

## Stagnation in Foodgrain Production in Pakistan: Evidence, Causes and Prospects

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Stagnation of foodgrain production in Pakistan in recent years is so manifest that it hardly needs any evidence. Nevertheless an examination of Table 1 reveals the deceleration of the growth rate of wheat production from 4.00 percent per annum during 1967-68-1979-80 to 2.65 percent per annum during the Eighties and to only 0.65 percent a year during 1988-89-1991-92.

Table 1  
*Growth in Area, Yield and Production of Wheat<sup>a</sup>*

Period	Area	Yield	Production
1949-50-1966-67	1.64	0.08	1.72
1967-68-1979-80	0.91	3.09	4.00
1980-81-1990-91	1.03	1.62	2.65
1988-89-1991-92	0.33	0.33	0.66

<sup>a</sup> Growth trend has been calculated by using semilogarithmic equation;  $Y = e^{a+bt}$  where  $Y$  represents production, (area and yield),  $t$  represents the numbers of years from the base period of the series, and  $b$  represents the annual rate of change in the logarithm of  $Y$ .

Table 2 shows that sometime in the late Seventies rice production also began to slow down and by the late Eighties, the growth in area, yield and production was totally arrested.

### The Possible Causes of Slowdown

It is not easy to isolate the causes of this decrease in the rate of foodgrain production, or to assess their individual importance as a number of factors may be interacting with each other to produce the current deceleration. Nevertheless some of the factors which could be responsible for the slowdown are outlined below.

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Table 2  
*Growth in Area, Yield and Production of Rice<sup>a</sup>*

Period	Area	Yield	Production
1949-50-1966-67	2.75	0.59	3.34
1967-68-1979-80	2.64	2.06	4.70
1980-81-1990-91	0.71	(-) 0.97	-0.24
1988-89-1991-92	(-) 0.49	0.59	0.10

<sup>a</sup>Please see note under Table 1.

### Lack of Co-ordinated Approach

In most western countries, the complexity of agricultural research and the lack of a co-ordinated approach prevented the significant impact of biological science research on agricultural production until nearly the middle of the twentieth century. Jarvis (1931) observed as follows:

"It is significant that inspite of the amazing progress in genetics, in knowledge of plant diseases and insects and their control, in soil surveys, in increased use of fertilizers, during the last 40 years average yields per acre have shown no appreciable increase in this country (Canada). On the other hand, the almost unlimited possibilities for increased production have been demonstrated continually by the phenomenal yields obtained both on experimental plots and on individual farms. What is the secret of this inconsistency between our accumulation of scientific knowledge in relation to agriculture and our lack of gain in average yield per acre? It is that we have concentrated upon isolated problems of genetics, insect and disease control, soil fertility or individual response to stimuli and have neglected to view all agencies in their interactive relationship as individual plant environments."

This observation has an amazing relevance to our existing situation. Unless various measures are adopted concurrently in a co-ordinated manner, it may not be possible to overcome the current slowdown in foodgrain production.

### Limited Scope for Increasing Area under Foodgrain

Over the last 40 years or so, almost 40 percent of wheat and over 50 percent of rice output has resulted from increased area under these crops. We have now almost exhausted this source of increased production and in future, higher foodgrain output must come essentially from higher yields per hectare. Being management-intensive, the raising of yields per hectare is much more complex a job than bringing additional areas under crops. This may partly explain the stagnation in foodgrain output during the recent past.

### Soil Depletion

High-yielding varieties of wheat and rice are highly extractive of nutrients from the soils. The soils, unless replenished with nutrients on a regular basis, soon get depleted and productivity begins to tumble. Also, the lack of organic matter in the soils seriously impairs their efficiency to make full use of the inorganic

fertilizers. The lack of soil testing facilities, the ineffectiveness of the extension service, as also the ignorance of the farming community about the importance of balanced fertilizer application have combined to arrest the growth in production.

