PLANNING FOR SCIENTIFIC AGRICULTURE AN URGENT NEED-I

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Globalisation of agriculture in Pakistan will have far reaching consequences for the country; little studied, little realised and little known. Pakistan signed WTO in 1994/95, without informing the nation, possibly under foreign pressures, but doing no studies in the past ten years under four successive regimes is pitiable. It required study of our own crops, their possible markets abroad, competitors in the importing countries prices and establishment of market channels in favourable countries, in addition to plans for increasing yields of specific crops for export. With almost free market world over, we would simply ruin our selves, if we do not increase our yields to those of advanced countries and failing therein, we will push our farmers into utter poverty and unemployment, which will also affect our total agro-industry including textiles. Yields of many crops in developing countries are three times ours and little has been done to close the gap. No doubt the possibility of improvement is there, but methods to achieve it under present system in Pakistan are discouraging, basically because of failure to impart proper education and ability of students to absorb the knowledge. Latest technical books are not available and even if they were available, neither teachers have interest, nor can students read them by them-selves.

Having lost ten years, we have to rush our plans to achieve maximum yield and quality within five to ten years keeping in view crops like; wheat, cotton, rice, corn, pulses and horticultural crops like, mango, guava, papaya, zizyphus varieties, low chill fruits for Sindh namely; apples, apricots, grapes and peaches, lychee and longan, new varieties of chicku, grapes, citrus and seedless grape fruit, vegetables, flowers and herbs including post-harvest of all of them. It is planned to discuss all these items in instalments, but beginning is being made with mechanisation of agriculture.

Mechanisation of agriculture

The age old thinking in the whole South Asia is that mechanisation is costly and uneconomical, besides it will displace labour and create employment. This layman's imagination has crept in minds of planners, since the past seventy years. I had a unique opportunity of being trained by International Harvester Co., USA, for two years on mechanisation of agriculture and earth moving machinery, on crops like, cotton, corn, wheat, rice, vegetables, fruits, irrigation and plant protection equipment under Sindh

government's scholarship. This training as I have always felt has given me two more arms and two more legs to work in many scientific fields.

In 1965, I mechanised cotton crop fully, except harvest and all operations like; seedbed preparation, making ridges and furrows, planting on ridges placing fertilisers one inches below the seed and two inches away from it on both sides, inter-cultivating five times, plant protection by spraying with tractor mounted 40 ft long boom sprayer five times and defoliating for ease and cleanliness in harvesting, on my own land near Tando Jam. All these operations took 7.5 tractor hours. The cost of these operations was 16.66% of gross returns. To cultivate 50 acres, we had to engage two men for watering and odd manual jobs. Seed rate was also reduced to about one third (six pounds per acre). Total inputs including harvest accounted for about 30% of gross returns.

The yield also was double, because of precise equidistant placement of seeds, fertilisers and weeds and disease control by machines. The secret lay in row crop tractor with tool bar for mounting a number of implements like ridgers, planters, fertiliser attachments, 40 foot boom sprayer with adjustable height over the plants and nozzle positions and inter-cultivator shanks, tines and sweeps. The operations were perfect and plant protection chemicals used were according to size of plant with full coverage and less than half the quantity ordinarily used. This equipment could easily be adopted for mechanisation of corn, vegetables, castor, ground nuts, all types of row crops etc.

In sixties all tractors were imported. For the same make of tractor two types, standard and row crop were available. The difference between standard and row crop tractor was that, the latter had its front wheels at same width as rear wheels or had two front wheels placed close by, to look like tricycles or Rikshaw, but otherwise it was the same tractor. The rear tyres were narrower, but of the same height. Rear tyres could also be adjusted to 60, 64, 68 and 72 inch widths or to 72, 76, 80, 84 inch widths for spacing of different crops. Implements of all types were also imported though in small numbers.

Once Pakistan started manufacturing tractors, no notice was taken of row crop tractors. Defect of standard tractors is that with a ridger, it can make ridges only once and to go over it a second time, its front wheels at narrower spacing will destroy ridges made in first operation and so no further mechanised operations are possible. The mechanisation of crops therefore ended then and country has suffered for last thirty years. The row crop implements in form of attachments to tool bar are not difficult to manufacture locally as accurate design are available, but the difficult part in the whole process of mechanism is accurate mounting of various components on the tool bar. We had a drawing made on concrete floor and tractor was driven on it and with places pre-marked for wheel positions and tool bar and various implements were mounted in exact positions pre-

marked on the floor. The interculturing operations could be done as close as two inches from the plants, a near perfect job for weed eradication. Until mid seventies, when tractors were imported, implements too were imported and importers acted as mechanisation promoters. With local manufacture of tractors, limited types implements were fabricated locally, import stopped and progress in mechanisation beyond ploughing was virtually killed.

