



# Doubling Farmers' income in Himachal Pradesh: Challenges and Solutions

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## ABSTRACT

Earlier efforts to augment production of cereals, pulses, fruits and vegetables were successful but farmers never got remunerative price for their produce. They were forced to sell their produce in distress because food processing units and cold storage structures were not established. Assured irrigation and quality inputs like seed, pesticides were not available. Still, irrigation facilities are lacking and farmers are dependent on timely rains only for successful farming. Many a times, unpredictable weather damages crops leading to economic losses. Thus, efforts to improve economic conditions of farmers must lay due emphasis on improving the basic infrastructure related to farming. Small and medium food processing industries should be established to ensure proper disposal of produce at remunerative prices.

**Key Words:** Agriculture, Farmer, Food, Income, Industries, Infrastructure, Inputs, Processing.

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## INTRODUCTION

People associated with non-agriculture vocations have made tremendous progress, whereas, no perceptible change in pathetic and pitiable condition of farmers is visible despite many schemes initiated for their welfare. In the past, technologies related to crop production and protection were very crude and food production was just enough to feed the population. With the passage of time, lot of improvement have taken place in the production and protection technologies like development of high yielding varieties/hybrids, sowing/transplanting techniques, standardization of nutrient requirements of crops, irrigation needs, pests and disease management strategies etc. (IARI, 2014). Adoption of these technologies by farmers helped them realize higher yields and assured nutritional security (Lepcha *et al*, 2017). However, despite increased production and productivity, poor economic status of farmers remained unchanged. However, recently targeted efforts have been made to double their income by the year 2022. Policy makers and scientists have been entrusted with herculean responsibility to strategise for the same. There is a need to analyze the discrepancies

in policies and plans of the past that focused on food production but not on farmers' prosperity. The present study is an attempt to understand this situation *vis-à-vis* Himachal Pradesh for suggesting suitable solutions.

## MATERIALS AND METHODS

The data from relevant issues of Statistical Outline of Himachal Pradesh published by the Department of Economics and Statistics, Himachal Pradesh and Annual Reports of the Department of Agriculture, Co-operation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India have been used. Detailed enumeration of reasons responsible for continued poor economic status of farmers is largely based on the personal observations of authors. These observations were recorded during interface with farmers of different districts of the state for more than twelve years. These interactions happened on multiple occasions such as organizing awareness-cum-training programmes, diagnostic visits to the farmers' fields, celebrating field days, conducting on farm trials (OFTs) and front line demonstrations (FLDs). The suggested solutions are based on the

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valuable farmers' feedback as well as on authors' understanding of these practical issues.

## RESULTS AND DISCUSSION

### The Challenges

The agriculture sector in Himachal Pradesh lacks infrastructural facilities necessary for successful farming. Infrastructural inadequacies are real bottlenecks that block the economic progress of farmers (Barah, 2010). In addition, many non-technical challenges too are faced by farmers. The ambitious goal of doubling farmers's income by 2022 can be accomplished only by addressing these inadequacies and other non-technical issues. Some of the practical challenges faced by the farmers are:

### Weather vagaries

Weather plays an incredibly important role in agriculture. Suitable weather conditions particularly rainfall and relative humidity favour successful crop production as it permits timely agricultural operations. Hence, moderate and timely rainfall is desirable; excessive and untimely precipitation leads to high humidity conducive for disease development. Disease management, in turn, entails investment on pesticides which escalate production cost manifold. Chakraborty and Acharya (2018) also reported that deviation in weather parameters like temperature, rainfall pattern significantly impacted farm production and farmer economy. Changed weather conditions in high altitudes of Himachal Pradesh have paved the way for occurrence of pests and diseases in these regions too (Sharma, 2014).

### Rain-fed farming

Irrigation facility is essential for crop diversification which offers an opportunity for improving the economic well-being of farmers (Sharma, 2011). However, more than 80 per cent of cultivable area in Himachal Pradesh is rainfed (Anon, 2017). Inadequate or no rainfall during any of the important stages of crop growth hampers crop health and the concomitant yield in these areas. During the *Rabi* season of 2017-18,

Himachal Pradesh received 72 per cent less rainfall than the normal (Anon, 2018). Consequently, the sowing in rainfed areas was either delayed or denied altogether. Many rain-fed regions in low hills and plains of Himachal Pradesh reported total failure of wheat crop in *Rabi* season of 2017-18. This adversely impacted overall production and net monetary returns to farmers.

