
















Directorate of Research
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 (Research Recommendations released during the year 2018-2019)

Research Recommendations approved by Joint Agresco-2019

The details of research recommendations of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola viz. developed crop varieties, farm implements and crop production technologies approved in 47th meeting of Joint Agricultural Research and Development Committee (Joint Agresco-2019) held at Mahatma Phule Krishi Vidyapeeth, Rahuri Dist: Ahmednagar during 29th to 31st May, 2019 are given below

A) Released crop varieties				
Sr. No	Crop	Variety	Salient features	
1	Cotton	Suvarna Shubhra (AKH-09-5)	<ul style="list-style-type: none"> • Average seed cotton yield (Rainfed) - 1300-1600 kg/ha • Maturity duration - 150-160 days • Boll weight – 3.7– 4.0 g. • Staple Length (UHML)- 28-30 mm • Ginning Out turn- 35-36 % • Tolerant to Jassids, <i>Myrothecium</i> leaf spot, grey mildew, and Bacterial Leaf Blight diseases 	
2	Mustard	TAM-108-1	<ul style="list-style-type: none"> • Yield - 09 q/ha • Oil content : 40 percent • Duration – 101 days • 1000 seed weight: 5 gms • Resistant to aphids 	
B) Released farm implements / Machinery				
Sr. No	Name	Particulars	Salient features	
1	PDKV ajwain and fennel seed extractor	PDKV Ajwain and Fennel seed extractor is recommended for extraction of ajwain and fennel seed	<ul style="list-style-type: none"> • The capacity of Ajwain and Fennel seed extraction is 170 Kg/h. • The machine is operated on 2 horse power motor. • Two unskilled labors are required for operation of machine. • The machine is easily movable from one place to another. • The developed machine having higher capacity than traditional method and seed extraction is economical. 	

2	PDKV loading/unloading device for onions	The PDKV loading/unloading device with sorting table along with small inclined belt conveyor and tractor trolley attachment is recommended for loading/unloading of onions into/from onion storage structure	<ul style="list-style-type: none"> •The capacity of the machine for loading/unloading of onions from onion storage structure is 20 tons per day. •Loading and unloading machine is operated on 2 Hp motor •Four unskilled labors are required for operation of machine •The machine is easily movable from one place to another. <p>The developed machine having higher capacity than traditional method and seed extraction is economical.</p>	 
3	PDKV Solar Biomass Hybrid Dryer	It is recommended to use PDKV solar biomass hybrid dryer for continues drying of chilli	<ul style="list-style-type: none"> •Capacity of dryer : 30Kg/batch •Thermal Efficiency of dryer : 19.35 % •Dryer is easy to handle •Dryer is easy to transport •Drying capacity is better than traditional drying and also less expensive 	
4	PDKV solar powered refrigerator	It is recommended to use PDKV solar powered refrigerator at 2 to 8 °C and to conserve energy	<ul style="list-style-type: none"> •Refrigerator Capacity: 60 lit •Solar powered refrigerator uses nano-refrigerant technology and efficiency of refrigeration is 15 %. •Suitable for domestic use and vaccine storage •Refrigerator is operated on solar energy •Solar powered refrigerator is easy to handle and transport 	
5	PDKV solar cabinet dryer	It is recommended to use PDKV solar cabinet dryer with phase change material for drying of vegetables and medicinal plants	<ul style="list-style-type: none"> •Capacity of dryer: 20Kg/batch •Thermal efficiency of dryer in winter and summer is 46.58 % and 69 % respectively. •This dryer is operated on solar energy. •Dryer is easy to handle and transport •Dryer capacity is more and cost of operation is less as compared to traditional drying. 	 

6	PDKV tractor operated garlic planter	PDKV garlic planter (tractor operated) is recommended for planting of garlic	<ul style="list-style-type: none"> The average field capacity of PDKV developed tractor operated garlic planter is 0.40 ha/h. A tractor mounted, 10 row, raised bed precision planter was found suitable for planting graded garlic cloves on a raised bed. Seed rate of garlic planter is 676 kg per ha. Germination percentage of garlic of planter is 78.16 %. The overall saving cost for planting of garlic by using developed garlic planter over conventional method is 78.12%. 	
7	PDKV Small tractor operated stubble collector	Small Tractor operated folding type stubble collector is recommended for collection of stubble	<ul style="list-style-type: none"> Stubble collector is small tractor operated. Average field capacity of stubble collector is 0.30 ha/h. Average stubble collection efficiency of machine is 81.47, 82.12 and 83.73 % in sorghum, mustard and red gram, respectively. The cost of operation for the collection of stubble by using developed stubble collector is Rs. 856 per ha. 	
8	PDKV Manual okra seed dibbler	PDKV Manual okra seed dibbler is recommended for more efficient dibbling of okra seeds	<ul style="list-style-type: none"> The seed rate of okra seed dibbler is 6 kg per ha. Uniform seed to seed placement is possible. The cost of planting of okra seed is Rs.250 per ha by using the dibbler. This dibbler has more effective field capacity and reduced drudgery as compared to manual dibbling. 	
9	PDKV Ground nut decorticator (Power operated)	PDKV Ground nut decorticator (Power operated) is recommended for Ground nut decortications	<ul style="list-style-type: none"> Decorticating efficiency is 89.92 to 93.89 % Seed output capacity is 94 to 98 % The average seed damage percentage is 2.37, 5.10 and 7.59 in AK-303, TAG-73 and TAG 24 variety respectively. Damaged seed, block seed and blown seed is negligible. Seed germination percentage is 96 to 97 % Suitable for small farmers and small entrepreneurs 	

