AGRICULTURE 'CATALYST' FOR GROWTH
ESTIMATING REAL CONTRIBUTION TO GDP AND LINKAGES TO EMPLOYMENT AND POVERTY

September 2021

POLICY NOTE

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EXECUTIVE SUMMARY

The contribution of agricultural growth to the national GDP has declined sharply over the last decade. The Economic Survey 2021 show that contribution of the agriculture sector was 25.7% of GDP at current market prices. Hence, there is a bigger focus from policy makers on incentivizing growth through the services sectors (56.2% of GDP) and to some extent the manufacturing sector (18.1%).

As the government targets to sustain 6% GDP growth over the medium term, we believe it cannot be achieved without significantly increasing farm output through productivity gains. Our analysis shows that the contribution of the agriculture sector to the GDP is significantly higher when we take into account the indirect contribution (forward and backward linkages with all other sectors in the economy) and the consumption spending of the rural population, which is 64% of the total population.

Our research shows that the agriculture output is a key input for the manufacturing and services sectors, with estimated contribution of 6.7% of GDP. Consumption spending by the rural households contributes an estimated 14% of GDP. Based on our analysis we estimate that the total direct and indirect contribution of the agriculture sector is 46.4% of GDP.

We acknowledge the limitations of our research methodology due to data constraints and hope more research is done on the subject. In conclusion, policy makers must address agriculture sector productivity to achieve sustainable growth, create more jobs and reduce poverty.

INTRODUCTION

Declining agriculture output and low productivity is one of the major reasons for low growth and high food inflation in Pakistan. Poverty remains concentrated in rural areas with agriculture sector unable to absorb the youth entering the labor force. Can the Government realistically target sustained GDP growth of 6% without a strategy to boost agriculture output?

To answer this question, we need to understand the actual contribution of the agriculture sector to the GDP. This should include both direct contribution to GDP and the contribution to the value added in industry and services sectors. Also important is the contribution of farm incomes towards domestic consumption, the biggest contributor to overall GDP. Unfortunately, there is very little research available covering these important topics.

In this paper we attempt to estimate the direct and indirect contribution of agriculture to the GDP. The National Accounts at constant prices show a dismal picture of the agriculture sector with its share declining sharply in the last decade to 19.2% of GDP in 2021, from 22% of GDP in 2010. At current prices, the share of agriculture has increased marginally to 25.7% of GDP in 2021, from 24.3% in 2010, reflecting higher prices amid declining farm output.

The indirect contribution of the agriculture sector towards the value-added manufacturing and services industry is more difficult to calculate. As a proxy, we use the input – output tables to calculate the forward and backward linkages of the agriculture sector with the value chains of both industry and services. We realize the limitations of using the input output tables. Rather than quantifying the impact, this analysis provides a qualitative analysis of how strong the linkages exist between agriculture output and value added produced by other sectors in the economy

While estimating the contribution of agriculture sector to GDP, the most

overlooked aspect of the agriculture sector contribution to the economy is the impact of the rural household spending on the GDP. According to 2017 Census of Pakistan (PBS), the rural population was 132 million, which is 64% of the total population. Bulk of these households earn livelihoods linked to the agriculture sector. If the incomes of these households stagnate at 2.6%, which is the average growth over the last ten years in the agriculture sector, then it is virtually impossible to sustain overall per-capita GDP growth rates of 6%.

We also attempt to explore the relationship between rural poverty and agriculture growth. Low agriculture growth also leads to rising unemployment / under employment which has an adverse impact on the incidence of poverty. We analyze the findings from recent studies and establish that a positive correlation exists between agricultural growth and poverty reduction, implying that reduction in rural poverty is strongly linked with agricultural growth.

DIRECT IMPACT OF AGRICULTURE TOWARDS GDP

Agriculture sector has underperformed other key sectors of the economy in the last decade. Low productivity and inadequate investments has led to stagnant crop output. Effects of climate change and water availability have also impacted crop cycles.

According to the National Accounts published by the Pakistan Bureau of Statistics the share of Agriculture as a percent of GDP has declined from 22% in 2010 to 19.2% in 2021, at constant prices (Table 1). Similar trends can be seen in the industry which has also seen a decline in share of GDP over the last decade.

