Green Revolution in Khyber Pakhtunkhwa (A Comparative Study with Punjab)

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Abstract
Problem Statement
The KP Province is a lagged area Agriculturally and industrially. The inter-regional economic inequalities coined during British rule kept continued after independence when green revolution technologies contribute tremendously to agriculture development in Pakistan in 1960 and 1970. The inter-regional economic inequalities thus once born deepened with the passage of time, particularly in 1960-70. The Question arises, why frontier districts could not share equally the economic development? This paper will try to gather information about the causes of backwardness, whatever that may be.
Keywords: Agriculture, KP, Green Revolution, Punjab, Industry

Production

Introduction

The economy of the Northwest Frontier Province was essentially agriculture based. Northwest Frontier Province served as a fruit basket for the region in early 1950s. Out of the 3.5 million total population of the province about 90 percent depended directly or indirectly on agriculture for its livelihood in 1947[1]. The traditionally operated and managed agriculture sector tended to lag in providing livelihood as well as absorbing labor over time. The production of major food grains such as wheat, rice, gram and maize were not sufficient to meet the requirement of the province. It had an annual food deficit of about 50,000 tons of food grain, chiefly as a result of the extremely low production in the tribal areas. The province depended on import of wheat from Punjab. As agriculture was highly susceptible to the vagaries of weather it generated a small income. Moreover, the topography of the province made some areas non-feasible for modern technology. The growth rate of Agriculture in the province was less than the rate of demographic increase. In the early years after independence, backward

areas like NWFP received some attention. About, a little less than 50 percent of the land in NWFP was in the possession of a few thousand landlords[2]. These landlords were a very influential political group from 1947 to 1958. The total cultivated area of the province was 2.34 million acres in 1946-47, out of which 2.1 million acres' area was under food grain cultivation, 0.13 million acres' area was under minor crops and 0.11million acres under cash crops.

There exist contradictory views in the leading works about the impacts of green revolution technologies on various regions and different size of farms. Khan[3], Kiramat[4], Alvi[5], Falcon[6] and Griffin[7] are of the view that the benefits from growth experience under green revolution technology have not been distributed uniformly between large and small farms. The large farms benefited greatly. Falcon argues that even though in "theory" modern inputs such as seed and fertilizers are size neutral "in practice they are not"[8]. Similarly, Griffin pointed out, "The technical inputs required by the 'green revolution' are essentially 'scale neutral' but the institutions required by the new technology often are not[9]. He further added that government programs such as price support for output and subsidies on input tended to benefit big farmers mainly.

Green Revolution in KP versus Punjab in agriculture of Pakistan

The green revolution technology consisted of several complementary inputs viz. high yielding varieties of seeds for different crops, chemical fertilizers and pesticides. However, the irrigation water played a critical role particularly the installation of public as well as private tube wells. The overall impact of green revolution technology in Pakistan was strong and resulted in significant increase in agricultural production particularly in the irrigated areas. The situation changed as the economy was growing.

Khan[10], Griffin, Bagchi[11], Alvi[12], Burki[13], Falcon[14] and Gotsch[15] are of the view that the introduction of green revolution technology led to increasing rural income disparity in Pakistan. These authors hold that the benefits of technology remained restricted to irrigated areas alone, as in Punjab, 90 percent of cultivated area was irrigated, so the benefits of green revolution remained restricted to Punjab only. Punjab with an elaborate system of canals and installation of tube wells is likely to have made tremendous gains in agricultural production as compared to other provinces especially NWFP and Baluchistan where agricultural production has shown no visible signs of improvement. These apprehensions led to the conclusion of rising inter provincial disparity. Khan pointed out "In their pre-occupation with raising output levels, policy makers relegated the distributive aspect of their policies to the background. There is little doubt that 10 percent of the farmers in Pakistan, owning 25 acres or more and accounting for 43 percent of the farmed area, spearheaded the agricultural change and were its main beneficiaries. Consequently, the income disparities within agriculture

certainly have widened"[16]. Similarly, Griffin says, "The most important reason for the bias of the green revolution is the bias of government policy. For many years, extension and investment program in agriculture have been devoted to raising output, their primary concern has not been to increase the welfare of the rural population and to improve the distributive aspect of the income and wealth"[17]. Bagchi shares these views as "the basis of regional and class wise inequality in the distribution of gains of agricultural productivity had already been laid in the earlier years through the working out of the policies". These authors are of the view that concentration of agricultural land has increased during the green revolution period[18]. Contrary to this Chaudhry Ghaffar, and others are of the view that the green revolution technology was "size neutral" and "scale neutral", meaning that all type of farmers, i.e., small or big, poor or rich equally benefited from the modernization of agriculture. They argue that the Green Revolution technology has added to the employment of labor force. Chaudhry argued that despite the differential impact of new agricultural technology in the early stages of development, the inter farm differential in the adoption of modern practices has either been disappeared or has been gradually narrowed after the demonstration of profitability of improved farm practices[19]. Chaudhary combined the whole set of issues and concluded in these words; "the empirical evidence in Pakistan seems to establish conclusively that net income of tenants and small farmers have been increasing faster than those of big landowners. On the whole, the green revolution appears to have been employment creating. Chaudhry is of the view that the increases in agricultural production were not confined to Punjab alone, but other provinces widely and equally shared them. He is of the view that the rising shares of other provinces in agricultural production are indication of more rapid growth of agricultural production in the provinces of Sind, NWFP and Baluchistan than in the Punjab in the 1970s, when green revolution technologies were adopted in these provinces. Naqvi, Khan and Chaudhary[20] are of the view that the reduction in farm size has positive impacts on land productivity and on the income of small farmers and tenants. Both these factors are universally acknowledged as conducive to raising agricultural productivity. Gotsch found that despite the general lack of concern regarding small farmers who traditionally has been associated with various government agencies, the simplicity, divisibility and profitability of seeds and fertilizers have been such that the diffusion process has penetrated to groups of all sizes. Since tube well is physically indivisible and their installations also require lump sum investment, it may thus be beyond the limited financial means of small farmers to install their own tube well.[21]

Arbab[22] conducted a survey and examined the role of tube well water in the adoption of a full range of the green revolution technology and its impacts on productivity and inter-farm distribution of income in NWFP.

In the pre-British period 57 percent of the total area of the upper trans-Indus belt of Peshawar division and 16.6% of lower trans-Indus belt of Kohat, Bannu, and Dera Ismail Khan was under cultivation.[23] The five branches of Kabul and Swat rivers along with the Bara River traverse Peshawar valley. The canals of the frontier regions utilized the water of the Swat and Kabul River in Peshawar, of the Kurram and Tochi River in Bannu and the minor tributaries of the Indus in Kohat, Bannu and Dera Ismail Khan.

The Punjab with its ample agricultural potentialities like the fertile thirsty plains, underutilized rivers and hardworking peasantry, was regarded by its British conquerors as more valuable than the discovery of the richest mines. From 1885 onward, the economy of Punjab began to be reshaped by the unprecedented extension in the agricultural production brought about by canal colonization. In the western Punjab, the emergence of a hydraulic society combined with extensive irrigation schemes in the neighboring province of Sindh had led to the establishment of the Indus Basin, one of the largest irrigation systems in the world. It composed of 43 main canals, which serve as large distributary's canals and feed minor canals[24]. Contrary to this, terrain of the Northwest Frontier, inhabited by the Pashtuns, whose war like temperament and religiosity all contributed to their stiff resistance to British. They looked upon the arrival as well as rule of the British as a curse and getting rid of them was considered a sacred duty of every individual. So, they were engaged in their efforts to expel the British from their motherland. Their somewhat neglected condition might be attributed to the British Government of Punjab greater preoccupation with the problem of security and law and order in the trans-Indus districts than with socio-political development of the area.[25] Though the Indus River formed the eastern boundary of the Frontier Districts for about 200 miles, yet the British Government of Punjab had done nothing to utilize the water of Indus for irrigating the frontier districts. Sind and Punjab could make admirable use of the Indus water. There is no other reason why a more effective use of Indus water was not made for irrigating trans-Indus southern districts. At the time of independence total cultivated area in NWFP increased to 2.92 million acres out of which 1.04 million acres (35.6) was irrigated. This was no remarkable change in the irrigated area. About one fourth of the total area of Punjab was under cultivation, and of this, one sixth was regularly irrigated[26]. The vast irrigated land resources had a profound impact on the economy and society in Punjab. The Punjab obtained its most promising development. Similarly, Sind, which was desert in the 1890s, had 5 million acres irrigated land at the time of independence[27] but the irrigation projects in the frontier districts were comparatively far less conspicuous.