Production Technologies

Field Crops

1. Seed treatment with liquid Azospirillum @ 2 ml /kg seed along with RDF is recommended in Kharif Sorghum for obtaining higher grain yield, fodder yield and monetary return.
2. Application of 5 t FYM per ha along with 75% RDF and ZnSO₄ @ 25 kg/ha is recommended for obtaining high green Hurda yield and monetary return from Hurda Sorghum.
3. Under dryland condition, for higher productivity and monetary returns, intercropping of vegetables in Hirsutum Cotton + Cowpea or Clusterbean sown at 45 cm in 1:1 row proportion and application of 75:37.5:37.5 NPK kg/ha is recommended.
4. It is recommended to use 2.5 t/ha vermicompost for increase in yield, monetary returns and sustainable soil fertility of organic Chickpea production system.
5. It is recommended to use 2.5 t/ha vermicompost for higher yield, monetary returns and sustainable soil fertility of organic Soybean production system.
6. For increasing the production, monetary return and nutrient use efficiency in pigeonpea, it is recommended to apply 125 percent N (31.25 kg ha⁻¹), 100 percent P (50 kg ha⁻¹ through phosphoric acid) and 100 percent K (30 kg ha⁻¹) in five splits (as per table below) through drip irrigation

Quantity of fertilizer	Days After Sowing
10 % NPK	Basal
20 % NPK	40 DAS
20 % NPK	60 DAS
25 % NPK	80 DAS
25 % NPK	100 DAS

7. It is recommended that the pre emergence application of atrazine (0.50 kg a.i./ha) @ 1 kg/ha followed by post emergence application of tembotrione (0.120 Kg a.i./ha) @ 285 g/ha at 20DAS are the most remunerative and effective herbicides for controlling weed flora and getting higher yield and economic returns in Maize.
8. It is recommended that the post emergence application of Clodinafop Propargyl + Metsulfuron Methyl @ 0.06 + 0.004 kg a.i. /ha (400 g/ha) or Sulfosulfuron + Metsulfuron Methyl @ 0.03 + 0.002 Kg a.i./ha (40 g/ha) at 35 DAS were the most remunerative and effective herbicides for controlling the weed flora and getting higher yield and economic returns in wheat.
9. For getting higher grain yield and net monetary returns from greengram, blackgram, chickpea and redgram pulse crops, foliar application of gibberellic acid at flowering and pod development stages is recommended as follows:

Sr. No.	Crop	Dose of gibberellic acid (90% a.i.)
01	Greengram	15ppm (8.3g GA ₃ (90% a.i.)/ ha in 500 liters of water)
02	Blackgram	15ppm (8.3g GA ₃ (90% a.i.)/ ha in 500 liters of water)
03	Chickpea	15ppm (8.3g GA ₃ (90% a.i.)/ ha in 500 liters of water)
04	Pigeonpea	25ppm (13.9g GA ₃ (90% a.i.)/ ha in 500 liters of water)

10. Foliar application of 15 ppm GA₃ [8.3 g GA₃ (90% a.i.) / ha in 500 liters of water]] at flowering and pod development stages of soybean crop for getting higher grain yield and net monetary returns is recommended.