Table 1: GDP at Constant Prices (2005-2006)

	2010	2015	2020	2021	Average Growth	2010	2015	2020	2021
	Rs Trillion				*%*	*Contribution to GDP %*			
Agriculture	1.9	2.2	2.4	2.5	2.6%	22.0%	20.7%	19.4%	19.2%
Industry	1.9	2.2	2.4	2.5	3.1%	21.0%	20.7%	19.2%	19.1%
Services	5.0	6.2	7.7	8.0	5.5%	56.9%	58.6%	61.4%	61.7%
GDP	8.8	10.6	12.5	13.0	4.4%	100%	100%	100%	100%

Source: Economic Survey of Pakistan, Ministry of Finance

In terms of current prices, the share of Agriculture to the GDP has increased marginally to 25.7% in 2021, from 24.3% in 2010 (Table 2). This is reflective of higher budgetary transfers including subsidies and minimum support prices and higher crop prices available in the international and domestic markets. In 2021, the UN FAO index shows that prices of food items have increased sharply to the highest levels since 2011.

Government heavily subsidizes inputs, an estimated Rs 200 bn is spent on

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fertilizer subsidy each year, but Abedullah[4] (2021) estimates that these subsidies have had little impact on reducing cost of inputs for farmers and hence reducing prices of essential commodities for consumers.

Table 2: GDP at Current Prices (2005-2006)

	2010	2015	2020	2021	Average Growth	2010	2015	2020	2021
	Rs Trillion				*%*	*Contribution to GDP %*			
Agriculture	3.5	6.5	9.6	11.5	21.2%	24.3%	25.1%	24.4%	25.7%
Industry	2.9	5.2	7.4	8.1	16.1%	20.6%	20.1%	18.7%	18.1%
Services	7.9	14.3	22.4	25.2	20.1%	55.1%	54.9%	56.9%	56.2%
GDP	14.2	26.1	39.4	44.9	19.6%	100%	100%	100%	100%

Source: Economic Survey of Pakistan, Ministry of Finance

For the purposes of this study we shall use the direct contribution of Agriculture sector to the economy as Rs. 11.5 trillion in 2021, which is equivalent to 25.7% of the GDP.

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[4] Abedullah. 2021. "Fertiliser Subsidy an Ineffective Policy Tool to Offer Low Prices of Basic Food Commodities". PIDE Knowledge Brief series.

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INPUT-OUTPUT LINKAGES: INDIRECT IMPACT OF AGRICULTURE SECTOR

The Asian Development Bank (ADB) data on the input output linkages is published for all member countries and available on their website. We use this data as a proxy in trying to determine the indirect contribution of the agriculture sector to the national GDP.

The indirect contribution of the agriculture sector towards the value added manufacturing and services industry is harder to calculate. As a proxy, we use the input – output tables to calculate the forward and backward linkages of the agriculture sector with the value chains of both industry and services. We realize the limitations of using the input output tables in estimating the indirect contribution of the agriculture sector.

In some cases, the value-added comes primarily as a result of the manufacturing processes, e.g. when a bale of cotton becomes a ready-made garment. But in other cases, when the product is sold in its natural state (i.e. fruits, vegetables etc.) the value-added is disproportionately attributed to the service sector, as when a bunch of bananas leaves the farm at Rs. 30 and ends up being sold at the retail outlet at Rs. 100. The relative imbalance is also true for lightly-processed products, i.e. flour mills and rice husking. The same applies to livestock related products, milk and meat etc.

The farmers are also short-changed in the intermediate processes (i.e. weighing, grading etc). Their lack of holding-power means the farmer sells the crop/perishable product immediately when the crop is ready and prices fall to their lowest. The manufacturers and services sectors benefit from the subsequent upward slope of the price curve.

However, the reverse does not happen. Agriculture sector does not gain, or extract value, from the other sectors, in the same way. While we agree that all sectors of the GDP are complementary, with strong forward and backward linkages. However, Agriculture sector is inordinately always the bottom-man on the totem pole.

Table 3: Pakistan Input Output Table

	Agriculture	Industry	Services	Consumption	Investment	Exports	Total
Agriculture	18.0%	40.0%	7.0%	30.0%	3.0%	2.0%	100%
Industry	1.4%	25.0%	12.0%	38.0%	15.0%	8.5%	100%
Services	2.0%	12.3%	15.2%	65.4%	2.3%	2.8%	100%

Source: ADB Pakistan: Input-Output Economic Indicators

https://data.adb.org/dataset/pakistan-input-output-economic-indicators

According to the data, nearly 40% of all agriculture output goes to the Manufacturing industry while another 30% is consumed by the households. Services sector consumes 7% of the total agriculture output, whereas 18% is retained by the farmers mostly for seed or low value added processing (Table 3). The data shows strong forward linkages between agriculture and other sectors of the economy.

On the other hand, the backward linkages of agriculture with other sectors of the economy is relatively low. The agriculture sector accounts for only 1.4% consumption of the manufacturing industry. Similarly, agriculture sector has a small share of 2% in the consumption of the value added services (Table 3). Concentration of services consumed is primarily for inputs purchased from the wholesale & retail markets and use of tractors for farming.

