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RESEARCH RECOMMENDATIONS OF 2014

Development and release of crop varieties

A) Field Crops

1. Rice : Karjat-9

This variety has been developed through hybridization followed by pedigree method from the cross between Kasturi × IR 50. This variety has dwarf stature (height 95-100 cm), non lodging, midlate in duration (120-125 days) having medium slender grain type. It has given 17.90% increased yield over best variety check RP 4-14 in Station trial. It has recorded 17.16% yield advantage on overall mean of three years over check RP 4-14 in Konkan and Vidarbha region of Maharashtra State Co-ordinated Trial (Midlate). It has given 20% yield advantage on regional check Triguna in Maharashtra State in All India Co-ordinated trial 2008. This culture (Karjat 2-2-44-10 rice) has recorded 15.66%, increase grain yield over check Ratnagiri-4 during Kharif 2011 and 15.09% & 18.50% increased grain yield over check Ratnagiri-4 & RP-4-14 during Kharif 2012, respectively in Adaptive trials conducted on farmer's field. It has recorded 25.67% increase grain yield over check Palghar-1 during Kharif-2013 in Konkan and Vidarbha region. It is moderately resistant to neck blast, BLB and Resistant to leaf blast. Resistant to BPH, WBPH and moderately resistant to stem borer. The average grain yield is 4.5 to 5.0 t/ha. This variety is recommended for cultivation in Konkan and Vidarbha region of Maharashtra.

B) Horticultural Crops

1. Mango – Konkan Samrat (Hybrid 579)

The mango hybrid 579 is a cross combination between Alphonso and Tommy Atkins. Hence female parent in Alphonso & male parent in Tommy Atkins. This variety has better plant growth than Alphonso and Tommy Atkins. Medium fruit size (284.50 g) as compared to the Alphonso (250 g) and Tommy Atkins (484 g). The pulp percentage (73.28) is similar to Alophonso (74.60%) and Tommy Atkins (71.79%). Good T.S.S. (20.03^0 Brix). This variety has high percentage of perfect flowers (27.52%). Regular bearing, cluster bearing, spongy tissue free and low fibre. This is second hybrid having Alphonso as female parent and first hybrid of exotic parent. This variety is ideal for table purpose.

2. Snapmelon : Konkan Madhur (DPL-SM-2)

This variety of snapmelon has been developed through mass selection from local smapmelon types. It is high yield (15-31 t/ha) and less cracking (9%) variety. The fruits of this variety has firm light orange colour pulp and good keeping quality (3-4 days). It is top event to pest and diseases. It is recommended for cultivation in Konkan region during Kharif season.

Development and release of farm implements

1. Self propelled reaper for harvesting of paddy

Self propelled reaper was developed for harvesting of paddy. The cutter bar width was 1.2 m. It was decided to have power source as 3 hp petr5ol start kerosene run engine. The reaper was designed to have operating speed as 2 to 2.5 km/h. Gear box and chain and sprocket type power transmission arrangements were used. The gear box was splitted in two units so as to have proper balancing and less stress on arms while operating. The weight of the developed reaper was 225 kg. The dog clutch was provided for turning.

The field performance as well as ergonomic evaluation of developed self propelled reaper was carried out

a. The field capacity was about 1 ha/day
b. The time required to cover one has was 7 h.
c. The fuel consumption was about 1 1/h
d. The height of stubble was about 10 cm
e. The average working heart rate was 141 beats/min. The average work pulse was 43.3 beats/min and noise level was 85.6 dB (A)
f. The cost of self propelled reaper of Rs. 81,000/-

2. Pedal operated arecanut dehusker

Pedal operated arecanut dehusker was developed based on ergonomical and mechanical considerations. Dehusking mechanism having rubber beaters was developed for dehusing of dried arecanut fruits. It was operated by pedal using bicycle mechanism. The machine dimensions such as hopper height, saddle height, handle diameter and length etc. were designed using the relevant anthropometric data/ The peripheral speed of dehusking drum was optimized as 7 m/s with 15 kg/ha feed rate. The pedaling rate was optimized as 60 rpm with power requirement as 75 W. The developed prototype of pedal operated arecanut dehusking was ergonomically and mechanically evaluated.