During 1950s, Policy makers in Pakistan thought that the path to rapid economic growth lay in rapid industrialization. The adverse effects of squeezing agriculture hard were ignored. Persistent poverty in rural areas cannot be cured without agricultural development. Moreover, agricultural

production could no longer keep up with the increase in population. Therefore, Pakistan had to import one million ton of food grain per year during 1950s[28].

The first Prime Minister of Pakistan Liaquat Ali Khan in his address to food and Agriculture Committee at Karachi on 4th December 1950 stressed the need to create an atmosphere where new ideas will take root and improved methods, and technique will find a ready response among the farmers[29]. Government kept the prices of manufactured goods above the world level through import control and that of agriculture products below the world level through the compulsory procurement of major agricultural crops. Moreover, domestic taxes and exports duties on agricultural commodities made the inter-sectoral terms of trade unfavorable for agriculture. The term of trade operated against agriculture and in favor of industry[30]. All over the state policies amounted to a concealed tax on agriculture and a concealed subsidy for industry so the working of these controls made agricultural investment an inferior alternative for the private sector"[31].

Meager resources were allotted to agriculture in Pakistan. It got only 7 percent of the total development outlay of the first five-year plan (1955-60)[32]. The share of public sector investment in agriculture including irrigation was Rs.2, 179 million during the first five-year plan period[33].
The leading position in agriculture was occupied by crop productions especially by four major crops, wheat and cotton in West Pakistan, jute and rice in East Pakistan. The yield per acre of these crops was very low due to the use of primitive methods of cultivation. The inadequate monsoons and low canal irrigation supplies caused poor crops during 1952-53, which necessitated heavy food grains imports from abroad. The windfall gains, which unexpectedly benefited Pakistan, were due to the boom in world commodity prices resulting from the Korean War. Pakistan earned enough foreign exchange from export of raw material like jute and cotton and got some relief from the urgency of economic pressure besetting the economy.

This was one of the causes of low agricultural growth rate of 1.7 percent per annum during 1950s[34]. Agriculture exhausted its capacity to augment production through the use of additional conventional inputs and annual agriculture growth rate fell to 1.43 percent, less than annual population growth rate between 1948 and 1958[35].In order to improve and organize agriculture on scientific lines, the government of Pakistan constituted Agricultural Inquiry Committee in March 1951, under the chairmanship of Lord Boyd Orr. In the light of the recommendations of Orr committee, a" Central Grow More Food Committee" was set up on ad hoc basis to think over possible measures for curtailment of food shortage situations in the future. The Committee recommended the short-term measures such as bringing more area under food grains cultivation, diffusion of improved seeds, improved methods of cultivation, use of manure, fertilizers and pesticides that will enable the Pakistan agriculture to increase

the existing crops yield by more than 50 percent. The committee also recommended the establishment of multiplication farms on large scale, intensification of demonstrations for the use of improved seeds, fertilizers and the establishment of cooperative societies[36]. A 'Central Grow More Food Emergency Committee' was constituted in 1953, and the provincial governments were also directed to set up similar committees to work in collaboration with the Central Committee. Under the "Grow More Food Scheme" rupees 21 million were allocated to NWFP[37].

In Punjab and Sind canal irrigation works expanded rapidly with the construction of GM Barrage in 1955, Taunsa Barrage in 1958 and Guddu Barrage in 1962. These barrages expanded the canal command area in Pakistan from 14 million acres in 1947 to about 35 million acres in 1960.[38] In Swabi district of Peshawar valley and Bannu district of D.I.Khan division in NWFP, hundreds square miles of cultivated area was under the menace of water logging and salinity. Therefore, the Salinity Control and Reclamation Program (SCARP) was started in 1954. It was a public tube well digging program launched for salinity control and reclamation as well as for providing irrigation water.

The provincial government of NWFP undertook the following steps for improvement of agriculture (1). Bringing more land under cultivation. (2). Increasing the existing crop yields by introduction of healthy seeds, modern farming implements and fertilizers. (3) Saving the existing crops from the ravages of insects and pests, bringing more and more areas under cultivation.

At the time of formation of One Unit in October 1955, the Frontier province had 1.791 co-operative societies, with a membership of 55,385 and working capital of Rs. 27.56 million[39]. After the formation of One Unit the Northwest Frontier Province was opened for the cooperative techniques of other amalgamated provinces. During the first five-year plan period 1.5 million rupees were provided annually by cooperatives in NWFP. The average Taqavi loans provided to the farmers in the pre-planned period (1947-54) were 0.751 million rupees per annum and rose to 1.01 million rupees during the first plan period. The Agricultural Bank of Pakistan was established in 1957, which provided credit facilities, particularly to the small farmers. The institutional credit increased twenty folds in NWFP. The tillers received the institutional loan at the average annual rate of Rs.0.52 million during the pre-planned period. It rose from Rs.250 thousand in 1947 to 2.5 million in 1960. It attained the average annual level of Rs.2.6 during the first plan period (1955-60).

Total cultivated area reached 3.13 million acres in 1960[40]. In 1958, sugar beet production was started, and about 17 thousand acres of area was annually sown to it. Its production reached 100 thousand tons per annum[41]. The orchard area expanded three times i.e. from 18,000 acres in 1948 to

23,122 acres in 1960 and fruits production from it reached 160,732 tons in 1960.[42]

The production of food grains, sugarcane and tobacco crops of the province during (1955-1960) as compared to the average production during 1948-1954 in thousand tons

Name of the Crop	Average production during base period (1948-1954)	Average production during (1955-1960)	Percent rise or fall
Wheat	246	272.6	10.8
Rice	11.6	8.3	-28.4
Total food grains	550.7	622.8	13
Sugarcane	1226.3	1795	46.4
Tobacco	44.9	25.9	-42

Source: Government of NWFP, Agricultural Statistics of NWFP, Bulletin No. 1

There was negligible increase in case of food grains in Pakistan during the first plan period. But in the case of Frontier as the table shows, there was a substantial increase of 13 percent in food grains and 46 percent in Sugar cane. Tobacco and rice did not perform well.

A shift in government policy in favor of agriculture occurred with the advent of Green Revolution Technology in the 1960s. The growth was quite satisfactory in all sectors of the economy during the decade of the 1960s. The average annual rise in GDP was 6.3 percent per annum during 1960-70. In January 1959 and Ayoub Khan promulgated the West Pakistan Land Reform Regulation referred to as MLR-64 on February 7, 1959. In West Pakistan about 2.3 million acres area was surrendered by 6,000 landlords in addition to 0.7 million acres of land surrendered as a Jagir. Under this regulation 240,406 acres of land was resumed in NWFP and 24314 persons benefited from allotment of resumed land. Most of the resumed land lied in the districts of Dera Ismail Khan, Mansehra and Kohat. The fertile districts of Peshawar and Mardan yielded very little. The allotment of resumed land was so made as to upgrade maximum number of holdings below subsistence level. The allotment was made to 24,314 tenants that resulted in up-gradation of 4.2 percent of below subsistence holdings to subsistence level. Moreover 101,170 acres were allotted to eligible persons on payment.