### **Late Sowing**

The common crop rotations being followed at present for wheat production are: cotton-wheat and rice-wheat. This invariably results in late sowing of wheat which is an important cause of low yields of wheat. Byerlee *et al.* (1991) report that delayed wheat planting is generally estimated to lead to a loss of 1 percent in yield per day beyond the optimum planting date and may be the major cause of low and declining productivity of wheat. The seriousness of this factor can be judged from the fact that nearly half of all the wheat area is sown late.

### **High Profitability of Cotton Crop**

The high profitability of cotton seems to have undermined wheat production by prompting late sowing of wheat due to purely economic reasons because even the last cotton picking done in late December/early January is reported to yield better net return than does early sown wheat.

### **Increase in Fertilizer Prices**

During the past 5 years or so, the increase in fertilizer prices was significantly higher than that in the prices of wheat and rice. It resulted in a slowdown of fertilizer use. This may have adversely affected the output and productivity of these crops. Farmers growing wheat and rice are responsive to changes in prices of these crops as well as changes in the prices of cotton and fertilizers. A 10 percent increase, for instance, in the price of wheat would tend to increase wheat output by 2.3 percent in the short run. An equal increase in the prices of cotton and fertilizer would, however, tend to depress wheat production by 1.5 percent and 2.5 percent respectively. During the last four/five years, the depressing effect of the higher fertilizer prices exceeded the incentive effect of the higher support price for wheat.

### **Inadequate Emphasis on Non-price Factors**

Most current discussions of agricultural policy unfortunately assume that only high prices of output and low prices of inputs can pull agriculture out of stagnation. It would, however, seem rather simple-minded to assume that price policy alone could work the magic by increasing output and productivity. It is important to realise that price policy is a necessary, but not a sufficient condition, for boosting agricultural output. Mellor and Ahmad (1988) report that the use of modern inputs is strongly influenced by such non-price factors as public expenditure on agricultural research (resulting in high yielding varieties), effectiveness of the extension service (in helping diffuse complex technology), investment in physical

infrastructure, institutional set up and administrative arrangements for the supply and distribution of modern inputs. Thus the non-price factors are equally if not more important than price policy in enhancing agricultural production.

### **Limited Supply of Good Quality Seed**

One may raise the question whether a plateau has been reached in the biological ability of the wheat and rice seed to respond profitably to modern inputs. Obviously this is not the case as a record wheat yield of 8 tonnes/ha has been recorded by the National Agricultural Research Council (NARC). The highest reported farmer's yield in irrigated Punjab is 5.3 tonnes/ha which is nearly three times the existing wheat yield of 1.8 tonnes/ha. The fact of the matter is that although nearly 95 percent of the wheat area is said to be under the HYVs, the availability of certified high quality seed is very limited. Instead of the recommended 20 percent replacement annually, during the last four/five years, the use of quality seed remains woefully low covering only 6 to 8 percent of the total area under wheat. Seed of indifferent quality sown over 90 percent of the wheat area seems to have arrested the increase in productivity.

### **The Shortage of Water**

It is no exaggeration to say that irrigation is the key to agricultural growth and the chief means of raising productivity. In recent years, the growth of new tube-wells has slowed down due to shortage of good quality sub-soil water. There is also the shortage of surface water. This water shortage has adversely affected agricultural productivity.

### **The Degradation of the Natural Resource Base**

Our lands are gradually deteriorating due to the growing menace of waterlogging, salinity and soil erosion. The degraded soils naturally register lower productivity. Ahmad (1991) reports that nearly 42 percent of the total area of the Indus Basin had a water table within 3m. in 1977-79. A high water table not only creates problems of oxygen deficiency but also of salt build-up in the soil profile. According to the same author, about 55 percent of the total area suitable for agriculture and forestry is affected by wind and water erosion. This deterioration of the natural resource base is not only retarding the growth of agricultural productivity but also, and more importantly, is destroying our potential for future development.

### **The Lack of Funds for Agricultural Research**

The importance of agricultural research has not been fully recognised in Pakistan. Government of Pakistan (1988) reports that salaries and allowances alone consume 80 to 90 percent of the budgetary allocation for agricultural research.

leaving very little for the actual conducting of research and for the upkeep of research establishments.