### Wild and stray animals

The menace of wild and stray animals has assumed monstrous proportions. Damage to crops by wild and stray animals is reported from many parts of the state. Stray animals largely comprise of dry and unproductive cows, male calves and bulls; whereas, the wild animals include blue bulls, bears wild boars, hares, leopards, porcupines etc. (Table 1).

Small and marginal farmers find rearing of unproductive cows and male calves unprofitable. Mechanized farming has rendered male calves useless for farmers. Earlier, these farmers provided bullock service to fellow villagers for tilling and sowing. Now, the mechanization has eliminated this income generation activity too. Over exploitation of forests for meeting fuelwood requirement is the genesis of wild animal nuisance. It has depleted the forest resources and destroyed natural habitat of wild animals. Consequently, wild animals are forced to venture into cultivated crops.

### Monkey menace

Monkey menace is far more serious threat to crop cultivation than the wild and stray animals in many hilly states including Himachal Pradesh (Sahoo and Mohnot, 2004). The losses caused by wild animal including monkeys are estimated to be more than 500 crores rupees annually in Himachal Pradesh (Chakravarty, 2015). In low and mid hills of the state, monkey menace has compelled farmers to abandon farming. They deem it more fit not to sow crops than to sow and suffer losses. Consequently, large acreage remains fallow. Hence, monkey menace mars successful crop cultivation and destroys economy of the farmer.

## Doubling Farmers' income

**Table 1. Major wild animals causing damage to cultivated crops and their area of activity in Himachal Pradesh.**

Sr. No.	Stray/ wild animal	Area of activity
1.	Bulls and cows	Plains, low and mid hill regions
2.	Wild boar	Low and mid hill regions
3.	Sambhar and nilgai	Nahan, Paonta and lower Shiwalik hills
4.	Porcupine	Low and mid hill regions
5.	Black bear	Kullu, Manali, Mandi, Chamba and some parts of Shimla
6.	Brown bear	Tribal regions, upper parts of Chamba and Rampur
7.	Leopard	Throughout the state except tribal regions
8.	Snow leopard	Tribal regions
9.	Monkey	Almost all urban and rural habitations

### Lack of quality seed

Quality seed is the basic and essential input for successful farming. Farmers primarily rely on costly seeds of multinational companies (MNCs). More often than not, farmers get duped as these costly hybrid seeds turn out to be substandard with poor germination and susceptibility to prevalent pests and diseases. Sowing of such seeds leads to poor crop stand and enhanced expenditure on plant protection measures.

### Spurious agro-chemicals

Pests, diseases and weeds are managed by using insecticides, fungicides, herbicides etc. However, many spurious agro-chemicals are easily available in market that often fails to keep the target pest or disease under check. The farmers feel tempted to purchase them because of their low price. Farmers are also deceived into buying these spurious chemicals as the information on containers reads the same active ingredients with similar composition. Resultant crop failures result in massive monetary losses to the farmers.

### Non-judicious use of pesticides

Injudicious pesticide use occurs when recommended dose, proper stage of target pest and right time of spray is disregarded. It destroys the beneficial fauna viz. parasitoids, predators and microorganisms. Nowadays, some earlier common predators like green lacewing (*Chrysoperla carnea*)

and praying mantis (*Hierodula grandis*) are rarely noticed predated in fields. This disturbed natural balance accounts for frequent outbreaks of pests and diseases which forces farmers to spray frequently incurring monetary expenses.

### Fragmentation of land holdings

In Himachal Pradesh, 11 per cent of the total geographical area is available for cultivation and about 88 per cent of farmers fall in the category of small and marginal owning land less than two hectares. This accounts for about 54 per cent of the cropped area (Table 2).

The overall average size of land holdings is just 1.0 ha. Lack of non-farm employment opportunities in countryside and liberal laws of inheritance promote subdivision of cultivable land leading to preponderance of smaller land holdings. Ever increasing population pressure on limited land resources also contribute towards land fragmentation. As the land holding becomes smaller, net returns decline due to decreased production and productivity of these tiny holdings. Therefore, living standard of marginal and small farmers has not improved.

