

## ECONOMIC RATIONALE OF AGRICULTURAL DEVELOPMENT IN COLD DESERT AREAS OF HIMACHAL PRADESH

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### ABSTRACT

The data obtained through two stage stratified random sampling design from 65 farmers of cold desert of Spiti Valley revealed that the agriculture of cold desert area is mostly traditional, primitive and subsistent in nature. Improved technology was not found to have any significant impact in the study area. The optimum farm plans suggested that with the introduction of improved technology and reallocation of resources, as high as 50 per cent increase in farm income could be attained. The vast potential of agriculture in the study area remained untapped because of number of geographical, social and economic constraints. The major economic constraints responsible for non-adoption of improved technology were inadequate and untimely supply of farm inputs, smaller holdings, scarcity of capital, inadequate irrigation facilities and lack of adequate extension services in the study area. Once the constraints responsible for poor agricultural development are removed, there lies a wide scope of improving the tribal agriculture. The study also suggested that keeping in view the non-economic constraints there is a need to follow the psycho-social approach for the agricultural development of the cold deserts.

### INTRODUCTION

The Indian cold deserts have extremely rocky and difficult terrain, low population density, low level of economic activity, closed social structure and without monsoon rains. Spiti Valley and Pooch Tehsil of Kinnaur district are inhabited by scheduled tribes and form an integral part of the cold deserts of Himachal Pradesh. Development of such isolated and difficult areas is a challenging task. Recently, the tribals of cold deserts have received special attention of various developmental agencies like Desert Development Programme (1977) and Integrated Tribal Development Programme (1980).

The agriculture being practised in cold desert areas is traditional and primitive in many ways due to a number of constraints. The use of improved technology is quite limited, the cropping patterns have remained unchanged over the years and the yields of crops are low as compared to their potential. For economic development of these tribal people, the agricultural development of the area is a pre-requisite. This calls for identification of constraints and their causes in the agricultural

### Cropping pattern

The existing as well as optimum cropping pattern in Spiti Valley is presented in Table 2. A perusal of the table reveals that about 62 per cent of the total cropped area was devoted to cereals. It is evident from the table that barley was the most important cereal crop which accounted for nearly 47 per cent of the total cropped area on all farms. The area under potato was to the extent of 12 per cent.

Table 2. Existing and optimum cropping pattern, 1986-87 (Per cent)

Crops	Size of farm			All Farms
	Small	Medium	Large	
Wheat (local)	3.20 (-)	4.81 (-)	3.26 (-)	(3.71) (-)
Wheat (high yielding)	8.97 (6.28)	12.88 (5.76)	13.27 (4.89)	11.17 (5.80)
Barley	51.78 (26.53)	42.76 (25.41)	41.75 (17.49)	46.95 (24.09)
Potato	13.62 (42.76)	12.46 (40.83)	8.72 (39.89)	12.13 (41.50)
Peas	9.27 (11.63)	8.33 (12.78)	10.93 (18.76)	9.36 (13.62)
Kidney beans	6.31 (8.64)	5.76 (9.58)	6.46 (13.36)	6.18 (10.02)
Mustard	2.92 (4.16)	4.09 (5.64)	5.01 (5.61)	3.76 (4.97)
Net area sown (ha)	0.59	1.10	2.02	1.10
(Per cent)	96.07	91.09	89.40	93.26
Current fallow	3.93	9.01	10.60	6.74
Total cropped area (ha)	0.62	1.21	2.26	1.18
(Per cent)	100.00	100.00	100.00	100.00
Cropping intensity (%)				
i) Existing	95.16	91.00	89.38	92.55
ii) Optimum	100.00	100.00	100.00	100.00

Note : Figures in the parentheses indicate optimum cropping pattern

About 16 per cent of the area was devoted to pulses viz., kidney beans and peas. On an average, about 93 per cent of the total cropped area was sown and rest was kept as fallow. The average cropping intensity in the study area was worked out to be 92.55 per cent. The peculiar climatic and geographical features of the Spiti Valley inhibit growing of more than one crop in a year.

The optimum cropping pattern clearly suggests that instead of cereals the stress should be on growing potato. The study area is known for the production of quality seed potato and, therefore, the plan suggested that 41.50 per cent of the total cropped area is to be put under potato. In the study area, the principal grains viz.,

wheat and rice are distributed through fair price shops on a subsidy. The plan reveals that more area is to be allocated to peas (13.62 per cent) and kidney beans (10.02 per cent). It can be noted from the table that under optimum cropping plan cent per cent cropped area was allocated to the crops and no area was allowed to be kept as fallow.

### Average Yield

Table 3 presents the average yields of important crops in the study area. It is evident from the table that yields of crops were comparatively higher than the state average yields. The average yield of wheat (HYV) were recorded as 12.60 and 22.96 quintals per hectare. The per hectare yield of barley was noted to be 20.45 quintals. In case of kidney beans and peas the average yields were noted to be 11.91 and 12.07 quintals. The average yield of potato ranged from 102.33 quintals on small farms to 120.81 quintals, per hectare, on large farms. The per hectare yield of potato on all farms, was worked out to be 110.78 quintals. The average yield of mustard was found to be 7.51 quintals per hectare.