Agriculture share fell to 45.8 percent in GDP in 1960. The percentage of labors force engaged in agriculture fell to 64[43]. The cropped area grew by 1.7 percent a year and the supply of irrigation water grew by 2.5 per cent a year during 1960-70. Agriculture grew at the rate of 3.7 percent per year during 1960-65 and 5.6 percent per annum during 1965-70[44]. The share of Agriculture in GDP of Pakistan further came down to 38.9

percent in 1970 and 58 percent of the total labor force of country was engaged in agriculture.[45]

Due to strain trade relations with India and Pak-India 1965 war, the export of fruits from NWFP to India fluctuated and fell.[46]. During 1955-1970 all the four provinces Punjab, Sind, NWFP, and Baluchistan remained unified in One Unit of West Pakistan. During the one-unit regime the public sector total development outlays in NWFP plus tribal areas were Rs.1200 million or 80 million per annum[47]. As an amount of 4 percent of total was invested in NWFP. Therefore, the province emerged with thin industrial structure and the existing industrial units were mostly confined to sugar and tobacco industries. Northwest Frontier Province occupied about 9.4 percent of the total area of Pakistan and contained about 13 percent of the total population of Pakistan[48]. Cultivated area per head in NWFP was 0.47 acres as compared to 0.94 in Punjab and 1.57 in Sind. The land man ratio was 0.45 acres in NWFP while it was 1.45 acres for Pakistan as a whole[49].

The systems of support and subsidies policies of agriculture were initiated in 1958, and their list and rate structure were expanded considerably during the sixties. Towards the end of the sixties, it was noted that almost all the agricultural inputs including fertilizers, insecticides, seeds, tube wells, tractors and tractor-related equipment were subsidized in one or another form. The subsidies going to each province were in proportion to the production of major crops. One- percent production of major crops enabled a province for one- percent share of the subsidy. As Punjab was producing more than 60 percent of major crops of Pakistan so its share in subsidy was also above 60 percent. NWFP with its share below 7 percent in production of total major crops of Pakistan made it liable to the subsidy below 6 percent[50]. The province of NWFP progressed more rapidly than other provinces in fruit production. The province was an important fruit growing area. The annual average production of fruits was 160 thousand tons valuing 52.5 million. The average annual production of plums, pears, peaches and citrus fruits was 64.7 thousand tons, 22.9 thousand tons, 3.7 thousand tons and 33.5 thousand tons respectively. This region produced 76 percent of the plums, 96 percent of the pears, 46 percent of the peaches and 100 percent of the citrus fruits of West Pakistan[51].

The Sugar cane research station was established in Mardan. In 1957, the agriculture section of Islamia College was elevated to the status of full fledge college of agriculture. Science and Agriculture College was established in Dera Ismail Khan in 1967. It was elevated to the status of faculty of agriculture Gomal University D.I.Khan in 1979. Seed farm was established in D.I.Khan in 1958, which was later elevated to full-fledge Agricultural Research Station. Seed Farm Ratta Kulachi was converted to Hybrid Maize Seed Farm, D.I.Khan and Rakh Zindani Seed Farm was established in D.I.Khan. More than one and half million were spent for the development and reclamation of agricultural land, plant protection measures

and distribution of seed and fertilizers in the Frontier region[52].The light of the recommendations of Food and Agriculture Commission (1959-60), West Pakistan Agricultural Development Corporation (WPADC) was established in 1961. Main task before the corporation was commercial operations of agriculture like supply and distribution of modern inputs i.e. seeds, fertilizers, pesticides and implements. The Pakistan Tobacco Board was established in 1968, for carrying out research and other tasks for development of tobacco. The share of agriculture in the development plans of Pakistan has fallen from about 10 percent in the first five-year plan (1955-60) to 4 percent in the sixth five-year plan (1983-88). The share of agriculture research and extension in the development budget of agriculture has, however, risen from 8 to 20 percent during the same time[53]. Irrigation work consisting of installation of tube wells, surface wells, small bunds and dams was given priority. A sum of Rs.14.9 million incurred on it and 3,714 different schemes were completed. In agricultural sector 239 different schemes were completed on the expense of 1.7 million[54].During second five-year plan period (1960-65) the credit facilities by cooperative reached 3.5 million rupees annually that was provided to the farmers in NWFP. During third five-year plan period (1965-70) a sum of 0.94 million rupees per annum were delivered to the peoples[55]. During second and third five years' plan (1960-70) the average annual Taqavi loans rose to 1.97 and 1.87 million rupees respectively[56]. The institutional credit increased twenty folds in NWFP. It rose to Rs.5 million at the end of 1960s. It rose to the average annual level Rs.5.9 and Rs.5.4 million during the second and third five-year plans respectively. During the decade of 1960s the ADBP supplied a loan of Rs.18.2 million to the farmers in NWFP[57]. At the end of decade of 1960s Punjab benefited greatly and usurped 72 percent of the institutional credit of Pakistan while NWFP availed only 4 percent of the total institutional loan of Pakistan. Per acre availability of institutional credit was 10 rupees in Punjab and 2 rupees in NWFP[58].

Green Revolution in 1960s

Availability of several agricultural inputs like land, water, fertilizers, healthy seeds, curative and preventive measures like insecticides, pesticides and herbicides and mechanical appliances like tractors and threshers are of great importance for increase of agricultural production. By the beginning of the second five-year plan, the institutional changes had already begun to exert a positive influence. Subsidies were introduced on fertilizers, improved seeds and plant protection. The institutional and technological improvement and shift in policy led to the introduction of the green revolution in agriculture. The use of improved irrigation facilities like tube wells, HYV seeds, fertilizers, pesticides and modern machinery like tractors and threshers led to an increase in the production of agricultural in the late 1960s. The distribution of tube wells, tractors, fertilizers and insecticides were done

by public sectors. PASSCO distributed HYVS, Fertilizers and Pesticides and WAPDA plus Canal Department expanded irrigation facilities.

Water was the key variable that established the spread of green revolution technology. Other variables such as seeds and fertilizer were dependent on the timely availability of water. The increase in the availability of water either through canal or by tube wells was thought to be responsible for half of the total increase in output[59]. A Study conducted by Falcon and Gotsch found that of the annual crop growth rate of 4.9 percent during 1960s in Pakistan, 2.7 percent was to be attributed to irrigation, 1.0 percent to fertilizer and the remaining 1.2 percent to other factors[60].

During the second (1960-65) and third (1965-70) five-year plan period 24 percent of the total development outlay was allotted to agriculture and water sectors. Irrigation and reclamation facilities were provided to 2.05 and 6.5 million acres of land during second five years plan period. During third five-year plan period 2.7 million acres land was watered and irrigation facilities to 12.65 million acres land were improved in Pakistan[61]

In Pakistan Canal water supplies increased from 50 million acres' feet in 1960 to 54.89 million acres' feet in 1970[62]. Although the volume of water has increased rapidly, expansion in the canal irrigated area has not been so. The canal irrigated area increased from 21 million acres in 1955 to 26 million acres in 1960 falling to 23.43 million acres in 1970.[63]

The public works department NWFP also started construction work on multipurpose projects and completed four small dams.The Warsak Dam in the Kabul-Chitral-Swat Basin, Kurram Garhi and Tanda in the Kurram-Kohat-Gomal Basin and Khanpur Dam in Hazara during the first two decades. The government of NWFP invested Rs.9.8 million during the first plan period, Rs.6.5 million during the second plan period and Rs.95.3 million during the third plan period in this basin[64]. A total of 0.401 million acres have been benefited, 0.233 million acres of dry land was supplied irrigation water, 26 thousand acres of the already irrigated field received improved water supplies, 21 thousand acres were protected against floods and 120.5 thousand acres of land was provided drainage facilities[65] Except Bannu most of the other areas in the southern part are poorly irrigated. The first and most important project completed in this basin was Kurram Garhi Dam project.

A number of important incentives were provided to the farmers for installation of private tube wells in 1960s. Firstly, large volumes of loans on easy terms were made available for the purchase of tube wells and secondly due to import liberalization policy it became easier for the farmers to import materials for tube wells installation. It resulted in the rapid expansion of private tube wells particularly in the Indus Basin region. The availability of water from tube wells became a major source of irrigation. The average annual figure of tube well installation increased from 330 in 1950s to 8000 in 1960s in Pakistan[66]. In Punjab alone the figure during this period was 22,348 and in NWFP only 303 tube wells were annually in operation in 1963-

65. During 1960-70, supplies of public tube wells water increased by 293 percent in Pakistan.[67]

Punjab possessed about 90 percent total tube wells of the Pakistan while share of NWFP was only 1.3 percent in the total tube well of the country. The irrigated area that was 13.8 million acres in 1948 in Punjab rose to 16.6 million acres in 1960 and 21 million acres in 1970. In Northwest Frontier Province, the irrigated land increased to 1.20 million acres in 1960 and 1.60 million acres in 1970. The unequal development in irrigation in Punjab and NWF region resulted indifference in per capita increase of cultivated and irrigated acreage and was the basic cause of the difference in the extent of development of agriculture observed in both these regions during 1960-70[68].

