Getting Punjab Agriculture Back on High Growth Path: Sources, Drivers and Policy Lessons

Policy Brief

Ashok Gulati ■ Ranjana Roy ■ Siraj Hussain

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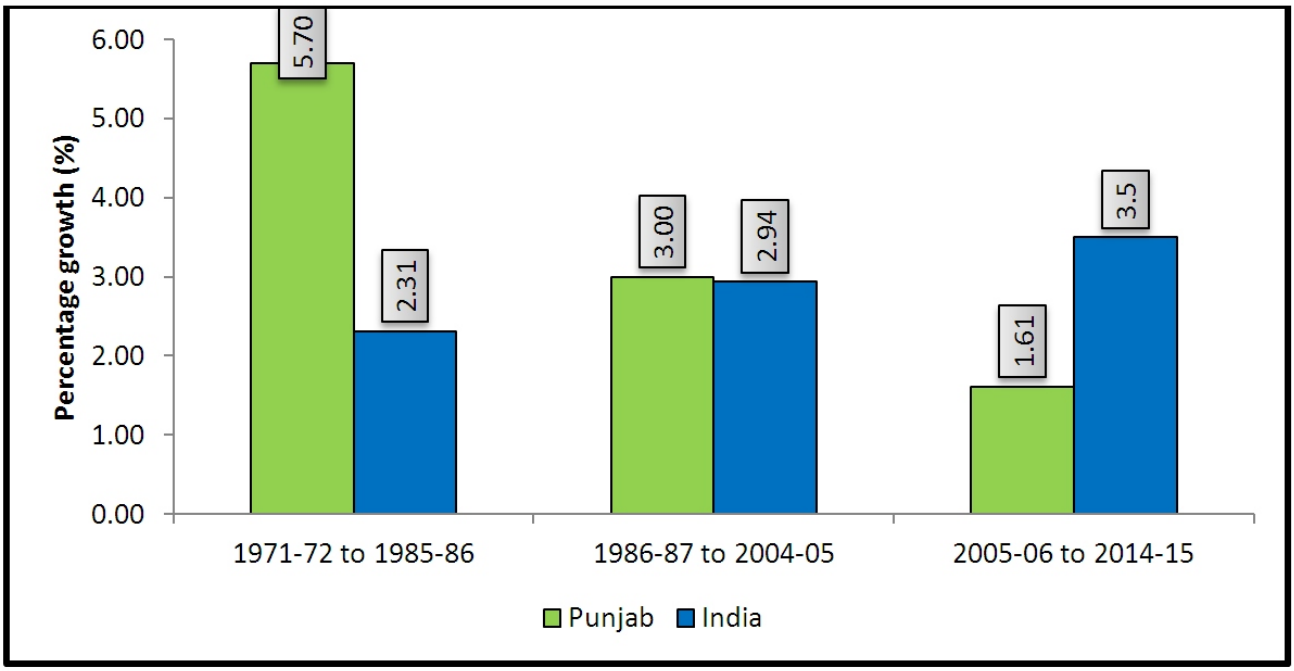
Punjab has been a star performer in agriculture during heydays of Green Revolution. Its agriculture GDP grew at 5.7 per cent per annum during 1971-72 to 1985-86, which was more than double the growth rate of 2.31 per cent, achieved at all-India level during the same period. It was this stellar performance of Punjab, first witnessed in large wheat surpluses and then similar rise in production of rice, which helped India free itself from the PL 480 food aid and its associated political strings. Punjab became a symbol of India's grain surpluses, giving India the much needed food security. But after 1985-86, green revolution started greying and growth in Punjab agriculture slowed down to 3 percent per annum over the period 1985-86 to 2004-05, almost same as achieved at all India level. But the real challenges to Punjab agriculture emerged when its growth plummeted to just 1.6 per cent per annum during 2005-06 to 2014-15, which was less than half the all-India agri-GDP growth of 3.5 percent over the same period (see Figure-1). Thanks to the earlier years of high agri-growth Punjab had one of the lowest poverty ratios (7.7 percent in rural Punjab) in the country in 2011-12, as per Tendulkar poverty line, which was almost one-third of the levels of poverty at all India level. Providing food security to the country and reducing its own poverty to lowest levels within all India context, have been the most commendable achievements of Punjab.

