

Research Recommendations released during 2014 - 2015

(Approved by Joint Agresco - 2015)

Crop Improvement

Sr. No.	Crop	Variety Hybrid	Important Features
A) Varieties / Hybrids released			
1	Wheat	AKAW-4210-6	<p>Salient Fetures</p> <ol style="list-style-type: none"> 1. Suitable for cultivation under IR-LS conditions in Maharashtra State 2. Early Maturity & hence wider adaptability to sowing time 3. Good yield potential (40-42 qt/ha) under IR-LS 4. Non-lodging and easy threshing ability 5. Rust resistant 6. High Iron, Zinc and Manganese content 7. Good chapatti and bread making quality
2	Udid	AKU 10-1	<p>Salient Features of genotypes are as under</p> <ol style="list-style-type: none"> 1) In Vidarbha region it was found to be superior by 18.34%, 22.81%, 18.14% and 31.87% over the existing checks i.e. TAU-1, AKU-15, TPU-4 and BDU-1 respectively. 1) In Maharashtra it was found to be superior by 16.25%, 18.08%, 13.29% and 25.54% over the existing checks TAU-1, AKU-15, TPU-4 and BDU-1 respectively. 2) Medium bold grain (4.5 g per 100 seed). 3) Early and synchronous maturity (71 days). 4) Resistant to <i>Macrophomina</i> blight and moderately resistant to powdery mildew. 5) Identified as a multiple disease resistant source for Stem necrosis, Anthracnose and Root rot in AICRP programme. 6) Suitable for kharif planting in Maharashtra

New Farm Implement/ Machinery

Sr. No.	Name of farm implement/ Machinery	Important Features
1	PDKV green pod shelling machine	<p>I It is recommended to use PDKV green pod shelling machine (Capacity 25 kg/h) for green pigeon pea shelling. PDKV green pod shelling machine is recommended for green pea shelling (Capacity 36 kg/h) by fixing stainless steel corrugated sheet on rubber roller and by chaging the sieves</p> <ol style="list-style-type: none"> 1.Capacity of the machine is 25 kg/ha for green pigeon pea pod shelling and 36 Kg/ha for green pigeon pea pod shelling 2. It can be operated by 1 hp single phase electric motor 3. Shelling efficiency of the machine is 70 % for green pigeon pea pod shelling and 77 % for green pea pod shelling
2	PDKV Turmeric slicing machine	<p>It is recommended to use PDKV turmeric slicer having capacity 380 kg/h for turmeric slicing.</p> <ol style="list-style-type: none"> 1. Capacity of the machine is 350-400 Kg/h 2. It can be operated by 1 hp single phase electric motor 3. Slice thickness as per requirement can be obtained
3	PDKV de-seeding Machine for custard apple pulp	<p>Modified PDKV de-seeding machine is recommended for de-seeding of custard apple pulp for more pulp extraction efficiency and flakes recovery.</p> <ol style="list-style-type: none"> 1. Capacity of the machine is 50 kg/h 2. It can be operated by 0.5 hp single phase electric motor 3. Easy to operate 4. Pulp extraction efficiency is 93 % 5. Pulp contain 75 % flakes

Production technology

Field Crop

- 1) To restrict the excessive vegetative growth and for getting higher monetary returns, application of plant growth retardant Chlormequat Chloride @ 1000 ppm (2ml/L of water) at 40 DAS is recommended for soybean.
- 2) Under irrigated condition sowing of Desi chickpea (Vijay and Jaki-9218) up to 15 November is recommended
- 3) In Cotton-Onion crop sequence for increasing the system productivity, economic returns and nutrient use efficiency, it is recommended to apply 100 per cent N and K in five splits through drip (at given in the following table) and P as basal through soil application.
- 4) To check the luxurious vegetative growth of both the crop and to obtained hig higher yield and monetary returns the application of cycocel growth retardent (2 ml/litre water) @ 1000 ppm CCC the stage of flower bud initiation in Soybean + Pigeonpea intercropping is recommended.
- 5) Two foliar spray of salicylic acid @1.50mM at 75 and 105 DAS after sowing under rainfed condition of Maharashtra may be given for maximization of cotton yield

