

Food Culture in Pakistan Since 1979-80:

Composite Vs Split

CULTURE ALIMENTAIRE AU PAKISTAN DEPUIS 1979-80:

COMPOSITION VS. PORTION

Khaliq-uz-Zaman¹

Imran Zafar²

Abstract: The paper is about change in food culture in Pakistan. Food availability per capita per annum in Pakistan increased from 298.1 kg in 1979-80 to 414.8 kg in 2007-08 at a rate slower than Population growth (from 85.09 million to 163.8 million over the same period). Food consumption pattern in Pakistan are exception and changing by weight nearly three quarters of the diet is made up of cereals and milk product.

The food production (Cereals, Gram, Pulses, Vegetables, Potatoes, and Fruits, Animal product Poultry Product, Sugar and Veg. Ghee) was increased by 52 percent in 1990-2000 over the 1979-90 and by 34.9 percent in 2000-2010 over the nineties. The annual rate of growth in overall food production rose to 3.9, 4.2 and 2.8 per cent in the eighties, nineties and last recent decade against 3.1, 2.4 and 1.9 per cent growth of population in same time period. Food grain production was increased by 32.8 to 29.5 per cent during last thirty years.

Key words: Food culture; Composite; Split; Food consumption pattern

Résumé: Le document étudie le changement dans la culture alimentaire au Pakistan. La disponibilité alimentaire par habitant et par an au Pakistan a passée de 298.1 kg en 1979-80 à 414.8 kg en 2007-08 dans un taux plus lent que celui de la croissance démographique (de 85.09 millions à 163.8 millions sur la même période). Le modèle de la consommation alimentaire au Pakistan est changé. Près de trois quarts de l'alimentation est composé de céréales et de produits laitiers.

La production alimentaire (céréales, pois chiches, légumes secs, légumes, pommes de terre, fruits, produits d'origine animale, produit volaille, sucre et beurre) a été augmentée de 52% en 1990-2000 par rapport à 1979-90 et de 34.9% en 2000-2010 par rapport aux années quatre-vingt-dix. Le taux annuel de croissance de la production alimentaire globale est de 3.9%, 4.2% et 2.8% dans les années quatre-vingt, quatre-vingt-dix et la dernière décennie contre un taux de croissance démographique de 3.1%, 2.4% et 1.9% sur la même période. La production de céréales alimentaires a augmenté de 32, 8% à 29.5% au cours des trente dernières années.

Mots clés: Culture alimentaire; Composition; Portion; Modèle de consommation alimentaire

1. INTRODUCTION

Food culture i.e. food consumption and production patterns are the driving forces behind any Economy and play a significant role shaping the sustainability of future economic growth, Mahmood and Walters (1990). This pattern is changing since 1980's because growth rate of the (GDP) has been averaging 5.6 percent per annum during the decade beginning from 1980-81 further during the last 20 years the average growth rates of the economy has also remained 4.7 percent. Since population has increased by at least 2.05 percent per annum, from 85.09 million to 173.5 million between 1980 and 2010 in Pakistan, Khan (2000). To feed this rising population, food production ought to increase

¹ (Corresponding Author) Research Economist Punjab Economic Research Institute, 48-Civic Centre, Johar Town, Lahore-Pakistan
E-Mail: khzlhrr@gmail.com

² Assistant Commissioner in Land Revenue, Regional Tax Office, Faisalabad-Pakistan
E-Mail: imran.zafarfb@gmail.com

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proportionately and pattern of change in the production of different items should have been changed against the changes occurred in food consumption pattern, generally the pattern of agricultural diversification shows a shift from crop production to livestock product namely, milk, meat, eggs etc., Husain (2005). There are number of studies analyzing the growth performance of Pakistan agriculture covering different periods, however, very few studies that have actually looked into the sources of growth in food cropped production. I have not come across any such study that decomposed sub-period wise the output growth into the area, yield and interactive effect covering the most recent period, especially the eighties, nineties and recent decade of this century when Pakistan agriculture did experience significant changes Khan (2006). Keeping in view this background, this paper attempts to assess changes in food consumption and Production pattern by analyzing factors responsible for enhancing in production of such items between time periods 1979/80 – 1989-/90-1990/91-1999/2000 and 2000/2001 to 2009/2010 by using data of Household Income and Expenditure Survey 1979, 1987- 88, Pakistan Integrated Household Survey 1998-99, 2001-2002. Pakistan Social and Living Standard Measurement (PSLM) Survey 2004-05. Agriculture Statistics and various issues of Pakistan Economic Survey published during 1979-80 to 2009-10.

2. CHANGES IN MEAN AREA, PRODUCTION AND YIELD OF MAJOR CROPS FROM 1979-80 TO 2009-10 IN PAKISTAN

The performance of agriculture can be judged from the growth rate of area, production and yield of different crops, Hasan (1997) Husain (2004). Data regarding overtime change and annual growth rate in average area, production and yield of different crops, including total food grains during 1979 /90 to 1990/2000 and 1990/2000 to 2000/2010, has been presented in Table 1-A , 1-B, 1-C and 1-D.