Figure: 1 Agriculture Growth in Punjab and India (2004-05 prices)



Source: CSO and Government of Punjab (www.pbplanning.gov.in)

But lately, as a result of its decelerating agri-growth, Punjab has lost its pre-eminent position of being the state with highest per capita income in India, a distinction it carried since its inception in 1966 till 2002-03. In 2014-15, e.g., Punjab stood at the 7th position in per capita income amongst 21 major states of India. And if current growth trends continue, it won't be a surprise that Punjab slips further down in this hierarchy of large Indian states in terms of its per capita income.

That raises some fundamental questions: where did Punjab go wrong? And how can it get back to high growth path of more than 5 percent per annum in agriculture and overall GSDP of more than the national average of 7-8 percent per annum, say for the next 10 to 15 years? It is precisely these questions that we try to address in our larger study on Punjab agriculture, identifying its sources and drivers of growth, and how best to accelerate its agri-growth.

For Punjab, agriculture is still quite an important sector. As per Labour Bureau, in 2015-16, 34 per cent of its workforce was still engaged in agriculture, although the contribution of agriculture to state's overall GDP has declined from 48 per cent in TE 1982-83 to 27.7 per cent in TE 2014-15.

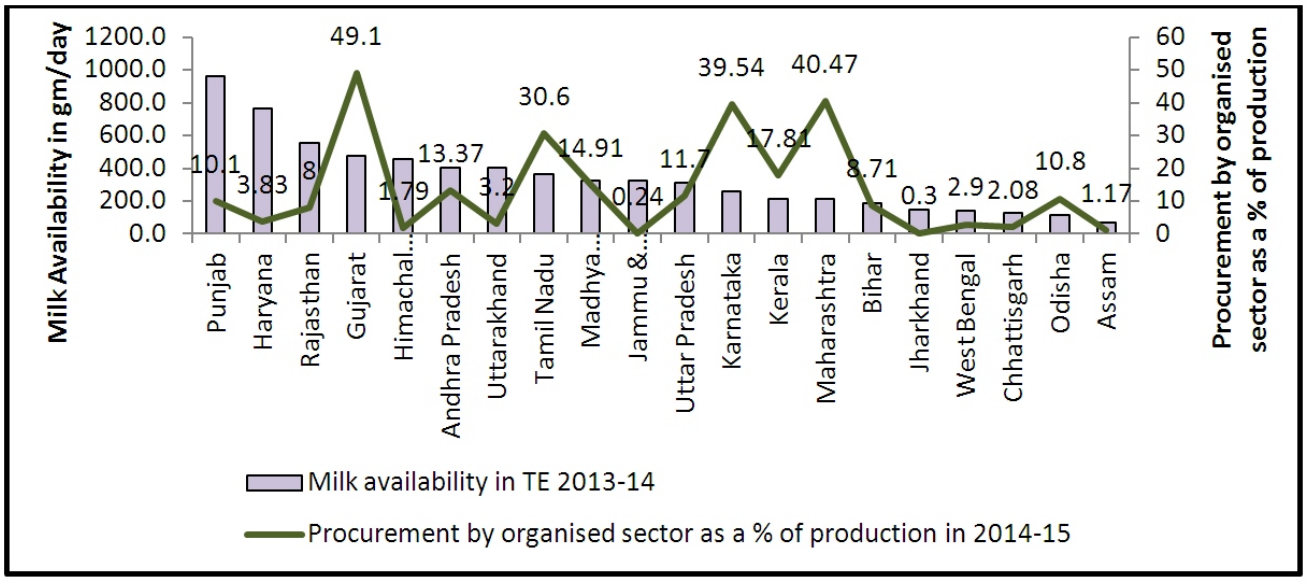
Our study reveals that Punjab seems to have become a victim of its own success. After Independence, India had to often rely on food grain imports whenever the monsoons were below normal. The situation became acute when India faced back to back drought in mid 1960s, and heavy imports of wheat under PL 480 made it look as if the country was living "from ship to mouth". No wonder, highest priority for the policymakers was to achieve self sufficiency in food grain production. Green revolution strategy was adopted, with high yielding variety seeds imported from Mexico, and distributed in well endowed regions of Punjab, Haryana and western UP. Simultaneously an effective procurement system with remunerative minimum support prices (MSP) was erected. New technology with good

