ESTIMATION OF SEED, FEED AND WASTAGE RATIOS FOR MAJOR FOODGRAINS IN HIMACHAL PRADESH

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Executive Summary

Abstract: The present study provides estimates of seed, feed and wastage ratios for major food grains and pulses (maize, wheat and black gram) and the availability of these for human consumption in district Shimla and Hamirpur of Himachal Pradesh. The results of the study reveal that as a whole, 21.4 and 18.2 per cent of total production of maize was retained for seed, animal feed and wastage in district Shimla and Hamirpur respectively, while this percentage comes out to be 27.3 per cent in case of wheat in district Hamirpur. On an average, consumption of maize used as feed (animal and poultry feed) was found to be 9.8 and 7.1 per cent in Shimla and Hamirpur district respectively, while quantity of wheat fed to animals was 6.4 per cent of the production in district Hamirpur. On an average, wastage was found to be maximum in case of wheat 11.2 percent, followed by blackgram 8.3 percent and maize i.e. 8.0 and 7.7 percent in Shimla and Hamirpur respectively. On the basis of results obtained, various suggestions to reduce the losses are also given in the study.

Objectives

1. To estimate the total quantity of food grains consumed for seed, feed and wastage.
2. To estimate the net availability of food grains for human consumption.

Methodology

The present study is mainly confined to two crops i.e. wheat and blackgram (one cereal and one pulse) based on the area predomination in the State. Hamirpur for wheat (cereal) and Shimla for blackgram (pulse) have been selected purposively because of higher area under these crops. After the selection of two districts, all the tehsils of each selected district were divided into four strata/tehsils by suitably combining the adjoining tehsils on the basis of elevation and agro-climatic conditions. From each selected tehsil, five villages were selected randomly. Thus forty villages in all were selected. After that a reconnaissance survey was conducted in all selected villages to obtain

information of farmers growing wheat and blackgram. All the cultivators of the selected villages were divided into three categories namely small (0 to 2 ha.), medium (2 to 4 ha.) and large (above 4 ha.). Thus fifteen cultivators from different farm size have been selected from each selected village. Thus the total sample of 600 (300 each for pulses and cereals) cultivators has been selected for detailed study.

Main Findings

General Features of the Study Area

Hamirpur and Shimla district cover about 2.01 and 9.22 per cent of the total geographical area of the State. According to 2001 census, these districts constitute 6.79 and 11.89 per cent of the total population of the State. Sex ratio was found to be 1099 in Hamirpur, 896 in Shimla and 968 in the State as a whole. The rural population accounted for 92.68 per cent in Hamirpur, 76.85 per cent in Shimla, whereas it was 90.20 per cent for the State as a whole. Population density per sq. km. was 369 persons in Hamirpur, 141 persons in Shimla and 109 persons in Himachal Pradesh. The proportion of main workers in total population was 42.31 per cent in Shimla, 29.04 per cent in Hamirpur and 32.31 per cent in Himachal. Cultivators account for 70, 64 and 65 per cent of the main workers in Hamirpur, Shimla and Himachal Pradesh as a whole respectively. The net area sown was 0.35 lac and 0.72 lac hectares in Hamirpur and Shimla district respectively. Cropping intensity was 191.7 per cent in Hamirpur and 129.6 per cent in Shimla district.

General Features of Sampled Farm Households

In the selected villages of district Shimla, out of total farmers, 89.2, 8.5 and 2.3 percent were small, medium and large farmers respectively, while in district Hamirpur, 78.6, 16.9 and 4.5 per cent of total farmers were small, medium and large farmers respectively. The average size of holding was reported to be more in district Hamirpur as compared to district Shimla. On an average, per household net-cropped area was reported to be 1.09 and 0.85 hectare in Shimla and Hamirpur respectively. In district Hamirpur, both crops i.e. wheat and maize were grown in rainfed condition. While in district Shimla about 10

