

# **Agricultural productivity and challenges for its enhancement**

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# Introduction

- Agricultural productivity plays a vital role to meet the food demand of the rising population and can contribute to reduction of poverty ([Kaya et al., 2013](#)).
- Agriculture sector contribute 21% of GDP and 45% of the total employment.
- Approximately 22 million hectares are cultivated for agriculture out of total area of 80 million hectare ([Ahmad, 2009](#)).

# Agricultural productivity

- Production of agriculture crop per hectare of land is called agricultural productivity.
- Agricultural productivity here refers to “output per unit of input” as mentioned by Dharmasiri (2012).



# Measure of Agricultural Productivity

Agricultural productivity here refers to crop yield obtained from a unit land area, i.e. one hectare.

Two measures of productivity are frequently used:

- Partial measure of productivity and
- Total measure of productivity.

## Partial measure of productivity

- Crop yield per unit of land is generally used partial measure of agricultural productivity. It is common because of easy availability of the required data.
- In Pakistan, generally partial measure of productivity is used to quantify the agricultural crop productivity, such as wheat production per hectare of land.

# Total measure of Productivity

- Total measure of productivity considers all inputs to quantify the agricultural productivity.
- The economic models, namely; growth accounting model, Cobb-Douglas econometric model and nonparametric model are used for measuring agricultural productivity (Dharmasiri,2012).

# Major cropping systems

1. Wheat-Maize (Khyber Pakhtunkhwa)
2. Rice-Wheat (Punjab)
3. Mixed-Wheat (Punjab)
4. Cotton-Wheat (Punjab)
5. Sugarcane-Wheat (Punjab)
6. Cotton-Wheat (Northern Sindh)
7. Cotton-Wheat (Southern Sindh)
8. Rice-Wheat (Northern Sindh)
9. Rice-Wheat (Southern Sindh)

# Scenario of Agricultural Productivity

- In irrigated areas, major cropping systems include rice wheat, cotton-wheat, sugarcane and mixed cropping based on various combinations of wheat, rice, cotton and sugarcane.
- In rainfed areas, major cropping system includes wheat, pulses and oilseeds.
- Pakistan's scenario on agricultural productivity of wheat, cotton, rice, maize and sugarcane per unit land area is shown in Table 1.



## Table 1: Average yield and Best practice yield

Crop	Average yield (t/ha)	Best practice yield (t/ha)
Wheat	2.26	4.50
Cotton	1.87	2.89
Rice	2.88	4.58
Maize	1.77	7.46
Sugarcane	48.06	106.70

*\*(Source: Kamal et al., 2012)*

**Table 2: Various yield Levels (t/ha) and gaps for major crops in Pakistan**

Crop	World highest average Yield*	Pakistan Potential Yield	Progressive farm's yield	National average yield	Yield gap (%)
Wheat	7.45 (France)	6.80	4.50	2.26	50
Cotton	3.98 (China)	4.30	2.89	1.87	35
Rice	7.37 (USA)	5.20	4.58	2.88	37
Maize	9.91 (France)	9.20	7.46	1.77	76
Sugarcane	119.84 (Egypt)	300.0	106.7	48.06	55

*\*(Source: Kamal et al., 2012)*

# Major Constraints to Agricultural Productivity

## ■ Environmental Constraints

- Globally more than 75 countries are dealing with a challenge of salinity and has adverse effects on soil fertility ([Hogarth 2015](#)).
- Climatic conditions such as heavy rains, floods and droughts adversely affects agricultural productivity.
- About 20% reduction in crop productivity occurs due to adverse climatic situations in Pakistan ([Sattar, 2012](#))



## ■ Irrigation water constraints

- Water distribution irregularities within a watercourse along with variability of outlet discharge results low irrigation application efficiency. This may cause low crop yield.
- Most of the farmers do not follow appropriate conjunctive use forms and also use poor quality groundwater.
- This results in salinization and causes low agricultural productivity.



## ■ Technological constraints

- Majority of the farmers in Pakistan use traditional agricultural technology which results in low land productivity (Sattar, 2012).
- Farmers are unaware of the modern agriculture technology that can increase land productivity.
- Lack of up scaling of modern agriculture technologies



## ■ Agronomical constraints

- Lack of awareness about smart farming practices and technologies.
- poverty and high prices of modern technologies are the main causes for using traditional methods of cultivation (Jehangir et al., 2007).
- Improved quality seed is also a big constraint for enhanced agricultural productivity.
- Pests and plant diseases also cause low crop yields (Khan, 2012).

## ■ Institutional Constraints

- Inadequate institutional seed production capacity
- Inadequate agricultural research and extension
- Ineffective agricultural education and training
- Inadequate credit facilities

## ■ **Socio-economic Constraints**

- In Asia, South Asia is the most populous region of about 1.74billion (World Population Prospects, UN 2017) which require food, energy and water.
- small land holdings
- Lack of access to improved quality inputs and Services
- Illiteracy and poverty of the farmers also lead to low agricultural productivity



# Prospects for Agricultural Productivity Enhancement

- Up scaling of modern technology
- Land Reforms
- Improved Agricultural Credit Facilities
- Enhanced Good Quality Seed Production
- Improved Availability and Use of Inputs
- Improved Irrigation Water Management
- Effective Research and Extension Services

# Way Forward

- Awareness campaigns for rapid change of climate.
- By creating better opportunities for people to improve rural agriculture livelihoods.
- Comprehensive process of reforms is required to activate the full expertise of agricultural science.
- Innovation towards agricultural development.

**THANK YOU**