. Soil Science and Agricultural Chemistry

- 6) Application of 50 per cent recommended dose of phosphorus (37.5 kg ha^{-1}) through phosphocompost (2 ton/ha) and remaining dose through inorganic fertilizers is recommended for getting higher soybean productivity and improving soil quality.
- 7) In Vertisols, for getting higher cotton productivity, boll weight, fibre quality and monetary returns, application of two foliar sprays of Sulphate of Potash @ 1.5 % (15 g SOP/L) at flowering and boll development stage is recommended alongwith recommended dose of fertilizers.
- 8) For obtaining higher yield and monetary returns of pearl millet in Inceptisols, the application of 30 kg K_2O along with RDF (5 ton FYM, 60:30:00 kg NPK ha^{-1}) is recommended.
- 9) Sulphur deficient soils, for obtaining higher onion bulb yield and monetary returns, nutrient use efficiency and improving soil fertility, soil application of sulphur @ 45 kg ha^{-1} through gypsum or sulphur @ 30 kg ha^{-1} through bentonite-S along with recommended dose (10 ton FYM , 100:50:50 kg ha^{-1} N, P_2O_5 and K_2O) is recommended

Plant Protection

Entomology

- 10) For the management of gram pod borer on chickpea and getting higher monetary returns, spraying of Lambda cyhalothrin 5 % EC (@1.25 ml/litre of water) or Ethion 50 % EC (@ 2 ml/litre of water) at ETL (2 Larvae/mrl) followed by second spraying after 15 days is recommended.
- 11) For the ecofriendly management of insect pest of rice viz. stem borer, leaf folder, army worm, green leaf hopper, brown plant hopper & white backed plant hopper and for getting higher B:C ratio, ecofriendly IPM module as given below is proposed
 - Seed treatment – 3 % salt treatment.
 - Paddy seedling roots dip in Chloropyrifos 20 EC solution @10 ml in 10 liters of water upto 12 hrs before transplanting for management of Gallmidge and Stem borer.
 - Application of Garadi (*Cleistanthus collinus*) leaves @ 1.5 ton / ha at the time of puddling for management of Gall midge, Stem borer and Hopper
 - Collect eggs masses of Stem borer & put it in bamboo basket for parasitoids emergence.
 - Destruction of wild rice plants adjacent to field.
 - Rope drag over the crop if case worm, leaf folder& army worm infestation is seen.
 - Collection and destruction of Stem borer infested dead heart, White Ear head and Gallmidge infested silver shoots.
 - Withdrawn of water for 3-4 days if case worm and hopper infestation is seen.
 - Filling up of water if Army worm infestation is seen.
 - Four Release *Trichogramma japonicum* @ 50,000 eggs /ha at weekly interval for stem borer management.
 - Use of *Metarrhizium anisoplea* @ 2.5 kg/ha at the initiation of Brown plant hopper, after withdrawn of water from paddy bundhies.
- 12) For effective management of leaf folder, GLH, BPH & WBPH and for higher economic returns on paddy after attaining ETL of any aforesaid pest, spraying of Triazophos 40% EC @ 20 ml/10 L of water or Thiomethaxam 25 WG @ 2 g/10 L of water and second spraying at 15 days interval is recommended

Plant Pathology

- 13) Before sowing of pigeonpea, seed treatment of dual inoculation of Rhizobium PKVPR-101 (25 g/kg seed) and PSB-3 (20 g/kg seed) as biofertilizers is recommended for enhancing the yield.

Horticulture

- 14) Drip irrigation at 80% evapotrans-replenishment for all the six stages is recommended for higher fruit yield , quality and water saving in Nagpur mandarin under Central and Western Vidarbha conditions .

