

Unlocking Full Economic Potential of Agriculture Sector in Punjab: Policy Options

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Abstract

In order to unlock the full economic potential of agriculture sector in Punjab, there is need to identify, map and prioritize the challenges and constraints faced by agriculture. The key challenges and constraints in the agricultural value chain from production to consumption include productivity, financing and regulatory. The policy initiatives are called to boost agricultural productivity, reduce post-harvest losses and expand market access. There is need for private investment in agribusiness value chain to lower cost of financing and increased agro-financing measured in terms of cost of capital (%) paid, number of loans and credit provision, private capital formation and number of participants. Private investment is essential for storage, processing, marketing and trade, and infrastructure. It is essential to develop and launch agro-entrepreneurship platforms for youth and women to enter agribusiness economy by facilitating investment support, training, and capacity building. The database for rural infrastructure planning is required to be revitalized for robust agriculture policy and planning. Climate smart agriculture calls for developing technical, policy and investment conditions to achieve sustainable agricultural development by sustainably increasing agricultural productivity and incomes, adapting and building resilience to climate change and reducing and/or removing greenhouse gases emissions.

Keywords: Economic potential, Agriculture sector, Punjab, Policy options

1. Introduction

Punjab's agriculture played a key role in success of green revolution. Punjab has been a star performer in agriculture in post green revolution period (Gulati et al., 2017) and became an iconic state (Basu, 2016) by contributing significantly to economic growth (Singh & Singh, 2002) and food security of India (Gulati et al., 2017). The growth rate of agriculture has been rising till 1980s. For instance, Punjab experienced a high agriculture growth rate of 5.7 per cent in 1971-72 to 1985-86 compared to national agriculture growth rate of 2.31 per cent. However, between 1986-87 and 2004-05, Punjab's agriculture grew at about 3 per cent, which was more or less equivalent to the India's agricultural growth rate. Between 2005-06 and 2014-15, Punjab's agriculture grew at just 1.61 per cent, which was less than half the country's average agriculture growth rate of 3.5 per cent (Gulati et al., 2017). Thus, up to early 1990s, Punjab agriculture had high growth performance and then slowed down (Kalkat et al., 2006; Singh, 2009).

The decelerating agricultural growth in Punjab has been attributed to government mandated agriculture innovation system focusing on development of seed varieties of food grains only, which led to propagation of wheat-paddy monoculture over mechanization and intensive use of inputs. Agricultural innovations in Punjab led to very high increases in yields since mid-sixties (Singh, 2016). For instance, paddy yield increased from 1,009 kg per hectare in 1960-61 to 3,741 kg per hectare in 2011-12 and wheat performed even better, with near quadrupling of yields from 1,244 kg per hectare in 1960-61 to 5,097 kg per hectare in 2011-12 (Sidhu, 2016). As a result, the post-Green Revolution period witnessed high growth in per capita income and high consumption levels thereby improving welfare of the population of the state (Shergill, 2012). Besides agricultural innovations and new institutional arrangements, the sustained rise in food grains production even in drought years is attributed to assured groundwater irrigation through massive increase in tubewell installation from 600,000 in 1980-81 to 1,384,000 lakh in 2012-13 (Government of Punjab, 2013). Thus, commendable achievements of Punjab in food grains helped the country to tide over droughts that hit states with rain-fed agriculture (Chand, 2008).

However, Punjab's agriculture sector has been reeling under serious crisis since early 1980s due to slowdown in agriculture productivity (Johl, 1986; Chand, 2008; Sidhu, Joshi & Bhullar, 2008). The relative rank among Indian states in terms of per capita income fell from first to seventh, causing Punjab's economy to slip from top rank to middle income status during the past two and a half decades (Government of India, 2016). Besides technological constraints, over exploitation of land and groundwater resources have posed big question mark on food grains sustainability of Punjab (Swaminathan, 1996; Karte and Scheunert, 1986; Johl, 1986). Alongside, climate change has posed uncertainty regarding returns from agricultural production and pushed a significant proportion of small farmers into debt traps (Sidhu, Joshi & Bhullar, 2008; Singh, Bhangoo & Sharma, 2016), which led to high suicide rates among farmers and agricultural labourers. Due to the constraints of the technology led agricultural development in Punjab, a full-fledged industrialization was suggested as an alternative to overcome the crisis (Gill, 1988) along with agriculture diversification from low value-added to high value-added crops, which failed due to lack of robust policy and institutional arrangements (Singh 2016, Johl, 1986).