per cent area was irrigated in all the size of holdings as well as in both the crops. A study of cropping pattern reveals that in Hamirpur, area under wheat was relatively higher 48.83 percent as compared to Shimla 22.39 percent, while the area under blackgram was relatively higher 8.23 percent in district Shimla as compared to Hamirpur 1.47 percent. As far as productivity is concerned, in the case of blackgram, it was more in Shimla 4.66 qtls/ha as compared to Hamirpur 3.96 qtls/ha. The same pattern was observed in case of maize, whereas in paddy, wheat and barley the reverse trend was observed. Gross value of production of all crops at farm harvest prices ranges from Rs. 297646/- on large farms to Rs. 1308287/- on small farms in district Shimla while in district Hamirpur it was higher as compare to Shimla due to larger area under food grains.

Seed, Feed & Wastage Ratios

In the various stages of food-grain handling i.e. harvesting, threshing, clearing, storage, transportation etc. a considerable portion of the produce goes waste. While harvesting some grains of the maize and wheat fell on the ground due to shattering. Similarly in threshing process some grains pass into the straw and some grains get mixed with dust/dirt on threshing floor. While storing the produce for home consumption, seed and for later disposal, some wastage occurs due to insects, rats and dampness etc. The wastage of food-grains also occurs in loading/un-loading and during transit of the produce. The losses estimated under this study are: losses at harvesting of crop, during threshing, shattered on ground, mixed in straw and losses during transportation from field to home, losses in storage and losses during home consumption and left in animal/poultry feed. For the purpose of estimation, all losses were asked from each cultivator in each crop during the field investigation and these losses are added in net production to get the gross production and percentage of losses is calculated from gross production. The crops taken for the estimation of losses are blackgram and maize in district Shimla and wheat and maize in district Hamirpur.

Analysis reveals that in district Shimla, area under blackgram on all the sample farms was 37.82 hectares with the total production of 17635 kg. Out of the total

produce, on an average wastage estimated to be 8.3 per cent and seed retained 6.7 per cent. The quantity of seed, feed and wastage was found to be 15 per cent of the total production.

As far as maize is concerned, in district Shimla, sampled farmers devoted 84.78 hectares area under the crop whereas production was 178414 kg. On an average, 9.8 per cent of the total maize was used as feed, 8 per cent wastage and 3.4 percent kept for seed. Thus seed, feed and wastage accounted for 21.2 per cent of the total production.

In district Hamirpur, total area under wheat on sampled farms was found to be 228.09 hectares whereas the production was 284540 kg. On an average, 11.2 per cent of the total wheat production was estimated as wastage, 9.7 per cent kept as seed and 6.4 per cent fed to animals. Thus total quantity of seed, feed and wastage in wheat has been estimated to be 27.3 per cent of the total production. The reasons of relatively higher proportion of seed, feed and wastage in wheat are: (i) farmers use higher quantity of seed per hectare due to rainfed agriculture, poor germination of the seed, (ii) general practice of giving home produced grain as feed to the animals, and (iii) the wastage is higher because maximum operations are done manually and the system of storing the produce adopted by the farmers is traditional. Moreover, the per farm production of wheat is relatively lesser than that of Punjab, Haryana and other wheat producing States in the country.

In case of maize, total area of sampled households was 225.67 hectares. The production of maize was 372560 kg. On an average 7.1 per cent of the total production was used as feed and 3.4 percent was kept for seed. The wastage was observed to be 7.7 percent. Total quantity of seed, feed and wastage was estimated to be 18.2 percent of the total production.

Conclusions and Suggestions

The results of the study reveal that in the selected crops, on an average the

losses/wastage ranges between 7.8 to 11.2 per cent of total production. It may be concluded from the analysis that the losses in the selected crops were relatively higher in wheat, followed by blackgram. The losses were observed to be more during storage of grains. Further, the ratio of seed kept to the total production was also higher in case of wheat as compared to black gram. Proportion of produce used as feed was 5.4 percent of the total production in case of wheat. Blackgram was not given as feed to animals in the selected area. Hence, seed, feed and wastage ratios were higher in wheat as compared to blackgram.