Punjab cultivated area increased from 22 million acres in 1948 to 24 million acres in 1960 and 27 million acres in 1970. In Northwest Frontier Province the cultivated land enhanced from 2.92 million acres in 1948 to 3.13 million acres in 1960 and 4.20 million acres in 1970[69].

Use of Chemical Fertilizers

Use of fertilizers received an impetus with the introduction of high yielding variety seeds and fertilizers responsive varieties of wheat and rice in mid 1960s, together with the increased availability of irrigation water. Introduction of subsidies on fertilizers and expansion of institutional credit were two additional incentives. Use of chemical fertilizers increased five folds in 1965-66 as compared to 1957-58. The fertilizer consumption saw a dramatic increase of 150 percent between 1960 and 1965 and a rise of 235 percent between 1965 and 1970. On the national level its use raised from 53 thousand nutrient tons in 1960s to 386 thousand nutrient tons in 1970s[70].

Consumption of fertilizers in term of Plant nutrient in NWFP during 1953-70

Year	Fertilizer consumed (Tons)	Year	Fertilizer consumed (Tons)
1952-53	106	1961-62	7,691
1953-54	3,334	1962-63	12,210
1954-55	2,356	1963-64	3,920
1955-56	952	1964-65	2,328
1956-57	655	1965-66	4,066
1957-58	4,276	1966-67	10,066
1958-59	3,331	1967-68	22,496
1959-60	3,457	1968-69	27,557
1960-61	6,196	1969-70	33,830

Source: Nurul-Islam Mian Agricultural Economy of NWFP and Economic Survey and outlook of NWFP (1971-72)

The table shows fluctuation in quantity of fertilizers used. Maximum fertilizer was used in 1953 during the decade of 1950s. The use of fertilizer has considerably increased from 6,196 tons in 1960 to 33,830 tons in 1969.

High Yield Varieties Seeds

Seed is the basic, vital and central input in agriculture. It is the timely availability of quality seed of the right variety in adequate quantities that decides the health and strength of an agricultural economy. The high yielding wheat and corn varieties were initially developed in Mexico in the 1950s. New high yielding varieties of wheat, maize and rice developed at CIMMYT in Mexico and IRRI in the Philippines respectively were made available in Pakistan in the second half of 1960s. The high return associated with the use of these seeds led to their rapid diffusion among farmers in many countries including Pakistan. Seed is relatively low-cost input but has the potential to increase yield on an average by 20 percent over the traditional seed used by the farmers[71]. Certified seeds were produced and distributed by Punjab and Sind seed corporations. NWFP, which did not possess such industry, Agricultural Development Authority supplied seeds to the farmers.

The average annual quantity of improved seeds of wheat, maize and gram used in NWFP during 1953-70

Period	Wheat (Maunds)	Maize (Maunds)	Gram (Maunds)
1953-55	11,403	1,746	267
1955-60	47,909	436	6,343
1960-65	48,816	1,455	11,192
1965-70	73,532	5,800	6,266

Nurul Islam and Sajidin Hussain. Economic Analysis of Cropping Pattern in NWFP Part1 Historical Perspective (1947-76), Publication Number.115, I.D.S, Agricultural University Peshawar

The table shows that there was a continuous increase in the quantity of improved seed of wheat used. It reached 73,532 maunds during 1965-70. There was favorable rise in the use of improved seed of maize and reached 5,800 maunds during 1965-70. Wide fluctuation occurred in the use of improved seed of gram. Its amount increased to 11,192 maunds during 1960-65 and fell to 6,266 maunds during 1965-70.

Curative and Preventive measures

The government of Pakistan has spent 4.1 million to combat pests and crop diseases during the pre-planned period. During the first, second and third plans periods Rs.60 million, Rs.256 million and Rs.655.94 million were allocated for this purpose[72]. In 1960, the area under preventive and curative measures reached 9.8 million acres or 23.4 percent of the net area sown. In

1970, the area covered by plant protection measures reached 13 million acres or 34.3 percent of the net area sown[73].

Pests and crops diseases were responsible for significant losses in crop production in NWFP also, especially in the case of sugarcane and fruits. Both curative and preventive measures were used but the proportion of net area covered by these operations was small as compared to Punjab.

Area Covered by Plant Protection Operations in NWFP during 1960-70

Year	Curative measures (in acres) (Pest and Rodent control)	Preventive measures (in tons) (Seeds treatment)
1960	19,636	104
1961	1,39,811	557
1962	95,490	195
1963	1,65,574	706
1964	1,76,126	733
1965	1,43,520	1,158
1966	3,68,276	122
1967	51,460	162
1968	1,20,761	745
1969	2,23,567	846

Source; Nurul Islam the Agricultural Economy of NWFP, (Institute of Development
Studies, Agriculture University Peshawar, 1970), p.129

The table indicates that the area covered by plant protection measures during 1960-70 fluctuated. Maximum area was covered by curative measures during 1967 when ground and aerial spray was spreading on 3, 68, 278 acres. Similarly preventive measures were at peak during 1965 when 1,165 tons of seed sown was treated with chemicals against seed borne diseases.

Mechanization

Tractor contribution had important consequences on agriculture during the decade of 1960s. Its imports were encouraged by the provision of cheap credit through Agricultural Development Bank of Pakistan. In 1959, there were 2,000 tractors in the country, which increased by over 8,000 percent to 18,909 in 1968[74]. Three divisions of Multan, Lahore and Bahawalpur possessed 58 percent of the total tractors of the country[75]. In NWFP the total number of tractors both owned by government as well as private people reached 1,019 or 5.4 percent of total tractors in West Pakistan in 1970[76].

Agricultural out put

The phenomenal increase in agricultural growth took place in two phases. In the first phase from 1960 to 1965, the main cause of the growth during this period was due to the increase in irrigation facilities, mainly tube

wells. The average annual growth rate of agricultural output reached 4.5 percent during the period 1960-65 against 1.3 percent during 1950s. In the second phase, during 1965-70, agriculture showed impressive growth when the expanded irrigation facilities were supplemented by the technology package of high yielding variety seed, chemical fertilizers and pesticides. The agriculture growth recorded at 6.3 percent per annum during this phase. Major crops grew at 9.1 percent, minor crops at 3.8 percent and livestock at 2.0 percent per annum[77].

In NWFP, most of the farmers being illiterate and poor were reluctant to adopt the modern agricultural inputs, technology package and new methods of farming and were clung to the old methods of tillage inherited by them from their forefathers. Generally, agriculture in the province was characterized by low investment, inadequate supply of inputs, poor per acre yields and consequential low income of farmers in NWFP. The extension workers find it difficult to inculcate modern inputs and farming methods among the farmers. In 1968-69 total area under cultivation rose to 3.19 million acres, out of which 2.79 million acres was under food grain cultivation, 0.13 million acres under minor crops and 0.26 million acres was under cash crops[78]. In 1968-69, the area under fruit orchard rose to 28,573 acres and fruit production went up to 1, 73, 833 tons.[79]

The total area under crop production rose to 2.57 million acres in 1968[80]. The position of food grains such as wheat and maize were not encouraging because the increase in production could not keep pace with the raising requirements in the province. The province produced only 80 percent of its annual requirements. Food grains were cultivated on 86 percent of the total cropped area and produced 41 percent of the total value of all crops[81]. The average annual area sown to wheat was 1,464 thousand acres, which produced 324 thousand tons. Sowing of maize was spreading over 728 thousand acres and producing 334 thousand tons at average annually. The annual average of rice acreage has reached 375 thousand acres, and its production rose to 114 thousand tons[82]. Other food grains such as barley, bajra and gram were cultivated annually on 552 thousand acres and average production from them was 92 thousand tons. The province was surplus in some commodities such as tobacco, sugarcane, fruits and vegetables. These crops were grown on average on 470 thousand acres annually and were accounting for 59 percent value of all crops. Tobacco, a major cash crop of the province was sown on 89 thousand acres annually and its average production was 90 thousand tons per annum. NWFP produced about 65 percent of the total tobacco of West Pakistan[83]. Sugarcane, the second major cash crop of the province, was cultivated on 206 thousand acres annually and 3200 thousand tons sugarcane was produced annually. NWFP produced 15 percent of the total sugarcane of West Pakistan. Potato and chilies were other cash crops of the province, the former was sown on ten thousand acres per annum and its average annual production was 41 thousand tons, while the

latter was sown on 6 thousand acres annually producing averagely 5 thousand ton annually[84].