11. Foliar application of 25 ppm GA3 [13.9 g GA3 (90% a.i.) / ha in 500 liters of water]] at square initiation and boll development stages of hybrid Bt cotton crop for getting higher yield and net monetary returns is recommended.
12. It is recommended that, spraying of Thidiazuron @ 250 ml per ha at 150-155 days after sowing (10 days before picking) on American cotton hybrids is effective for defoliation (96.63%) of cotton leaves for mechanical picking

Soil Science and Agril. Chemistry

13. In boron deficient Inceptisols, for obtaining higher onion seed yield and higher monetary returns, recommended dose of fertilizer (100:50:50 N, P₂O₅ & K₂O) along with foliar application of borax @ 0.2% at buttoning stage is recommended.
14. For obtaining higher yield and monetary returns of Ajwain crop in Inceptisols, application of 80:40:40 N, P, K kg ha⁻¹ (50 % N and 100% P and K at the time of sowing + 50 % N 40 DAS) is recommended.
15. For obtaining higher seed yield, oil content, protein content, monetary returns of Safflower as well as improving fertility status in sulphur deficient deep black soil, application of 20 kg K₂O ha⁻¹ in combination of 20 kg S ha⁻¹ along with RDF, 40 kg N and 25 kg P₂O₅ ha⁻¹ is recommended.

Horticulture

16. For commercial propagation of wood apple, softwood grafting on one year old rootstock during first forth night of November is recommended.
17. For commercial propagation of guava by air layering, IBA 5000 ppm concentration during the month of July to September is recommended.
18. For successful and profitable propagation of pomegranate through air laying, four layers per branch at 15-20 cm distance in month of August is recommended.
19. For production of healthy and quality seedling of acid lime, raise bed of 7.5 x 1.0 x 0.45 m dimension containing solarised soil: sand :FYM in 2:1:1 ratio under 50% shednet is recommended.
20. Application of fertilizer dose of 150 kg Nitrogen, 50 kg Phosphorus and 50 kg Potassium per hectare is recommended for the higher and better quality seed yield of onion and higher monetary returns.
21. For getting early, higher, economical with better quality yield in summer okra, application of chemical fertilizer @ 50 kg N + 25 kg P₂O₅ + 25 kg K₂O ha⁻¹ with vermicompost 2.0 t ha⁻¹ + 0.5 t Neem cake ha⁻¹ alongwith seed treatment of 25 g kg⁻¹ seed each of Azatobactor and PSB with soil application of 10 kg VAM ha⁻¹ is recommended.
22. Application of recommended dose of fertilizer for tuberose (200: 300 :200 kg / ha) in four split of Nitrogen (50 kg/ha each) at the time of planting, 45, 90 and 135 days after planting and phosphorus and potash(150 kg/ha and 100 kg/ha each respectively) applied at the time of planting and 45 days after planting is recommended for obtaining vigorous growth and higher yield of flower spike and bulb yield of tuberose.
23. Hardwood cuttings of Ficus benjamina L. treated with IBA @1000 ppm is recommended for commercial propagation
24. Sowing of Ashwagandha in the first week of September is recommended for maximum dry root yield and economic returns

Crop Protection

25. Spraying of Ethion 50% EC @ 20 ml in 10 L of water at 50 per cent flowering of Chickpea followed by second spraying of Chlorantraniliprole (18.5 SC) 2.5 ml in 10 L of

water after 15 days is recommended for effective management of pod borer and higher yield of Chickpea

26. For effective management of Chickpea pod borer and getting more yield with increased net return following plant protection module is recommended
 1. Erection of bird purchers on chickpea field @ 15 / ha after 30 days of crop sowing
 2. Spraying of HaNPV @ 500 LE/ ha (10 ml in 10 L of water) first at bud initiation stage of the crop and second after 10 days
 3. After 10 days of second application of HaNPV undertake spraying of *Azadirachtin* 300 ppm @ 50 ml in 10 L of water
27. For management of Urdbean spraying of Monocrotophos 36 SL @ 12.5 ml in 10 L of water at bud initiation stage followed by spraying of Chlorantraniliprole (18.5 SC) 2.5 ml in 10 L of water after 15 days is recommended

Farm Implements

28. PDKV developed seed plate is recommended to use in inclined plate planter for planting Sesame.

Social Science

A) Extension Education

29. CROPSAP had average impact of 21.95 per cent in terms of increase in knowledge (19.07%), adoption (13.93%), productivity (29.94%) and income (24.88%) of the Soybean growers. It is therefore, recommended that, Crop Pest Surveillance and Advisory Project should be implemented for longer period of time for the farmers.

B) Agricultural Economics

30. The per hectare post harvest losses in tomato and brinjal were observed 16.49 q. and 13.29 q. respectively. Therefore, to avoid the post harvest losses, it is recommended that, Government should provide storage and quick transportation facilities and also aware farmers about post harvest technology through training so as to increase the monetary benefit of the farmers.
31. The lac production on Palash tree is economically profitable venture (B: C ratio 1: 2.27) as a subsidiary income of the farmers, therefore, it is recommended that, the Government and Agricultural Universities should promote the lac cultivation by scientific method and cultivation technology of lac cultivation on farmers fields as well as fallow land of the state which will help to enhancing the supplementary income (doubling) of the farmers