To reduce losses in these crops the following suggestions are recommended:

- It was observed that the farmers using larger quantity of seed as compare to recommended practices due to poor germination of retained seed. It is suggested that for reducing the damage of seed by insect/pest the farmers should educate regarding the scientific methods of seed storage.

- To reduce losses during harvesting, the farmers should educate about the right stage of maturity of crops for harvesting. The threshing floor should have smooth surface to minimize the wastage of grain during threshing of crops.

- The grains should store in safe containers. The appropriate container should be provided to the marginal and small farmers on subsidized prices. Before storing, the grains should be properly dried-up. Storage losses can also be minimized by storing the grains in clean, dry and cool conditions.

EXECUTIVE TABLE OF MAIN FINDINGS

Table: Percentage of seed Feed and Wastage in Gross Production of food grains/pulses

Size of holding	Area (ha.)	Gross production (kg.)	Seed Used		Seed kept		Used as feed (Animal feed & Poultry feed)		Wastage		Consumption as seed, animal, poultry and wastage	
			Qty. (kg.)	%	Qty (kg.)	%	Qty. (kg.)	%	Qty. (kg.)	%	Qty. (kg.)	%
District Shimla												
Blackgram												
Small	19.40	9055	502.25	5.5	611.00	6.7	-	-	729.96	8.1	1340.96	14.8
Medium	15.10	6997	351.00	5.0	456.00	6.5	-	-	612.37	8.7	1068.37	15.2
Large	3.32	1583	90.50	5.7	112.00	7.1	-	-	117.25	7.4	229.25	14.5
All	37.82	17635	943.75	5.3	1179.00	6.7	-	-	1459.58	8.3	2638.58	15.0
Maize												
Small	41.10	89685	1616.00	1.8	3060.00	3.4	6451.00	7.2	7696.20	8.6	17207.2	19.2
Medium	36.80	75489	1509.50	2.0	2590.00	3.4	10349.00	13.7	5665.20	7.5	18604.2	24.6
Large	6.88	13240	206.00	1.6	430.00	3.3	700.00	5.3	930.70	7.0	2060.7	15.6
All	84.78	178414	3331.50	1.9	6080.00	3.4	17500.00	9.8	14292.10	8.0	37872.10	21.2
District Hamirpur												
Wheat												
Small	99.29	126840	11819.00	9.3	12085.00	9.5	83330.00	6.6	13752.83	10.8	34167.83	26.9
Medium	108.32	135500	1376.00	10.1	13005.00	9.6	8830.00	6.5	15402.16	11.4	37237.16	27.5
Large	20.48	22200	2795.00	10.8	2435.00	10.9	1040.00	4.7	2820.39	12.7	6295.39	28.3
All	228.09	284540	27974.00	9.8	27435.00	9.7	18200.00	6.4	31975.38	11.2	77610.38	27.3
Maize												
Small	98.87	167360	4410.00	2.6	5834.00	3.5	13780.00	8.2	13674.24	8.2	33288.24	19.9
Medium	102.52	175200	4663.00	2.7	5725.00	3.3	10110.00	5.8	12568.55	7.2	28403.55	16.3
Large	24.28	30000	915.00	3.0	1085.00	3.6	2300.00	7.7	2279.70	7.6	5664.70	18.9
All	225.67	372560	9998.00	2.7	12644.00	3.4	26190.00	7.1	28522.49	7.7	67356.49	18.2

Chapter 1

INTRODUCTION

1.1 History of Methods of Estimation followed in the State Income Accounting Process

In Himachal Pradesh, the work of State income estimation for the first time was carried out in the year 1959-60. The first estimates of State income at current and constant prices with the year 1950-51 as the base were released in the year 1963 which covered the period from 1950-51 to 1960-61. In 1966-67 with the reorganization of erstwhile Punjab State, the Himachal Pradesh underwent territorial changes. With this change, a new series of state domestic product was developed for the year 1966-67 to 1969-70 at current and 1960-61 prices. The third series of State domestic product prepared in the Himachal Pradesh was based on 1970-71 prices, which consisted of the estimates up to 1986-87.