Agricultural research is basically of two types: (i) productivity-maintenance research and (ii) productivity-augmenting research. The first type of research is undertaken to protect the gains already made.

Most of the research being done in Pakistan today is of this type. Productivity-augmenting research, on the other hand, is characterised by fresh technological breakthrough leading to higher yields and lower costs per unit of output. This type of research is expensive and time-consuming. Not much is being done in this vastly important field due to the paucity of funds and lack of research personnel trained in such fields as biotechnology and genetic engineering.

### **Ineffectiveness of Our Agricultural Extension Service**

It is agreed all around that there is very limited scope now for bringing new areas under food crops, and that additional output must come from higher yields per hectare. The technology for raising yields is becoming increasingly complex. It is no longer enough to apply high doses of fertilizer to get higher yields. The fertilizer to be used must be based on soil tests. Seed should be certified to be of good quality and suitable for the ecological zone. Sowing must be done at the optimum time. Irrigation must be applied at the right time and in right quantity. Pest-scouting should be done to determine the right type and dosage of pesticides, so on and so forth. Under such demanding technological conditions, the role of extension service becomes highly critical in increasing productivity. Unfortunately, however, our extension service is mostly ineffective in dealing with these increasingly complex technological issues. Haq *et al.* (1986) reported that for nearly 70 percent of the farmers, the main sources of information for latest crop production technology were radio and fellow farmers. The role of the extension staff (whose knowledge capabilities are reported to be not upto the mark) was marginal (17 percent).

### **Declining Public Investment in Agriculture**

Government has always laid emphasis on agricultural development in day to day statements but has generally neglected to allocate adequate funds. An examination of the trends in public sector planned expenditure clearly indicates the decline of emphasis on agriculture in recent plans.

The drastic decline in attention to agriculture is evident from Table 3. It needs to be realised that modernisation of agriculture requires increasing attention to the development of link roads, co-operatives, marketing infrastructure, storages, community development, agricultural education, research, extension and social services. Gone are the days when agriculture could register healthy growth rates without much additional investment due to the low ICORs. Agriculture has now become very capital demanding and would need massive additional investment to resume growth and to forge ahead.

Table 3  
*Sectoral Outlays in the Five Year Plans*  
*(Percent of Total Outlay)*

Sector	1st Plan	2nd Plan	3rd Plan	Non Plan Years	5th Plan	6th Plan	7th Plan
Agriculture	9.5	8.6	10.5	8.6	9.7	7.1	4.5
(a) Agriculture	9.5	6.7	6.2	5.5	4.0	3.3	3.5
(b) Fertilizer subsidy	—	1.9	4.3	3.1	5.7	3.8	1.0
Water	20.0	43.4	34.2	17.0	10.3	9.1	8.1
Total Agriculture	29.5	52.0	44.7	25.6	20.0	16.2	12.6

Source: Government of Pakistan (1992).

### SUMMING UP

While our foodgrain output remains almost stagnant, our population is galloping at the rate of over 3 percent per annum. If production of wheat and rice does not pick up soon, the foreign exchange burden of heavy food imports may become unbearable for Pakistan. To recapitulate: What is the prognosis for the future? Is the recent stagnation in wheat and rice output (and productivity) a temporary phase or does it threaten to be long term?

The author's view is that if corrective measures are taken promptly, the current stagnation would be only a temporary one and that growth in output and productivity could resume its upward trend in the near future. How vigorous and sustained the upsurge will be would depend upon the vigour of the measures taken by the Government. There are historical precedents both in Pakistan [Chaudhry (1984)] and India [Sawant (1983)] when fears were expressed over stagnation of foodgrain production but before long the growth in production resumed and the fears proved unfounded.