Thus, in view of the widespread agrarian crisis and distress faced by farmers in Punjab, increasing their income through various credit and non-credit interventions involving all the stakeholders is a big challenge. This requires a well framed strategy and policy to boost agricultural productivity and to increase farmers' income by switching to high value agriculture and diversifying to allied and non-farm activities. All this calls for long-term policies focusing on irrigation, agricultural diversification, farm profitability and community support programmes to empower the farmers. Farmers' livelihood is influenced by both the market and climatic conditions, which cause farm crisis and distress. Market volatility affects high production crops. Farm crisis and distress have multidimensional effects on socio-economic-environmental-technological-gender aspects, which call for robust policy changes.

2. Key Initiatives

There is need to involve the key stakeholders to increase the farmers' income and to build Punjab an agribusiness economy capable of delivering sustained prosperity of farming community by meeting national food security, reducing dependence on food imports and supporting sustainable income and job opportunities in agriculture sector. The strategy and policy options for increasing the farmers' income in Punjab calls for developing the integrated agriculture sector through the following key initiatives:

- 2.1. Integrating agricultural commodity value chains into the broader supply chain of agro-industry, creating agro-based job opportunities, increasing the contribution of agriculture to state domestic product, and enhancing the capacity of agricultural exports;
- 2.2. Promoting the sustainable use of land, water and other natural resources to create a vibrant agricultural sector offering greater livelihood opportunities for a growing population;
- 2.3. Facilitating the government's capacity to meet its obligations to national food security, food safety and quality nutrition; and
- 2.4. Creating a mechanism for improved governance of agriculture by supervising institutions and improving the quality of engagement between the Central and State Government

3. Addressing Challenges

Unlocking the full agricultural potential of agricultural economy of Punjab will call for addressing the following challenges:

- 3.1. Policy Framework: Punjab suffers from agriculture policy instability due to lack of policy accountability and transparency, which has made the business environment unpredictable and discourages investors. Therefore, there is need to evolve coordination among decision-making authorities for agricultural transformation.

3.2. Political Commitment: The budgetary allocations for agriculture sector are low. Political commitment at both the Central and State levels will be required to enforce reforms with regard to increasing budgetary allocation to the agricultural sector.

3.3. Agricultural Technology: Punjab faces persistent shortcomings to generate and commercialize new agricultural technologies to meet the needs of local market. Agricultural technology challenges have been severe for improved varieties of seeds or other planting materials and breeds of livestock. The farmers are also deprived of access to proven technologies. This needs to be addressed by better coordination among extension agents and public and private suppliers of agricultural inputs.

3.4. Infrastructure Deficit: Agricultural sector suffers from an infrastructure challenge such as insufficient road connectivity and poor irrigation, which are unable to support scale-driven agriculture and add to the cost heavily and result in price uncompetitive of agricultural produce. Therefore, access to low cost infrastructure will be essential to boost farm productivity, increase marketable surplus and expand value chain.

3.5. Finance and Risk Management: Agriculture sector in Punjab have poor access to financial services thereby hampering farmers access to new technologies and market and lower their resilience to economic shocks. Therefore, poor financial liquidity needs to be addressed to enable private input suppliers, agro-processors and traders to play their effective role in agriculture. Lending rates are also quite high. All this calls for improving financing options and de-risking value chains to intensify innovation in agro-financing.