### Denying remunerative price for farm produce

More often than not, the farmer does not get due price for his produce because the product pricing is a function of crop production. Bumper crop leads to fall in price; whereas, reduced production leads

**Table 2. Distribution of land holdings in Himachal Pradesh (2011).**

Category of farmers	Size of land holdings (ha)	No. of holdings in lakh (% of total)	Area in lakh hectare (% of total)	Average size of holding (ha)	Change in area over 1990-91 census* (%)
Marginal	<1.0	6.70 (69.78)	2.73 (28.63)	0.41	+25.99
Small	1.0-2.0	1.75 (18.17)	2.44 (25.55)	1.39	+4.92
Semi Medium	2.0-4.0	0.85 (8.84)	2.31 (24.14)	2.72	-9.63
Medium	4.0-10.0	0.28 (2.87)	1.57 (16.39)	5.61	-22.91
Large	>10.0	0.03 (0.34)	0.51 (5.29)	17.00	-40.78
Total		9.61	9.55	1.00	+15.23

Source: Directorate of Agriculture, Himachal Pradesh. \*(+) and (-) signs indicate increase and decrease in the area under different categories of farmers, respectively.

to prices skyrocketing. In either case, the farmer suffers significant monetary losses. Also, farmers get fleeced at the hand of middlemen. Assured procurement by government agencies towards the central food grain pool is very limited due to poor storage facilities. Large stacks of food grains stored under open sky are a common sight in many states. Besides causing wastage of precious food grains, it denies the farmers a remunerative price for their produce. Also, the absence of food processing industries force farmers to sell the bulk production of perishable produce at much cheaper rates. Many a times, farmers even throw their vegetables to protest against the low prices. Sometimes, cheaper rates deter farmers to harvest their crops as the labour cost far exceeds the sale proceeds.

### COUNTERACTING THE CHALLENGES

Addressing these challenges can help in improving the production, productivity and economic returns to farmers. It warrants the government agencies and farmers to work in tandem. Collective efforts can help in finding a lasting solution to these problems. Some of the ways suggested to overcome these challenges have been discussed below:

#### Neutralizing weather vagaries

Perceptible changes in weather parameters like total rainfall, number of rainy days, maximum and

minimum temperatures are noticeable. Deforestation is the single most important human activity that has greatly impacted weather conditions. Drought, deficient and untimely rainfall experienced nowadays can be attributed to depletion of dense forest cover. Excessive exploitation of forests and large scale cutting of big trees for development projects has adversely impacted weather. Abrupt felling of a large number of big trees has destroyed a sizeable carbon sink contributing to rise in overall average temperature. Efforts to replenish and restore the green cover in lieu of sacrificed trees are utterly lacking. Primarily, weather manipulation is beyond the purview of human being. Still, afforestation drives to enhance green cover can reverse the trend. Higher survival rate of saplings planted by Department of Forest can contribute towards increasing green cover. Small check dams may be constructed in forest areas to store rain water. These small check dams will not only provide water source for wild animals but also support the growth of natural vegetation.

#### Decreasing dependence on rainfall

Various water sources like canals, wells, tubewells, etc. should be judiciously utilized for providing assured irrigation. A significant increase in net area irrigated by wells and tube wells (54.11%) and canal (21.66%) has been observed in Himachal Pradesh (Table 3). Comparatively lesser increase

## Doubling Farmers' income

**Table 3. Net irrigated area through different sources of irrigation in Himachal Pradesh**

Year	Net area irrigated (ha)*				
	Canals	Tanks	Wells and tube wells	Others sources	Total
2000-01	3,463	263	14,172	1,05,758	1,23,656
2005-06	4,010	654	16,200	82,776	1,03,640
2010-11	4,213	33	21,840	83,854	1,09,940
Change as per base year 2000-01	+21.66	-87.45	+54.11	-20.71	-11.09

Source: Directorate of Land Records, Himachal Pradesh; \*(+) and (-) signs indicate increase and decrease in net irrigated area, respectively through a particular source.

in canal irrigation may be attributed to enormous expenditures required to be incurred for creating a huge network of carrying canals and field channels. Systematic and planned efforts in this direction can yield rich dividends. At the same time, other ways of irrigation should be promoted and popularized. In areas where canal irrigation is not feasible, check dams may be constructed to harvest rain water. The harvested rain water may be power lifted to irrigate fields.