- 15) Drip irrigation at 80% evapotrans-replenishment for all the six stages is recommended for higher fruit yield, quality and water saving in acid lime under Central and Western Vidarbha conditions.
- 16) Irrigation at 90% evapotrans-replenishment and 80% RDF through fertigation is recommended for higher and quality fruit production of hasta bahar in acid lime with saving in water and fertilizers, under Central and Western Vidarbha conditions.
- 17) For high density guava orchard planting at 3 x 2 m spacing (1666 plants ha-1) are recommended for obtaining maximum fruit yield and higher monetary returns.
- 18) Pineapple variety "Mauritious" is recommended for obtaining higher yield and quality in eastern vidarbha zone.
- 19) Sweet potato variety Kamal Sundar is recommended for obtaining higher yield and better quality tuber under eastern vidarbha zone.
- 20) The fenugreek variety CO-2, is recommended for earliness , more fresh green leaf yield and economic returns.
- 21) Pre emergence application of Oxyfluorfen 23.5 EC @ 0.100 kg a.i./ha (10 ml/10 L of water) followed by the fenoxaprop-p-ethyl 9.3 EC @ 0.100 kg a.i./ha(20 ml/10 L of water) at 30 DAS is recommended to control weeds and to obtain higher yield in garlic bulbs.

Medicinal Plant & Foretry

- 22) The Kalmegh or Safed musli + Pigeon pea intercropping at 3:1 row proportion is recommended for obtaining higher yield and monetary returns.
- 23) For the vegetative propagation of *B. polymorpha* (Narangi) and *D. stocksi* (Chivar-mesh) bamboo, two nodes culm cuttings should be treated with 2500 ppm IBA solution .

Soil Water Consevation

- 24) Sewage water treated by Phytorid Wetland Engineering Technology is recommended to use for irrigation to Maize and Cotton crop.
- 25) For the satisfactory growth of dry land tree species (Karanj, Sitaphal, and Bel) and higher moisture conservation in medium deep soil up to 1.5 to 2.00percent slope the half moon basin 45 cm. away from the plant at down stream with 20 cm. width and height are recommended up to three years after plantation.

- 26) For the prediction of Erosion index for 30 minute duration of rainfall intensity for Akola district the following equation is recommended

For 30 min. intensity duration

$$y = -0.0007 X^4 + 0.0151 x^3 + 0.0876 x^2 + 3.1352$$

$$x + 0.2019$$

(y = EI and x = PI)

- 27) It is recommended to use mean weekly reference evapotranspiration given in following table for determining water requirement of different crops at Akola and Nagpur districts of Vidarbha.

SMW	Dates	Reference Evapotranspiration (ET _o), mm/day		SMW	Dates	Reference Evapotranspiration (ET _o), mm/day	
		Akola	Nagpur			Akola	Nagpur
1	1-7 Jan	3.0	3.0	27	2-8	5.2	4.4
2	8-14	3.1	3.0	28	9-15	4.7	3.9
3	15-21	3.4	3.3	29	16-22	4.3	3.8
4	22-28	3.5	3.5	30	23-29	4.0	3.6
5	29-4 Feb	3.7	3.7	31	30-5 Aug	3.9	3.5
6	5-11	4.0	4.0	32	6-12	3.7	3.4
7	12-18	4.4	4.4	33	13-19	4.0	3.5
8	19-25	4.7	4.7	34	20-26	3.9	3.7
9	26-4 Mar	5.2	5.1	35	27-2 Sep	4.0	3.6
10	5-11	5.4	5.4	36	3-9	4.3	3.9
11	12-18	5.7	5.5	37	10-16	4.5	4.0
12	19-25	6.2	6.0	38	17-23	4.4	4.2
13	26-1 Apr	6.5	6.4	39	24-30	4.4	4.4
14	2-8	6.9	6.5	40	1-7 Oct	4.3	4.3
15	9-15	7.4	6.8	41	8-14	4.1	4.3
16	16-22	8.0	7.4	42	15-21	3.9	4.2