3.6. Institutional Reforms: Most agricultural institutions are not robust and lack accountability which calls for streamlining, clarifying mandates and ensuring accountability for outcomes through well-defined operational coordination mechanisms between different departments and agencies.

Increasing the farmers' income calls for addressing the aforesaid challenges using prudent and market based policy measures to reduce income inequality and transform agriculture sector through promotion of agricultural investment, financing agricultural development programmes and research for agricultural innovation and productivity.

4. Policy Thrust and Objectives

Increasing farmers' income in Punjab needs to be readjusted to address the aforementioned challenges through priorities on national food security, export promotion, agri-job creation and economic diversification. Thus, the new policy regime for agricultural development and sustainability must takes in to account the aspirations of the current political regime which includes the following:

4.1. Agriculture as a business focusing on government-enabled and private sector-led growth of the sector

4.2. Agriculture as key to rural prosperity focusing on commercialization by access to technologies, financial services, inputs supply chains and market linkages for job creation, diversification, national food security and agricultural sustainability

4.3. Food as a human right focusing on national food security, social security and equity by protecting from hunger and malnutrition

4.4. Value chain approach focusing on crops, livestock and fisheries through input supply, production, storage, processing/utilization, marketing and consumption

4.5. Prioritizing crops focusing policy on improving national food security and increasing export earnings by closing infrastructure gaps to accelerate productivity and investment

4.6. Market orientation focusing on stimulating agricultural production, facilitating market linkages between producers and traders, and reducing price volatility through agricultural insurance

4.7. Addressing climate change and agricultural sustainability focusing on sustainable use of land, soil, water and ecosystems

4.8. Participation and inclusive development focusing on farmer's associations, cooperatives, SHGs, and private sector for policy advocacy roles and development agents

4.9. Policy integrity focusing on accountability, transparency and efficiency

4.10. Nutrition sensitive agriculture focusing on stunting, wasting, and underweight of vulnerable groups including children under 5 and nursing mothers

4.11. Agriculture's linkages with other sectors focusing on industry, environment, power, energy, works and water sectors

5. Policy Framework

With above framework, the strategy and policy options for doubling the farmers' income will include the following initiatives for the development of agricultural sector on situation analysis, identification of policy areas with activities and budgets, and the investment plan based on weighted priorities across possible intervention areas.

5.1. Interventions to Unlock Full Potential of Agriculture

In order to unlock the full economic potential of agriculture sector in Punjab, there is need to identify, map and prioritize the constraints faced by agriculture. A matrix of constraints have been identified which includes productivity, financing and regulatory constraints and based on the analysis, an attempt has been made to develop policies and interventions to act as guidelines for resolving these constraints. These proposed interventions and policy choices have been presented as under:

5.1.1. Productivity Enhancements

The policy initiatives are called to boost agricultural productivity, reduce post-harvest losses and expand market access, which will result in increasing farm productivity compared to base year in terms of proportionate increase in yield, reduction in post-harvest losses, share of modern agricultural input used and the share of fresh agricultural produce sold in formal markets.

Box 1: Soil Fertility

Challenges	Key Constraints	Policy Thrust
Soil fertility requires need to maintain adequate levels of soil nutrients under intensive production systems that remove nutrients from agriculture areas	Better targeting of fertilizers to communities where the use of fertilizer is profitable and improved incentives for fertilizer supply	Soil mapping and testing Crop rotation to improve nitrogen fixation Use of organic fertilizer
Soil erosion due monsoon floods wash away topsoil with nutrient layers and pose a threat to soil fertility	Soil degradation due to inappropriate agricultural practices, soil erosion, deforestation and climate change	Soil/crop specific fertilizer formulation Improved conservation and reforestation
Climate change with temperature increase speeds up the breakdown of soil organic matter required for water retention and root development	Cost-effective fertilizer delivery by use of technology Insufficient mapping of soils by type as an input into designing fertilizer types	Fertilizer supply / demand strategy to focus efforts in areas requiring most support