2.1 Area under different crops

Data presented in the table 1-A shows that while area under wheat, rice, maize increased by 11,11 and 12.9 percent in nineties, as compared to eighties, it decreased by varying degree under the remaining food crops (Bajra 23 percent, Jowar -0.7 percent Barley -4.1 percent). Overtime change in area during 2000-10 remained positive in case of wheat (3 percent), rice (12.9 percent), maize (8.1 percent) and Bajra (11.1 percent), wheat is the most vantage and pivotal crop of the country. This edible food crop accounts for about 41.7 percent, 42.4 percent and 42.2 percent of the cropped area of the country during eighties, nineties and recent decade respectively. Considering the 15 important crops being produced in overall Pakistan, it was found an increased in the area of food, grains, 8.6 percent in nineties over eighties and decreased 4.3 percent in 2000-10 over nineties. The area under total crops has grown at the rate of 1.5, 0.8 and 0.6 percent per annum, while area under food grain crops has also grown at the rate of 0.9, 0.8 and 1.5 per cent per annum during eighties, nineties and 2000-10 respectively. Within food grain, the highest growth in area has been recorded for maize (1.8 percent) followed by wheat (1.1 percent) during eighties while rice (2.1 percent) followed by maize (1.6 percent) during nineties. It was also highest in case of rice (3.0 percent) but followed by bajra (2.7 percent) during 2000-10. Favorable weather in Barani area accounted to high growth for bajra. Growth rate of wheat (1.3 percent) and rice (3.0 percent) in recent study decade was also high as compared to nineties.

2.2 Production and yield per Hectare of Different Crops

Table 1-A: Change over Time in Average Area and Annual Growth Rate of Major Crops in Pakistan during 1979-90, 1990-00 and 2000-10.

Crops	Area (000 hect.)				Avg. Area 2000-10	% Change during 1990-00 to 2000-10	Annual Growth rate during 2000-10
	Avg. Area 1979-90	Avg. Area 1990-00	% Change during 1979-90 to 1990-00	Annual Growth rate during 1979-90			
Wheat	7372	8183	11	1.1	8427	3	1.3
Rice	1996	2216	11	0.4	2502	12.9	3
Bajra	526	405	-23	0.9	451	11.5	2.7
Jowar	395	392	-0.7	0	316	-19.4	-4.5
Maize	802	905	12.9	1.8	979	8.1	1
Barley	196	153	-21.9	-4.1	102	-33.4	-3.7
Total Food Grains	11287	12255	8.6	0.9	12778	4.3	1.5
Gram	968	962	-0.7	0.3	960	-0.2	4.9
Other Pulses	1376	1501	9.1	1.1	1452	-3.3	-0.4
Sugar cane	847	979	15.5	0.2	1021	4.3	0.3
Rap & Mustard	348	311	-10.7	-3.5	248	-20.3	-3.2
Sesamum	33	79	135.9	-4.4	85	7.4	-3
Cotton	2526	2880	14	3	3005	4.3	0.2
Tobacco	43	52	19.9	-2.1	50	-4.2	0.9

Table 1-B: Change over Time in Average Area and Annual Growth Rate of Major Crops in Pakistan during 1979-90, 1990-00 and 2000-10.

Crops	Area (000 hect.)							
	Avg. Area 1979-90	Avg. Area 1990-00	% Change during 1979-90 to 1990-00	Annual Growth rate during 1979-90	Annual Growth rate during 1990-00	Avg. Area 2000-10	% Change during 1990-00 to 2000-10	Annual Growth rate during 2000-10
Vegetable	168	220	30.9	5.6	0.6	235	6.6	1.8
Potato	49	83	69.9	5.7	4.6	117	41.4	4.1
Total Other Crops	6358	7066	11.1	1.5	0.8	7171	1.5	0.6
Grand Total	17645	19321	9.5	1	0.8	19949	3.3	1.2

Table 1-C: Change over Time in Average Production and Annual Growth Rate of Major Crops in Pakistan during 1979-90, 1990-00 and 2000-10.

Crops	Production (000 tonne)							
	Avg. Production 1979-90	Avg. Production 1990-00	% Change during 1979-90 to 1990-00	Annual Growth rate during 1979-90	Annual Growth rate during 1990-00	Avg. Production 2000-10	% Change during 1990-00 to 2000-10	Annual Growth rate during 2000-10
Wheat	12338	16981	37.6	2.7	3.2	21097	24.2	3.0
Rice	3259	3950	21.2	0.0	5.3	5342	35.3	5.4
Bajra	232	179	-22.8	-3.4	0.6	242	35	4.7
Jowar	229	233	1.5	0.0	-0.4	189	-18.9	-4.3
Maize	1041	1393	33.8	2.8	4.4	2672	91.8	10.4
Barley	140	150	7.1	-2.4	-0.7	86	-42.8	-8.3
Total Food Grains	17239	22886	32.8	2.0	3.5	29628	29.5	4.0
Gram	438	567	29.3	6.0	4.8	562	-0.8	3.0
Other Pulses	673	782	16.1	2.4	4.4	848	8.5	3.3
Sugar cane	32602	44837	37.5	1.0	3.7	48711	8.6	1.9
Rap & Mustard	235	250	6.3	-0.9	4.4	204	-18.4	-2.2
Sesamum	13	35	157.6	-4.9	4.7	35	1	-1.1
Cotton	1071	1657	54.7	8.6	-0.3	2006	21	2.2
Tabbaco	74	94	27.3	0.1	2.2	99	5	2.6
Vegetable	2182	2994	37.2	6.4	-0.1	3016	0.7	1.4
Potato	564	1085	92.3	4.6	7.3	2083	92	5.2
Total Other Crops	37853	52301	38.2	1.6	3.4	57562	10.1	2.0
Grand Total	55092	75187	36.5	1.8	3.5	87190	16	2.4