The average annual acreage, average annual production and yield per acre of major food and cash crops in NWFP during 1960-65 and 1965-70

Annual average during 1960-65				Annual average during 1965-70		
Crop	**Acreage (000 acres)**	**Production in million Mds**	**Yield per acre Mds**	**Acreage (000 acres)**	**Production in million Mds**	**Yield per acre in Mds**
Wheat	1336	8.92	6.69	1488	9.73	6.56
Maize	572	6.95	12.14	751	9.22	12.27
Sugarcane	169	65.64	388.38	202	88.56	438.44
Tobacco	42	1.16	27.50	82	2.32	28.24
Gram	240	1.322	5.11	228	0.795	3.49
Jowar	79	0.412	5.22	71	0.397	5.59
Bajra	88	0.464	5.27	78	0.369	4.73

Source: Nurul Islam and Sajidin, An economic analysis of cropping pattern in NWFP. (Institute of Development Studies, Agricultural University Peshawar, 1979)

The table shows the average annual area under cultivation of wheat, maize, sugar cane and tobacco increased while acreage under gram, jowar and bajra decreased. Again, per acre yield shows an increase in the case of maize, sugar cane, tobacco and jowar while decreased in case of wheat, gram and bajra.

In Punjab, agriculturally most developed province of Pakistan increases in per acre yield of major food and cash crops like wheat, maize, jowar (sorghum), bajra, and sugarcane was 11.6, 0.27, 0.10, 0.25 and 0.38 percent respectively. While decrease in per acre yield of some crops like rice, gram and cotton was 0.73, 3.7 and 1.1 percent respectively[85]. In case of NWFP as we see from the above table per acre yield shows an increase of 1.07, 12.89, 2.7 and 7 percent in case of maize, sugarcane, tobacco and jowar (sorghum) respectively and decrease of 2.0, 1.7, and 10.25 percent occurred in case of wheat, gram and bajra (barley) respectively[86].

Forests covered 1.33 million-hectare or 13 percent of the total area of NWFregion in 1968. The province has largest proportion of area under forest in Pakistan. About 39 percent of the national hectarage under forest was in NWF region and contributed 53.7 percent of the total revenue of the country received from the forests[87].

Green revolution in Northwest Frontier Province as compared to other provinces of West Pakistan

With the coming of the green revolution, the income distribution aspect became critical and there was a demand for emphasis on better regional and social balance in the development process. Agricultural growth

in West Pakistan during decade of 1960-70 has been impressive. The agriculture sector grew at 3.8 percent per annum in the NWF region. In Pakistan, the overall growth in the production of major crops was 4.7 percent per annum and for the minor crops it was 4.8 percent per annum. But the growth was uneven among the provinces. The Punjab played a leadership role in the adoption of new technology and NWFP lagged in this respect. Because of differential rates of adoption of the green revolution technology in the provinces of Pakistan per acre growth of various crops was different in all the four provinces.

The trend in agricultural growth, provincial share in total agricultural production, gross value product per farm worker per annum and per acre in the provinces of Punjab and NWFP during 1960-70

Province	Annual agricultural growth trend rate (in percent)	GVP per farm worker (Rs)	GVP per cropped acre (Rs)	Percent roportion In total roduction
West Pakistan	5.9	783	172	100
NWFP	3.8	522	147	7.8
Punjab	6.1	740	191	70.9

Source: Muhammad Ali Frontier migration to Industrial areas in West Pakistan, PhD Diss. Washington State University, 1973, p.28

The table indicates that all the variables i.e. growth rate trend, gross value product both per farm worker and per crop acre were lower for NWFP as compared to Punjab and Pakistan as a whole.

The growth was due to acreage effect (bringing more and more area under cultivation) and yield effect (HYV, fertilizers and agricultural machinery). Several factors have been responsible for the differential growth rates of agriculture among the provinces. Regional variation in agricultural growth has also appeared because of the water availability.

The gross regional products and GRP per capita per annum in the provinces of Pakistan during 1969-70

Province	GRP (million Rs)	Population (million)	GRP per capita (Rs.)
NWFP	3,714	10.3	360
Punjab	21,356	34.8	614
Sind	9,805	11.5	854
Baluchistan	769	1.7	455

Government of Pakistan, Fourth five-year +3lan (1970-75), (Islamabad: Planning Commission, 1970), p.547

The spread of green revolution technologies from 1960s onwards, was on limited scale in NWFP as compared to Indus basin region of Punjab and Sind. There were strong inter-provincial variations in the adoption of modern agricultural inputs in 1960. The province of NWFP, being a land of small landowners and farmers, has fragmented and unevenly distributed land. Irrigation water constituted the most important part of the spread of whole green revolution technology. At the end of decade of 1960s, the area irrigated by canals reached 15.84 million acres in Punjab, while in NWFP there was only 1.36 million acres canal irrigated area at the same time[88].To sum up, the real breakthrough in agriculture came during the 1960s with an increase in the availability of water, both through canal and tube well irrigation, and the use of new subsidized seeds and fertilizers. Among the provinces, in Punjab 78 percent of cultivated area was irrigated while in NWFP 40 percent of cultivated area was irrigated[89]. Punjab was producing more than 60 percent of major crops of Pakistan, so its share in subsidies and credit was also above 60 percent. NWFP with its share below 7 percent in production of total major crops of the Pakistan made it liable to the subsidy and credit below 7 percent[90]. Moreover, industrial expansion in the regions of Sind and Punjab has been more rapid than in the NWFP. So, the potential unemployment in the NWFP was 76 percent in the case of agricultural sector and 69 percent in non-agricultural sectors.

There was no doubt that a breakthrough in agriculture in the 1960s had a beneficial effect not only on rural employment in agriculture, at least in early stages, but also in agriculture-related non-farm rural activities and urban industry. However, there were two limitations. The first was in terms of coverage. The impact of the green revolution was confined mainly to the irrigated areas of Punjab, Sindh, and parts of NWFP. The rain-fed areas of Punjab and NWFP, and the northern hilly region and arid lands of Sindh and Baluchistan, were left behind. The second limitation arose from the access to credit that was essential to the dissemination of this technology package, strengthened by considerable subsidies on agricultural inputs. This biased the use of the green revolution technology mainly in favor of the big farmers. In NWFP small and fragmented holdings prevailed that was one of the causes of the thin structure of agriculture in the province.

Agriculture Development in Nwfp During 1970s

The decade of the 1970s was marked by exogenous shocks. After the annulment of One Unit of West Pakistan on July 1,1970, the old provinces of Punjab, Sind, Baluchistan and Northwest Frontier Province were restored. In terms of population Punjab was the largest one possessing 34.8 million (56.7 percent) of the total population of Pakistan followed by Sind with 11.5 million (22.7 percent), NWFP with 10.3 million (15.6 percent) and

Baluchistan having 1.7 million (5 percent) only[91]. The annulment was followed by an atmosphere of general economic uncertainty caused by the secession of East Pakistan in December 1971. Also, the period onward 1973 were the years of bad luck, because Pakistan was facing a worldwide recession and a sharp rise in the oil price by OPEC in late 1973, which caused rise in the prices of fertilizers and other agricultural inputs. The droughts in 1972 & 1974 harmed the major crops. In 1973, 1974 and 1976 floods damaged the crops, particularly cotton crops in Punjab. During 1975-77 excessive rainfall and crop pests depressed the cotton crop[92].

Soon after taking over the government, The PPP government tried to bring about reform in agriculture structure. The prices of agricultural commodities were lowered and reduced to less than the world level, while those of fertilizers were raised. In 1972, Agricultural Pesticides Ordinance was promulgated, which regulated the import, production and distribution of pesticides. A Quarantine Act was promulgated in 1976 to keep the country free from the introduction of pests and diseases[93].

