EDITORIAL

Low Cost Technology, a Vision on Agricultural Research for Farmers

COLUMN

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Remarkable research advancement and break-through have been achieved in various disciplines of research including breeding, genetics, physiology, plant protection, finally up to molecular biology to produce high yielding crop cultivars. Of course, biotechnologist made innovative progress in the production of insect resistant Bt-crop cultivars but recently it failed to give good results in farmers fields. Recently, there was a lot of arguments in favour or against it among specialists in linkedin team members. However, all these high technology crops can perform well under high input situations, but fail to give reasonable yield under sustainable agriculture in farmers' fields. A gradual increase in global warming, heat stress, drought, salinity and other abiotic stresses affect crop yield substantially. It may mentioned here that about 1/3rd of the World arable land is semi-arid and 2/3rd of it is saline, thereby affecting crop productivity substantially in these areas. Very Little research inputs have been directed to improve crop productivity under sustainable agriculture. This urges a new visión in the direction of agricultural research in terms of low input but high responsive agriculture.

In this context, it may be also mentioned that the high yielding cultivars can not perform well under drought or salt prone areas. The innovation of high cost technology (molecular biology) fails to achieve the success in crop improvement and supply food to ever increasing hungry people of under-developed countries such as Ethiopia, other African and Asian countries. Therefore, there is a great necessity of the innovation of low cost technology for screening crop cvs. preferably crop varieties/pipe line crop cvs. and finally selection of cvs. tolerant to salinity, drought, heat stress etc. In this respect, salt tolerant cv. can give a reasonable yield under salt prone areas, similarly drought resistant cvs. in the semi-arid regions. Utilizing pipe line crop cvs. which have been tested in multi-locations for high yield and adaptation have great potential for increasing crop production under sustainable agriculture.

I want to mention here recent trends of research in agriculture as has been discussed by different specialists thru Linkedin.

An integrated research activities need to be directed to improve crop productivity in the farmers' field. The technology and the results of research should be transferred directly to the farmers effectively to increase yields in the stress prone farmers' fields. An increase in chemical fertilizers deteriorate soil fertility and quality gradually; thereby, urging the less use of chemical fertilizer and similarly less use of insecticides. Constant use of insecticides finally lead to develop immunity of the insects to the insecticides, thereby make them ineffective. The use of organic source of nutrients and bio-insecticides are amply recommended. Final consumers preference determines the success of agricultural research.

We have to feed 9 billion people in the World. Therefore, agriculture has to face a great challenge to meet the demands of these hungry people. The preferences of the final consumers will determine the future of agricultural research. New cheap technology need to be applied in farmers fields.

I want to narrate here a brief acount on research trends in Israel and Australia. In Israel, agriculture has made good progress starting from nomadic agriculture to its advancement. Initally the infrastructure in agriculture was very poor. Soils are rocky, not suitable for crop cultivation. There was the absence of trees and shrubs in the southern part of the country leading to desert environment. Finally, thanks to the hard labour of Israeli people, they could produce crops such as wheat, orange, vegetables in these harsh environments. Owing to harsh

environment, the horticulturists produce vegetable extensively in green house without using insecticides. As pollinating insects are absent in the green houses, they culture bumble bees and free them in green house for efficient production of vegetable seeds. They grow biodiesel crops and produce biodiesel for vehicle with less depependence on petrol/diesel. In place of using insecticides, they innóvate the culture of sterile moths which are allowed to move in the crop fields reducing insect population drastically, an innovative technique and an ideal example of research innovation to the World. A classical example may be mentioned here with respect to a great progress in breeding insect and pest resistance in Israel. Besides, an innovative technique has been developed for rodent control in Israel. Initially poisons are put in holes in the areas infested with rats. This method agravates contamination in the soil making it unsuitable for crop cultivation. In this respect, they breed special types of hungry birds which are fond of catching the rats and eat their flesh. This technique control rat problems satisfactorilly.

Lastly, an ideal example is cited about the progress of high-tech agriculture in Australia with special reference to Riverina agriculture. Highly sophistacated research advances have been achieved in Riverina in Australia. Australia is the World leader in livestock production. They are the exporter of various livestock and milk products to various countries earning billions of dollars. They made significant achievent in horticulture productions. The cultivation of citrus in arid lands started in 1917 and now lead the World in citrus production and world leader of its export. Riverina is the largest orange producing regions in Australia and World as well. They extended juice technology in orange. They export citrus fruits in more than 50 countries such as USA, Japan, Hungary etc. In Riverina, grape cultivation started in 1930. Now it occupies the largest grape wine producing country (65%). Dry summer is good for sweet grape wine production. Drip irrigation is found to be very effective to minimize water consumption and greater water use efficiency in dryland agriculture in this region. In dryland agriculture, they grow soya, various oil seeds such as sunflower, cereals like sorghum, maize. An integrated rice cultivation in semi-arid environment led the Riverina as a rice bowl with excellent quality. It is one of the leading rice and corn producing countries earning about 800 billions dollars.

In a nutshell, there must be a modern trends in transfer of low and high input technology in an advanced agriculture. As mentioned above, the innovation of low cost technology for selecting crop cvs. resistant to various abiotic stresses could have enough potential to increase crop productivity under sustainable agriculture. Finally the molecular biologists could confirm the feasibilty of these cvs. for stress resistance.

