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Realizing Oil Seed Self Sufficiency Through Systematic Interventions

Oil seeds production and productivity remains static over period of time in India. Every year major portion of requirement is imported from other countries. The decrease in area under production of oilseeds is in alarming rate. India is the major oil seed producing country (20% in area and 10% in Production). Annual production of oil seeds is 32.0 MT and annual total requirement of oilseeds is 45.64 MT. Hence, to minimize the shortfall in requirements, every year is 10-15 MT of oilseeds is imported. Percapita consumption of oil seeds is 8 Kg/year. Increase of production to 60 MT, will definitely decrease the oilseeds import. Major oil seed crops *viz.,* groundnut, rapeseed, soybean, mustard, sunflower, and sesame Increase in area, production and productivity oilseeds need systematic approaches from policies to technological interventions.

INTRODUCTION

Fatty acids are important component of diet and oils are part of cooking in every house hold of the nation. The production and productivity of oil seeds remains same over period of time in India. Every year, country is importing oils from foreign countries to meet out the domestic consumption which involves lot of money on procurement. Some of the issues/constraints associated with oil seeds production in India for major oil seed crops *viz.,* groundnut, rape, mustard, groundnut, sesame and sunflower are given below. Area is under cultivation of oil seeds is in decreasing trends.

LACK OF HIGH YIELDING VARIETIES

Genetic gain for the improvement of major oil seeds is very low. Crops like Groundnut, Sesame, mustard, show very poor genetic responsiveness for the yield enhancement. Complexity of genetic regulation of fatty acid synthesis and negative correlation with yields make it a very difficult process to develop high yielding varieties in these crops. There is no sufficient heterotic vigour present in this crop due to less genetic variability.

Selection for high yielding varieties combined with higher yield is always a difficult process. There is no additive genetic variance regulating the higher yields combined with oil yield in major oil seed crops. Genotype X environment interaction is in very high proportion in oil seeds which make it difficult to select the high yielding varieties combined with oil seeds. Stability is very low for the oil seeds for wider adaptability.

LACK OF AVAILABILITY OF QUALITY SEEDS

Yield response and oil accumulations are highly regulated by photo period, temperatures and rain fall pattern. Timely sowing of oil seeds is very much essential to utilize the rainfall and obtain expected yields. But due to the poor seed multiplication ratios, targeted quantities of seeds required for the particular area is always not being met and there are always shortfalls in production and supply of seeds in time. So, farmers are forced to use their own seeds for cultivation which are eventually having poorer seedling vigour and germination which always affect the yield substantially.

MICRO NUTRIENTS DEFICIENCIES

Micro nutrients like zinc iron boron calcium manganese and sulphur are highly essential for growth development and oil accumulation in major oil seed crops. But most of Indian soils are having micro nutrient deficiencies due to poor organic matter content, climatic changes, lack of availability of bulky organic manures and failure of application of micro nutrients in rainfed cultivation. Micro nutrients deficiency greatly affects the yield of oil seeds.

PESTS AND DISEASE INCIDENCES

Sucking pests, borers, mites, aphids cause major economic damages. Soil and seed borne diseases like wilt and root cause significant yield losses also affect the quality of the oils.

DROUGHT/ FLOOD/ CLIMATIC CHANGES

Oil seeds are mainly raised under rainfed situations which are subjected to vagaries of distribution and reception. Moisture stress greatly affects the nutrients absorption and lack of nutrients cause poor growth and development. Many times complete crop failure is experienced due to lack of sufficient quantities of rainfall.

LACK OF MODERN PROCESSING INDUSTRIES

Rural areas lack modern oil processing units and farmers are forced to sell their produces for lower prices. Lack of proper marketing facilities affect the income generation capacity of farmers and they are caught up with vicious cycles of poverty.

TRANSPORT COST

Oilseeds farmers of dry land regions are falling into poor and marginal categories. Their resources don't allow them to incur expenses on transportation to distant procurement areas.

INCREASED COST OF CULTIVATION

Their economic status is hindering to follow application of inputs on time. They are forced to use inferior standards of inputs which are cheaper and they are not effective.