In rural area of Pakistan social and economic relations evolve round the control of land. Landlords monopolized social power in the rural structure. Pakistan has a highly skewed pattern of land distribution.

The government announced the land reforms regulation of 1972 (Martial law Regulation No.115) on March 11, 1972. An individual was entitled to own or possess 150 acres of irrigated or 300 acres un-irrigated land (one acre of irrigated land being equated to two acres of un-irrigated land). In NWFP an area of 1,56,512 acres was resumed under MLR-115. Out of total resumed land 21 percent was cultivated and the remaining 79 percent was barren[94]These land reforms were more effective in NWFP. The number of peasants receiving land in the province formed 33 percent of the total number of tenants. Almost 12 percent of the total farm area in the province was redistributed. This was a creditable achievement. The prices of agricultural products improved steadily. Subsidies on agricultural inputs continued. The subsidy to agriculture (water, fertilizer and credit) increased from 31million in 1970-71 to 1766 million in 1980[95]. In NWFP, 90 percent of the prevalent farm size was below subsistence holding. So the benefits of the government's agricultural inputs and credit subsidy program have accrued disproportionately to the Punjab, which had better access to water, power and fertilizers[96].

The share of agriculture remained 36 percent in the total GDP despite 67 percent of the total population engagement in agriculture sector during 1970-75. The annual growth rate fell to 1.75 percent per annum during 1971-77. Rice and wheat crops showed steady increase during 1971-77[97].

The subsidy received by a province was proportional to major crops produced by that province. One percent production of major crops enabled a province for one percent in subsidy of the country. Government of Pakistan introduced Cotton export subsidies in 1979-80. Since NWFP was not

producing exportable cotton so the new subsidies wholly sully went to Punjab and Sind.

The number of tube wells and tractors consecutively rose from 161,210 and 71,000 in 1977 to 207,810 and111, 000 in 1982. Similarly, the use of fertilizer increased from 0.7 million nutrient tons in 1977 to 1.4 million nutrient tons in 1982. Such an increase has been made possible through the massive inflow of foreign remittances summing 600 to 700 million US $ annually during this period[98].

Total cultivated area of the province was 4.62 million acres (9.05 percent of the total cultivated area of Pakistan). Out of 4.62 million acres' farm area in NWFP 0.63 million acres or 15.4 percent of the farm area was in newly merged Malakand. In Malakand, 58 percent of the total farm area was irrigated. Wheat and maize were the main crops sown in 77 percent-cultivated area in this region. The amalgamated region was rich in fruit orchards. Fisheries, forestry and livestock have favorable prospects in the region. The gross regional products of the NWFP province were valued Rs.3714 million as compared to Rs.21356 million of Punjab and GDP per capita per annum was Rs.360 in NWFP as compared to Rs.614 in Punjab. Out of Rs.3714 million gross regional product of NWFP, Rs.1480 million (40 percent) was contributed by agriculture in 1970[99]. The increase in gross provincial product was matched by the rise in population. Therefore, the per capita income remained low. In 1982, the agriculture provided employment to 80 percent of the labor force of the NWFP and contributed hardly 40 percent of the Gross Provincial Product whereas manufacturing accounted for only 4.5 percent of the GDP[100]. Out of the total investment made in Agriculture in Pakistan during the decade of 1970s, Punjab's share was above 70 percent and that of NWFP was only 7 percent. Due to thin structure of agriculture in the province, there was a shortage of employment opportunities in the agriculture sector and one million workers were migrating from the province to other places during 1972-81[101].

The per capita cultivable area in the province was 0.4 acres as compared to 0.96 acre and 2.02 acres in Punjab and Sind[102]. In 1971-72 the total area under cultivation reached 4.04 million acres in NWFP. The abrupt increase in cultivated areas of NWFP in 1971-72 was due to inclusion of Malahand Division. By 1982, Punjab was contributing 56.4 percent of Pakistan's total cultivated area and NWFP 9.4 percent of the total cultivated area of the country[103]. In 1971-72 out of 47.2 million acres total cultivated area of Pakistan, Punjab possessed 27.28 million acres or 57.8 percent of the total cultivated area of Pakistan, whereas NWFP shared only 4.003 million acres or 8.49 percent of the total cultivated area of Pakistan. The total cultivated land in Punjab reached to 28.4 million acres or 56.7 percent of the total cultivated land of Pakistan while share of NWFP hardly reached 4.77 million acres or 9.5 % of the total cultivated land of Pakistan in 1980.

The inflow of more than two million Afghan refugees in 1979, lodged in 235 camps at 94 different places along with their herds of cattle leading to increasing encroachment on land under forest and overgrazed ranges. The committee constituted in 1975, recommended distribution of 1700 metric tons of Mexican wheat at subsidized rate to the growers. A sum of Rs.0.16 million was allocated to NWFP by central government for procuring and subsidizing seed of Mexican wheat[104]. Agricultural Department NWFP established seed farms at different places in the width and length of the province for supply and multiplication of new variety seeds. The Department of Agriculture extended its extension activities through introducing Denial Benore's Training and Visit system (T&V System) in some selected areas in the late seventies. Preliminarily the T & V system was introduced in Dera Ismail Khan in August 1978 and in Buner with head quarter at Daggar in October 1978. In 1980, provincial agriculture department maintained 30 fruit nursery farms in various districts of the province[105].

Barani Areas Development Project (1975-80)

The Barani Areas Development Project (BADP) was launched in NWFP with the assistance of US-AID in 1975, when the government felt the need to develop and boost productivity of the vast lands having no irrigation facilities. The main objective of the project was to ameliorate the economic conditions of the farmers in the Barani (rain-fed) areas by increasing the crops' yield. During the period starting from 1975 and ending in 1980, a total sum of Rs.7.55 million was allocated to the different programs under BADP. The BADP arranged 12,255 crop cultivation demonstration plots in 2172 villages spread over the whole province. Moreover 489 adoptive research trials, 197 commercial and 313 contour/ chisel plough plots were undertaken[106].

In NWFP, rupees 3.02 million taqavi loans were advanced in 1970-71. In 1980, these loans decreased to rupees 2.66 million. The number of cooperative societies reached 3444 and rupees 71.21 million loan was advanced in 1980[107]

Agricultural inputs

Main problem faced by agriculture in NWFP was absence of irrigation facilities for watering of land. Out of 3.05 million acres total cultivated area only 1.15 million acres was irrigated in NWFP. Thus, the percentage of irrigated area to total cultivated area was 38 percent in NWFP. While the percentage of irrigated area to total cultivated area was 85.4 in the case of Punjab.

Canals irrigation development

Despite that the 4th and 5th five years' plan pointed towards the economic concentration in irrigated tappas. A possible solution would have been to invest in the rain-fed areas. On the contrary, the Revised Action

Program prepared for the development of water resources continued to stress further improvement in those areas where irrigation was already developed. In NWFP, the construction of Tarbela Dam at Bara site on River Indus was started in 1968 and completed in 1974. It increased and regularized availability of water to canals in NWPP, Punjab, Sind and Baluchistan. Chashma Right Bank Canal was expected to irrigate 0.22 million acres' area in NWFP.

The Khanpur project was completed in 1983 on the Harro River near Khanpur. It provides 131 million gallons' portable water per day to Rawalpindi and Islamabad and irrigated 13865 acres in Punjab and 22785 in NWFP. In NWFP there was net decline of 15.6 percent in irrigated area as percentage of cultivated area in the province, as availability of canal water decreased from 3.08 million acres' feet in 1970 to 2.8 million acres' feet in 1980. Irrigated area of Pakistan increased from 2.73 percent in 1970 to 2.80 percent in 1980. While Canal irrigated area in Punjab rose from 17.54 million acres in 1971 to 18.58 million acres in 1980. In other words, share of Punjab increased from 69.76 percent in 1970 to 70.19 percent of the total canal irrigated area of Pakistan in 1980.