Table 1-D: Change over Time in Average Yield and Annual Growth Rate of Major Crops in Pakistan during 1979-90, 1990-00 and 2000-10

Crops	Yield (tone/hect.)							
	Avg. Yield 1979-90	Avg. Yield 1990-00	% Change during 1979-90 To 1990-00	Annual Growth rate during 1979-90	Annual Growth rate during 1990-00	Avg. Yield 2000-10	% Change during 1990-00 to 2000-10	Annual Growth rate during 2000-10
Wheat	1.7	2.1	24.0	1.6	2.6	2.5	20.5	1.7
Rice	1.6	1.8	9.2	-0.4	3.2	2.1	17.8	2.4
Bajra	0.4	0.4	0.3	-4.3	1.7	0.5	13.0	1.0
Jowar	0.6	0.6	2.3	0.1	0.5	0.6	1.0	0.1
Maize	1.3	1.5	18.4	1.0	2.8	2.7	75.5	9.4
Barley	0.7	1.0	37.2	1.7	0.8	0.8	-18.6	-4.6
Total Food Grains	1.5	1.9	21.5	1.2	2.7	2.3	23.2	2.5
Gram	0.5	0.5	10.5	5.6	5.0	0.6	24.1	-1.9
Other Pulses	0.5	0.5	6.4	1.4	3.7	0.6	15.2	3.7
Sugar cane	38.5	45.8	19.0	0.8	1.4	47.7	4.1	1.1
Rap & Mustard	0.7	0.8	19.0	2.6	2.5	0.8	-3.6	1.0
Sesamum	0.4	0.4	9.2	-0.5	1.8	0.4	-9.5	1.9
Cotton	0.4	0.6	35.6	5.6	1.5	0.7	21.7	2.0
Tobacco	1.7	1.8	6.2	1.3	1.3	2.0	10.5	1.7
Vegetable	13.0	13.6	4.9	0.8	-0.8	12.9	-5.2	-0.3
Potato	11.6	13.1	13.2	-1.1	2.7	17.9	36.1	1.1
Total Other Crops	6.0	7.4	24.3	0.2	2.6	8.0	8.1	1.0
Grand Total	3.1	3.9	24.1	0.7	2.7	4.4	13.1	1.2

During 1979-80 to 1990-2000 and 1990-2000 to 2000-10 the food grain production grown at a compound rate of 2, 3.5 and 4 percent while yield per hectare increased 1.9, 1.2, 2.5 per cent respectively (Table 1-C & 1-D). Although the growth of area contributed to the expansion of production of food grain crops, the growth rate of yields were better than that for growth rate of area. The production of wheat the major cereal crop of the country, increased at a compound rate of 2.7, 3.2 and 3.0 per cents during eighties, nineties and 2000-10. During eighties rate of increase in production of rice is zero, while during nineties rate of rise in production of rice (5.3 percent) is higher as compared to wheat (3.2 percent) and maize (4.4 percent). During 2000-10 rate of growth in the production of maize (10.4 per cent) was highest followed by rice (5.4 per cent) as compared to other food crops and while yield of wheat (1.7 percent) rice (2.4 percent) and maize (9.4 percent) also increased at a significant rate particular due to the introduction of high yielding varieties of rice and maize Javaid (2003) Expansion of areas production and yield of maize was due to its role as a livestock, poultry feed production and edible oil. The production of oil seeds (rap and mustard, sesamum) has declined during last thirty years despite the fact that demand for vegetable ghee has tripled as result of substitution of desighee. In fact cotton seed, which has always been the major domestic source of edible oil double its production, consequently, the share of cotton seed oil in domestic production has further increased, while that of rapeseed and mustard and sesamum has declined Khan (2006), wheat and Gram and barley suffer decline both in area and yield during (2000-10) these crops are grown mainly in barani areas. The fluctuation in weather was a major factor behind the instability of these crops. Among non-food grains the most promising crops include sugarcane and cotton. In net terms the total food grains production experienced an increased of 32.8 percent in nineties over the eighties and 29.5 percent in 2000-10 over the nineties. Although the cropping sector as a whole and some individual crops in the past did experience remarkable growth rates from the 1980 but the rates of increase in yields have either slowed as in case of wheat (important food grain crop) or become constant (see detail in table 1-C & 1-D).

In so far as average yield was concerned, all food grain recorded net increase of 21.5 percent in the nineties over eighties and 23.2 percent in 2000-10 over nineties respectively. Self sufficiency in food can be achieved and sustained only if yield of these crops can be increased beyond past trend. This can be done by bringing more area under certified seed by improved cultural practices, more balanced and timely use of fertilizer and high water use efficiency Mahmood (1990), Khan (2006).

It can be safely inferred that overall performance was nevertheless quite good. The trend of food grains production rose 128.20 per cent between 1979 and 2010. The average annual rate of growth (2.5 per cent) was equal to developing country. Three fourth of the growth (1.6 per cent) was due to growth in yield and one fourth (0.9 per cent) to the growth in gross area sown. The contribution of yield growth has risen over time, while the contribution of area expansion has declined (see figure 1 and 2). About 40 percent area was due to increase double cropping, the remainder being accounted for by the expansion of the net cultivated area (see table-2).

