type paddy thresher 750 x 550 x 1500.	
46	Power operated hold on type paddy thresher.	
47	1) Trimurti 2 MB reversible plough. 2) 9 Tine adjustable cultivator f/s boxes 3) Passa set (3 Nos). 4) Sarry ridger (3 Nos).	
48	Manual Knapsack Sprayer Model KP-100 capacity 16 liter.	
49	Primer-HP disk jet 5652 HP Photo ret optical 6 link color printing up to 48-50	
50	1) Tractor drawn 2 row Potato planter (Semi automatic). 2) Extra for fertilizer attachment in planter. 3) Fodder harvester complete with cutter bar attachment on the rear side of the tractor.	
51	Tractor drawn two row Potato planter Mahindra make.	
52	Payal Chaff Cutter	

	Model : PHV 8 B, Overall dimension LxBxH 41'x28.5"x34" Motor stand dimension 20" x 10"	
53	Tractor drawn Disc Harrow 7+7 discs.	
54	VST Shakti MT 180 D 18.5 HP Tractor with std. accessories, Rotavater, Straight Tynes set. Trailer 1.5 MT capacities. M.B. Plough. Cultivator (Five Tyned). Multi Utility PTO Stand.	

### E) Farm Machinery Testing Laboratory

Sr. No.	Instrument / Equipment	Purpose
1	Rockwell cum Brinell hardness Tester	Used for conducting the practical's of the UG/PG students
2	Digital Load cell with Indicator; Electronic balance	
3	Hot Air Oven	
4	Hardness Tester for Non- Conducting Metals	
5	Polar Heart Rate Monitor	
6	Eye Flicker Meter,	
	Reaction Meter,	
7	Emission Gas Analyzer	
8	Comuterized UTM	
	Digital In-Situ Soil Moisture Meter	
9	Spray Pump Test Rig	
10	Spray Patternator	
11	Digital Cone Penetrometer	

## F) Workshop Technology Laboratory

Sr. No.	Instrument / Equipment	Purpose
1	Spot welding machine	Used for conducting the practical's of the UG/PG students
2	CO2 welding Machine	
3	Power press(50 Ton)	
4	Vertical drilling machine	
5	Portable Drilling Machine	
6	Blade Butt Welding Machine	
7	Air Compressors	
8	Horizontal Metal Cutting Band Saw Machine	
	Pipe and Bolt Threading Machine	
9	Traub machine	
10	Milling Machine	
12	CNC Machine,	
13	Hydraulic Multi-Function Sheet Metal Working Machine	

### Infrastructure:

### Projects Completed by Students:

#### M. Tech. (Farm Machinery and Power Engineering)

Sr. No.	Name of M. Tech. Student	Name of Guide	Title of the M. Tech. Thesis	Year
1.	Deoram Tukaram Pacharne	Prof. R. K. Parkale	Development of Power operated Sunflower Thresher	1987
2.	Laxman Vithal Gharte	Prof. R. P. Sandge	Cost Reduction and Optimization of Gas Production in Bio Gas	1988
3.	Vasant Maruti Chavan	Prof. R. K. Parkale	Development of a Multipurpose Tool Carrier	1990
4.	Ashok Baburaop Lende	Prof. R. K. Parkale	Use of Solar Energy to Enhance Biogas Generation in an anaerobic Digester	1990
5.	Ramchandra Tukaram Jadhav	Prof. R. V. Jadhav	Design Development and Performance Evaluation of Bullock Drawn Interculturing Implement	1991