Tube wells irrigation development

In NWFP, SCARP Peshawar Pubbi Pilot Project II, SCARP Peshawar Jui Sheikh Unit, Anti water lodging Peshawar City Unit, Anti water lodging Khanwand and Naranji Unit, SCARP Peshawar Warsak Canal Unit, SCARP Mardan and SCARP Bannu were completed in 1970s. The total number of tubes well was 82, 451 in Pakistan in 1970, out of that 75,346 i.e.91.34 percent were in Punjab. In NWFP, there were 1,163 tube wells that formed 1.41 percent of the total. In 1980 the number of tube wells reached to 188,670 in Pakistan.

The table indicates that there were 90,101 total tube wells in Pakistan in 1971, out of that 81,814 i.e.90.08 percent were in Punjab. In NWFP, there were 1,483 tube wells that formed 1.65 percent of the total. In 1981 the number of tube wells reached to 188,670 in Pakistan. In Pakistan both canal and tube wells irrigated areas have significantly increased during 1970s. Sind and Punjab were the main beneficiaries of irrigation development during 1970s. During the period 1971-80, in Punjab the irrigated area went from 22.68 million acres to 25.55 million acres registering an increase of 12.6 percent. In NWFP it increased from 1.61 million acres to 1.73 million acres during the same period, registering an increase of 7.5 percent. At the end of decade of 1970s, 90 percent of cultivated area in Punjab was irrigated, while in NWFP the corresponding figure was only 40 percent. In 1982, the percentage of irrigated area to total cultivated area reached 95 percent in Punjab and in NWFP it hardly reached 40 percent. The percentage share of Punjab and NWFP in national incremental increase in irrigated area during 1973-83 was 18 and 3.7 respectively[108].

Irrigated areas in Punjab rose from 22.68 million acres in 1970 to 26.05 million acres in 1980. In the case of NWFP, the total irrigated area increased from 1.61 million acres to 1.83 million acres. In 1980, total irrigated area of Pakistan increased to 36.82 million acres. Punjab's share rose to 26.05 million acres or 70.54 percent, while irrigated area in NWFP reached 1.83 million acres or 4.97 percent of total irrigated area of Pakistan.

Fertilizers

Fertilizer consumption in Pakistan during seventies was impressive. Average consumption per year was over 73 thousand nutrient tons and the annual growth in fertilizer off-take was 12.4 percent[109]. It increased from 0.38 million nutrient tons during 1970 to 1.24 million nutrient tons in 1982[110].

Agricultural department of NWFP, Agricultural Statistics of NWFP 1971-1980, and Barani area (rain-fed) agricultural development project, NWFP, Peshawar, 1978.

Of the total fertilizer used, the average share of Punjab was 66 percent while that of NWFP was only 7 percent during 1970s. The table shows that throughout 1970s the Punjab share in the total fertilizer consumption of the country was about 66 percent while share of NWFP was only 7 percent of the total. NWFP lagged Punjab in the use of fertilizer per acre-cultivated area by 18 kg during 1970-75 and by 43 kg during 1975-80. It is evident that during the period 1971-1975 the fertilizer consumption in Punjab was 60 kg per acre, which rose to 111 kg per acre during 1975-80. In NWFP, fertilizer consumption increased from 42 kg per acre during 1970-75 to 68 kg per acre during 1975-1980.

Improved varieties of seed

In the 1970s the use of improved varieties of seeds increased more than three times in Punjab while in NWFP the use of improved seeds doubled. The total area under wheat and rice devoted to high yielding varieties of seeds has been raised from 57.89 and 70.42 percent in 1972 to 89.03 and 94.33 percent of the total area under these respective crops by 1982 in Punjab. While in NWFP 45.59 and 33.33 percent of wheat and rice was under high yielding varieties of seed in 1972 that rose to 67.47 and 42.86 percent in 1982[111].

Year-wise distribution of improved seeds of main crops in NWFP in Maunds

Year	Wheat	Maize	Gram
1970-71	21409	2057	1337
1971-72	31284	1100	250
1972-73	32558	5447	650
1973-74	36528	5323	800
1974-75	119351	1210	700
1975-76	42261	1351	150

1976-77	70250	5075	750
1978-79	4399	2080	305
1980-81	36404	3025	18236

Sources: Agricultural department of NWFP, Agricultural Statistics of NWFP, (1971-1981), and Barani area agricultural development project, NWFP, Peshawar, 1978

The table shows that the quantity of improved varieties of seed of wheat, maize and gram fluctuated. Maximum quantity of wheat seed was used during 1974-75 and minimum during 1978. Similarly, maximum quantity of improved seed in case of maize was used in 1972-73. Maximum quantity of improved seed of gram was used in 1980.

Plant protection measures

The growth in use of pesticides has been slow as compared to the new seeds or fertilizers. In the early seventies most of the emphasis was on the improvement of facilities and services necessary for effective plant protection. In 1974-75, pesticides covered 7.54 million acres. Out of the 60 percent of the national area covered by plant protection, lied in Punjab and 4 percent in NWFP[112]. The most heavily sprayed crops were cotton, sugarcane, rice, tobacco, fruits and vegetables. From 1968 to 1984, the annual increase in ground spraying was 10.6 percent and for aerial spraying the annual increase was 2.8 percent[113]. The annual modest increase in aerial spraying was due to the withdrawal of facility of free aerial spraying by government where farmers were required to pay only the cost of pesticides.

Crops output

The most outstanding production has been that of wheat output in Pakistan. With the extension of area under wheat, the main impact has been through the rapid increase in the adoption of the high yielding disease resistant varieties. More than 80 percent wheat area was under modern varieties in 1982 in Pakistan. Wheat production rose from 7.29 million tons in 1970 to12.4 million tons in 1982 in the country. During the period 1971-81 yield per acre went from 11.6 mounds to 17 maunds[114]. Wheat imports declined from 20 percent of the total availability in 1965 to an average of only 4.6 percent during 1980. In the case of rice, since the mid-1970s, overall growth in rice production has been slower than wheat. 50 percent of rice area was under high yielding in 1979.The total rice production has increased from 2.26 million tons in 1971 to 3.44 million tons in 1983 and per acre yield increased from 15.9 mounds to 18.8 mounds during the same time. The yield of rice increased at 2 percent per year[115]. Yield improvement has contributed only 23 percent to the production of crops between 1970 and 1982, in contrast to 66 percent for wheat. Gram production decreased from 0.51 million tons in 1971 to 0.34 million tons in 1980[116]. Cotton production grew at a rapid rate compared to rice. Cotton production fluctuated due to poor weather and pest attacks before 1979. Sugarcane yields have been static

during 1970s. The average per acre yield of sugar cane increased from 398.75 maunds in 1971 to 425.2 maunds in 1981[117]. The average per acre yield of tobacco was 14.42 maunds during this period. The area under fruit increased from 0.58 million acres in 1975 to 0.71 million acres in 1980. The yield of fruits remained static i.e. 91.4 maunds per acre during this period[118]. In NWFP. Per acre yield of wheat and sugarcane was lowest as compared to Punjab and Sind. The yield per acre of tobacco was competitive[119]. In the case of NWFP the output of fruits and vegetables has increased much faster, and the growth of fruits was twice that of vegetables. The annual average area under fruit reached 6672 acres and total production reached 28200 tons in 1980. Potato, onion and tomato are predominant vegetables in the province. The average annual area under vegetable excluding potato reached 10429 acres and average annual production reached 56,400 tons.

The average annual acreage, production and yield per acre of major food and cash crops in NWFP during 1970-75 and 1975-80

	Annual average during 1970-75			Annual average during 1975-80		
Crop	**Acreage (000acres)**	**Production in million Mds**	**Yield Mds per acre**	**Acreage (000acres)**	**Production in million Mds**	**Yield Mds per acre**
Wheat	1345	14.192	8.70	1770	19.93	11.26
Maize	799	10.395	13.0	806	11.1	13.77
Sugar Cane	219	93.466	426.79	230	98.69	429.09
Tobacco	67	1.369	20.43	75.12	1.206	16.08
Gram	224	0.713	3.18	278.99	0.8084	2.91
Jowar	70	0.412	5.89	68	0.365	5.37
Bajra	96	0.378	3.95	149.7	1.323	8.83

Source: Government of Pakistan, Pakistan Agricultural Statistics, various issues from1972 to1980

The table shows that the average annual area under cultivation of all the crops increased. Again, per acre yield shows an increase in the case of wheat, maize, sugar cane and bajra while decreased in case of tobacco, gram and jowar.

