

Integrated model farming *Agriculture*

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AGRICULTURAL development depends on how successfully knowledge is acquired and applied at the farm level. Investment in knowledge, science and technology forms a part of the strategy to promote sustainable and equitable agricultural development.

All this depends on how successfully knowledge and technology are transferred to farmers and accepted by them. Investment in traditional agricultural science and technology research and extension is not sufficient to facilitate agricultural development. Therefore, there is a need to integrate the activities of public sector with the private initiative.

Pakistan has all the basic elements for a progressive agriculture which can feed the nation and also earn substantial foreign exchange through exports. Unfortunately this potential is not being exploited in its true sense, e.g., the agriculture sector performed poorly during 2007-08 due to less use of fertiliser because of its non-availability and high price, particularly DAP. The same was the situation with urea for 2008-09 wheat crops. Efficient use of fertilisers with advanced methodologies, repeatedly tested by the scientists, can help overcome the problem of food shortage.

There is a need to create link among educational and research institutions and farmers. To tie up various components of this chain, the role of private sector has to be enhanced. A World Bank study on agriculture innovations clearly explains "knowledge, information, and technology are increasingly generated, diffused, and applied through the private sector".

Research and development are interlinked processes which include identification of symptoms, diagnosis of problem, practical implication of possible solutions and the result analysis of the solutions. Development depends in proper diagnosis of the problem and application of right solution at right time. This process can be accelerated if there is a proper link among various components of the research and development chain. Research activities in universities could be made fruitful by establishing their linkages with industry/private sector and other stakeholders i.e. farmers.

The Institute of Soil and Environmental Sciences, University of Agriculture, Faisalabad, needs to establish linkages with a number of industries including fertiliser and chemical which produce effluents and solid wastes and face problem of their safe disposal. These linkages, based on mutual benefits of both institute and industry, can be anchored on development of methodologies and technologies to

boost crop yields by conversion of industrial wastes into useful products, thus protecting the environment.

The products, by-products and waste materials of various industries can be used directly or indirectly for agricultural production. Such linkages would help produce standardised products in a cost-effective manner. This relationship will not only help cope with the WTO challenges but may also result in prosperous and sustainable agriculture.

A well known agricultural production chain comprises pivotal role of farmer with input suppliers and industry using agricultural products directly or indirectly. Both sectors are not realising that their business growth is directly with the farmers.

The unfair transfer of resources from farmers to other economic agents weakens the whole production and supply chain. The attitude of all stockholders has to change to develop a prosperous agriculture.

For involving university and the private sector to transfer innovative technologies to farmer's field, a project is in progress. The theme of this project is to render service to the farmers for increasing the input use efficiency without increase in cost of production i.e. focusing on saving cost. It will give choice to the farmer to adopt the best suitable and appropriate methods for improving crop yields— with 'seeing is believing' approach.

Taking an example of wheat crop, the recommended fertiliser rate for wheat is two bags of urea, two bags of DAP and half bag of potassium fertiliser. In this project, the recommended use is: one bag of urea and DAP only with the addition of one bag (25 kg) of compost, one liter of humic acid having pH < 7 and two foliar sprays of multi-nutrients.

Saving from reduced use of fertiliser is estimated at about Rs3,500, while expenditure incurred on additional input use is about Rs1700. So there is saving of more than 50 per cent with additional saving of water, maintenance of soil health and improvement in soil organic matter status, uniform seed germination and healthier plant growth.

For that matter almost 57 trials throughout Punjab have been conducted. The minimum trial area was five acres with additional one acre having normal farmer's practices. Result: the crop stand is dark green, broader leaves, dense growth, 15-20 per cent more in number of tillers per m².

Technology generation and its transfer or commercialisation is one of the major determinants of sustained economic growth and development. Therefore, use of private sector as a vehicle can be helpful to transfer and apply technology on sustainable basis as private sector business is totally dependent on agricultural development and their role is expected to grow with increasing intensification of agriculture.