Table 3. Average yields (q/ha) of important crops, 1986-87

Crops	Size of farm			All farms
	Small	Medium	Large	
Wheat (local)	12.78	13.08	11.62	12.60
Wheat (high yielding)	24.61	22.72	19.96	22.96
Barley	21.18	20.23	19.29	20.45
Potato	102.33	115.92	120.81	110.78
Kidney beans	12.25	11.99	11.13	11.91
Peas	12.89	11.78	10.83	12.07
Mustard	6.78	7.83	8.56	7.51

### Farm Income

Table 4 summarises the farm income under existing plan and optimum cropping plan. It can be seen from the table that in optimum plan the reallocation of the resources (alongwith introduction of modern technology and borrowing-in of capital), on an average, led to as high as 50 per cent increase in farm income over the existing situation. The maximum increase, to the extent of 60.63 per cent, was noted on small farms followed by medium (51.41 per cent) and large farms (41.64 per cent).

### Constraints in agricultural development

**Geographical Constraints** The Spiti sub-division of Lahaul & Spiti district is more difficult in terms of terrain, climate and habitation. The arid climate, highly rugged conditions and high altitude make this region difficult for human habitation.

Table 4. Farm income (Rs) under existing and optimum cropping plan, 1986-87

Particulars	Size of farm			All farms
	Small	Medium	Large	
1. Farm income under				
i) Existing plan	3,173	5,390	9,867	5400
ii) Optimum plan	5,097	8,161	13,976	8089
2. Percentage increase in (ii) over (i)	60.63	51.41	41.64	49.80
3. Per hectare farm income				
i) Existing plan	5,118	4,455	4,366	4,576
ii) Optimum plan	8,221	6,745	6,184	6,855

The annual rainfall in the region is 177 mm. The region is a typical mountain desert. Soil of Spiti is too dry and too barren to support plant life on its own. Due to severity of climate there is only one cropping season in the valley. The climate of an area is such that no forest is seen. however, vast stretches of land are lying unutilised due to non-exploitation of existing irrigation potential which ultimately bars the possibility of agricultural development.

### Social constraints

The non-economic factors when clubbed together play an important role in the process of agricultural development. Therefore, an attempt was made to have working knowledge of these factors before suggesting some policy measures.

The inhabitants of this cold desert area are illiterate (70 per cent), ignorant, superstitious and have faith in super-natural powers. They are conservative and bound by out moded customs and institutions such as premoginature and laws of inheritance etc. These customs fully keep them satisfied with their primitive system of cultivation. They are less affected by the consideration of economic progress. Hence unless the environment/atmosphere which supports agricultural backwardness is changed, there can be no possibility of progress inspite of the potential that exists.

### Economic constraints in the adoption of improved technology

Inspite of strenuous efforts made by the State Government for the agricultural development of cold desert areas, it has been realised that improved technology did not make a significant dent in the study area and much remains to be done.

Table 5 summarises the constraints in the adoption of improved technology on different sizes of farms. It can be seen from the table that inadequate and untimely supply of farm inputs (HYV seeds and fertilizers) was one of the most severe prob-

Table 5. Economic constraints in the adoption of improved technology (per cent)

Particulars	Size of farm			All farms
	Small	Medium	Large	
Inadequate and untimely supply of critical inputs	70	73	71	71
Small size of holdings	86	70	20	66
Scarcity of capital	73	70	47	66
Lack of proper credit facilities	60	65	60	62
Lack of irrigation	60	55	53	57
Inadequate extension services	53	50	27	46
Lack of technical know-how	63	45	13	46
Scarcity of labour during peak periods	27	35	73	40

lems of the study area, reported by 71 per cent of the farmers. This is attributed to heavy snowfall in the region as a results of which the transportation and communication is badly affected and inputs are not made available to the farmers in time. The problem of small sized holdings was reported by 66 per cent of the farmers, in general.

Scarcity of capital was found to be another big hurdle in the adoption of improved technology. The improved technology is capital intensive and, therefore, accounted for additional capital on the farms. Sixty six per cent farmers, in general, revealed scarcity of adequate amount of capital in the adoption of improved technology. This is attributed to the lack of proper credit facilities in the study area which was complained by as much as 62 per cent of the farmers.

The problem of inadequate irrigation was put forward by 57 per cent of the farmers. This can be attributed to non/slow adoption of improved technology on their farms. It was found that the extention services, were not able to cope up with requirements of the farmers and, therefore, 46 per cent farmers, in genral, revealed inadequate extension services and thereby lack of technical know-how regarding improved technology. In the study area, during peak periods, human labour was found to be scarce for various farm operations thereby creating production problems.

#### Policy implications

The study suggests the following priorities :

1. Adequate and timely availability of critical inputs like seeds, fertilizers and credit should be an aspect of exceptional importance in our strategy to improve the agriculture in cold desert area.