These series with the base as 1950-51, 1960-61 and 1970-71 were based on the comprehensive review of the estimates, utilizing all available data and incorporating all the methodological improvements as suggested by Central Statistical Organization (CSO) from time to time. In the year 1988, CSO released a new series on National Accounts Statistics with the base year 1980-81. These estimates were prepared up to 1997-98 only. At present, the estimates presented are based on new series with the base year 1993-94.

1.2 Methods of Estimation of State Income

The particular method to be followed for estimation of State income depends upon the object of these estimates and the availability of data for the purpose. Basically State income can be estimated by any of these three approaches viz: (i) Output approach, (ii) Income approach (iii) Expenditure approach. For estimating the state domestic product, the methodology suggested by CSO is followed as far as practicable. The economy for this purpose has been divided in to following 14 sectors:

1. Agriculture including Animal Husbandry
2. Forestry and Logging
3. Fishing
4. Mining and Quarrying
5. Manufacturing Registered
6. Manufacturing Un-registered
7. Construction
8. Electricity, Gas and Water Supply
9. Transport, Storage and Communications
10. Trade, Hotel and Restaurants
11. Banking and Insurance
12. Real Estate, Ownership of Dwellings and Business Services
13. Public Administration
14. Other Services

1.3 Estimation Methodology for Agriculture

Agriculture is one of the important activities of State economy. A large proportion of the population depends upon agriculture for their livelihood. This leading sector of the economy which comprises agriculture, horticulture and livestock production accounts for the largest single share in the state domestic product. The contribution to State domestic product from agriculture, horticulture and livestock production except government irrigation system is estimated by using the production approach which involves estimation of the gross value of products and by-products and ancillary activities and deduction of the value of inputs, services and consumption of fixed capital in the process of production to obtain the net value added. For irrigation, an income approach is used and the total factor incomes generated as a result of providing the irrigation services is measured. Separate estimates are prepared for gross value of output from agricultural crops, horticultural crops and livestock products while net value added estimates are worked out for the activity as a whole.

For the purpose of State income estimation all principal and minor crops, miscellaneous and unspecified crops and various by-products have been

considered. Data on area and production of major crops in each district are made available by the State Directorate of Land Records, which are published in 'Annual Season and Crop Report'. The publication gives the outturn of principal crops only. For unspecified and miscellaneous crops, the value of output per hectare is arrived on the basis of weighted average value of output per hectare of related specified main crops in each category of the unspecified crops.

The by-products which have some economic value included in the estimation are (i) stalks and straws of various cereals and pulses, (ii) cotton sticks, (iii) cane trash, (iv) Grass and (v) Bagasse. The estimates of straws and stalks of various cereals and pulses, cotton sticks and cane trash have been prepared on the basis of value of by products per hectare as supplied by C.S.O. The estimates of bagasse have been prepared by taking it as 22.5 per cent of total Gur production and the estimates of the production of grass are prepared on the basis of yield per hectare supplied by C.S.O. In the combined area under (i) permanent pastures and grazing land, (ii) miscellaneous tree crops and groves, (iii) culturable waste, (iv) fallow lands, and (v) net area sown by adopting the weights 4:1:2:2:1 for combining these.