3. COMPONENT OF CHANGE IN MEAN PRODUCTION

The change in output of major crops in Pakistan can be broken into three components (1) expansion in cropped area at the old yield level (2) increase in yield on the old cropped area, and (3) a cross-product term of increased area and yield Majumdar (2005). The results of decomposition into area, yield and interactive effects are produced in table 3. The breakdown of change in output measured separately for each decade since the early 1980s. The data given in table indicates that among different sources of increase in mean production of total food grains increase in mean yield contributed 68.5 per cent and 81.8 per cent in first and second period i.e. 1979-80 to 1990-2000) and (1990-2000 to 2000-2010) respectively. In first period (1979-80 to 1990-2000) and second period (1990-2000 to 2000-2010) most of the growth in crop output is explained by increase in yield for all crops except pulses and vegetables. The contribution of yield to the change in output of wheat rice, total grain, cotton and vegetables continued to be strong in the (1990-2000 to 2000-2010) but negative so far vegetables. In second period (1990-2000 to 2000-2010) growth in vegetable is strongly explained by expansion of area and modestly as regard sugarcane output. The area expansion effect on output growth of wheat, rice, total grain, and cotton is very weak in both period (i.e. (1979-80 to 1990-2000 to 2000-2010) vegetables are integral part of the household and for regional economies in Pakistan. Their growth has been important in providing nutrition, employment and, forwarding linkages to processing industries. Since 1980's the share of crop area used for vegetables has increased significantly because its increasing demand of the domestic and middle East market, but the impact of yield on output was negative. This is because production of certified vegetable seed is inadequate rather negligible as compared to the requirement Ashiq (2007) However, to meet the yield gap Government in 2005-06, launched fruit and vegetable development project for dissemination of improved production technologies, certification and registration of fruit plants and vegetable seed and improving marketing and post-harvest technology of fruit and vegetable. The analysis given in table 3 indicates that most of the increase in output of wheat, rice, total food grains, sugarcane, cotton and pulses has occurred due to productivity gains.

$$\Delta o = yb \Delta A + Ab \Delta y + \Delta A \Delta y$$

$$\Delta o = \text{Change in crop output (between "t" and "b")}$$

Ab	=	Area of crop in the base year
y _b	=	yield level of crop in the base year
Δy	=	Change in yield level (between time “t” and “b”)
ΔA	=	Change in crop area (between time “t” and “b”)
b, t	=	base and terminal year (average of each decade in each case)

4. FOOD PRODUCTION PATTERN INCLUDING NON CROPPED

The estimates for the 1979-80 to 2009-10 position with regard to important food items, such as food grain (wheat, rice, maize, jowar and Barley), Pulses, sugar, edible oils, livestock product (milk, mutton, beef, poultry meat) vegetables, potatoes, fruits, fish and eggs are given in Table 4.

Table 2: Area, Production Yield, Cropping Intensity of Food Grain Crops

Years	Cultivated Area (million)	Cropped Area (million)	Food Cropped Area (000 hec.)	Production (000 tonne)	Yield (Kgs)	Cropping Intensity
1979-80	20.23	19.22	10803	15232	1410	95
1980-81	20.30	19.33	10709	16188	1512	95
1981-82	20.42	19.71	11141	16319	1465	97
1982-83	20.31	20.06	11255	17491	1554	99
1983-84	20.33	19.99	11264	15854	1407	98
1984-85	20.61	19.92	11258	16692	1483	97
1985-86	20.17	20.28	10392	18462	1777	101
1986-87	20.92	20.60	11678	17216	1474	98
1987-88	20.66	19.52	11183	17471	1562	94
1988-89	21.02	21.82	11738	19395	1652	104
1989-90	21.07	21.89	11922	19312	1620	104
1990-91	20.96	21.82	11934	19588	1641	104
1991-92	21.06	21.72	11668	20634	1768	103
1992-93	21.40	22.44	12191	21056	1727	105
1993-94	21.51	21.87	11919	20917	1755	102
1994-95	21.55	22.14	12297	22422	1823	103
1995-96	21.68	22.59	12473	22968	1841	104
1996-97	21.98	22.73	12113	22962	1896	103
1997-98	21.96	23.04	12618	25160	1994	105
1998-99	21.93	22.86	12599	24775	1966	104
1999-00	21.96	22.74	12734	28381	2229	104
2000-01	22.13	22.04	12359	25986	2103	100
2001-02	22.23	22.12	12000	24310	2026	100
2002-03	22.21	21.85	11989	25890	2159	98
2003-04	22.12	22.94	12657	26955	2130	104
2004-05	22.13	22.78	12654	29905	2363	103
2005-06	22.65	23.13	12896	30396	2357	102
2006-07	21.88	23.56	13066	32332	2475	108
2007-08	21.23	23.85	13020	29789	2288	112
2008-09	21.18	23.80	13980	35061	2508	112
2009-10	21.21	23.80	13679	34759	2541	112
Growth Rate	0.1	0.8	0.9	2.5	1.6	0.7

Livestock product contributed by cattle, sheep, goat and poultry. Among the crops used as food, partly consumed by the farm household and partly sold in the market, food grain (wheat, rice, maize, jowar and Barley), constitute the most important group (44.4 percent) followed by fruits (7.3 percent) vegetable (5.6 percent) pulses (1.7 percent), Potato (1.1 percent) and Gram (1.1 percent) during eighties and during nineties 38.8 percent, 6.8 percent 5.1 percent, 1.3 percent, 1.8 percent and 1.0 percent for same items respectively. Similar pattern was observed during 2000 to 2010 however, during all three study decades the product range share of each food items has stayed within a broad percentage of 44.4 to 0.7. The food production pattern during last thirty years with protein has gone up by a significant margin especially milk, beef, poultry and sugar.