Agriculture – Industry linkages

According to data the agriculture sector is a relatively small consumer of goods & services. In terms of manufacturing industry, the agriculture sector consumes 1.4% of the total output produced by the industry. This varies by different industries. Key inputs used by the agriculture sector are primarily fertilizers and pesticides, and hence agriculture sector consumes 11.2% of the total output produced by the Chemicals industry.

On the forward linkages, the agriculture sector accounts for 20.9% of all inputs consumed by the industrial sector in Pakistan (Table 4). The concentration is the highest in the food & beverages industry, with agriculture accounting for 57.5% of the sectors inputs. Similarly, the textile and leather industry is a heavy consumer of agriculture inputs, accounting for 43% and 14% of the industry's consumption respectively.

Table 4: Forward & Backward linkages - Agriculture & Industry

	Inputs	Outputs
Industry	**1.4%**	**20.9%**
Food, beverages, and tobacco	1.5%	57.5%
Textiles and textile products	0.1%	42.9%
Leather & leather products	0.3%	14.2%
Wood and products	0.0%	2.5%
Paper products; packaging	0.0%	0.8%
Coke, refined petroleum	0.4%	0.0%
Chemicals & chemical products	11.2%	1.9%
Rubber and plastics	0.5%	12.5%
Non metallic minerals	1.7%	0.1%
Electricity, gas, and water supply	1.2%	0.4%

Source: ADB Pakistan: Input-Output Economic Indicators
https://data.adb.org/dataset/pakistan-input-output-economic-indicators

Agriculture – Services sector linkages

Agriculture sector forward and backward linkages with the services sector is also relatively small. Agriculture sector as a consumer of services accounts for only 2% of the value added services produced in the domestic markets (Table 5). Concentration of services consumed is primarily for inputs purchased from the wholesale & retail markets and use of tractors for farming.

Table 5: Forward & Backward linkages – Agriculture & Services

	Inputs	Outputs
Services Industry	**2.0%**	**2.9%**
Automobile maintenance & Retail fuel	5.5%	0.3%
Wholesale trade	5.5%	0.1%
Retail trade	5.5%	0.2%
Hotels and restaurants	1.8%	17.0%
Transport	2.1%	8.6%
Post and telecommunications	1.1%	0.0%
Financial intermediation	1.5%	0.2%
Real estate activities	2.2%	0.1%
Public services	0.0%	2.5%

Source: ADB Pakistan: Input-Output Economic Indicators
https://data.adb.org/dataset/pakistan-input-output-economic-indicators

On the forward linkage, agriculture sector output becomes a key consumption item for Hotels & Restaurants, accounting for 17% of the consumption of this service sector (Table 5). Similarly, transport service sector supplies agriculture output from the farms to the markets. Overall, agriculture sector accounts for 2.9% of the total consumption of the services sector in the domestic markets.

Interestingly, the wholesale and retail sector is shown as a small consumer of agriculture output. This is primarily as wholesale & retail sector acts as an intermediary only and supplies agriculture goods to the industry, hotels & restaurants and households.

Table 6: Estimating the Indirect impact of Agriculture on GDP

	Direct Contribution	Inputs used by Agriculture	Outputs supplied by Agriculture	Total	Multiplier
	a	b	c	a+b+c=d	d/a
Agriculture (Rs trn	**11.5**	0.6	2.4	**14.6**	**1.26**
% of GDP	**25.7%**	*1.4%*	*5.4%*	**32.5%**	
		Rs trillion			
Industry		0.1	1.7		
Services		0.5	0.7		
		*% share** *			
Industry		1.4%	20.9%		
Services		2.0%	2.9%		
Source: ADB Pakistan: Input-Output Economic Indicators					
https://data.adb.org/dataset/pakistan-input-output-economic-indicators					
** see Table 4 and Table 5 for more details					
Industry	8.1	0.1	1.7	1.8	
Services	25.2	0.5	0.7	1.2	
GDP Current Price	44.9				

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IMPACT OF FARM INCOMES ON GDP

Consumption spending by the private sector is the single biggest contributor to the national GDP, accounting for 81%[5] of the GDP in 2021. In this section we try to estimate the impact of rural household's consumption on the national GDP. We use the Household Income Expenditure Survey (HIES) 2018-19, published by the Pakistan Bureau of Statistics as the primary data source.

Rural households account for 64% of the total population, whereas urban households account for 36% (Table 7). That means out of a total estimated population of 207 million people, around 132 million live in the rural areas.