Evaluation of the output of agricultural crops has been done at the average wholesale price/farm harvest price prevailing in the primary markets of the districts during the peak market arrival period. These prices are arrived at by averaging the wholesale price of a commodity in each district over the peak marketing season and which are collected by the District Statistical Officers of the Himachal Pradesh every fortnight. In case of by-products, except for bagasse, the value per hectare as supplied by C.S.O were used which were based on the results of cost of cultivation studies. For bagasse the bench mark year price is moved with the price of firewood. The price of grass and tea is also supplied by C.S.O. The evaluation of fruits has been done with the price data made available by State Horticulture Department. The Gross income from the operation of Government irrigation system is culled out from the Budget documents. To arrive at the estimates of gross/net value added or domestic product from agriculture including livestock various deductions have been made

on account of current costs of inputs, market charges and consumption of fixed capital etc.

1.4 Trends in Seed, Feed and Wastage Ratio

Wheat and Blackgram are the major cereal and pulse crops of the state. The trends in seed requirements of these crops are based on the seed rate as recommended by State Agricultural University and the area under these crops in different years. The total seed requirements for wheat crop increased consistently from 35000 tonnes in 1971 to 40,000 tonnes in 1981 and 42,000 tonnes in 1991. After that seed requirements for this particular crop decreased to 40,000 tonnes in 2001. Contrary to it, seed requirements as per cent of total production declined consistently from 9 per cent in 1971 to 7 percent in 2001. The total seed requirements for blackgram crop in the State have been fluctuating due to fluctuations in blackgram area i.e. 250 tonnes in 1971, 450 tonnes in 1981, 390 tonnes in 1991 and 290 tonnes in 2001. The total seed requirement as percentage of total blackgram production is also fluctuating i.e. 5.7 per cent in 1971, 5.1 per cent in 1981, 8.4 per cent in 1991 and 5.3 per cent in 2001.

The feed requirement for milch animals estimated to be about 15000 tonnes in 1982 and about 17000 tonnes in each 1992 and 2003, constituting 3.9, 4.5, and 3.2 per cent of the total wheat production respectively. Regarding wastage ratio, no such type of study has been conducted in Himachal Pradesh.

1.5 Net Availability of Cereals and Pulses in Himachal Pradesh

The analysis of Table 1.1 reveals that cereal production has increased from 5,13,460 metric tonnes in the year 1951 to 14,27,477 metric tonnes in the year 2001. Net availability of cereals is also increased from 4,49,278 metric tonnes in the year 1951 to 12,49,042 metric tonnes in the year 2001. While the per capita per day availability of cereals registered fluctuating trend from 515 gms in 1950-51 to 629 gms in 1971 and again declined to 563 gms in 2001. This quantity is more than national level availability of cereals per capita per day. As far as pulses are concerned, their production has shown wide fluctuations from the year 1951 to 2001 due to variation in its area. Similarly, net availability of

pulses is also registerd fluctuating trend during the reference period. The per capita per day availability of pulses decreased from 23 gms in the year 1951 to 9.59 gms in the year 2001 and this is less than the national average

Table 1.1: Net Availability of Cereals and Pulses in Himachal Pradesh

Year	Population	Cereals production (MT)	Net availability (MT)*	Per capita availability per day (Gms)	Total pulse production (MT)	Net availability (MT)*	Per capita availability per day (Gms)
1951	2385981	513460	449278	515	23250	20344	23.00
1961	2812463	701930	614189	598	27590	24141	23.51
1971	3460434	908730	795139	629	29892	26156	20.70
1981	4280818	1046374	915577	585	16833	14729	9.42
1991	5171079	1332244	1165713	624	12559	10989	5.80
2001	6077248	1427477	1249042	563	24316	21276	9.59

Source: *Directorate of Land Record, Shimla, HP*
** Net production has been taken as 87.5 per cent of gross production 12.5 per cent being provided for seed, feed requirement and waste (**Source:** Economic Survey, Govt. of India, 2005-06)*

1.6 Probable Impact on the State Income Accounting

In all the past studies of State income conducted by Department of Economic and Statistics, Govt. of Himachal Pradesh time to time, not considering wastage ratio of food grains. They calculated the State income on the total out turn of different food-grains multiplied by prevailing prices in the market. If we consider the wastage ratio in the State income, the State income marginally go down.