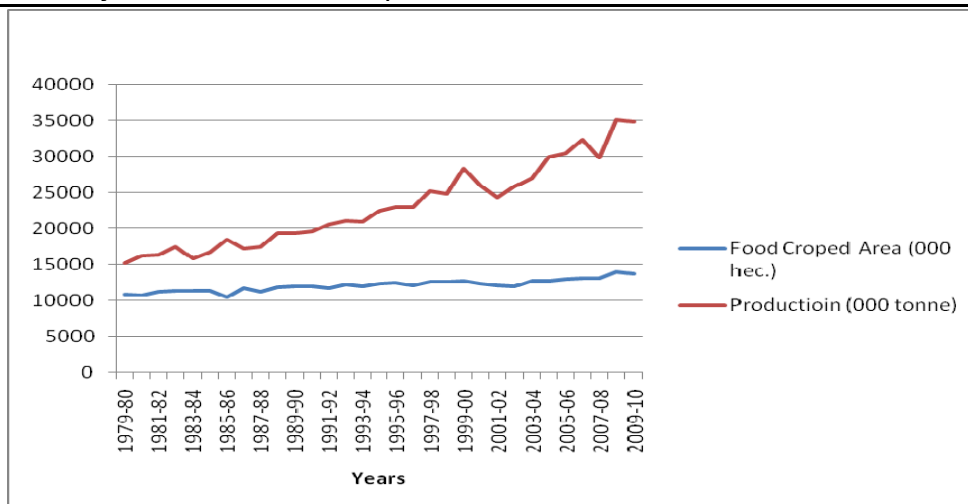


Figure 1: Area and Production of Food Grains

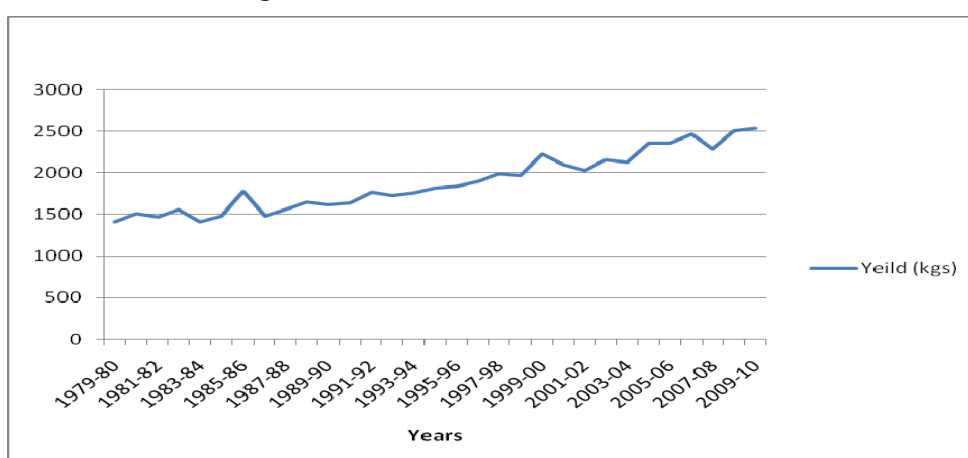


Figure 2: Yield of Food Grains (kgs)

Table 3: Decomposition of Change in Output of Major Crops

Period	Area effect yb Δ A	Yield effect Ab Δ y	Interactive Effect $\Delta A \Delta y$
1979-80 to 1990-2000			
Wheat	29.6	63.4	7.0
Rice	51.4	43.7	4.8
Total Food Grains	25.7	68.5	5.8
Sugarcane	41.5	50.6	7.9
Cotton	24.7	66.0	9.3
Pulses	58.3	38.2	3.5
Vegetables	83.0	13.0	4.0
1990-2000 to 2000-2010			
Wheat	12.4	85.0	2.5
Rice	37.0	55.8	7.2
Total Food Grains	14.7	81.8	3.5
Sugarcane	49.8	48.1	2.1
Cotton	21.7	75.0	3.3
Pulses	-40.3	145.1	-4.8
Vegetables	735.1	-594.6	-40.5

