Better agronomy, better wheat yield

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To increase and improve food grains for the largest growing population of Pakistan is the job of Today's Agriculturists and growers. Wheat contributes about at least 80% in the food needs of people of Pakistan except rice and maize. The current record explores the scenario of the target of the area and production, which was 8mha and 20 mTons for the year 1998-99, against wheat production target of 22 mTons for 2000-2001. This was a quite big jump in last two decades and also more than 50 years' history of Pakistan. How and why this quantum jump in production has occurred?. The answer of this question is evolution of high yield varieties of wheat by the plant breeders and use of high inputs and better weed control measures. The high yielding quality of wheat varieties is not due to resistant to diseases only, but also the dwarf and semi dwarf height characters of such promising wheat varieties. However, adaptation of improved crop production technologies including better seed quality, proper land preparation i.e. fine seed bed, precise land leveling and dividing field into small plots for making proper use of inputs and control of weeds in wheat, have been the main reason for yield increase.

Basic concept: The concept of better agronomy, better wheat yields may properly be exploited by the agriculture scientists and growers, which must depend upon a set of technologies developed for the growers to enhance wheat production in Pakistan.

In broad sense, agronomy is field of crop production and management of soil as well as management of rest of the inputs. Whereas, agronomist is the crop management expert who, provides expertise to single and multiple crop growers within the agro-economic system of the country. Plant breeders evolve crop varieties and agronomists adopt that newly introduced variety under different agro-ecological zones for its better performance.

Wheat crop needs better agronomic practices right from time of the sowing upto harvest of the crop. The improved agronomic technologies include pure seed, proper land preparation, timely sowing, enhanced seed rate, balanced fertilizer use, proper irrigation scheduling, and timely control of weeds, harvesting and threshing of wheat. However, modern farm machinery and proper use of agriculture credit may also help in boosting wheat yields.

Pure seed use: Farmers always come across the pure seed supply problems at their door steps. Seed of thigh purity and germ inability is the need of time and it may be considered as high quality input by the growers. The pure seed of high yielding wheat varieties may produce vigorous

and healthy plants that would ultimately increase crop yield. Pakistan has well organized seed production system including National Seed Council, provincial seed councils, seed corporations, such as Punjab seed corporation and Sindh seed corporation, Federal Seed Registration Department, Federal Seed Certification Department etc., but even then, pure seed production and its supply is one of the main problems of the growers. There are admixtures in the seed and selling wheat with fake names of the varieties. Whereas, enhanced rate of seed from 40 upto 50 kg/acre (125 kg/ha) during normal sowing and from 50 upto 60 kg/acre (150 kg/ha) for late crop of wheat may be suggested for higher yields. However, the sowing of clean and graded seed may give better germination. But, local Seed Corporation like Sindh Seed Corporation at Sakrand and wheat research oriented institutes such as, Wheat Research Institute at Sakrand and Nuclear Institute of Agriculture Tandojam as well as Wheat Research Station at Tandojam would supply reliable seed to the growers in the Province of Sindh.

Proper land preparation: The precision land leveling is one of the important agronomic practice to remove ups and downs of the soil and to achieve better seed bed conditions for the uniform distribution of irrigation water and better supply of other inputs to the growing wheat crop. Wheat requires fertile loam to clay loam soils with good drainage for better yields. The crop growing areas should be divided into small plots of half an acre along with channels in the middle to separate each plot and to make proper use of irrigation water according to crop needs.