price incentives played wonders, and India attained self sufficiency in grains within 5 years.

However in recent years, the situation has completely changed. India emerged as the largest exporter of rice in three years in a row (2012-14), and on July 1, 2012, India had unprecedented stocks of grains with public agencies that Crossed 80 MMT. Punjab has been the largest contributor of grains to the Central pool. Grain in Punjab, primarily wheat and rice, occupy 80 per cent of its gross cropped area (GCA), with almost highest productivity in India. Mounting buffer stocks of grain often meant that MSP increases would be minimal and that affects the profitability of large mass of Punjabi peasants. But, being predominantly a food grain economy, our research at ICRIER shows that out of total growth of agriculture and allied sector in Punjab for the period 2001-02 to 2013-14, the highest contribution (38.9 percent) still comes from cereal segment, followed by Livestock (31.7 per cent) and Fruits and vegetables (15.4 per cent). But policies like, ban on exports of wheat and rice (2007-2011), stocking limit on private trade, heavy statutory levies on buying of wheat and rice (14.5per cent) from Punjab have adversely impacted the growth of Punjab's agriculture.

Growth in income through production of cereals has reached a saturation point in Punjab, and there is urgent need for diversification and value addition through dairy, fruits and vegetables, and food processing industry. Only, 3.6 per cent of Punjab's GCA is under production of fruits and vegetables compared to 8.3 per cent at all-India level in 2014-15. On the other hand, despite having highest per capita milk availability in the country, the state processes only about 10 per cent of total milk production (10.35 MMT in 2014-15) through the organised sector, compared to 49 percent in Gujarat and about 40 percent in Maharashtra and Karnataka.

Figure: 2 Per Capita Milk Availability (grams/day) and Processing by Organised Sector (percentage of production) in Major Producing States, 2014-15



Source: NDDB

Agriculture growth is impacted by a host of factors, which can be classified at least in three distinct sets: (i) Technology (Irrigation, Fertiliser consumption, seed replacement ratio, farm mechanization), (ii) Price Incentive (Terms of Trade, Minimum Support Price), and (iii) Infrastructure (Electricity, Roads, etc). Besides these, there could also be factors that impact the institutional setting of agri-sector, such as land markets, land lease laws, marketing laws (Essential Commodities Act (ECA) and Agriculture Produce Marketing Act (APMC), contract farming laws, etc)

In a simple econometric regression model, taking log GSDP as the dependent variable and the above mentioned three sets of quantifiable variables as independent variables (in log form), with data from 1970-71 to 2014-15, we estimate the following equation: $Y_t = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$ (1)

Here, X_1 is Irrigation Ratio (IRR); X_2 is terms of trade (ToT); and X_3 is surfaced road density (SRD) between agriculture and industry.[1]

[1] GSDPA is the log of gross domestic product from agriculture and allied activities (2004-05 prices), IRR is Log of ratio of gross irrigated area (GIA) to gross cropped area (GCA), ToT is measured by Log of GDP deflator between agriculture sector and industry sector for Punjab, and SRD is measured by Log of surfaced road length per thousand sq. km of area

The estimated equation gives the following results [2]:

GSDPA= 7.7 +3.47IRR***+ 0.35ToT*** +0.37SRD**

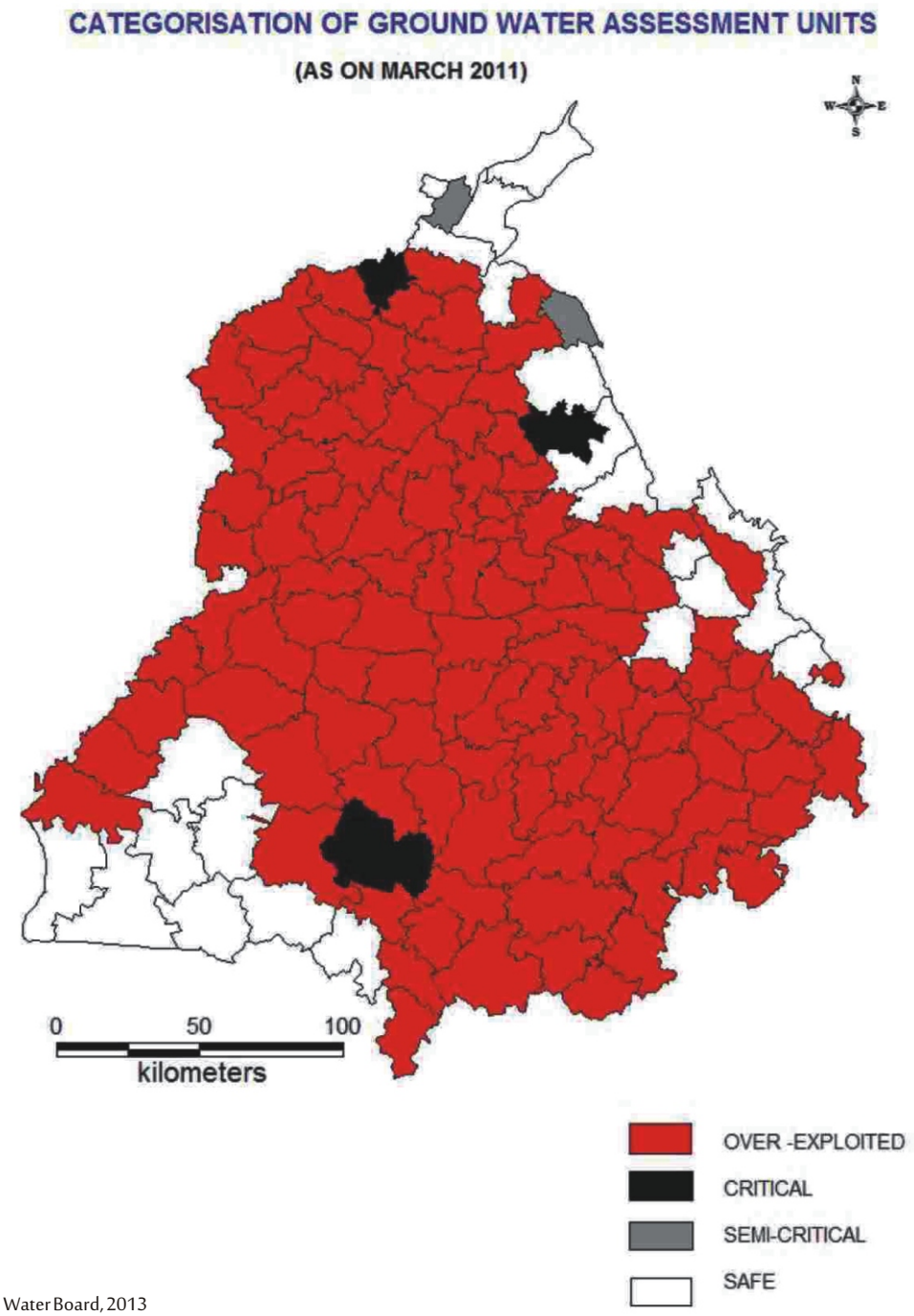
(7.97) (4.43) (4.32)

Adj R-square= 0.97

What this equation implies is that 97 percent of the growth in agriculture during this period (1970-71 to 2014-15) can be explained by expansion of irrigation ratio, road density, and price incentives (ToT), with irrigation having played the most important role.