The most striking increase has been in milk. These changes usually portray the outcome of an interaction of major physical and technological and institution factors. Favorable changes in public policy and increased private investment since the early 1980s have shifted the emphasis from small scale (fragmented) production to the development of large scale cattle farms Golai (2006), Jalil (2009). The dairy and meat industries are apparently now responding to the rapid growth of demand for these products. A well organized and efficient poultry industry has already emerged in the urban areas of the country since the late 1970s Mahmood (1990), Khan (2008). The average annual rates of change in the

production of different food items in the last three decades are given in table 4. The food production was increased by 52 percent in 1990-2000 over the 1979-90 and by 34.9 percent in 2000-2010 over the nineties. The annual rate of growth in overall food production rose to 3.9, 4.2 and 2.8 per cent in the eighties, nineties and last recent decade against 3.1, 2.4 and 1.9 per cent growth of population in same time period. Food grain production was increased by 32.8 to 29.5 per cent during last thirty years. The population growth rate of Pakistan which was running at 3.1 percent in 1980-90 and declined from 2.4 percent in the 1990-2000 to 1.9 percent in 2000-2010 is projected to reach over 351 million by 2050, which is the challenge that have to face by the agriculture sector to feed an ever increasing population. To feed this population Pakistan may begin the strategies to fulfill the potential yield, gap, of food obtained by cropped and livestock output. Pakistan planning commission in January 2011 obtained from Iqbal (2003) and identified unachieved potential of yields regarding different crops which is 67 to 84 percent and of which the difference between best practice and average yield is 31 to 75 percent and the difference between research potential yields and the best practice yields is 25 to 75 per cent regarding wheat (43.5 percent) Maize (58.5 percent) rice (45.6 percent) sugarcane (72.8 percent) and cotton (30.08 percent). The reasons narrated for such a huge productivity gap include: traditional farming practices, inefficient irrigation methods, high input costs, lack of bio safety regulations and insufficient institutional credit for poor farmers Javaid(2003),Iqbal(2003). Although livestock is showing improvement over past few years in dairy sector, yet there is a great room for improvement of productivity. In dairy sector there is 78 per cent yield gap if compared with minimum standard required to compete globally. Moreover, a striking issue of 30 to 40 per cent livestock is underfed and only 10 percent of livestock is vaccinated.

According to the data given in table 4, food production increased at the growth rate of 3.9, 4.2 and 2.8 per cent during eighties, nineties and recent decade at a rate slightly faster than population growth (which averaged 3.1, 2.4 and 1.9 per cent per annum during the same time period). Unfortunately, the country has not been able to achieve self-sufficiency in producing the main staple crop (wheat) and has to import, on average 10 to 12 percent of the country total consumption. However, 25 percent of rice is exported Husain (2005).

Table 4: Average Food Production (000 tone), % Share of Each Food Items, Change over Time and Annual Growth Rate of Food Items

Food Items	Avg. Production 1979-90	%	Avg. Production 1990-00	%	% Change during 1979-90 to 1990-00	Annual Growth Rate during 1979-90	Annual Growth Rate during 1990-00	Avg. Production 2000-10	%	% Change during 1990-00 to 2000-10	Annual Growth Rate during 2000-10
Total Food Grains	17239	44.4	22886	38.8	32.8	2.0	3.5	29628	37.2	29.5	4.0
Gram	438	1.1	567	1.0	29.3	6	4.8	562	0.7	-0.8	3.0
All Pulses	673	1.7	782	1.3	16.1	2.4	4.4	848	1.1	8.4	3.3
Vegetables	2182	5.6	2994	5.1	37.2	6.4	-0.1	3016	3.8	0.7	1.4
Potato	564	1.5	1085	1.8	92.3	4.6	7.3	2083	2.6	92.0	5.2
Total Fruits	2817	7.3	4025	6.8	42.9	4.8	2.6	4903	6.2	21.8	3.8
Mutton	468	1.2	692	1.2	47.9	5.6	-2.1	639	0.8	-7.7	-2.3
Beef	552	1.4	894	1.5	62.0	6.0	2.5	1306	1.6	46.1	6.4
Milk	11364	29.3	20706	35.1	82.2	5.3	6.2	30967	38.9	49.6	3.8
Fish	386	1.0	577	1.0	49.3	5.5	2.0	696	0.9	20.6	5.2
Poultry meat	153	0.4	285	0.5	86.1	8.5	7.5	485	0.6	70.4	8.9
Sugar	1414	3.6	2780	4.7	96.6	7.2	2.4	3475	4.4	28.6	1.1
Veg.ghee	572	1.5	722	1.2	26.1	5.4	1.7	961	1.2	33.2	0.7
Grand Total	38822	100.0	58994	100.0	52.0	3.9	4.2	79567	100.0	34.9	2.8
Eggs million nos.	3487		5933		70.1	7.4	53.0	9339		57.4	5.5
Population (million)	-				-	3.1	2.4	-		-	1.9

5. FOOD CONSUMPTION PATTERN

Food consumption pattern in Pakistan are exception and changing. By weight nearly three quarters of the diet is constituted by cereals and milk products. However, this pattern is changing as majority of the population shifts to more

animal product and poultry Mahmood (1990). It is generally thought that there is positive correlation between income and consumption of animal and poultry product. The following table 5-A shows estimates of per capita monthly consumption of food items in Pakistan in 1979-80-1987-88, 1998-99, 2001-02 and 2004-05. The estimates are based on data obtained from PIHS, Household income and expenditure survey and PSLM survey of these years. Data given in the table 5-A, 5-B shows consumption of cereals has declined since the 1979. Per capita consumption of cereal (including wheat, rice) fell from 12.45 kg in 1979-80 to 9.29 kg in 2004-05. The decline in cereal consumption (32.7 percent) could be explained because it has been replaced in Pakistani diet by increased in animal product (35.9 percent) poultry product (1.3 percent) vegetables (14.7 percent) sugar (4.6 percent) in 2004-05 against consumption of 1979-80 that was 44.6 percent, 25.9 percent, 0.5 percent, 11.4 percent and 2.6 percent in case of cereals, milk product, poultry product, vegetables and sugar respectively (see detail in table 5-A, 5-B). Several factors may have contributed to the rapid expansion in the consumption of animal product, poultry product, vegetables and sugar in Pakistan first real per capita GNP increased at an annual rate of 4.9 percent per annum between 1979-80 to 2009-10 second Pakistan is the most urbanized nation in south Asia with city dwellers making up 36 percent of its population (2008) while the urbanization rate is 3 percent (2005-10), Pakistan Economic Survey (2009-10).