Better time and method of sowing: Time and method of sowing may be the major cause of low yield in wheat. In normal course, the sowing of wheat must be completed in the month of November. But in some cases, wheat grown after Cotton, Rice, Sugarcane and fodder crops in rotation may be delayed upto December. The zero tillage technology may be adopted in rice-wheat growing area, where wheat is grown as Dubari crop on residual moisture after rice, without initial tillage practices. The seeds may be drilled directly using zero tillage drill in rice areas, after soil comes in condition. This method would show better yield performance. The delay in sowing of wheat in different crop zones may be hazardous to crop yields, due to poor crop growth during delayed periods, which might show negative effects on yield contributing parameters. The method of sowing is also important feature in wheat production technologies to enhance crop yields. Drilling method has far better qualities such as to keep proper space between rows, which would help to reduce crop competition, make easiness in controlling weeds and removing hard pan of soil by weeding and inter culturing practices during initial growth period. This also helps in to dressing of fertilizers and spraying of crop. Harvesting becomes much easier by local method using sickle and combines harvesters. But, wheat can also be grown by broadcasting method, which do not encourage inputs to be utilized properly and there is no way out to provide better environment to the crop for its vigorous growth and yield increase.

Balanced fertilizer use: Wheat crop needs balanced use of chemical fertilizer, which is applied at the time of sowing and it must be completed upto first and/or second irrigation. Full dose of phosphorous should be given at the time of sowing and nitrogen should be applied in split doses i.e. half at the time of sowing and half at first or second irrigation. But, the fertilizer dose must be selected after soil test with regard to its quality and crop needs. Wheat requires adequate amount of nitrogen and phosphorous during early growth period for vigorous growth that ultimately enhance crop yield.

Proper irrigation scheduling: The optimum water quantity must be applied to wheat for reducing water losses. The excess water may cause lodging problem in wheat. However, wheat crop needs 5 to 6 irrigations from sowing to maturity periods. First irrigation should be given after 21 days of sowing and it must not be delayed beyond 21 days, which may cause poor root development. Whereas, subsequent irrigations should be given according to three weeks interval or critical growth stages such as crown root initiation, tillering, flowering and anthesis, grain filling, Milky and grain maturity or dough stages etc. These critical stages need special attention for yield increase with the timely supply of irrigation water needed in proper growth, development and maturity of the crop. The drought condition during different growth stages may decrease tiller number, which can survive to produce grains and may also decrease number of seeds and seed weight per ear that contributes to low yields.

Timely weed control: Weeds cause great losses in crops especially cereal grains. In wheat some broad and narrow leaved species of weeds, such as Jhil, Sinjh, Naro, Kanderi, Kandero, Dhank, Jhangli Jai, Drubh, Kabah, Chabber etc are found, which crease serious problem of competition with crop in food nutrients, water, sunlight, air and space; make crop weak and poor in growth and also cause decrease in yield. In fact, farmers give little or no attention to the weeds, which are considered as crop pests and cause yield losses in wheat. Therefore, weeds must be uprooted and controlled before first irrigation and/or after first watering to the crop. The effective methods are cultural and chemical control. The cultural method is laborious and time consigns one. Whereas, chemical method is easy, cheap and less time consuming. However, yield may be increased from 15 to 25 per cent by the control of weeds.

Crop harvest technology: Crop harvest, its time and method are important features to reduce yield losses in cereal grain crops. The wheat crop must be harvested after maturity, keeping in view the golden color of ears and straw and also solid condition of the grain. Threshing of wheat must be done by a machine such as wheat thresher, which reduces grain losses from 5 to 10 per cent as compared to threshing of wheat by the use of bullocks. Seed cleaning and grading is limiting factor for quality maintenance in wheat. For pure seed production, the mixtures of other

varieties should be rouged out before crop harvest. The weeds of wheat should be removed off before mature their seeds.

Seed quality maintenance: The harvested materials of any particular variety should be kept separately in a bulk to avoid mixtures of seed. The precautionary measures must be taken during threshing, winnowing and cleaning of wheat seeds to avoid mixtures. The seed graders and sieves may be used to clean and screen out inert matter and small or undersize seeds for maintaining seed quality. The proper storage of seeds under hygienic condition is also a measure for quality control. This whole scenario of production technology leads to obtain higher wheat yields, which might solve food grain shortage problem in the country. Pakistan is very near to the door steps of self sufficiency in wheat production and it is hoped that we would emerge as wheat exporter in the world.