6.	Bhanudas Dnaneshwar Durugkar	Prof. R. K. Parkale	Design Development and Evaluation A Lucern Harvester suitable for small dairy farms	1990
7.	Jitendra Pandurang Shinde	Prof. R. V. Jadhav	Development and Performance Evaluation of Power operated Sunflower Thresher	1992
8.	Prakash Appasaheb Turbatmath	Prof. R. V. Jadhav	Design Development and Field Evaluation of Onion Digger Windrower	1992
9.	Pandit A Munde	Prof. R. V. Jadhav	Development and Performance Evaluation of Powertiller Drawn Groundnut Digger	1993
10.	Sharadchandra Vitthal Rane	Prof. R. V. Jadhav	Development and Performance Evaluation of Groundnut Thresher	1994
11.	Jayant Shriram Deshpande	Prof. R. V. Jadhav	Design Development and Field Evaluation of Tie Ridger	1994
12.	Appasaheb Nivrutti Kate	Prof. R. V. Jadhav	Development and Performance Evaluation of Agave Fibre Extraction Machine	1995
13.	Ravindra Vishnu Shinde	Prof. A. C. Pandya	Design and Development of Power Tiller Operated Sprayer for Pomegranate Orchard	1995
14.	Kadu Vilas Murlidhar	Prof. R. V. Jadhav	Development and Performance Evaluation of Tracor Drawn Multi Crop Planter	1996
15.	Bua Pandurang Bhosale	Dr. S. B. Ghadge	Liquified Petroleum Gas Utilization in Diesel Engine	1997
16.	Chandarakant Savleram Bhusari	Prof. R. V. Jadhav	Development and Performance Evaluation of Bullock Drawn Broad Bed Former Cum Groundnut Planter	1997
17.	Laxmikant Dhondu More	Prof. L. V. Gharte	Design and Development of Power Operated Centrifugal Mist Blower for Spraying Pomegranate	1998
18.	Avinash Vithal Gajakosh	Prof. R. V. Jadhav	Design and Development of Basin Former	2000
19.	Sachin Madhukar Nalawade	Prof. P. A. Turbatmath	Development and Performance Evaluation of Tractor Operated Jowar Reaper Windrower	2000
20.	Sanjay Waman Pawar	Dr. S. B. Ghadge	Development of Control Pannel Assembly For Tractor Mounted Sprayer	2001
21.	Mahesh Mhalu Pacharne	Prof. L. V. Gharte	Design and Development of a Constant Flow Valve for Agricultural Type Knapsack Sprayer	2001
22.	Shrikant Kallappa Patil	Prof. L. V. Gharte	Testing of constant flow valve for Agricultural type Knapsack Sprayer (LOK) with different types of nozzle	2002

23.	Manohar Raghunath Chavan	Dr. S. B. Ghadge	Design and Development of Unloader Valve for Power Operated Sprayer	2002
24.	Manohar Raghunath Chavan	Dr. S. B. Ghadge	Design and Development of Unloader Valve for Power Operated Sprayer	2002
25.	Dilip Anandrao Dhobale	Prof. L. V. Gharate	Utilization Pattern of Farm Tractors in District Ahmednagar Maharashtra	2003
26.	Dighe Vijay Dnyandeo	Dr. S. B. Ghadge	Development and Performance Evaluation of Manually operated Improved Wheel Hoe	2003
27.	Vijay Purushottam Tapare	Prof. L. V. Gharate	Development and Performance Evaluation of Tractor Mounted Turmeric Digger	2005
28.	Kiran Sarjerao More	Dr. S. B. Ghadge	Development and Testing of Power Tiller Operated Earthing Up Cum Fertilizer Applicator in Wide Row Sugarcane Crop	2005
29.	Jabbar Najiroddin Shaikh	Prof. L. V. Gharate	Studies on Effect of Tillage Practices on Quality and Protection of Kharif Potato in Pune District	2005
30.	Rupchand Bapuna Wase	Dr. D. T. Pacharne	Survey and Testing of Selected Tractor Operated Aeroblast Sprayer for Grape Vineyard	2006
31.	Sandip Yadavrao Pachpute	Prof. V. M. Kadu	Development of Low HP Tractor Drawn Sugarcane Earthing Up Cum Fertilizer Applicator Suitable For Wide Row Sugarcane Crop	2006
32.	Shanta Kumar T	Dr. P. U. Shahare	Development and Performance Evaluation of Air Sleeve Boom Attachment to Aspee Bolo Motorized Knapsack Sprayer for Vegetable Crops - Brinjele	2007
33.	Bhingardive A. P	Prof. S. V. Rane	Development and Performance Evaluation of Rotary Nozzle For Tractor Mounted Sprayer for Mango Orchard	2007
34.	Popat Ganpatrao Gardi	Prof. A. B. Lende	Development and Evaluation of Pedal Operated Rotary Type Groundnut Decorticator Cum Cleaner	2008
35.	Pravin Bhaskar Kadam	Prof. L. V. Gharate	Development and Performance Evaluation of Power Tiller Drawn Equipment for Planting and Interculturing operations for field crops	2008