a. The mean working heart rate, oxygen consumption rate and energy expenditure rate were 127 (± 8.4) beats/min, 1.3 (± 0.1) lit/min and 27 (± 2.79) kJ/min, respectively.
b. The average dehusking efficiency and kernel breakage for pedal operated arecanut dehusker at 7 m/s peripheral speed and 15 kg/ha feed rate were 96.6 per cent and 6.9 per cent, respectively.
c. The dehusking capacity for pedal operated dehusker was 9.8 kg/h, which was 2.7 times more than that of by traditional method
d. Dehusking cost of recanut with traditional method and pedal operated dehusker was Rs. 5.1/kg and Rs. 3.7/kg, respectively
e. The dehusking cost of arecanut by pedal operated dehusker was 27.5 per cent less as compared to traditional method.
f. The cost of pedal operated arecanut dehusker : Rs. 15,000/-

3. Power operated arecanut dehsuker

Power operated dehusker was developed for increasing the dehusking capacity and reducing drudgery. Dehusking mechanism having rubber beaters was developed for dehusking of dried arecanut fruits. One horse power single phase electric motor was used as power source. Belt pulley type power transmission was used. A simple hopper with flutted wheel type metering mechanism having two fruits was developed. The space of each flute is sufficient to accommodate 2 to 3 arecanut fruits. The capacity of hopper was sufficient to store 8 to 10 kg of arecanut dried fruits. The feeding rate of dried arecanut from 30 kg/ha to 15 kg/h could be altered by just closing and opening of flutes.

a. In case of power operated arecanut dehusker, average dehusking efficiency and kernel breakage ast 7 m/s peripheral speed and 20 kg/h feed rate were 98.1 per cent and 9.9 per cent, respectively.
b. The dehusking capacity for power operated dehusker was 13 kg/h, which was 3.6 times more than that of by traditional method.
c. Dehusking cost of arecanut with traditional method and power operated dehusker was Rs. 5.1/kg and Rs. 1.9/kg, respectively.
d. The dehusking cost of arecanut by power operated dehusker was 63.5 per cent less as compared to traditional method.
e. The cost of power operated arecanut dehusker : Rs. 22,000/-

A) Natural Resource Management

1. For obtaining maximum productivity and profit from Kharif groundnut under lateritic soils of Konkan, it is recommended to give first preference to fertilizer management followed by weed management and plant protection measures, respectively under resource constraints.
2. It is recommended to apply one Konkan Annapurna Briquettes (34:14:6) per four hills of transplanted hybrid rice at 25×15 cm spacing for getting higher yield.
3. For obtaining higher yield of Aonla 10 kg FYM + 250:250:250 g NPK plant/year is recommended for Konkan region to be applied in the month of June.
4. In Konkan region to increase the yield of arecanut, the application of 600 gm micronutrient complex (Bo – 1%, Zn – 5%, Mn – 1%, Fe – 2%, Cu – 0.5%) in first dose (August-September) along with recommended dose of fertilizer is recommended.
5. For effective and economical weed management in direct seeded drilled rice and intern its higher productivity under conditions of South Konkan Coastal Zone, pre emergence application of oxyfluorfen @ 300 g/ha integrated with PoE application of 2, 4-D @ 500 g/ha or hand weeding twice (20 & 40 DAS) is recommended.
6. In lateritic soil of Konkan region groundnut be planted as intercrop in 10 × 10 mango plantation in juvenile period.
7. Manga Bamboo can be commercially macro propagated by using three nodal culm cuttings of 6 month old stick under 50 per cent shade in a raised bed of (sand soil : FYM 1:2:2) in December-January followed by transferring the proliferated individual shoots in polybags after 6 months under Konkan conditions.

B) Horticulture

1. Centre opening and thinning in recommended in the March to October for old and dense orchards of sapota to obtain higher yield in Konkan region.
2. For vegetative propagation of Karonda, it is recommended to use air layering method during the month of July and soft wood grafting method during the month of September-October.
3. Among the six mongo varieties tested for juicy type Pairi, Amrapali, Benganpali and Suvarnarekha are good and economically profitable hence are recommended for commercial cultivation.
4. Varieties namely Hybrid 10/1, Alampur Baneshan, Ratna and Mallika having good quality fruits with high pulp percentage ideal for processing and economically profitable are recommended for cultivation as option for Alphonso.