INSTABILITIES IN PRICES

Procurement price is not stable always and it is always not predictable. Hence, farmers fail to generate adequate income.

LACK OF FARM MECHANIZATIONS INITIATIVES

Timely operations like sowing weeding and harvesting are affected due to lack of modern farm machinery.

STRATEGIES TO OVERCOME PRODUCTIVITY ISSUES IN OIL SEEDS

RHIZOSPHERE RESPONSIVE/ORGANIC RESPONSIVE/ VARIETIES THROUGH MICROBIOME ASSOCIATION

Microbiome plays major role in nutrients acquisition and utilization. They also induce systemic acquired resistance. Microbiome association is highly genotypic and geographic specific. Hence, varieties should be developed with microbiome colonisation ability to have more associations. Organic responsiveness can also be incorporated. The crop varieties which have inherent microbiome

colonisation ability will have low nutrients requirements and they will be adapted to particular geographical locations. They will enhance the soil fertility and yield levels can be maximized without usage of high cost fertilizers. It is a long term goal where parameters should be screened and incorporated by following different cross combinations and bringing them into one genetic background.

COMMUNITY SEED PRODUCTION

To overcome seed deficit, seed production should be concentrated at village level with specific targets for the ensuing years. Selected farmers should be trained on aspects seed treatment, seed certification processes, Timely interventions on nutritional pest and diseases management aspects, processing and storage of seeds.

These aspects will not only increase the productivity, but varieties will be selected for the better adaptations to a particular location. It will improve the seed requirements of the region and self-sufficiency in oil seeds will be achieved.

MAPPING OF AREAS SUITABLE FOR OIL SEEDS AND SUPPORTING WITH INTERVENTIONS

Agro ecological zones identified based on productivity, soil parameters, weather, incidences of pests and diseases and high productivity zones should be identified. Those zones should be provided with suitable packages of practices to address the yield gaps for maximising productivity from seed to seed.

MOBILE INTERACTIVE APPS FOR SEED TO SEED INTERVENTIONS

Mobile apps should be developed for timely interventions of oil seeds production from seed to seed stages. Higher production trials should be developed and demonstrated for each geographical location. Interventions should be specific to the crop variety and geographical region. They have to be incorporated into app. Farmers from particular region should register the crop for sowing.

The mobile Apps will help the farmers to monitor the growth and development and timely interventions will be instructed to farmers well in advance. Farmers can capture the symptoms and send it to experts for diagnosis and remedies. Total input requirements for the crop, weather forecast, pests and disease incidences will be informed to farmers timely. This will enable farmers to follow timely intervention which is one of the major limitations in achieving higher productivity in oilseeds.

PROMOTION OF RICE FALLOW CULTIVATIONS OF OIL SEEDS

Rice fallow conditions with oil seeds like sesame, groundnut and sunflower should be focused to utilize the fallow areas with adequate irrigation facilities. This cultivation can effectively utilize the land area and rice fallow cultivation is low input response method. Not only it increases the production level of oil seeds but also improve the soil physical chemical and biological properties due to crop rotations.

PROVIDING MICRO IRRIGATION FOR SESAME/GROUNDNUT/ SUNFLOWER/ RAPESEED AND MUSTARD

Where ever possible micro irrigation facilities like drip, sprinkler, mobile sprinkler facilities should be exploited to increase the production and productivity.

RAIN WATER HARVESTING AND SOIL CONSERVATION FOR MITIGATING CLIMATIC CHANGE ASPECTS

In rainfed oil seeds areas, efforts should be focused for rain water harvesting and soil conservation strategies for effective utilization of rain water for oil seeds production. It will decrease the dependency of rain water for growth and development and it will increase the water availability for oil seeds.

CONCLUSION

Oil seeds production and Productivity are the major concerns for agricultural Scientists, Extension officials and farmers. Overall increase in production and productivity for a larger agro ecological, zone needs stable and realistic strategies to address the yield gaps and achieving the targeted goals of production and productivity.

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