6. INPUT FACTORS AFFECTING TOTAL CROPPED FOOD PRODUCTION

Multiple regression techniques can be used to estimate the separate effects of various factors affecting food cropped output (Fertilizer, improved seed, No of tubewell, No. of Tractors, Credit disbursed and Area irrigated) whenever, there is sufficient independent variation among the determining factors Sanderson (1979). However, area irrigated was found to be highly inter-correlated with number of tube wells, and credit disbursed was found with all other inputs. A high degree of inter-correlation impairs the stability of the regression coefficient and, thus their dependability as indicators of the separate influence of each of these factors on output. For the purpose of this analysis, dropped the area irrigated and credit disbursed variable.

A regression equation was estimated using Cobb Douglas type production function. It estimates real contribution of each and every factor affecting output. Important factors affecting cropped food output i.e. no of tubewell, no. of tractors, improved seed distributed (000 tones) fertilizer off-take (000 N/T) area cultivated million hectares during 1979-80 to 2009-10. Many factors were left out to keep study within manageable limits.

Cobb Douglas type production function was fitted which is described as below

$$\text{LN OUTPUT} = \text{bo} + b_1 \text{LN Tube} + b_2 \text{LN Trace} + b_3 \text{LN Nimpse} + b_4 \text{LN fert} + b_5 \text{LNCULAr} + U$$

LN OUTPUT = Natural logarithm of cropped output (in 000 tones) from 1979-80 to 2009-10

bo = Constant

LN Tube = Natural Logarithm of No. of tubewell

LN TRac = Natural Logarithm of No. of tractors.

LN Nimpse = Natural Logarithm of seed distributed (000 tones)

LN fert = Fertilizer off-take (000 N/T)

LNcultAr = Area cultivated million hectares.

U = Random error term independently and identically distributed with
Zero mean and constant variance.

b1 to b5 = Co-efficient

6.1 Results and Discussion

The effects of all factors studied were investigated through multiple regression analysis. The Cobb Douglas production function was estimated using the ordinary least square (OLS) method. The R^2 0.758 represents the proportion of the variation in Y explained by the regression, since implies that about 75 percent variation in output explained by independent variables included in the study. The influence of independent variables in food cropped output is discussed as under.

6.2 Number of Tube wells and Tractors

The most popular form of mechanization in Pakistan agriculture have been tubewell, tractor. The value of coefficient found as 0.076 indicate that one per cent increase in installation of tube well increased the output by 0.07 percent and the value of coefficient of tractor (0.005) indicates that one per cent increase in Number of Tractor enhance output by 0.005

percent. There is subsidy system prevailed regarding tubewell and tractor in Pakistan a subsidy which does not discriminate between electricity and diesel, appears to be necessary to continue expansion of tubewell produce irrigation. The credit policy of the donor and government can play role in promoting the use of tractor and enhancing productivity regarding crop production Mahmood (1990).

6.3 Improved Seed Distributed, Fertilizer Use and Area Cultivated

The coefficient improved seed 0.064, fertilizer use 0.283 and area irrigated 1.04 was positive. It shows that one per cent increase with use in the improved seed, fertilizer; area irrigated increased the output of 0.064, 0.283 and 1.04 percent respectively. This analysis has shown that these factors of growth are likely to play a much smaller role in future only increased cultivated area expansion is significant. It is concluded that output of food crops can be increased by bringing more culturable waste area under plough and controlling urbanization. As regard the co-efficient of fertilizer it indicates that fertilizer dosage will increase, but the marginal pay-off is now relatively low under current production practice. Crop seed are a strategically important input that can enhance or constraint production. The basic genetic capability transmitted through seed allows the productive use of water, fertilizer and cultural practices Husan (2010).

7. CONCLUSION

This paper was carried out with the broad objectives of assessing the trends in food consumption and production in Pakistan since 1979-1980. As per the data area under food grain crops has grown at the rate of 0.9, 0.8 and 1.5 percent per annum during eighties, nineties and 2000-10 respectively while food production increased at the rate of 3.9, 4.2 and 2.8 percent slightly faster than population growth (which averaged 3.1, 2.4 and 1.9 percent per annum during the same time period). There has been a switch in preference towards non-cereal items, such as milk, poultry meat, eggs and beef. In this paper it was ascertained factors effecting cropped output. Most of the factors were found positive contributing toward higher food cropped output. However effect, of area cultivated was highly significant. It is suggested besides motivating the people to exercise over population the endeavors be made in an integrated fashion that is more area should be brought under plough for food production. Government imposes restrictions to prevent encroachment of productive agriculture land and manage canal water supplies for enhancing food outputs further, concentration on food production factors i.e. improved seed, availability of fertilizer, tractor, tube well and more area under plough be realized.