5. For vegetative propagation of mangosteen, use of one year age old seedling as rootstock and on which four month old and 15 cm length long scion stick is recommended for soft wood grafting during the month of September.
6. Planting of lesser yam at 90 × 30 cm spacing is recommended for obtaining higher net returns.

C) Animal and Fisheries Science

1. It is recommended to supplement 1.5 per cent black cummin (*Nigella sativa* L.) seed powder in broiler diet for reducing cholesterol and improving growth performance with economic production of broiler.
2. It is recommended to prepare the feed of Jitada Juvenile by adding 0.75% of phosphorum (*Calcium orthoposphate*) for better growth.
3. It is recommended to give organic manure in the form of Chicken Dropping (CD) and Raw Cow Dung (RCD) in 70:30 ratio instead of 100% Raw Cow Dung (RCD) in phase fertilization technique for better production of mix zooplankton in the Khar Land Ponds
4. It is recommended to alter the documents requirement after reviewing the necessity of documents required for establishment of ornamental fish business under the subsidy schemes of Marine Product Export Development Authority (MPEDA) and National Fisheries Development Board (NFDB).

D) Basic Science

1. The molecular marker OPD 2 is able identify to the sex of Kokum due to generation of a unique DNA fragment at 1300 bp only in the male plants. Based on this information after sequencing more specific marker can be generated.
2. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed process for making powder of Lesser Yam slices using tray dryer at 60^0 C up to 7 hours and 30 minutes (9.5% db final moisture) is recommended for fine particle size, better retention of nutritional and functional properties.
3. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed process for making the flour of ripe jackfruit seed flour of Kapa (firm flesh) seeds using tray dryer at 120^0 C up to 3 hours and 45 minutes or flour of ripe jackfruit of Barka (soft flesh) seeds using tray dryer at 90^0 C up to 17 hours is recommended for fine average particle size and better retention of nutritional and functional properties.

4. Wine can be prepared from rice Alphonso mango fruits by adopting the technology developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli.
5. It is recommended to prepare best quality Kheer from buffalo standardized milk with semolina (rawa) and sugar at the rate of 2 per cent and 8 per cent of the milk, respectively and firm flesh jackfruit bulb (flakes) at the rate of 15 per cent of the plain kheer.
6. It is recommended to prepare the most acceptable khoa burfi from buffalo milk blended with ginger juice and sugar at the rate of 5 per cent each of the milk at pat formation stage of khoa making.
7. It is recommended to prepare the most acceptable quality Sandesh from cow milk blended with mango pulp (*Mangifera Indica* L.) *cv*. Alphonso and Sugar @ 22.5 and 30 per cent of Chhana, respectively.

E) Plant Protection

1. Three sprays of Tricyclazole 0.1% or Isoprothiolane @ 0.1% are recommended at an interval of 21 days starting from the initiation of blast symptoms for effective management of blast disease of rice.
2. For effective management of post harvest fruit rot of Alophonso mango fruit dip treatment in hot water at 52^0 C for 10 minutes is recommended.

Non Label Claim Results

1. Pre sowing seed treatment of Trichorderma @ 5 g kg^{-1} + Carbendazim @ 1 g kg^{-1} be done for effective management of pre emergence damping off and post emergence seedling mortality of cowpea, chickpea and wal.
2. For management of mango hopper the botanical pesticides 0.003 per cent azadiractin 10,000 ppm (3 ml/l) or 0.005 per cent azadiractin 50,000 ppm (1 ml/l) are recommended.
3. For the management of sapota seed borer three sprays of the insecticides *viz*. Profenofos 50 EC @ 1.5 ml/lit or Indoxacrb 14.5 SC @ 0.5 ml/lit or Novaluron 10 EC @ 0.5 ml/lit or Deltamethrin 2.8 EC @ 1.0 ml/lit are recommended. The first spray should be given in the month of October and subsequent two sprays at an interval of one month. The repeated use of same insecticide should be avoided. The mature fruits should be harvested before spraying.
4. For management of rice caseworm, one spray of Cartap hydrochloride 50 SP @ 600 gm per 500 lit of water per ha is recommended. The application should be given, when the pest reaches ETL (two newly infested leaves per hill).