Table 7: Population Distribution & Growth

	2008	2013	2018	% Change	
				2018/ 2013	2018/ 2008
	(Millions)				
Population	**165**	**184**	**207**	**2.5%**	**2.5%**
Rural	103	122	132	1.7%	2.8%
% share	*62%*	*66%*	*64%*		
Urban	62	62	75	4.1%	1.9%
% share	*38%*	*34%*	*36%*		

Source: HIES 2018-19

According to HIES 2018-19 data the average monthly income for the rural households is estimated at Rs 34,520 (Table 8). Out of this nearly 90% is used for consumption expenditures and the rest for savings, purchase of jewelry and payment of dowry.

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[5] National Accounts, Economic Survey 2021, Ministry of Finance and PBS.

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Table 8: Estimating Household spending impact on GDP (2018)

|	Urban	Rural	National
Population (millions)	75	132	207
Households (millions)	12.6	20.6	33.3
Average size of Households	6.0	6.4	6.2
Employed persons per HH	1.7	1.8	1.8
Average Monthly Income (Rs)	53,010	34,520	41,545
Average Monthly Expenditure (Rs)	47,362	30,908	37,159
Monthly Consumption (Rs bn)	598	638	1,231
Annual Consumption (Rs bn)	7,181	7,650	14,775
% of GDP	22%	24%	46%
Food & Beverages (Rs bn)	2,226	3,213	5,467
Non Food spending (Rs bn)	4,955	4,437	9,308
% of GDP	15%	14%	29%
2018 GDP MP (Rs bn)	32,383	32,383	32,383

Source: HIES 2019, Pakistan Bureau of Statistics

Consumption expenditure for a rural household is estimated at Rs 30,908. Bulk of which is consumed for food & beverages, i.e. 42% of rural household's income. The remaining income 58% is spent on purchase of goods & services. The total annual consumption of rural households is estimated to contribute around 24% to the national GDP, slightly higher than the consumption spending of the urban households 22% of GDP (Table 8).

If we exclude spending on food items, then the total spending by the rural households on purchase of goods & services is estimated at 14% of GDP (Table 8). We can use this as a proxy for contribution of farm incomes contribution to the national GDP.

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EMPLOYMENT ELASTICITY OF THE AGRICULTURE SECTOR

Low agriculture growth over the during 2008 to 2018 (2.3% per annum) has led to a sharp rise in unemployment in the rural areas. According to the Labor Force Survey 2018, the unemployment rate has increased to 5% in 2018, from 4.7% in 2008. However, this data only partially captures the complete picture.

Figure 1: Unemployment rate
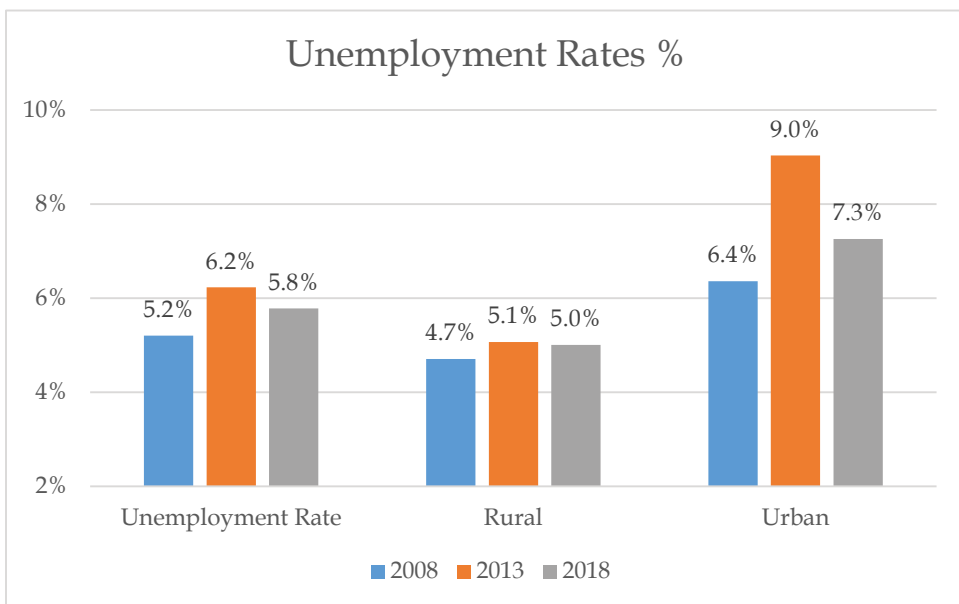
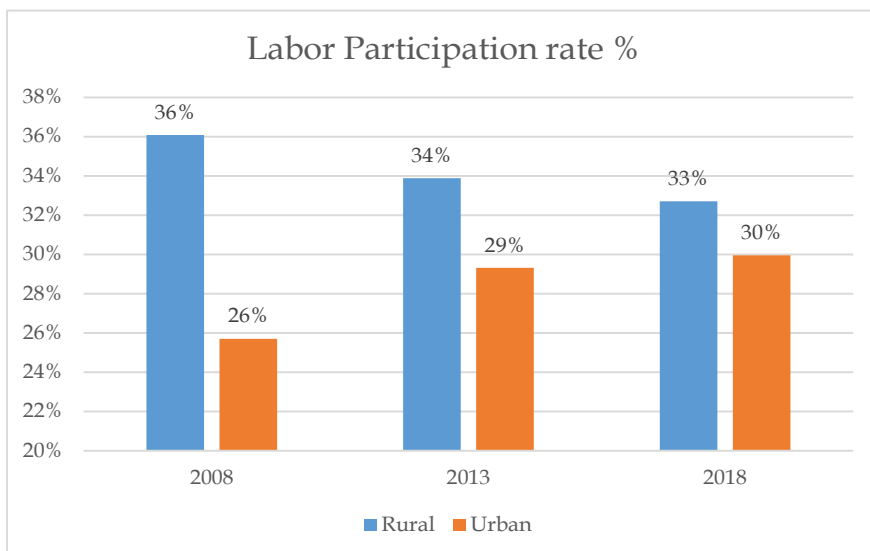Source: Labor Force Survey 2018