1.7 Need for the Study

Indian agriculture contributes significantly to the aggregate economy through food crops, cash crops, oil seeds, pulses and other crops. India is self sufficient for its need of agricultural commodities, except in times of war or disaster due to natural calamity. To estimate how much of food grains are available for human consumption, it is important to know the proportion of seed, feed and wastage of total production of food crops. This study is important, as it will provide

estimates of seed, feed and wastage for major food grain crops and the availability of these crops for human consumption in Himachal Pradesh.

1.8 Objectives of the Study

1. To estimate the total quantity of food grains consumed for seed, feed and wastage.
2. To estimate the net availability of food grains for human consumptions.

1.9 Organization Responsible for the Study

The present study is allotted to different Agro-Economic Research Centers by Ministry of Food and Agriculture, Govt. of India. The Institute for Social and Economic Change, Bangalore is the Coordinator of this study.

Chapter 2

REVIEW OF LITERATURE

In this chapter, a brief review of some earlier studies conducted on the related aspects has been presented.

Krishnamurthy (1968) reported that in the rural storages under farmers condition the losses due to insects in the wheat stored up-to 8 months varied from 2.03 to 9.52 per cent.

The Committee on post harvest losses of food grains in India (1971) estimated the losses of food-grain at various stages of post harvest operations. Loss percent in relation to quantity stored was found to be 0.20, 0.26, 0.13, 0.14, 0.10 and 0.07 per cent during the period 1963-64, 64-65, 65-66, 66-67, 67-68 and 68-69 respectively. Loss percent in relation to quantity transported of wheat crop decreased from 0.75 per cent in 1962-63 to 0.17 per cent in 1966-67.

Girish et. al (1974) in their study found that the losses of wheat in term storage in different regions of Uttar Pradesh ranging from 0.6 to 9.7 per cent.

Girish et.al (1975), estimated the average loss of wheat due to insect damage as 2.90, 0.85 and 0.95 per cent after seven months of storage in grain markets of Western U.P., Punjab and Haryana, respectively.

Birewar (1977) find out the losses during post harvest operations in food grains, which were estimated to be of the order of about 10 per cent in India.

Majumdar (1979) worked out the losses of food grains in India and estimated losses during post harvest operations. The estimated losses were 12.8 per cent of total food-grains output per year during 1951-52 to 1976-77.

Girish et. al. (1990) conducted a survey in Akola district of Maharastra and revealed that storage losses ranges from 5 to 12 per cent in Gunny bags, local mud storage structures and tins.

Singh et. al (1992) observed in their study that the losses in wheat crop during harvesting with sickle were of the tune of 1.49 to 1.55 per cent whereas with Harvest Combine the losses were 1.57 to 1.60 per cent. Threshing loss was observed to be 1.42 to 1.45 per cent. The losses in the traditional storage structures made of mud etc. were very alarming ranging from 6.79 to 6.84 per cent. Losses during marketing of the grains were estimated to be 0.80 per cent.

Gill (2000) reported that the post harvest losses were 7-10 per cent at the farm to market level and another 4-5 per cent from market to distribution level.

Chapter 3

METHODOLOGY

3.1 Selection of Districts

The present study is confined to two crops (one cereal and one pulse) based on the area predomination in the State. Maize and wheat are the two major cereals grown in the State and blackgram is the only pulse which is grown in almost all the districts. Acreage of wheat is higher than maize among all the districts as well as in State as a whole. Thus, wheat in cereals and blackgram in pulses were selected for the detailed study. District-wise proportion of area under maize, wheat and blackgram to total food-grains is presented in Table 3.1. The table reveals that under wheat, Hamirpur district has the highest proportion and Shimla district has the highest proportion in blackgram. Thus, Hamirpur for wheat (cereal) and Shimla for blackgram (pulse) have been selected purposively because of higher area under these crops.