Share of NWFP in the total crop production of Pakistan

The provincial share of NWFP remained about 9 percent of the total cropped area and about 5 percent of the total irrigated area of the country during the decade of 1970s[120]. Food crops occupied 80 percent of the total cultivated area in NWFP and contributed only 6 percent of the total food crops of the country. The share of NWFP in maize production ranged between 50 and 60 percent of the total production of the country. The average output of food grains remained lower in NWFP as compared to Punjab and

Sind. In the case of sugar cane NWFP contributed 12 percent at average to the total production of the country[121]. NWFP contributed 70 percent of the total tobacco of Pakistan. The livestock, fisheries and forestry accounted for 30 percent of agricultural GDP of Pakistan. The livestock sector contributed greatly as fisheries and forestry together comprised only 1.3 percent of the total agricultural out put[122]. The per capita poultry population in descending order was 0.89, 0.45, 0.33 and 0.29 respectively in NWFP, Baluchistan, Sind and Punjab. The per capita cattle population was higher in NWFP (0.27) while that of buffaloes was higher in Punjab (0.16)[123]. The share of NWFP in total livestock production of the country remained at 15 percent[124]. About 5.1 percent of the total reported area of Pakistan was under forest in 1981. In the case of NWFP, forestland was 3.1 million acres making up 15 percent of the total area of the province and formed 28 percent of the total forest area of Pakistan[125].

The percentage of provincial annual growth rate of gross crop value during 1970-80 in Pakistan

Period	Baluchistan	NWFP	Sind	Punjab
1970-75	2.7	3.7	4.7	2.2
1975-80	5.2	2.6	5.5	3.5

Source: Report Of the National Commission on Agriculture (1988) p.11

Growth has occurred in all the provinces; most notably in Sind and Baluchistan. In the case of NWFP growth was comparatively high during the first half of the decade of 1970s and low during second half of the decade of 1970s.

The land in NWFP is not as productive as in the Punjab and Sind because of poor irrigation facilities. Moreover, small farm sizes predominated in case of NWFP as compared to Punjab and Sind and small farm size is less productive and profitable.

Table 6.11

Shares of the provinces in gross value of agricultural output of Pakistan at current prices of 1990

Period	Percentage shares of provinces in gross value of agricultural crops			
	Punjab	Sind	NWFP	Baluchistan
1971-1975	64.3	24.2	9.0	2.5
1976-1980	60.9	25.7	9.9	3.5

Source: M Ghaffar Chaudhry and Zafar Iqbal, 'Regional Distribution of Agricultural Income: An Inter-Temporal Analysis' in the Pakistan Development Review Vol. XXVII, No.4 part II (Winter 1998)

The table shows that the share of Punjab decreased from 64.3 percent during 1971-75 to 60.9 during 1976-80. On the other side, the share of

NWFP and Baluchistan has increased from 9 and 2.5 percent of total in first half of the decade of 1970 to 9.9 and 3.5 percent of total in second half of the decade of 1970s. This means inequality in agricultural production among provinces has been reduced.

It is an undeniable fact that the most critical factor in Pakistan agriculture is the availability of water. Irrigation is the lifeblood of agriculture in Pakistan. Without irrigation virtually there would be no agriculture. In Pakistan canals and tube wells were major sources of irrigation and were irrigating 74 and 21 percent of the total cultivated land respectively. In 1980, the irrigated area rose to 18.60 million acres in Punjab while in NWFP it reached 1.70 million acres[126]. The total number of tube wells reached 181,892 in Punjab while NWFP had only 4,502 tube wells in 1982[127]. At the end of 1983, nearly a quarter of the total cultivated area in Punjab was irrigated by tube well while in NWFP; the area irrigated by tube well was only 2 percent of the total cultivated area in province128. The NWFP thus lagged not only in the expansion of canal irrigated area, but also in tube well irrigation. The cultivated area in Punjab reached 28.7 million acres or 56.7 percent of the total cultivated area of the country where as NWFP accounted only for 4.70 million acres or 9.5 percent of the total cultivated land in Pakistan in 1982[129]. Similarly, Punjab's share in the total irrigated area of the country was over 70 percent while NWFP had only 5 percent share in the total. In Punjab 95 percent of the cultivated area was irrigated in 1982 while in NWFP the corresponding figure was only 40 percent[130]. The green revolution technologies had, therefore, greater impact on Punjab's agriculture and rather small on the agriculture of NWFP. The policy followed was for the whole of Pakistan and did not take into consideration the specificity of the NWFP in terms of the inaccessibility of the region and marginal farmers operating on small, fragmented farms. The concentrations of the ADBP loans were biased towards development purposes and towards farmers using modern inputs. This approach was not very helpful to the bulk of small farmers in NWFP who were unable to modernize because of inherent land size and their low-income level. In 1981, Rs.85.33 million was disbursed to the NWFP, which was 5.5 percent of the total. NWFP has the lowest area and hence lowest share[131]. The inflow of three million Afghan refugees in 1979 in the NWFP further compounded the problem with the far-reaching implications for the economy, environment and the level of off-farm employment. Therefore, over the decades under review (1960-1980), millions of workers left the province for other parts of the country and abroad. Due to the thin structure of agriculture and industry the economy of NWFP was unable to absorb the surplus labor and during the 9 years period from 1972 to 1980, the net migration from the province for search of job stood 1.02 million[132].

Agriculture development during 1980s and 1990s

In the 1980s, a new agricultural policy was announced, which exhorted on extended role of private sector, reduction in subsidies on agricultural inputs and increased support prices for agricultural commodities. Agriculture sector regained its growth momentum in 1980, and growth rate of agriculture rose to 4.1 percent in 1980s in Pakistan. The share of agriculture in GDP of Pakistan decreased to 28 percent. The average annual contribution of agriculture to export of Pakistan remained 47 percent. 63 percent of the total population of Pakistan remained engaged in agriculture. Share of major and minor crops remained 50 and 18 percent in the total value added in agriculture.[133] Cotton and livestock made a major contribution to the growth process. Livestock accounted for 27 percent of the total value added in agriculture[134]. Forestry and fisheries collectively shared 4.5 percent of the total value added in agriculture. Wheat output increased and its import fell from 2 million metric tons in 1970s to 0.5 million metric tons in 1980. The record harvest of 12.4 million tons of wheat in 1982, enable the country, not only to achieve self-sufficiency but also led to production of exportable surplus of wheat.[135]

In NWFP, the USAID funded project on the transformation and integration of the Provincial Agricultural Network (TIPAN) started in 1986. The Provincial Agriculture Research system was handed over to the NWFP Agriculture University under the US Aid/TIPAN Program. The total credit advanced by ADBP and commercial banks reached Rs.82 per acre in 1992[136].

The decade of the 1990s is characterized by political instability. Moreover, the country was coping with the effects of the gulf crisis of 1990, natural calamities in the form of summer floods in 1993 and 1995, and Curl-leave virus (white fly) attack on cotton crop in 1994-95. For solving the problem of inter-provincial water dispute over utilization of Indus water, Indus Water Committees first formed under chairmanship of Akhtar Hussain in 1968 and Fazal Akbar in 1971, for the allocation of water among the provinces but no decision was taken. At last, in 1991 the chief ministers of all the four provinces agreed to the National Water Apportionment Accord 1991. According to Water Apportionment Accord 1991, 8.78 MAF or 14 percent of the Indus water was allocated to the NWFP, but NWFP cannot utilize more than 2 MAF or (3 percent) due absence of canals fed by Indus. Agricultural growth remained at 4 percent per annum during 1990s. The yield levels of cereals particularly wheat and rice rose by 3 percent per annum and that of sugarcane increased by 1.5 percent per annum. The share of agriculture in GDP remained 25 percent and the average annual share of agriculture to export of Pakistan remained 37 percent. 55 percent of the total population remained engaged in agriculture. The per capita GDP in Pakistan was $ 472 while in NWFP it was $ 235 in 1996. At the same time 46 percent of the population of the province lived below the poverty line identified with US$ 1 per capita per day.

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