Box 2: Access to Information and Knowledge

Challenges	Key Constraints	Policy Thrust
<p>To increase agricultural productivity and improve agribusiness, necessary information is required for planning and decision-making</p> <p>Information is required for all stakeholders including farmers, input suppliers, processors, traders, policy makers, development partners, and researchers</p> <p>Appropriate information can sharpen opportunities, clarify market access, and enable participants to make choices to use scarce resources</p>	<p>Inaccessible information for planning, decision making and innovation</p> <p>Limited awareness and capacity to manage information and knowledge</p> <p>Poor ICT infrastructure to serve stakeholders</p> <p>Poor information exchange and delivery mechanism</p> <p>Ineffective research to extension delivery system</p>	<p>Policy to enhance availability of information for farmers, agribusiness and policymakers</p> <p>Developing agricultural information systems, stakeholder dialogue, innovation and learning</p> <p>Focus on disseminating information to help farmers make best choices with respect to input costs, equipment, agronomic practices, crop prices and weather</p> <p>Enhancing reach, effectiveness and efficiency of extension delivery system using electronic extension services via SMS</p>

Box 3: Access to Inputs

Challenges	Key Constraints	Policy Thrust
<p>Access to inputs remains a challenge for achieving optimal productivity of agricultural outcomes</p> <p>Challenge includes late or non-delivery of inputs, sub-standard inputs and exclusion of rightful beneficiaries</p> <p>Need to increase productivity by ensuring access to timely, high quality and price competitive inputs</p>	<p>Ill-timed delivery of inputs</p> <p>Unreliable distribution and agro-dealer network</p> <p>Non-targeted distribution of subsidies</p> <p>Deficient farmer identification mechanisms for subsidized inputs</p> <p>Low level of commercialization, access to information/knowledge</p>	<p>Stimulating production of good quality inputs, especially seeds and fertilizer</p> <p>Financing for small seed companies</p> <p>Standards and quality control mechanisms</p> <p>Ensuring accountability, monitoring and evaluation of input subsidy</p> <p>Encouraging effective fertilizer use</p> <p>Development of processing and storage facilities</p>

5.1.2. Production Management

Box 4: Water/ Irrigation Systems

Challenges	Key Constraints	Policy Thrust
<p>Challenge of relative water scarcity</p> <p>Increased productivity of crops require prudent use of water through irrigation</p> <p>Optimizing use of available water resources through choice of crops, water conservation techniques and efficient irrigation methods</p> <p>Intensification of crop production to address climate change and surface water reduction</p> <p>Quality water for food processing and human health</p> <p>Appropriate investments in irrigation systems</p>	<p>Under-utilization of pump stations and supporting infrastructure</p> <p>Insufficient water for agricultural production</p> <p>Insufficient investment in irrigation systems</p> <p>Reduced water availability due to climate change and deforestation</p> <p>Substandard quality of water due to overuse of agrochemicals</p>	<p>Revitalizing tube wells</p> <p>Facilitating optimization of utilization of existing dams for irrigation</p> <p>Private sector investment in irrigation and irrigation systems</p> <p>Promoting water conservation by harvesting run-off water of monsoonal rivers</p> <p>Revitalizing water availability and pricing</p>

Box 5: Pest Control

Challenges	Key Constraints	Policy Thrust
<p>Challenge of pest control for raising incomes from crops</p> <p>Attention required for preventive as well as curative measures</p> <p>Pesticide overuse during production affects food quality and human health</p> <p>Pesticide's overuse spill-over effects on soil</p> <p>Exploring integrated pest management and organic control mechanisms</p>	<p>Indiscriminate use of fertilizers, herbicides and pesticides leads to contamination of food with chemical hazards</p> <p>Poor pest control mechanisms</p>	<p>Enforcement of safe use of agrochemicals</p> <p>Enhancing access to information about safe use of agrochemicals</p> <p>Promoting safe alternatives like organic pesticides</p> <p>Integrated pest management and control mechanisms</p>