There has also been a sharp drop in the rural labor participation rates, as more workers, in particular female workers, have been left behind due to lack of work opportunities and stagnant wages. The rural labor participation rate fell to 33% in 2018, from 36% in 2008. During the same time period urban labor participation rates increased to 30% in 2018, from 26% in 2008.

Figure 2: Labor Participation rate

Labor Participation rate %

Source: Labor Force Survey 2018

Hence, true unemployment in the rural areas is significantly underreported. If the rural labor participation rate had remained at 36%, then the rural unemployment ratio would be as high as 15.3%[6]. Therefore, there is a strong correlation between low agriculture growth and rising unemployment.

Table 9: Employment by Sectors

| | 2008 | 2013 | 2018 | % Change | | |
				2013/ 2008	2018/ 2013	2018/ 2008
		(Millions)				
Employed Labor	**50**	**57**	**62**	**2.4%**	**1.8%**	**2.2%**
Rural	35	39	41	2.1%	0.8%	1.5%
Urban	15	17	21	2.5%	4.8%	4.0%
Employment by secto		*(% of Employed)*				
Agriculture	0%	0%	0%			
Industry	0%	0%	0%			
Services	0%	0%	0%			

Source: Labor Force Survey 2018

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[6] Calculation is based on data from Labor Force Survey 2018. Total rural population in 2018 was 131 million, participation rate of 36% would translate into a labor force of 47.3 million as compared to 42.9 million at participation rate of 33%.

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Studies show that the employment elasticity of Agriculture sector is higher than the national average. The national average elasticity of employment for the period 1980 to 2015 is estimated by the Planning Commission at 0.45[7]. This implies that one percent increase in GDP growth leads to a proportional 0.45% increase in employed labor.

The International Food Policy Research Institute (IFPRI) 2018 report[8] estimates that the employment elasticities in the different sub sectors of Agriculture range between 0.8 to 1.2, significantly higher than the national average. The study finds that the largest magnitudes of changes in GDP and employment (relative to the base) occur from total factor productivity (TFP) growth in livestock, agricultural processing, and horticulture when combined with agricultural processing. In contrast, the effects of TFP growth in groups of major crops and in each case GDP and employment effects are smaller at less than 1%, see table below.

Table 10: Employment Elasticity of Agriculture subsectors

	Simulated TFP growth	GDP Growth %	Employment Growth %	Employment Elasticity %
Wheat	2.5	0.88	0.73	0.82
Rice, maize, oilseeds	2.5	0.43	0.36	0.83
Cotton, sugarcane	2.5	0.92	0.83	0.90
Horticulture	2.5	0.37	0.32	0.88
Other crops	2.5	0.60	0.60	1.00
Livestock	2.5	3.70	4.47	**1.21**
Agri processing	2.5	1.71	1.77	1.03
Horticulture + Agri Processing	2.5	1.05	1.24	**1.18**

Source: Saeed, Wajiha and Davies, Stephen; Growth and Poverty Reduction, Research Note 003, IFPRI 2018 Report. Calculation of GDP and Employment growth is relative to base growth of 2% across all sectors.

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[7] Planning Commission Annual 5-year plan 2015-2016, Chapter 6 on Labor and Employment. Based on calculations for the period 1980 to 2015, the employment elasticity is calculated as 0.45, implying that one percent increase in GDP of the country results in 0.45 percent proportionate change in employment.