The measures to be adopted for increasing foodgrain output and productivity are generally known. What needs to be emphasised is that these measures should be adopted concurrently in a co-ordinated manner. It is necessary to co-ordinate the use of better quality seed, balanced dosage of fertilizer, organic matter, pesticides, herbicides, optimal irrigation etc., concurrently through an effective and enlightened extension service. Output and input prices should be adjusted to provide economic incentives to the farmers to boost foodgrain output. Much greater emphasis needs to be placed on productivity-augmenting research than has been done so far. Above all, agriculture should be declared a high priority sector, and planned outlay in agriculture should be substantially increased from its present level in order to reclaim and preserve the national resource base, build social and physical infrastructure and to strengthen agricultural research.

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**Comments on**  
**"Stagnation in Foodgrain Production in Pakistan:**  
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The author should be, first of all, commended for giving the most important warning that foodgrain production in Pakistan has been stagnant for the last four years. The data, he has produced are irrefutable. However some researchers may not agree with the causes responsible for the stagnant productivity in agriculture per hectare, in foodgrains with the exception of cotton. The author appears to be optimistic that the current situation is of a temporary nature and the productivity of land per hectare producing foodgrains can be increased provided promptly corrective measures are taken. During 1988-89 and 1991-92 the production of wheat has increased only by 0.10 percent when the population growth of the country is above 3 percent per annum. It means that Pakistan will be forced to import wheat to feed the fast-growing population. He also warns if the steps are not taken now the current stagnation, which is of temporary nature may continue. He provides the example of India where such a situation happened in the early Eighties but the corrective measures were taken and the growth in production of foodgrains resumed and the fears of stagnant production or reaching the plateau in agricultural production proved unfounded.

In the case of Pakistan, according to author, the major factors responsible for stagnant foodgrain production are: area under foodgrain production cannot be increased, growth in productivity per hectare has flattened out. The author, suggests these bottlenecks should be removed by adopting measures concurrently in a co-ordinated manner. Output and input prices should be adjusted to provide economic incentives to the farmers to boost the output of foodgrains. Much greater emphasis needs to be placed on productivity-augmenting research than has been done so far. Planned outlays in agriculture should be doubled from its present level in order to retain and preserve the national resource base, build social and physical infrastructure and to strengthen agricultural research.

The author should have considered, besides prices of the inputs and outputs since 1988-89, other important factors responsible for constant or declining output per hectare. Such as stagnant off-take of fertilizers at about 1.8 million N. tonnes; declining credit disbursements and import of tractors during the period under study. Decline in these three major inputs has contributed to less output per hectare. The following table provides the actual figures.

Rice production has remained stagnant because Rice Basmati-385 has been introduced replacing Basmati-370. The crop has faced the attack of Leafy folder and it has also got only one year favourable weather out of four.

Table

	Fertilizers Of-take (000 N/T)	Credit Disbursed (Rs Million)	Tractors Imported (Nos)
1988-89	1,739.84	14479.26	24,639
1989-90	1,890.10	13834.46	19,939
1990-91	1,892.88	14858.99	21,699
1991-92	1,885.11	13831.60	14,279

Source: Government of Pakistan (1991).

In case of wheat no new variety has been introduced. It is assumed that the present varieties are giving good results at experimental stations but not in the fields.

According to one study the income of the rural workers has gone up in recent years due to availability of work outside agriculture resulting in less efforts on land affecting the productivity. It is a similar argument developed much earlier by Chayanou (1966) in the farmers budgetary approach.

Recently a productivity programme has been introduced by the Government such as providing gypsum at subsidised rates, providing improved seeds, advising deep ploughing etc.

A mention is necessary if the input prices are decreased and budgetary allocations for main agriculture are increased and also for the research and extension services, then the question will arise as how to finance these expenditures. Is tax on agriculture income suggested to finance the proposed expenditures? Or the landowners are persuaded to invest in agriculture research like the Indian Punjab.

Research activities are necessary to suggest which food crops can stand international competition. A comparative competitive advantage of producing only those crops may be encouraged and other less competitive crops phased out.

Consideration may be given to land reforms if they are conducive to productivity increases in the agriculture sector in general and in food crops in particular.

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