Box 6: Mechanization

Challenges	Key Constraints	Policy Thrust
<p>Addressing mechanization to enhance productivity and scale up production</p> <p>Tractors and farm equipments to achieve production target</p>	<p>Insufficient agro-entrepreneurial service centers for service mechanization</p>	<p>Promoting private-sector-led high technology mechanization services and tractor hiring system</p>

<p>Production, maintenance and access to farm equipments</p> <p>Supply of spare parts and trained mechanics to boost agro-entrepreneurial service centers</p>	<p>Lack of access to high technology farm machines, equipment and spare parts at affordable rates</p> <p>Lack of trained mechanics and technicians to support equipment maintenance</p>	<p>Stimulating production of farm equipments</p>
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Box 7: Storage

Challenges	Key Constraints	Policy Thrust
<p>Challenge of huge post-harvest loss for perishable crops</p> <p>Introduce cold storage solutions and warehouses</p>	<p>Poor farmers need cash quickly and reluctant to store</p> <p>Poor management of storage facilities</p> <p>Post-harvest losses due to rodents and pests</p>	<p>Promoting private investments in food storage and warehousing</p> <p>Enhance finance for safe and effective storage</p> <p>Public-private partnerships to expand storage and agro-logistics infrastructure and quality of storage facilities</p>

Box 8: Processing

Challenges	Key Constraints	Policy Thrust
<p>Challenge of standards in food processing</p> <p>Challenge of improvements in local infrastructure (roads, power, and water)</p>	<p>Inadequate infrastructure in high agricultural produce areas</p> <p>Lack of extension services and poor capacity for post-harvest handling</p> <p>Lack of quality standards for produce inspection, grading, food safety and traceability</p>	<p>Promoting private investments into food processing</p> <p>Enhance access to finance and information about innovative processing methods</p> <p>Secure supply of quality inputs from high production areas</p> <p>Enforce quality standards and food safety</p>

Box 9: Marketing & Trade

Challenges	Key Constraints	Policy Thrust
<p>Challenge of marketing and trade in agriculture</p> <p>Common constraints across rural and urban markets</p> <p>Types of food demanded and implications for production, processing, marketing, and trade</p> <p>Understanding of food preferences shift with increased income</p>	<p>Infrastructure (road, power, and farmer data)</p> <p>Lack of quality market information for market opportunities</p> <p>Lack of coordination to improve efficiency between concerned government agencies</p> <p>Marketing constraints due to poor infrastructure and transportation</p> <p>Post-harvest handling</p>	<p>Promoting private investments to enable markets function effectively</p> <p>Enhancing access to market information</p> <p>Addressing challenges of agricultural business</p> <p>Quality assurance and standardization of crops</p> <p>Improve infrastructure to reach markets</p> <p>Create export market support</p>

5.1.3. Private Investment

There is need for private investment in agribusiness value chain to lower cost of financing and increased agro-financing measured in terms of cost of capital, number of loans and credit provision, private capital formation and number of participants. Private investment is essential for Storage, Processing, Marketing & Trade, and Infrastructure.

Box 10: Access to Finance

Challenges	Key Constraints	Policy Thrust
<p>Challenge of agricultural for all producers, input supply markets, processors and traders</p> <p>Finance from multiple sources other than conventional banking system</p> <p>Access to agriculture insurance also remains a challenge</p>	<p>Insufficient access to credit and insurance products</p> <p>Non-recognition of cooperative and farmer-based organizations by financial institutions</p> <p>Inadequate capacity of financial institutions to lend to agricultural sector and facilitate agribusiness investment</p>	<p>Stimulating cooperative banking and affordable loans through commercial banks</p> <p>Facilitating agribusiness investment</p> <p>Increasing public sector funding to agriculture</p> <p>Improved financing for agro-dealers to offer trade credit</p> <p>Financing for growth of agribusiness</p> <p>Strengthening agricultural insurance markets to intensify competition and product innovation</p>

		Revision of existing subsidies regimes
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Box 11: Agribusiness Development