The story of mechanisation of agriculture in Pakistan and role of government is interesting to begin with and finally ending into tragic consequences. In fifties the number of tractors in Pakistan was small and less than one thousand, with a large number of makes and models and therefore in 1959 the Government of Pakistan standardised on four tractors namely; International Harvester, Ford, Messy Ferguson and John Deere, one model of each, but for that model they could import both standard and row crop models. Then they added Belarus. The idea to make availability of spare parts easy, government had to become too strict not to add more tractors and models. There was no extra merit in standardised tractors except to create reliable agents for repairs and making availability of spare parts easy. It was a good decision for short run and it did produce results in the beginning. By early seventies the number of tractors had hit about 20,000 and neither spare parts were a problem nor standardising of tractors had any meaning or merit any more, but it became a tool in the hands of officers to retain monopolies and not to allow any new entrants. The non technical decision makers in higher ranks of government did not know the facts and probably technical officers in charge were also not fully conversant with the implications. When local manufacture of tractors started the government of Pakistan allowed the manufacture of those makes, standardised fifteen years before in 1959 and now it is good forty six years that these tractor makes and models and the government decisions have become obsolete. It had no sense as in fifteen years new and improved models by the same and other manufacturers were available in the international market and Pakistan in terms of mechanisation has been kept it at 1959 level in 2005. No thought was given to row crop tractors and as they did not exist in large numbers in 1974. Thus mechanisation of agriculture now is limited to seed bed preparation only by a correct decision in 1959, but wrong and undesirable rigidity in sticking to 1959 standardisation in 1975 and continuing in 2005. It is pity that in 1959 decision only, six agriculture engineers of provincial governments were involved in an hour's discussions. It was a provisional and temporary decision and had to be revised in next ten years and also in each decade. The local manufacture of tractors brought total ban on import of other makes of tractors, another case of creating monopolies and removing competition in the interest of a few individuals. No implements for mechanisation were imported since 1974 and country got a great set back.

Now the only and quick solution to mechanisation is to allow import of row crop tractors from 30-100 horse power and modify the assembly lines of presently manufactured tractors in Pakistan to manufacture both

standard and row crop models. Another immediate step should be to allow free import of implements by various growers. This will automatically be limited to some advanced farmers to begin with. In Pakistan today tractor custom operators far exceed, growers owners. With limited education these custom operators cannot easily mechanise beyond the present limits of ploughing and ridge making. Importers of implements have to be made responsible for such training and they will willingly do it in the interest of their sales.

In terms of general economics of mechanisation, taking cotton as an example, it should be known that making good ridges and simultaneously dressing them, it takes one hour per acre, planting seeds, and simultaneous drilling fertilisers in, it takes half an hour. Fertilising again if needed by drilling takes twenty minutes and spraying with forty feet boom sprayer takes fifteen minutes each time and only one hour and a quarter five times. If crop is cotton and stalks have to be shredded it takes one hour. Thus in a total of seven and half hours, cotton crop is mechanised fully except harvest, but education and training is needed. It is not like learning Chinese and I have already done it and can volunteer to help grower tractor owners.

Mechanical inter-cultivation has another advantage of saving on cost of herbicides and protecting soil fauna responsible for soil renovation from being killed by these chemicals, which by reducing soil fertility also lower yields. Herbicides kill annual weeds but promote perennial weeds and these affect existing as well as future crops.

Small tractors versus large tractors

There is a fashion among non technical planners to give free reigns to their fantasies. One example is small tractors for small farmers is being talked about for past half a century . Unfortunately a small tractor of half the horse power of bigger one, does not cost half as much, it does not consume half fuel oil, its spare parts do not cost half as much and does not need half an operator. Above all its out put in terms of field operations is less than half of the other. In general owning and operating cost is 75-80% of a large tractor and therefore it is uneconomical to own and operate it. In Sindh tractors of minimum 50-65 horse power range are suitable due to heavy soils. Bigger tractors of 80-100 horse power will be more economical, but local manufacturer's lobby has opposed their imports, or suggested heavy import duties and sales taxes and government has innocently surrendered, much against the interests of the country and economy.

Present precision land levelling tractors

This is another unfortunate planning and execution of this project. Soon after introducing of rubber tyres for tractors in 1937, there was great boost in agricultural machinery in USA and a bucket pulled behind a tractor called Fresno (after the place where it was developed), became very popular for scrapping high spots and dumping earth in low spots for land levelling.