36.	SantoshKumar Ashok Nawale	Prof. L. V. Gharate	Development And Testing Of Bullock Drawn Implent For Interculturing Operations In Sugarcane Crop	2009
37.	Patil Abhijeet Mahadev	Prof. V. D. Deshmukh	Development and Performance Evaluation of Bullock Drawn Light Weight, Multipurpose Seed- Cum-Fertilizer Drill	2009
38.	Hase Sunil Annadrao	Prof. S. V. Rane	Development and Performance Evaluation of Multi-Crop Planter For Low Hp Tractor (18.5 Hp)	2009
39.	Vishal Ramdas Wagh	Dr. S. B. Ghadge	Design and Development of Tractor Operated Irrigation System	2009
40.	Hase Sunil Annadrao	Prof. S. V. Rane	Development and Performance Evaluation of Multi-Crop Planter For Low Hp Tractor (18.5 Hp)	2009
41.	Dhakne Amit Dinkar	Dr. P. A. Turbatmath	Development and Performance Evaluation of Tractor Operated Combination Tillage Implement	2009
42.	Shewale Arun Deoba	Prof. L. V. Gharate	Development Of Planting Attachment Suitable For Nine Tyne Cultivator	2010
43.	Kale Kishor Manoharrao	Prof. A. B. Lende	Modification and Performance Evaluation of Pedal Operated Rotary Type Groundnut Decorticator- Cum-Cleaner	2010
44.	Shinde Pranjali Madhukar	Prof. S. V. Rane	Development Of Tractor Mounted Air Sleeve Sprayer For Pomegranate	2010
45.	Pawar Vishal Rajaram	Prof. V. D. Deshmukh	Development and Performance Evaluation of Tractor Drawn Multicrop Ridger-Planter	2010
46.	Dhok Ajitkumar Suresh	Dr. S. B. Ghadge	Development and Performance Evaluation of Bullock Drawn Planter With Low Cost Metering Device	2011
47.	Sanglikar Vasant Ramchandra	Prof. A. B. Lende	Development and Performance Evaluation of Pedal Operated Castor Decorticator	2011
48.	Nakate Shivprasad Madan	Prof. A. B. Lende	Development of Manually Operated Single Row Multicrop Planter	2011
49.	Biwal Vikram Dilip	Prof. V. D. Deshmukh	Development and Performance Evaluation of Tractor Operated Mechanical Shaker For Harvesting Acid Limit Fruits	2011
50.	S. S. Kolhe	Prof. S. V. Rane	Development and performance evaluation of tractor operated pneumatic planter for okra	2012

51.	A. H. Dhobale	Prof. P. A, Turbatmath	Development and field evaluation of tractor operated check basin former	2012
52.	G. B. Bhange	Prof. V. D. Deshmukh	Development and performance evaluation of power operated onion detopper	2012
53.	Miss. Borkar Kumudini Mohanlal	Prof. A. B. Lende	Development of manually operated onion seed planter.	2012
54.	R. V. Salunkhe	Prof. S. V. Rane	Development and performance evaluation of tractor operated (18.5 hp) semi-automatic onion bulb planter	2013
55.	H. T. Mahale	Prof. S. M. Nalawade	Development and performance evaluation of Manually operated wholes stalk sorghum uprooter	2013
56.	S. S. Godase	Prof. S. V. Rane	Development of hand operated medicinal nut sheller	2013
57.	D.H.Londhe	Prof. V. D. Deshmukh	Development and performance evaluation of feeding and grading mechanism for power operated onion detopper	2014
58.	L.B.Bhore	Prof. P.B.Kadam	Development and performance evaluation of Manual experimental plot seeder for chickpea	2014
59.	M.P.Kamble	Prof. T.B.Bastewad	Development and performance evaluation of power operated chaff cutter	2014
60.	A.B.Sawant	Dr. P. A, Turbatmath	Development and performance evaluation of tractor operated Tie-Ridger	2015
61.	R. A. Bangale	Dr. P. A, Turbatmath	Development and performance evaluation of power operated medicinal Nut sheller	2015
62.	M. B. Bagul	Dr. P. A, Turbatmath	Development of pedal operated sugarcane single eye bud sett cutter	2015
63.	Mr. omer Hassan sakin	Prof. V. D. Deshmukh	Development and performance evaluation of Low –Hp tractor operated suitable shaver cum-off barring implement with fertilizer metering for sugarcane crop	2015
64.	S. B. Gharge	Dr. P. A, Turbatmath	Ergonomic evaluation and modification existing manually operated sorghum uprooter	2015
65.	R. S. Rajput	Prof. V. D. Deshmukh	Development and performance evaluation of power operated sugarcane sett cutter	2016