Table 3.1: District-wise Proportion of Area of Maize, Wheat and Blackgram to the total Food grains during 1999-2000 to 2001-02 Triennium

Districts	Crops				
	Maize	Wheat	Blackgram	Total food-grain (%)	Total food-grains (ha)
Bilaspur	47.1	48.7	0.2	100.0	56023
Chamba	43.9	35.6	3.8	100.0	58987
Hamirpur	45.9	50.1	0.1	100.0	69161
Kangra	29.6	47.5	1.5	100.0	197254
Kinnaur	6.6	7.0	0.2	100.0	5957
Kullu	32.9	46.7	2.4	100.0	48858
L. & S.	1.5	6.1	-	100.0	2453
Mandi	33.5	46.0	1.1	100.0	143505
Shimla	30.5	33.9	4.8	100.0	52285
Sirmour	37.0	42.7	2.1	100.0	64648
Solan	43.3	42.0	2.4	100.0	56187
Una	44.7	49.6	0.8	100.0	63398
Himachal Pradesh	36.6	44.8	1.7	100.0	818716

3.2 Selection of Tehsils

After the selection of two districts, all the tehsils of each selected district have been divided into four stratas by suitably combining the adjoining tehsils on the basis of elevation and agro-climatic conditions etc. Thus, in Shimla district four tehsils viz. Theog, Rampur, Rohru and Nerwa were selected and in Hamirpur district, Barsar, Bhoranj, Hamirpur and Sujanpur tehsils were selected.

3.3 Selection of Villages

From each selected tehsil, five villages have been selected randomly. The list of the selected villages is presented in Table 3.2 for district Shimla and in Table 3.3 for district Hamirpur.

Table 3.2: Stratum wise list of selected villages and total number of farmers for selected crop Blackgram in District Shimla

Stratum No.	Name of the Tehsil	Name of the selected villages	Total No. of farmers in the village	Total No. of farmers selected
1	Rampur	1. Ravi	283	15
		2. Dharali	105	15
		3. Tyabal	264	15
		4. Majhgaon	207	15
		5. Badhal	113	15
2.	Theog	1. Tikkari	36	15
		2. Sainj	50	15
		3. Lailu	31	15
		4. Bhalyana	23	15
		5. Dhali	18	15
3.	Rohru	1. Shekhal	41	15
		2. Lowerkoti	144	15
		3. Dhare	48	15
		4. Kiyartu	74	15
		5. Parsa	81	15
4.	Nerwa	1. Mool Shak	80	15
		2. Tari	33	15
		3. Tershanoo	58	15
		4. Bagasan	42	15
		5. Shawalla	96	15
All	**4**	**20**	**1827**	**300**

Table 3.3: Stratum wise list of selected villages and total number of farmers for selected crop Wheat in District Hamirpur

Stratum No.	Name of the Tehsil	Name of the selected villages	Total No. of farmers in the village	Total No. of farmers selected
1	Sujanpur	1. Jagadiyal	86	15
		2. Chamhardi	40	15
		3. Chakriyane	22	15
		4. Chamayana	144	15
		5. Ghadi	59	15
2.	Hamirpur	1. Padhar	27	15
		2. Majhogkhas	37	15
		3. Ropa	20	15
		4. Guhal	29	15
		5. Tibbi	48	15
3.	Barsar	1. Ganoh Brahmana	48	15
		2. Dhabdiyana	62	15
		3. Samoh	64	15
		4. Makteri	36	15
		5. Tukhani	59	15
4.	Bhoranj	1. Bassi	39	15
		2. Daileg	38	15
		3. Bhoranj Rahala	60	15
		4. Samlog	26	15
		5. Tikkar	59	15
All	**4**	**20**	**1003**	**300**

3.4 Selection of Ultimate Sample

After the selection of villages a reconnaissance survey was conducted in all selected villages to obtain information of farmers growing wheat and blackgram crops. All the cultivators of the selected villages were divided into three categories i.e. small (0 to 2 hectares), medium (2 to 4 hectares) and large (above 4 hectares). Fifteen cultivators from different farm sizes have been selected from each selected village. Thus the total sample of 600 (300 each for pulse and cereals) have been selected for detailed study.