The state has performed very well in terms of high input use and infrastructure development and also set an example for many other states. The state successfully brought 98.5 per cent of the gross cropped area under irrigation which is commendable. The road infrastructure in Punjab is among the most developed in India. Transport facilities enhance the interaction between different agents starting at the farm level to household consumption level. It becomes even more crucial when it comes to perishable agricultural commodities. Road density in Punjab has increased from 564 per thousand sq km in 1970-71 to around 2271 per thousand sq km in 2014-15.

Map: Dark Blocks in Punjab



Source: Central Ground Water Board, 2013

[2] Numbers in the parentheses are t values.

Further, surfaced road as a percentage of total roads is 87 percent in Punjab, one of the highest in the country. Unlike decreasing size of land holding at all India level, Punjab has experienced increase in operational land holding over the years. Average land holding size has increased from 2.89 ha in 1970-71 to 3.77 ha in 2010-11.

This combination of highest irrigation cover, one of the best road densities in the country, and increasing holding size, places Punjab in a very fortunate situation to get its agriculture back to growing at more than 5 percent per annum for another decade or more, provided it follows right mix of policies and incentives, as spelt out later.

One of the most significant problems of Punjab agriculture has been free power leading to massive depletion of water table, as cropping patterns leaned towards paddy. As a result, water table is going down at an alarming rate (70cms per year during 2008-12) and currently 80 per cent of the blocks are overexploited. Free power and unlimited procurement policies at MSP are sending wrong signal to farmers. This will impose heavy cost on future generations unless corrective actions are taken immediately.

Johl Committee Report (1986) suggested a shift in the cropping pattern from wheat-rice to wheat-maize in 1986. This suggestion still remains valid. But diversification of agriculture from food grains towards high value agriculture depends heavily on the availability of organised markets that can ensure remunerative prices to farmers. Our research indicates some policy interventions that can help enhance agricultural growth in Punjab, while ensuring sustainability in water use and augmenting incomes of Punjab peasants. They are categorised as follows: 1) Diversification from Common Rice, 2) Encouraging Food Processing Industries, 3) Promote Sustainable Agriculture with respect to Water Use Efficiency

1. Diversification from Common Rice:

a) Diversification to maize: Production of maize in the state declined from 0.81 million MT in TE 1970-71 to 0.34 million MT in TE 1990-91 and then rose to 0.48 million MT in TE 2014-15. Area under maize cultivation declined from 0.53 million ha in TE1970-71 to 0.13 million ha in TE2014-15 which is only 1.65 per cent of the gross cropped area. The area under maize cultivation can be expanded by linking maize farmers to maize processing industry for food, feed (especially poultry), starch, fuel, and several other uses of maize.

i) Fodder Conservation: Maize already constitutes a primary poultry feed ingredient in India. It can also be used as feed for dairy animals. Silage preparation can be a profitable venture given the significant share of dairy in the gross value of output from agriculture and allied activities. Milk production is pretty high in neighbouring Uttar Pradesh and Haryana as well. Investing in silage making will play a dual role of providing high quality green fodder to the dairy sector and generate assured income for the maize farmers. The state has the potential to emerge as the feed-hub of northern India.

ii) Other Uses of Corn: Corn and its by-products have many uses. The fast growing middle and high income Classes and changes in taste and preferences have led to an expansion in the market for processed foods, which offers new opportunities for the state to explore. In order to tap these opportunities, the state needs to strengthen the value chain infrastructure. Maize production can be incentivised by developing maize value chains, connecting farmers to feed producers, processed food industries making cornflakes, popcorn or food marts selling horticulture products like baby corn and sweet corn, and producer of corn oil and ethanol.

b) Promotion of Livestock Sector: Punjab is the fifth largest producer of milk in the country but it has the highest per capita availability of milk despite its small geographical area. But unfortunately only 10 per cent of the total milk production of the state is processed by organised sector; Gujarat in comparison procures 49 per cent of its milk through organised dairies. Government should provide incentives to the private sector to improve milk processing in the state and set up several plants to process at least 30-35 per cent of the total production in the coming 5 years. Milk processing with value added products should be the focus to make dairy farming more profitable.