**Ph. D (Farm Machinery and Power Engineering): Nil**

**Research Recommendations:**

**Sr. No. Name of the Implements Recommended**

- 1. Tractor Drawn Check Row Planter



- 2. Bullock Drawn Long Boom Sprayer



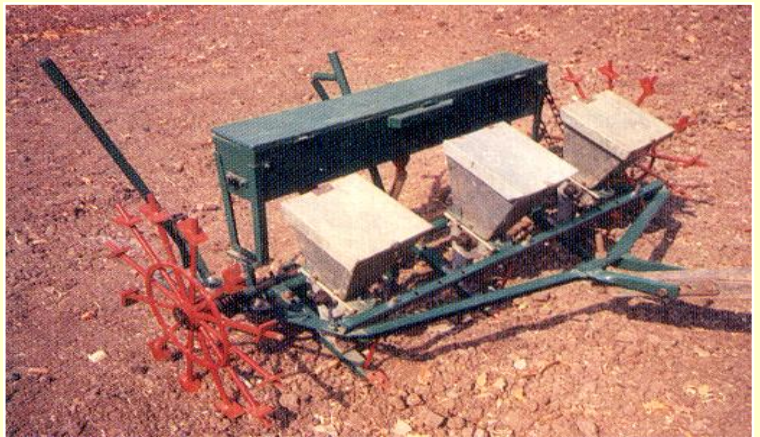
- 3. Power operated hold on paddy thresher



4. Power tiller drawn multicrop planter



5. Bullock drawn Jyoti multi-crop Planter for planting of gram  
Joint Agresco 1994 held at DrBSSKVV, Dapoli



6. Tractor drawn multi-crop planter for row spacing 22.5 cm to 45 cm  
Joint Agresco 1997 held at MKV, Parbhani.







7. Self propelled vertical conveyor reaper for harvesting paddy and wheat

Joint Agresco 1997 held at MKV, Parbhani.



8. Bullock drawn sugarcane interculturing and fertilizer applicator

Joint Agresco 1997 held at MKV, Parbhani.



9. Weeding attachment to sugarcane interculturing implement

Joint Agresco 1998 held at DrBSKKV, Dapoli



10. Sugarcane trash shredder for 90 cm row spacing

Joint Agresco 2005 held at MKV, Parbhani.