F) Agril. Engineering

1. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed technology of scrap type bandhara (temporary check dam) is recommended for water conservation.
2. For minimizing evaporation losses from the Konkan the cover of dry glass matting + 75% green shading net is recommended.
3. It is recommended to adopt soil and water conservation measures as graded bunding, contour trenching, bench terracing, strip cropping at specified locations in Dapoli watershed which will help to reduce estimated soil loss from 59.66 t/ha/year to 26.85 t/ha/year.
4. The values of drainage coefficients developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli for Ratnagiri district are recommended.
5. The values of drainage coefficients developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli for Sindhudurg district are recommended.
6. The optimum Cropping pattern prepared by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli for the Natuwadi medium irrigation project is recommended.
7. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed Power Operated Jackfruit Cutter is recommended for cutting of the Jackfruits.
8. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed Hand Operated Jackfruit Cutter is recommended for cutting of the Jackfruits.
9. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed Kokum liquid concentrate unit is recommended for the extraction of kokum liquid concentrate.
10. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli design and developed bamboo greenhouse of 192 m^2 area (length 24 m and width 8 m) is recommended for cultivation of vegetables in Konkan region.
11. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed bamboo treatment unit is recommended for chemical treatment of bamboo.
12. Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli developed bamboo mat board using Mes (*Dendrocalamus stocksii*) variety of bamboo is recommended for structural uses.

G) Social Sciences

1. As the socio-economic status is positively changed due to nursery enterprise it is therefore recommended that Government should finalize a proper strategy for strengthening nursery enterprise by making certain changes in their rules and

regulations. Credit facility with lowest interest rate be made available to nurserymen.

2. Department of Agriculture of Maharashtra state and Coconut Development Board should jointly organized the transfer of technology campaign with the help of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli for solving the problems of coconut growers.
3. It is recommended that in order to strengthen the goat enterprise in Konkan region trainings should be organized and technological interventions through farm and home visits, animal health camp and diagnostic visits be made.
4. The production and productivity of rice in Konkan region has increased by 21.24 per cent and 30.05 per cent, respectively in last three decades. The adoption of rice technologies by farmers in Konkan region was only 57.22 per cent resulted into yield gap to the extent of 36.06 per cent. Therefore, it is recommended to motivate the farmers through extension agencies for adoption of full package of all technologies for deriving economic benefits in the rice production.
5. In home scale, small, medium and large scale cashew processing units with high capital investment the benefit cost ratio was 1.29, 1.48 and 1.50 B.C. ratio, respectively. Hence, it is recommended that Government and financial bodies to form a long term policy for working capital finance to cashew processors at low rate of interest.
6. It is recommended to organize and educate cashew growers to harvest mature cashewnut for better price realization and minimizing storage losses at processor's level to ensure quality of cashew kernels.
7. It is recommended to use available co-operative institutions in the region with their storage facilities to ensure quality supply of raw material and minimizing marketing problems.
8. Considering the major constraint of non availability of Konkan Kanyal breed for goat rearing in Konkan region. It is recommended to increase the supply of Konkan Kanyal breed to the goat farmers in the region.
9. ECF scheme had increased employment by21.31 per cent and income has increased by 84.13 per cent over Non-beneficiaries. Therefore, it is recommended that for effective transfer of recommended agricultural technologies, such type of schemes must be conducted by extension agencies and scientists of the University on farmers field on large scale.
10. The mixed cropping in *Lakhi Baug* with annual and perennial crops is profitable in terms of both income and employment over scale cropping of coconut. However *Lakhi Baug* growers were not following mixed cropping in systematic

manner. Therefore it is recommended to adopt plant population of mixed crops in *Lakhi Baug* as per recommendation of the University by the growers so as to generate maximum profit from unit area.

11. The economic analysis revealed that in short run the variable cost is covered in group with flock size of 30 goats through selling price living considerable net profit to the goat keeper. Hence, to reap the benefits of scale of economies it is recommended to have the minimum flock size of 30 goats (28 does and 2 bucks).
12. Among the various technologies released by the University for rice cultivation, farmers be motivated and trained for proper adoption of major yield contributing technologies, *viz*. line spacing between two hills, No. of seedlings per hill, application of nitrogen and phosphorus as to increase production and productivity of rice.