Punjab can also make rearing of cattle more profitable to farmers through its vibrant dairy sector. Meat processing industry based on buffalo meat can also have good potential because of high number of buffaloes kept by farmers for milk. It can fetch farmers better price for non-milching buffaloes, if the state is declared free from foot and mouth disease.

c) Promotion of Horticulture: Currently, 3.6 per cent of the total GCA is under production of fruits and vegetables (F&V). High value agriculture, encompassing F&V, can give much higher income to farmers than food grains, provided farmers have access to assured and lucrative markets of F&V. The approach has to be demand driven, from 'plate to plough'. Protected cultivation using drip and sprinkler irrigation can be promoted, giving very high yields and saving groundwater. But it

has to be backed by modern infrastructure of grading, packaging, and processing, with a view to tap both domestic as well as export markets. Although the state was successful in building a good infrastructure for food-grains for procurement at MSP, it failed to create similar facilities for perishable items like F&V. If Punjab has to raise incomes of its farmers, it is high time to gradually shift away from basic staples to F&V. Getting at least 10 percent of cropped area under F&V in the next five years should be an achievable target.

d) Fisheries: Vast area of Muktsar, Fazilka, Bathinda and Faridkot districts is waterlogged. It provides good opportunity for development of fisheries in these areas to provide alternate employment opportunities. Currently, there are 9,318 constructed ponds covering 32,597 acre of land in various districts. But quality fish seed production has remained stagnant in Punjab compared to neighbouring Haryana. Easy credit at low interest could be provided to encourage construction of fish seed hatcheries and feed mills. The State Govt. could consider providing interest subsidy on such long term loans that will promote capital formation in agri-sector and help augment farmers' incomes on sustainable basis.

2. Encouraging Food Processing Industries:

Agriculture is going to stay as the backbone of farmers for another 10-15 years in Punjab. It can build on this core competency by linking agriculture to food processing sector, adding value, creating jobs in rural areas, and increasing farmers' incomes. Food processing sector, therefore, should be the focus area in Punjab's overall policy. Abundance of wheat and milk suggests that Punjab can emerge as a hub for units using wheat as raw material like flour mills, noodles and pasta manufacturing, biscuits and bakery, etc. Similarly, rice mills focusing on basmati, oil processing units using rice bran as raw material, packaging industry using straw, etc. can emerge in Punjab. State's role in procuring food grains for Central pool, especially rice for PDS should gradually come down. Wheat procurement for Central pool can be taken up by other States like Uttar Pradesh while procurement of rice can be undertaken in eastern States like Bihar, WB and Assam.

But all these years, wheat based processing units always felt unenthusiastic to buy wheat from Punjab due to very high taxes and statutory levies which touched 14.5 per cent. Neighbouring Uttar Pradesh seemed more attractive due to lower taxes and availability of wheat at prices lower than MSP. Under new GST regime the VAT of 5 per cent will be abolished and there will be no GST on food grains. Although Punjab may lose revenue to the tune of Rs 4000-5000 crores, it is hoped that it these losses will be reimbursed by the Centre. With abolition of high taxes, Punjab can again become attractive to private trade to purchase grains instead of buying them from other States. There is also an opportunity now to attract food processing industry which can benefit farmers and create employment.

Special focus should be given to improve the value chain infrastructure of horticulture, fisheries and poultry meat so that post harvest losses can be minimised and farmers are able to realise remunerative price by selling their perishable produce. The state should invest in creation of cold chain infrastructure. The scheme of cold chain infrastructure of MoFPI provides a template for increasing investment in such infrastructure. Lack of integrated infrastructure resulting in absence of assured market has discouraged Punjab farmer from diversifying from grains to high value agriculture. In this context, tapping the markets in Gulf countries by airlifting (cargo flights) fresh and packaged F&V needs to be explored. Expressway linking Khanna to Kandla can minimise the transportation time. But, high taxes on processed food items under the new GST regime will hamper the high value agriculture (F&V, Dairy) and there is an urgent need to reconsider these rates and bring down to the 5 per cent slab. Contract farming is still not taken up in large scale in the state. The state needs to operationalise Contract Farming Act 2013, which will incentivise corporate agencies and provide assured protection to the farmers.