11. Tractor operated high capacity sunflower thresher

Joint Agresco 2006 held at DrBSKKV, Dapoli





12. Tractor operated Phule banana stem shredder
- Joint Agresco 2007 held at MPKV, Rahuri



13. Tractor operated onion transplanter
- Joint Agresco 2011 held at MPKV, Rahuri



14. Self propelled Lucerne harvester
- Joint Agresco 2011 held at MPKV, Rahuri



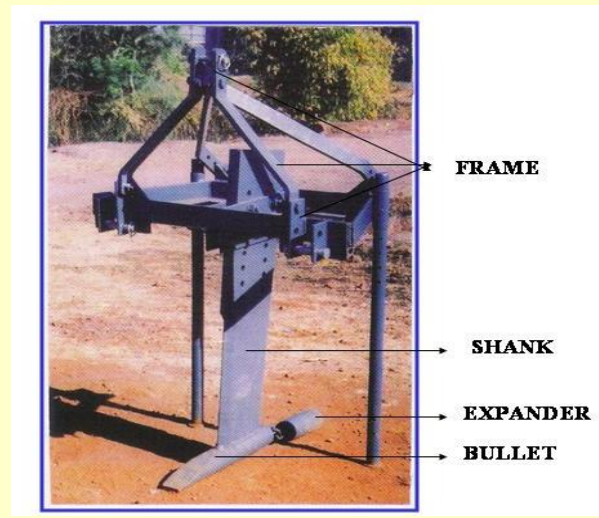
15. Tractor operated Phule multi-crop ridger planter

Joint Agresco 2012 held at PDKV, Akola



16. Tractor operated Phule mole plough

Joint Agresco 2012 held at PDKV, Akola



17. Bullock drawn Phule sheti yantra

Joint Agresco 2012 held at PDKV, Akola





18. Low hp tractor operated Phule sugarcane interculturing machine
- Joint Agresco 2012 held at PDKV, Akola



19. Bullock drawn Phule sugarcane interculturing implement
- Joint Agresco 2013 held at MKV, Parbhani



20. Low hp tractor operated Phule multi-crop planter
- Joint Agresco 2013 held at MKV, Parbhani



21. Power-tiller operated Phule multi-crop planter
- Joint Agresco 2013 held at MKV, Parbhani



22. Manually operated Phule sorghum up-rooter
- Joint Agresco 2014 held at DrBSKKV, Dapoli





23.

Manually  
operated  
Phule nut  
sheller

Joint Agresco  
2014 held at  
DrBSKKV,  
Dapoli



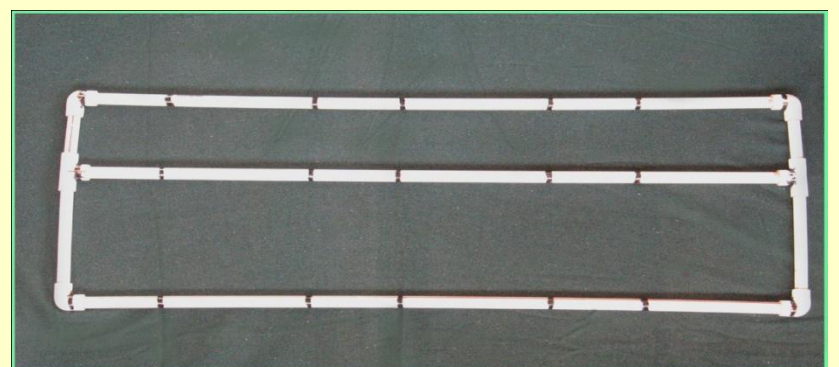
24. 1 H.P. Single  
phase power  
operated  
“Phule Chaff  
Cutter”

Joint Agresco  
2015 held at  
MPKV, Rahuri



25. “Phule PVC  
Bhat Lavani  
Choukat”  
(paddy  
transplanting  
marker) of  
size 1.20 m x  
0.40 m

Joint Agresco  
2015 held at  
MPKV, Rahuri



26. Tractor operated VSI Sugarcane Earthing-up Equipment

Joint Agresco 2015 held at MPKV, Rahuri



27. Tractor operated Phule check basin former

Joint Agresco 2016 held at PDKV





28. Electric motor operated Phule Nut sheller

Joint Agresco 2016 held at PDKV



29. Phule Drumstick harvester

Joint Agresco 2016 held at PDKV



30. Tractor operated Phule sugarcane transplanter

Joint Agresco 2017 held at MKV, Parbhani



31. Power operated Phule sugarcane sett cutter

Joint Agresco 2017 held at MKV, Parbhani



32. Tractor operated Phule inter row cum intra row weeder for orchards

Joint Agresco 2019 held at MPKV, Rahuri



## Extension Activities:

All India Coordinated Research Project on Farm Implements and Machinery, Dr. ASCAET, MPKV, Rahuri