Table 5-A: Per Capita Monthly Consumption of Major Food Items in Pakistan

Food Items	2004-05	%	2001-02	%	1998-99	%	1987-88	%	1979	%
Wheat & wheat Floor	8.2	28.9	8.94	35.0	9.27	35.7	10.045	37.0	11.2	40.1
Rice & Rice Floor	1.03	3.6	1.17	4.6	1.05	4.0	1.175	4.3	1.24	4.4
Bakery Product	0.06	0.2	0.05	0.2	0.04	0.2	0.02	0.1	0.01	0.0
Total Cereals	9.29	32.7	10.16	39.8	10.36	39.9	11.25	41.5	12.45	44.6
Gram	0.2	0.7	0.16	0.6	0.18	0.7	0.235	0.9	0.28	1.0
Mash	0.06	0.2	0.04	0.2	0.05	0.2	0.095	0.4	0.1	0.4
Moong	0.09	0.3	0.07	0.3	0.08	0.3	0.1	0.4	0.15	0.5
Masoor	0.06	0.2	0.05	0.2	0.06	0.2	0.08	0.3	0.09	0.3
Other Pulses	0.03	0.1	0.03	0.1	0.03	0.1	0.02	0.1	0.02	0.1
Total Pulses	0.44	1.5	0.35	1.4	0.40	1.5	0.53	2.0	0.64	2.3
Milk (Fresh & Boiled)	6.67	23.5	5.8	22.7	5.93	22.9	6.49	23.9	5.18	18.6
Milk Packed	2.18	7.7	0.06	0.2	0.03	0.1	0.01	0.0	0	0.0
Milk Dry/ Condensed	0.09	0.3	0.07	0.3	0.03	0.1	0.02	0.1	0.01	0.0
Butter	0.0446	0.2	0.0459	0.2	0.0526	0.2	0.0590	0.2	0.75	2.7
Desi Ghee	0.03	0.1	0.04	0.2	0.04	0.2	0.075	0.3	0.12	0.4
Yogurt	0.49	1.7	0.55	2.2	0.48	1.9	0.3	1.1	0.61	2.2
Mutton	0.07	0.2	0.1	0.4	0.11	0.4	0.13	0.5	0.16	0.6
Beef	0.63	2.2	0.61	2.4	0.59	2.3	0.44	1.6	0.41	1.5
Total Animal Product	10.20	35.9	7.28	28.5	7.26	28.0	7.53	27.7	7.24	25.9
Vegetable Ghee	0.67	2.4	0.64	2.5	0.65	2.5	0.575	2.1	0.51	1.8
Cooking Oil	0.12	0.4	0.09	0.4	0.08	0.3	0.045	0.2	0.03	0.1
Total	0.79	2.8	0.73	2.9	0.73	2.8	0.62	2.3	0.54	1.9
Fish	0.06	0.2	0.05	0.2	0.07	0.3	0.065	0.2	0.06	0.2
Chicken Meat	0.23	0.8	0.14	0.5	0.13	0.5	0.065	0.2	0.06	0.2
Eggs	0.08	0.3	0.07	0.3	0.06	0.2	0.04	0.1	0.03	0.1
Total Poultry & Fish	0.37	1.3	0.26	1.0	0.26	1.0	0.18	0.6	0.15	0.5
Banana	0.31	1.1	0.12	0.5	0.18	0.7	0.18	0.6	0.14	0.5
Citrus Fruits	0.19	0.7	0.21	0.8	0.16	0.6	1.925	7.1	1.87	6.7
Apples	0.24	0.8	0.11	0.4	0.16	0.6	0.075	0.3	0.02	0.1
Dry Fruits	0.020	0.1	0.008	0.0	0.016	0.1	0.018	0.1	0.016	0.1
Other Fruits	0.41	1.4	0.58	2.3	0.65	2.5	0.135	0.5	0.13	0.5

Table 5-B: Per Capita Monthly Consumption of Major Food Items in Pakistan

Food Items	2004-05	%	2001-02	%	1998-99	%	1987-88	%	1979	%
Potatoes	1.18	4.2	1.05	4.1	1.05	4.0	0.68	2.5	0.73	2.6
Tomatoes	0.36	1.3	0.34	1.3	0.33	1.3	0.29	1.1	0.27	1.0
Onion	0.94	3.3	0.98	3.8	0.89	3.4	0.695	2.6	0.62	2.2
Other Vegetables	1.71	6.0	1.51	5.9	1.53	5.9	1.605	5.9	1.57	5.6
Total Vegetables	4.19	14.7	3.88	15.2	3.8	14.6	3.27	12.1	3.19	11.4
Salt	0.33	1.2	0.3	1.2	0.31	1.2	0.235	0.9	0.24	0.9
Chilies	0.08479	0.3	0.08049	0.3	0.08643	0.3	0.00007	0.0	0.00008	0.0
Sugar (Dasi or Milled)	1.31	4.6	1.26	4.9	1.32	5.1	0.94	3.5	0.72	2.6
Gur/ Shaker	0.17	0.6	0.15	0.6	0.19	0.7	0.245	0.9	0.49	1.8
Tea (Black & Green)	0.0723	0.3	0.0563	0.2	0.0634	0.2	0.0001	0.0	0.08	0.3
Total Condiments	1.97	6.9	1.85	7.2	1.97	7.6	1.42	5.2	1.53	5.5
Grand Total	28.42	100.0	25.53	100.0	25.95	100.0	27.12	100.0	27.92	100.0

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