3. Promote Sustainable Agriculture especially with respect to Water Use Efficiency:

The most critical problem of Punjab agriculture is its depleting water table primarily due to paddy cultivation during summer. The situation is pretty alarming and it is high time that the new State Govt. promotes sustainable agriculture.

a) Shift to DBT with respect to Power Subsidy: Electricity subsidy was the most important factor which helped in achieving almost 98.5 per cent irrigation in the state. But free and unmetered electricity has resulted in serious distortions in the consumption of electricity in Punjab's agriculture sector. For improving power and water use efficiency, power supply should be metered. Subsidy on electricity on per hectare basis should be transferred directly to the farmers' bank account. So, farmers will be incentivised to minimise inefficient use of electricity and save the extra amount for investment elsewhere. This will positively affect the decline in water table. Electricity subsidy saved may be used by the state Govt. to develop the infrastructure for food processing industry.

b) Shift to DBT with respect to Fertiliser Subsidy: During green revolution the state encouraged use of chemical fertilisers. But it has led to imbalance in the use of fertilisers and the use of macro as well as micro nutrients is totally distorted. Currently (2014-15) the NPK ratio in Punjab is 36:8.74:1 which shows highly skewed use of Urea. This distortion in the use of fertilisers can be addressed by switching to direct cash transfer to farmer on a per hectare basis. Farmers should be incentivised for using fertilisers as per requirement assessed by testing soil. This can be done by linking soil health cards to fertiliser subsidy. Although this policy falls more in the domain of the Central government, Punjab can lead in guiding the Centre on this front as Punjab is one of the heaviest users of fertilisers on per ha basis.

c) Propagating Micro Irrigation Techniques: Sustainable agriculture should be promoted in Punjab with the adoption of drip and sprinkler irrigation. In 2014-15, 3.6 per cent and 1.2 per cent of the gross cropped area are devoted to the cultivation of fruits & vegetables and sugarcane respectively. Shifting to drip and sprinkler irrigation for these crops can save lot of water. Sprinklers are also used for wheat cultivation in Rajasthan, saving significant amount of water compared to traditional flood irrigation. Why Punjab cannot lead this revolution to save its depleting water table!

There are pilots being conducted in Punjab for drip irrigation in paddy. These need to be closely monitored and encouraged. Preliminary information is that it can save lot of (almost 65 per cent) water, power, fertiliser, and give higher productivity. Conducive policy environment will have to be created to scale up such pilots.

D) Sustainable Futuristic Agricultural Development: Government should promote solar power for powering irrigation pumps and generating solar power as the third crop so that farmers can sell surplus power to the grid. This will help check depleting water table too. Cold storages based on solar power can be more cost effective. Beginning should be made in case of potato cold storages in Jalandhar.

Overall, strategy for Punjab agriculture needs to shift from food security concerns of the country to income augmentation of Punjab farmers. This can be done by gradually shifting towards high value agriculture, focusing on food processing industry to add value to wheat, rice, milk and F&V production in the state. The strategy also needs to be demand driven (plate to plough), exploring new and remunerative markets, as in Gulf countries or even beyond to Europe and CIS countries. We feel that given right policies and incentives as suggested in this report, the state can turn around its agriculture growth back to more than 5 percent per annum, augment farmers' incomes, and use its precious water resources in a more sustainable manner.

(This policy brief is based on the report titled 'Getting Punjab Agriculture back on High Growth Path: Sources, Drivers and Policy Lessons' by Ashok Gulati, Ranjana Roy and Siraj Hussain)

Indian Council for Research on International Economic Relations

Core 6A, 4th Floor, India Habitat Centre, Lodhi Road, New Delhi - 110003, India
Phone No.: +91 11 43112400, Fax: 24620180, Website: www.icrier.org