## Research Publications:

1. Pathak S. V., N. A. Shirsath, A. V. Gajakos, S. M. Nalawade, K. D. Gharde. Development of an Electronic Information System on Farm Mechanization. BIOVED. 2007, vol. 18 (1-2)
2. Nalawade S. M., A. V. Gajakos and L. D. More, Performance Evaluation of Tie – Ridger Agriculture Update 2008 vol. 3 no. (1-2)
3. Gajakos A. V., S.M. Nalawade, V.V. Aware, S.B. Patil and B. B. Thakur. Development and Performance Evaluation of Coconut Dehusker. Agriculture Update 2008 vol. 3 no. (1-2)
4. Aware V.V., S.V. Aware, S.M. Nalawade, D.M. Mane and R.P. Patil. Development of Proximity Distance Sensor Based Electronic Metering Mechanism for Three Rows Planter Agriculture Update 2008 vol. 3 no. (3 – 4)
5. Nalawade S. M., P. A. Turbatmath and A.V. Gajakos. Development and Performance Evaluation of Tractor Operated Jowar Reaper Windrower. New Agriculturist 2009, vol. 20 (1-2)
6. A.B. Lende, R. V., Sangaliker, P. B. Kadam and S. M. Nalawade. Electronic Metering Mechanism for Bullock Drawn Planter. Green Farming. 2011, Vol 2, No.6
7. A. B. Lende, R. V., Sangaliker, P. B. Kadam and S. M. Nalawade. Performance Evaluation of Improved Tractor Drawn Weeder Green Farming . 2011, Vol 2 (5): 596-597
8. Kad V.P., H.G. More, S.M. Nalawade and V.L. Kanawade. Effect of moisture content on engineering properties of custard apple (*Annona squamosa* L.) seeds. Green Farming 2015. Vol 6, (6): 1385-1387
9. Nalawade S.M., V.P. Kad and A.V. Gajakos. Development of okra cutter holder. Journal of Krishi Vigyan. 2017. 6 (1): 54-57.
10. Nalawade S.M., A.K. Mehta, S.M. Mathur, A.K. Shrama and G.S. Tiwari. Physical properties of sugarcane and comparison of frictional properties of one and two budded setts. Green Farming . 2017. Vol 8, (4): 952-956.
11. S. M. Nalawade, A. K. Mehta, Nikhil Sane and Nikhil Joshi. Faster sugarcane planter machine for shorter planting period under climate change. Journal of Agricultural Research and Technology 2017 42 (3): 15-22
12. R. V. Sanglikar, M. M. Pacharne, S. M. Nalawade, P. B. Kadam, A.B. Lende and P. A. Turbatmath. Development and performance evaluation of pedal operated castor decorticator. Contemporary Research in India. December, 2017. Vol. 7: Issue: 4: 73-78
13. Shaikh S.M., Bastewad T.B., Sangaliker, R. V., Deshmukh, V.D., S. M. Nalawade and Pawar D.D. Performance evaluation of tractor operated onion bulb planter Contemporary Research in India January, 2018. Special Issue: 64-66
14. N.M. More, T.B. Bastewad, R.V. Sangaliker, S. M. Nalawade, V.D. Deshmukh, P.B. Kadam and D.D. Pawar. Performance evaluation of power operated detopper and grader machine for harvested onion crop Contemporary Research in India. January, 2018. Special Issue: 95-97
15. Nalawade S.M., A.K. Mehta and A.K. Sharma. Sugarcane planting techniques: a review. Contemporary Research in India. January, 2018. Special Issue: 98-104