[8] Saeed, Wajiha and Davies, Stephen; Growth and Poverty Reduction, Research Note 003, IFPRI 2018 Report.

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POVERTY CONCENTRATED IN RURAL AREAS

Despite rapid urbanization across all major cities, the bulk of the population continues to live in the rural areas. According to the Pakistan Census 2017 the majority of the population 64% lives in the rural areas and depends on agriculture sector and its associated industry and services for livelihoods.

Poverty is concentrated around the rural areas of Pakistan. The household income expenditure (HIES) survey data shows that there has been a sharp decline in the incidence in poverty across Pakistan. National poverty incidence fell to 24.3% by 2016, from 50.4% in 2005. Urban poverty levels have declined to 12.5% but rural poverty remains high at 30.7% in 2016.

Table 11: Poverty Incidence (2006 to 2019)

	National	Urban	Rural
2006	50.4	36.6	57.4
2008	44.1	32.7	49.7
2011	36.8	26.2	42.1
2012	36.3	22.8	**43.1**
2014	29.5	18.2	35.6
2016	24.3	12.5	30.7
2019	21.9	11.0	28.2

Source: Ministry of Planning & Special Initiatives
* Cost of Basic Needs (CBN) approach is used for poverty estimation

Based on the HIES 2019 survey, the Ministry of Planning estimates that poverty levels have decreased further to 21.9% of the total population by 2019, see table 11. The poverty estimates are calculated based on the cost of basic need (CBN) methodology adopted by the Government in 2014 to estimate poverty[9].

However, other studies show that the poverty incidence in Pakistan is significantly higher using a minimum calorie intake approach. Haroon Jamal (SPDC)[10] 2021 report estimates that the national poverty incidence was 36.6%[11] in 2019 compared to the official estimates of 21.9%. Similarly,

[9] National Poverty Estimate 2018-19. Dr Nasir Iqbal. PIDE Knowledge Brief May 2020
[10] Updating Pakistan's Poverty Numbers for the Year 2019. Jamal, Haroon SPDC. January 2021
[11] ibid

rural poverty rate was estimated at 39.3% compared to the official estimates of 28.2%.

Table 12: Distribution of Poverty (2019)

	National	Urban	Rural
Extreme Poor *(> 50% of poverty line)*	0.3	0.1	**0.4**
Poor *(> 50 % of poverty line and upto 100%)*	21.2	10.6	27.3
Vulnerable *(>100% and < 125% of poverty line)*	20.0	14.3	**23.2**
Non Poor *(> 125% of poverty line)*	58.5	75.0	49.1

Source: Dr Nasir Jamal PIDE 2019

The important take away is that poverty is concentrated in the rural areas. Looking deeper into the HIES 2019 survey data we find that three fourths of the extreme poor[12] live in the rural areas. These are households living below Rs 1,888 per month (less than 50% of the poverty line).

Also worryingly, the most vulnerable households, i.e. households spending up to Rs 4,720 per month (100% to 125% of the poverty line) are also concentrated in the rural areas. These are households that can slip below poverty line as a result of any shocks including increase in prices of essential commodities, loss of employment or death of the income earning member of family etc.

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[12] Extreme Poor identified as households living below Rs 1,888 (50% of the calculated poverty line)

Table 13: Impact of Crop sector on Poverty

Impact of Crop Sector Growth on Poverty						
	Crop sector growth (Per annum)	Reduction in Poverty %			Increase in Consumption (Inter Survey Period)	
		National	Urban	Rural	HIES	National Accounts
2005-2008	17.9	6.3	3.9	7.7	11.3	36.5
2008-2011	27.6	7.3	6.5	7.6	67.7	70.3
2011-2012	-12.6	0.5	3.4	-1.0	17.6	11.4
2012-2014	16.1	6.8	4.6	7.5	29.3	23.4
2014-2016	0.1	5.2	5.7	4.9	23.7	14.1
2016-2019	3.4	2.4	1.5	2.5	21.9	35.6

Source: National Accounts and HIES Surveys 2005 to 2019

There is a strong correlation between growth in agriculture and decline in poverty incidence in the rural areas. The table below shows that there is a strong correlation between decline in poverty rates and the growth in the major crops. The coefficient of correlation (r) which quantifies the strength of the linear relationship between two variables in a correlation analysis, shows that r = 0.91 between crop sector growth and decline in incidence of rural poverty. This shows a near 'perfect' correlation between the two variables.

During the period 2008-2011, the world economy went through a major global financial crisis which impacted Pakistan through record high inflation and stagnant growth, which should have led to a rise in poverty incidence. However, poverty incidence fell as record high international commodity prices lead to higher incomes for the farmers.