Challenges	Key Constraints	Policy Thrust
Need to develop effective institutional frameworks to facilitate and coordinate delivery of agribusiness and investment services	Absence of appropriate and adaptive processing technology	Promotion agro-processing through public and private sector investment
Post-harvest handling of agricultural produce to improve value chain development	Absence of rural infrastructure to support rural primary processing	Incentivize agribusiness development and infrastructure access
Progressive and sustainable expansion of agribusiness, investment and agro-processing activities	Inadequate capacity for processing or crude processing methods	Harmonization of standards, quality and other food safety measures for food security, market and trade
	Lack of quality control and standard	Effective price support mechanisms
	Low private sector investment in agriculture/agro-processing and high cost of fund for agro-processing	

5.1.4. Institutional Mechanisms

There is need improve the capacity all stakeholders and key partners to regulate the sector and engage previously excluded stakeholders to improve the ease of doing agri-business. There is need to maximize the contributions of women and youth to agricultural production by expanding wealth creation opportunities. It is essential to develop and launch agro-entrepreneurship platforms for youth and women to enter agribusiness economy by facilitating investment support, training, and capacity building. The database for rural infrastructure planning is required to be revitalized for robust agriculture policy and planning.

Climate smart agriculture calls for developing technical, policy and investment conditions to achieve sustainable agricultural development by sustainably increasing agricultural productivity and incomes, adapting and building resilience to climate change and reducing and/or removing greenhouse gases emissions. All this calls for increasing public awareness on climate smart agriculture and strengthening institutional linkages and partnerships for ensuring climate smart agricultural governance, policies, legislations and financial mechanisms.

The role of agricultural research for enabling food security, import substitution and job creation cannot be overemphasized, which calls for conducting research to increase agricultural productivity and disseminating research results to farmers and other stakeholders for agricultural development.

The strategy for operationalizing the policy options is to initially understand the baseline situation of farmers' income, cropping pattern, production and productivity, finance, agri-business and entrepreneurship, market and institutions to prioritize investment in systems and markets and to boost agricultural productivity so that farmers and investors can earn the highest possible return from increased output. It is emphasized that significant productivity enhancements targets need to be targeted and realized in short-term, medium-term and long-term compared to the baseline situation. The target of increasing farmers' income and productivity gains will be

realized, if the rise in farmers' income and productivity are significant compared to base year (% income/yield increases), reductions in post-harvest losses, share of modern agricultural input used, and share of fresh goods sold in formal markets. Similarly, the target for crowding in private sector investment in agriculture for increasing the farmers' income is realized in short-term, medium-term and long-term compared to the base year if there are significant lower cost of financing and improved availability of financing as measured by cost of capital, number of loans issued versus overall credit provision, levels of private capital formation, and the number of participants in the sector. If this happens, the outcome will be more developed agri-entrepreneurs and agri-business market ultimately contributing to increasing the farmers' income.

6. Conclusions

There is need to create an enabling environment to evolve mechanisms to meet the goal of increasing the farmers' income in Punjab. The participatory approaches are essential for successful design and implementation of roadmap for doubling the farmers' income. Another enabling environment is to improve the deteriorated basic rural infrastructure including farmers' access to market, communication and other supporting services. Local capacity is needed to be strengthened through active participation in the design and implementation of the strategy and policy options for doubling farmers' income. There is urgent need for substantial support to agricultural research, extension and training, and to provide technical assistance to support the local institutions in carrying out the strategy for doubling the farmers' income. Strong political will and support of civil society and non-government organizations (NGOs) is essential in implementation of the strategy and policy options for increasing the farmers' income. The spatial dimension of the strategy and policy options for increasing farmers' income assumes high priority in Punjab due to the substantive socio-economic-environmental diversity among different regions of the state. Therefore, there is need to adopt a spatial approach for new strategy design and implementation by taking the specificity of all the regions of Punjab into consideration. An efficient and equitable regional decentralization process for increasing the farmers' income is called for under the new strategy for agricultural rejuvenation.

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