16. Nalawade S.M., V.P. Kad and A.V. Gajakos. Development of manually operated areca-nut dehusker. *Multilogic in Science*. Jan, 2018, vol: VII, issue: XXV, 346-348
17. Nalawade, S M and V P Kad. Study on the Comparative Evaluation of Cashew Nut Shellers. *Journal of Krishi Vigyan*. Jan-June 2018, 6(2) 226-228
18. G B Yenge, V P Kad and S M Nalawade. Physical Properties of Maize (*Zea mays* L.) Grain. *Journal of Krishi Vigyan*. 2018, 7 (Special Issue) : 125-128
19. V P Kad, G B Yenge and S M Nalawade. Rheological Properties of Custard Apple Pulp-Flakes. *Journal of Krishi Vigyan*. 2018,7 (Special Issue): 135-138
20. A. Walunj, A. Sathyabhama, Bubble Dynamics and Enhanced Heat Transfer During High-Pressure Pool Boiling on Rough Surface, 33, 2018, 1-13. [SCI Indexed]
21. A. Walunj, A. Sathyabhama, Transient CHF enhancement in High Pressure Pool Boiling on Rough Surface, *Chem. Engg. Processing*, 127, 2018, 145-158. [SCI Indexed]
22. A. Walunj, A. Sathyabhama, Comparative study of pool boiling heat transfer from various microchannel geometry, *Applied Thermal Engineering*, 128, 2018, 672-683. [SCI Indexed]
23. A. Walunj, A. Sathyabhama, Dynamic Pool Boiling Heat Transfer Due To Exponentially Increasing Heat Input-A Review, *Procedia Technology*, 25, 2016, 1137-1145. [ISSN: 2212-0173]
24. A. K. Hussein, A. Walunj, Applications of Nanotechnology to Enhance the Performance of the Direct Absorption Solar Collectors, *J. of Thermal Engineering*, 6(1), 2016, 355-366.
25. A. Walunj, A. Sathyabhama, Influence of Surface Roughness on Pool Boiling Heat Transfer, *Materials Science and Engineering*, 402, 2018, 1-11.[Scopus Indexed]
26. A. Walunj, A. K. Hussein, Heat Transfer Enhancement in Heat Pipe Using Nanofluid – A Review, *Int. J. on Theo. Appl. Research in Mech. Engg.*, 4(1), 2015, 65-70. [ISSN: 2319-3182]
27. A. N. S. Jagtap, F. Z. Pathan, A. A. Walunj, L. B. Mulla, Experimental and FEA Approach for Optimization of Spiral Flexure Bearing, *Int. J. Modern Trends in Engg Research*, 2(7) 2015, 1723-1728. [ISSN: 2349-9745]
28. A. V. Daund, A. Walunj, D. Palande, Review of Natural Convective Heat Transfer From Rectangular Vertical Plate Fins, *Int. J. of Advanced Technology in Engineering and Science*, 7(2), 2015, 294-304. [ISSN: 2348-7550]
29. A. Walunj, D. Palande, Experimental Analysis of Inclined Narrow Plate-Fins Heat Sink under Natural Convection, *Int. J. of Mechanical Engineering*, 6(2), 2014, 8-14. [ISSN: 2321-6441]
30. Walunj, V. Daund, D. Palande, Review of Performance of Rectangular Fins under Natural Convection at Different Orientation of Heat Sink, *Int. J. of Innovation and Applied Studies*, 6(2), 2014, 232-238. [ISSN: 2028-9324]

31. A. Walunj, V. Daund, D. Palande, Parametric study of natural convection heat transfer from plate-fin heat sink, Int. J. of Research in Advent Tech., 4(1), 2013, 80-89. [ISSN: 2321-9637]

**Books:**

1. Question Bank for Agricultural Engineering, Published By M/s. Jain Brothers, New Delhi.
2. Tractor: Friend of Farmer, Krishi GranthBhandarPrakashan, Pune
3. Farm Machinery and Power, Aditi Prakashan, Kolhapur

**Book Chapters: Nil**

**Farmers-Scientist Club on Protected Cultivation:**

**Ad-hoc Projects (completed):**

S. No	Title	Sponsoring Agency	Period		Amount	Achievement
01	Centre for Advance Agriculture Science and Technology on Climate Smart Agriculture and Water Management (CSAWM)	World Bank through ICAR	2018	2021	199.90 lakh	PG diploma in (CSAWM), development of precision farm machinery and automation in agriculture

**Ad-hoc Projects (Ongoing): Nil**

**Faculty:**

Sr. No.	Name	Designation
1.	Dr. Sachin Madhukar Nalawade	Professor & Head
2.	Prof. Pravin Bhaskar Kadam	Assistant Professor
3.	Dr. Avdhoot Ashok Walunj	Assistant Professor

\*\*\*