In plain areas where ground water level is comparatively higher, irrigation through tube wells may be promoted. Also, the traditional water bodies (ponds) in the rural areas may be revived. Wherever existing, the feeder rivulets from the forest areas have been so disturbed by human habitations that these ponds too remain unfilled even during monsoon season. Therefore, efforts should be made to channelize the runoff during monsoons to replenish these ponds. Roof top rain water can also be harvested to fill water bodies at village level. The use of drip irrigation and sprinkler irrigation may also be promoted and popularized.

### Crop protection from animals

The wild animals constitute an integral component of natural ecosystem. Therefore, the often advocated solution to legalize shooting of wild animals does not seem to be a sagacious one. On the contrary, large scale killing of these animals can further disturb the fragile ecosystem and exacerbate other problems like predatory attacks

on humans habitations and domestic animals. The lasting solution to this problem lies in restoring forest cover where these animals can find food and shelter in plenty. Plantation drives by Department of Forests have not yielded desired results. As such, fencing forest area in a phased manner to prevent human activity is more practicable. Fencing of agricultural fields may be encouraged among farming community. Instead of laying emphasis solely on solar fencing, barbed wire and link chain fencing may also be equally promoted. Whereas, solar fencing can prove very effective in areas affected by monkey menace; barbed wire and link chain fencing can be quite useful against stray and wild animals. Yet another viable solution could be cultivation of crops like turmeric, ginger, elephant foot yam etc. in low and mid hills as these crops are not preferred by these wild animals (Sinha *et al*, 2013).

### Ensuring judicious use of agro-chemicals

Agro-chemicals are considered as panacea for all plant protection problems. The farmers resort to their usage even for minor problems that can be easily managed by eco-friendly means. Sensitization of farmers about harmful effects of excessive and improper use of these chemicals must be undertaken more vigorously. Farmers need to be made aware of the role of beneficial bio-control agents and the urgent need to conserve and promote their presence in the agro-ecosystem. Awareness about plenty of other plant protection options have to be created so that pesticides are used as a last resort and not as

first line of defense. Laboratory reared parasitoids of prominent pests may be regularly released to augment their preponderance in nature. Also, many ready to use formulations of useful fungi, bacteria and viruses available in market may either be regularly incorporated into the soil or sprayed on crops to manage pests.

### Preventing spread of spurious pesticides

Predominance of spurious pesticides shackles the successful farming. Besides injudicious pesticide use, sale of such pesticides is responsible for development of pesticide resistance and pest resurgence. Spurious pesticides forced farmers to use higher doses that disrupted agro-ecosystem and enhanced cost of cultivation (Kaur *et al*, 2018). Stricter implementation of the provisions of Insecticide Act 1968 must be ensured by the enforcement agencies. Firms found to be dealing in the sale of substandard pesticides must be penalized. Taking random samples of pesticides from market must be a regular feature. For testing quality of agro-chemicals, laboratories equipped with machinery and manpower must be established at district level.

### Procurement of farm produce at remunerative price

This is one of the principal factors that accounts for poor economic condition of farmers. Assured procurement at justifiable price can definitely assist in increasing monetary returns to them. Farmers may be given support price twice the cost of cultivation. However, accurate cost of cultivation should be calculated by taking into account the actual field situations. Establishment of food processing industries should be given a deserving impetus to ensure proper utilization of perishable products. Therefore, giving incentives for establishment of food processing units is the need of the hour. The crop insurance scheme to compensate for losses due to environmental exigencies can be made more effective. The present criterion of estimating losses based on block/ district level must be revised to the level of individual farmer.

## CONCLUSION

Lack of irrigation facility and relevant industrial infrastructure along with quality inputs are prominent challenges facing agriculture. Besides these, monkey menace and damage by wild and stray animals has emerged as another serious problem in many parts of Himachal Pradesh. Freely roaming stray animals is a social problem which can be tackled by creating mass awareness. Whereas, the scourge of wild animals can be sorted out by restoring green cover and increasing their natural habitats. Ensuring judicious use of pesticides is must to deal with pesticide resistance and pest resurgence. Popularization of organic preparations prepared from locally available plants known for pest repellence can help in reducing the pesticide usage. Remunerative price should be guaranteed through assured procurement by government agencies. Establishment of small and medium scale industries for processing perishable fruits and vegetables is essential. These measures can definitely help in increasing farmer income considerably if not doubling it by 2022.

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## Doubling Farmers' income

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