On the other hand, crop sector growth fell 12.6% in 2011-12 as a result of massive floods that destroyed crops and also caused loss of livestock. Poverty incidence recorded an increase of 1%, the only period where poverty incidence increased.

CONCLUSION

Based on our analysis we can estimate that the total contribution of agriculture sector to the national GDP is 46.4%, of which 25.7% is direct contribution of agriculture output.

Indirect contribution is calculated based on the input-output data published by ADB. The forward and backward linkages of agriculture sector with manufacturing and services is estimated as Rs 3 trillion (6.7% of GDP).

HIES 2018-19 data shows that rural household consumption expenditures (non- food) contribute around 14% of GDP. All the above combined give us a multiplier of 1.8, meaning that for every Rs 100 output produced in agriculture sector, the contribution to national GDP is around Rs 180.

Table 14: Multiplier to the Economy

	Direct Contribution *a*	Indirect Contribution *b*	Impact of Rural Household spending *c*	Total *a+b+c=d*	Multiplier *d/a*
Agriculture (Rs trn)	**11.5**	3.0	6.3	**20.8**	**1.8**
% of GDP	*25.7%*	*6.7%*	*14.0%*	*46.4%*	

Source: Direct Contribution taken from the National Accounts GDP at Current Prices
Indirect Contribution taken from the Input-Output data (see Table 6 above)
Rural households consumption spending (non-agriculture) is estimated based on HIES 2018-19

This study has many limitations and attempting to put values on the indirect contribution of agriculture sector is constrained by lack of data and time limitations. More important than quantifying the indirect impact, this research provides a qualitative analysis of the strong linkages that exist between agriculture and other value added sectors.

This study confirms our hypothesis that the actual contribution of agriculture sector is significantly higher than what most official statistics showcase. Not capturing the greater significance of agriculture to our

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economy is a continuing lapse.

Successive government have attempted to compensate for low agriculture growth through periodic subsidies instead of focusing on enhancing productivity. This policy intervention has been effective to the extent that higher budgetary transfers to the rural economy has led to a decline in poverty incidence. However, these subsidies have had no effect in terms of increasing employment opportunities, leading to high unemployment rates and low labor participation in the rural economy.

A policy must be formulated to make farmers more efficient producers and more efficient sellers. In more efficient markets, farmers would have stronger linkages with end consumers through relevant infrastructure including cold-chain storage facilities, warehouse facilities, and a functional national commodity exchange. A policy must be formulated that incentivizes farmers to gain more control on subsequent value-added processes.

POLICY RECOMMENDATIONS

The focus for policy makers needs to be on enhancing productivity of farm sector which in turn will lead to higher incomes for rural community and support higher growth in the economy. The productivity gap between average farm output and output of farms that have adopted technology and have access to credit, is estimated to be 40%[13].

We prioritize six key government interventions including availability of modern farm machines, storage facilities and seeds for higher productivity. Better credit availability and crop insurance schemes will support small farmers to enhance farm productivity. Lastly, a shift to higher yielding crops (fruits, vegetables) will boost incomes of small farmers.

I. Scaling up farm mechanization through service providers

Lack of access to quality farm machinery (transplanter, harvester, laser levelling equipment, etc.) is a major reason for low farm yields and high crop losses at harvesting. According to research done by the Pakistan Agriculture Coalition (PAC), the use of quality machinery leads to a 20% increase in farm yields and reduces the post-harvest crop losses by up to 50%. For rice crops, use of machinery also reduces the water consumption by 15%.

There is an urgent need to encourage manufacturing of farm machinery in Pakistan. The government should incentivize the local manufacturing through a revision of tax and duty structure on import of machinery and parts. Supply of quality farm machinery will boost farm output and reduce crop wastage. Target should be to build a national fleet of new machines that justifies machine manufacturing in Pakistan over the medium term.

The policy makers need to encourage private sector firms to provide farm machinery to small farmers on rental and short term lease arrangements. Currently, there are not enough machines available to provide services and getting access to these machines is an expensive proposition especially for small farmers. The provincial tax on services discourages private sector

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[13] ZTBL. 2020. "Crop Yield Gap Analysis Pakistan". Planning & Research Department, Zarai Taraqiati Bank Limited.

from setting up service delivery solutions for the small farmers.

II. Modernize seed regulation to build robust private seed sector

Pakistan has one of the lowest farm yields in the world and compares poorly with other developing economies. The seed market is dominated by uncertified and unbranded seed companies, as a result seed available to farmers is of low purity leading to low germination rates – adversely impacting crop output. Research shows that for cotton nearly 88% of seed available to the farmers is unbranded seed, whereas quality seed supplied by the government makes up only 2% of the seed available in the market.