Introduction of diesel operated crawler tractors D-7 and D-8 of 100-200 horse power by Caterpillar Company respectively in late thirties and after World War-II in 1946, caused development of a 40 or even 80 feet long and 12 feet wide trolley with a blade in the centre by BG Company for land levelling. These were for big holdings of minimum 40 acres. In mid fifties, implement companies brought out a copy of these models on 12 feet long and 6 feet wide trolley with a six foot blade, for 40-50 horse power wheel tractors and an inverted blade at tail for polishing ground. In mid seventies, USAID brought both these implements for precision land levelling in Pakistan under On Farm Management Project. These machines were very inefficient and took sixteen hours to level one acre of already cultivated and reasonably levelled land by convential farmers, to precisely levelled one. In the mid eighties government mounted lasers on tractors and above mentioned 12 foot trolleys for precision land levelling. I had done precision land levelling on my land by dividing each acre into forty ghuntas, each 33x33 feet, finding out average level of land by dumpy level and marking corners of each ghhunta on the ground by small mound or ditch about 6x6 inches. Then labourers had to level the land within each ghunta with spades and collecting surplus earth from high level plots and dumping it in low spots. It needed ten men to level one acre in eight hours. The total cost of labour, surveyor for dumpy level and manager for supervision in todays money, for each acre was Rs.1,000. Against this the government's laser mounted on the trolley 12x6 feet and tractor cost exiharbitant amount. Besides the cost of the laser equipment was more than tractor it-self. The main defect of this equipment besides the cost is, that levelling trailer blade cannot be moved from place to place, cannot cross watercourses and has to be disconnected from tractor and transported by truck. The electric connections of trolley and tractor have to be separated and an electrician is needed to reconnect them every time. Level of each acre of land has to be taken by dumpy level and final level fixed from averages. The laser then is fixed according to average level and machine started, but in practice no dumpy level is used and operation is left to tractor operator, popularly called USTAD, who by guess work starts and finding surplus earth goes over the land a second and third time, losing valuable hours and increasing the cost and inefficiency. The laser equipment is being supplied to the provinces by Federal Ministry during the past twenty years. As against this, the present author suggested 150-200 horse power industrial wheel type tractors (with all wheels of the same size), with levelling blade, mounted with layer equipment and capable of precisely levelling each acre of land in one hour for LBOD (OFWM) Project. The proposal could not be sanctioned by World Bank for lack of interest among the officers. It was anticipated that this equipment will precisely level one acre of land in one hour at cost Rs.1,500 for the equipment and Rs.100 for dumpy level crew at no profit no loss basis. When land is badly levelled, water applied at high spots can be only one inch and at low spots six inches. In such cases fifty percent of water seeps down to water table. In my opinion precision land levelling should precede watercourse lining.

In year 2000, I suggested the Government of Sindh that I could mount their own lasers on a few of on their crawler bulldozers free of cost, if they are interested. They rejected the offer on the basis that lasers cannot be mounted on the bulldozers. It was total ignorance and this is where country stands on mechanisation of agriculture.

Tractors for transport

In 1965, I used tractor trolley to haul night soil from Hyderabad, twenty five kilometres on my farm. I soon found that at tractor hour rates prevailing then, it cost me twice as much as trucks or pickups and life of tyres was reduced drastically. Hiring a truck or pickup costs less than half as much. Unfortunately the policy of Agriculture Development Bank in early days was to give loan for a tractor and only two implements, one of which usually was trolley. For mechanisation of row crops the total cost of full set of implements will be twice cost of tractor, but still they will pay back for them-selves within a year or two by increasing efficiency and yield, reducing labour costs and eliminating tenants share. Implements have economic life of ten years or three thousand hours each, against ten thousand hours of tractor. Tractor tailer is economical only on the farm for hauling over short distance of 6-8 kilometres.

I was taken a member of Agriculture Advisory Board by the Federal Minister of Agriculture in December 2003 and its first meeting was held in January 2004 in Islamabad. The members were told that no TA or DA will be paid. I attended the meeting, but other members from Sindh were wise enough to avoid attendance, as it was no benefit to them to pay for their time, travel and hotel expenses. The purpose of Advisory Board was defeated and no further meeting could be held during the year. I did send many proposals to honourable Minister Agriculture to improve agriculture and had no response during the year.

I plan to write more on horticultural crops and their post harvest processes, On Farm Water Management, wheat price policy through fifty years, cotton and textiles, sugar cane and sugar mills, organic agriculture, failure of green revolution, agriculture extension services, agriculture research and present state of agriculture education in a few instalments, through this media and discuss the past policies, hoping that new ministers and officers take notice and to change wrong doings of their predecessors over past fifty years.