17	23-29	8.2	7.4	43	22-28	3.8	4.1
18	30- 6 May	8.8	7.9	44	29-4 Nov	3.8	3.9
19	7-13	9.4	8.2	45	5-11	3.5	3.8
20	14-20	10.0	8.2	46	12-18	3.3	3.5
21	21-27	10.2	8.6	47	19-25	3.2	3.4
22	28-3 Jun	9.9	8.3	48	26-2 Dec	3.1	3.2
23	4-10	8.8	7.5	49	3-9	3.0	3.1
24	11-17	7.2	6.2	50	10-16	2.9	3.0
25	18-24	6.3	5.3	51	17-23	2.9	2.9
26	25-1 Jul	5.6	4.5	52	24-31	2.9	3.0

Agri Engineering

- 28) After Sunset extended 3 hours are available for drying of Tamato and Gingerslices in solar cabinet dryer with heat storage system is recommended.
- 29) For better milling of pigeon pea grain(Variety- PKV Tara) It is recommended to use enzyme pretreatment of 2:1:1 proportion of xylanase, pectinase and cellulase enzymes at the rate of 45 g/q dm of dry pigeon pea grain
- 30) It is recommended to use the optimized process parameters such as syrup concentration 48 °Brix, syrup temperature 49 °C and duration of osmosis 139 min for osmotic dehydration of sapota samples.
- 31) The osmo-convectively dried PDKV Sapota powder is recommended to dry at 60 °C temperature and 1m/s air velocity for better nutritional value.
- 32) It is recommended to cultivate Capsicum in 50% Green shadenet for higher production

Seed Technology & Plant Physiology

- 33) Two sprays @ 250 ppm of Maleic Hydrazide, first at 50 days followed by 60 days after sowing is recommended for inducing dormancy upto 35 days in greengram.

Biotechnology

- 34) It is recommended to use primer set ITS-12 and ITS-14 for discrimination of *Phytophthora* from commonly occurring plant pathogenic fungi present in infected plant and soil samples.
- 35) It is recommended to use primer set BTA-2, BTA-7 and BTA-8 for discrimination of Galgal rootstock from commonly used rootstock Rangpur and Jambhary .
- 36) It is recommended to use essential volatile oil of Java citronella as a gaseous antifungal fumigant in culture rooms and transfer hoods @ 2.5 ml/100 cuft area with replacement of oil at every 10 days interval for effective bio-control of common fungus observed in plant tissue culture laboratories.
- 37) It is recommended to use nanoparticles of copper in place of copper sulphate in the culture media for control of major pathogenic microbes of plant tissue culture at the corresponding dose of media in Banana commercial tissue culture unites.

Social Sciences

Extension education

- 38) The research study on Soil Testing Status of the Farmers in Distress Prone Districts of Vidarbha indicated that, nearly two third (62.84%) of the farmers possessed medium level of knowledge about the various soil testing techniques, However, it was observed that majority (85.00%) of the them did not test their farm soil till date. Non availability of soil testing lab nearby village/taluka level is the major constraint perceived by 87.50 per cent of the farmers for non adoption of soil testing techniques.

Hence, it is recommended, that soil sample testing facility should be made available at block level and mobile soil sample testing van along with technical staff should be made available at village level by the State Department of Agriculture, to the farmers, to increase the adoption level of soil sample testing technique and its recommendations at field level.

- 39) Considering the increasing use of herbicide application in wheat crop, it is recommended that for avoiding the poor efficacy of herbicide technology the State Agricultural Universities and Extension Functionaries (Krishi Vigyan Kendras, State Department of Agriculture and NGO's) should organize regular trainings/workshops, demonstrations, preparation and distribution of printed material about use of herbicides to wheat growers before sowing of wheat crop for effective transfer of this technology

Agril.Economics& Statistic

- 40) To achieve maximum production of Peigon pea crop,it is necessary to adopt the recommended technologies for decrease the cost of production(by Rs,500 to 600 per qt.).So it is recommended that, Pigeon pea producing farmers should used recommended dose of manure and phosphatic fertilizer.

- 41) In order to minimise the price risk and to protect the price security of farming community and also to stabilise the acreage under Redgram and Greengram of Maharashtra state which are the volatile commodities in terms of market prices, it is recommended that long term procurement policy should be adopted to maintain price stability.