Government needs to incentivize private sector for setting up a world class seed company, with international specialist for research and development of new seeds and hybrids for enhancing agriculture productivity. The legal and regulatory barriers for new investment need to be removed and streamlined. Government should target to see a robust private seed sector in 3 years.

SBP recommends that government should provide subsidized credit to encourage new startups and encourage expansion of existing seed companies[14].

III. Investment in new modern storage facilities

USAID report[15] recommends that investment in storage facilities can reduce post-harvest losses by 20% and will also boost farmer's income by 23%. SBP reports on agriculture value chains recommend that investment in cold storage facilities (milk chillers and refrigerated tankers for transport) will increase milk output by 9.6 mn liters valued at over Rs 170 bn annually[16].

Policy makers need to support private sector investments into setting up warehouses / storage facilities through fiscal incentives including tax exemption on import duties and GST on silos and associated drying facilities/other equipment. Provincial sales tax on services (16% in Punjab

[14] https://www.sbp.org.pk/publications/ChainReport/index.htm
[15] USAID Small & Medium Enterprise Activity 2020 Report – Private Silo Warehousing for Pakistan Grains
[16] https://www.sbp.org.pk/publications/ChainReport/index.htm

and 13% in Sindh) significantly impacts the viability of such warehousing services especially when the informal sector is providing much cheaper service to farmers.

SBP Financing Facility for Storage of Agricultural Produce (FFSAP) should be expanded for supporting standalone agriculture warehousing. Currently all investments done under this scheme are all inside mill premises, not accessible for small farmers.

To support the Electronic warehouse receipts (EWRs), an initial grant of US$ 5 million should be established for a risk mitigation fund. In economies where 'uninsurable risks' such as contract breach are possible, the holders of warehouse receipts (including banks) are paid out of a risk mitigation fund (also called an indemnity fund).

IV. Crop insurance scheme

The existing insurance schemes launched by the Federal government and by the Punjab government have had limited impact to date. Both the farmer and the bank are not adequately secured under these schemes.

Policy makers need to review the effectiveness of these schemes. What is required is incentives for farmers to try new seeds and technology to enhance their productivity. The Pakistan Agriculture Coalition (PAC) has proposed a new Area Yield Index based Insurance (AYII)[17] scheme. Under this scheme if the yield drops below 70% of the average yields in the area then the farmers get a payout.

The benefits towards moving to the AYII scheme are two folds. Firstly, it provides more comprehensive protection to farmers against the more frequent risks (pest, extreme weather conditions etc) as compared to the two government schemes currently in place. Secondly, the payout to farmers is not restricted, currently schemes limit the payout to 3 times the premium.

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[17] Feasibility study for agricultural crop insurance in Pakistan. Pakistan Agriculture Coalition (PAC). June 2021.

V. Improve credit availability for small farmers

SBP studies into the agriculture value chains find that 80% of the farmers do not have access to credit[18]. According to data available, only 18% of the total of 8.3 million farms had access to bank credit in 2020[19]. This needs to be scaled up significantly for improving agriculture outputs.

In FY20, large farms with more than 50 acres, who account for only 1.4% of all agriculture borrowers, received 60% of the loan disbursements. By comparison, small farmers with less than 12.5 acres' farm holding, received only 28% of the loan disbursements. The preference of banks is to lend to the large farmers.

The Kamyab Kissan scheme announced in the FY2022 Federal Budget, under the banner of the Kamyab Pakistan program, aims to provide interest free loans to the small farmers. Under the program, loans of Rs 150,000 on crop inputs and Rs 200,000 on machinery will be provided to small farmers at zero interest costs. The small farmers are defined as having land holding of upto 12.5 acres.

This will incentivize small farmers to enhance productivity and scale up production. Government targets to reach out to over 100,000 small farmers in the current year which will lead to higher farm output and enhance household incomes. This pilot scheme needs to be monitored and scaled up if proved successful.

VI. Cultivation of higher yielding fruit and vegetable crops

Punjab Spatial Strategy 2047 recommends to increase cultivation of fruits & vegetables to 15% by 2047, from the current cultivation of 5%. This shift from lower yielding products (cotton, grains, wheat etc) to higher yielding products (onions, potatoes, citrus etc) will lead to a 54% increase in incomes for farmers. An implementation strategy around the Punjab Spatial Strategy 2047[20] is needed and a working group should be set up which should include representatives from the Punjab Agriculture department, SBP and commercial banks.

[18] https://www.sbp.org.pk/publications/ChainReport/index.htm
[19] Feasibility study for agricultural crop insurance in Pakistan. Pakistan Agriculture Coalition (PAC). June 2021.
[20] https://www.urbanunit.gov.pk/Download/publications/Files/12/2021/PSSBrochure.pdf

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