The data was collected by the investigators of Agro-Economic Research Centre by survey method on pre structured schedule supplied by Coordinator of the study. Simple tabular analysis has been done to estimate the seed, feed and wastage ratio. The field data pertain to the agricultural year 2004-05.

Chapter 4

GENERAL INFORMATION ABOUT THE STUDY AREA

In order to estimate the seed, feed and wastage ratio for major food-grains in Himachal Pradesh, two districts namely Hamirpur and Shimla were selected for wheat and blackgram crops respectively. The general profile of these districts in terms of their demography, education (literacy rate), and land utilization pattern etc. has been discussed in this chapter.

4.1 General Features of the Sampled Districts

The general features of sampled districts for the year 2001-02 have been shown in Table 4.1. The geographical area of Hamirpur and Shimla district is 1118 and 5131 sq. km. respectively which accounts for 2.01 and 9.22 percent of the total geographical area of the State. As per 2001 census the population of Hamirpur and Shimla districts was 4.13 and 7.23 lakh which is 6.79 and 11.89 per cent of the total population of the State respectively. The population of female per thousand male was found 1099 in Hamirpur, 896 in Shimla and 968 in the State as a whole. The rural population accounted for 92.68 per cent in Hamirpur and 76.85 per cent in Shimla district whereas it is 90.20 per cent for State as a whole. The population density was 369 persons per sq. km. in Hamirpur, as against 141 persons per sq. km. in Shimla and 109 persons per sq. km. in the State. The literacy rate was relatively higher in both the districts than the State average. The proportion of man workers in total workers was comparatively more in Shimla 42.31 percent than that of Hamirpur 29.04 percent and State as a whole 32.31 percent. The cultivators accounted for about 70 percent of total workers in Hamirpur, 64 per cent in Shimla and 65 per cent in the State as a whole. The net sown area was 0.35 lakh hectare and 0.72 lakh hectares in Hamirpur and Shimla district respectively. In Hamirpur district the cropping intensity was 191.7 percent as against 129.6 per cent in Shimla district. The irrigation intensity was found to be 184, 173 and 144 per cent in Hamirpur, Shimla and State as a whole respectively.

Table 4.1: General Profile of sample Area (2001-02)

S.No.	Profile	Hamirpur	Shimla	Himachal Pradesh
1	Geographical area (Sq.kms)	1118	5131	55673
	Percent to state area	2.01	9.22	100.00
2	Population 2001 (persons)	412700	722502	6077900
	Percent to total population	6.79	11.89	100.00
	Male	196593	380996	3087940
	Female	216107	341506	2989960
3	Female per thousand male	1099	896	968
4	Rural population %	92.68	76.85	90.20
5	Urban population %	7.32	23.15	9.80
6	Density per Sq. kilometer	369	141	109
7	Literacy percent (Person)	83.16	79.68	77.13
	Male	90.86	87.72	86.02
	Female	76.41	70.68	68.08
8	Percent of main workers to total population	29.04	42.31	32.31
9	Cultivators (percent to workers)	69.88	64.15	65.33
10	Agricultural labourers (percent to workers)	1.60	2.65	3.15
11	Household industry workers (percent to total workers)	1.42	1.18	1.75
12	Other workers (Percent to total worker)	27.10	32.02	29.77
13	Land utilization			
14	Total geographical area (hect.)	110169	508027	4547280
	Forest (hect.)	18676	123943	1093545
	Land put to non agril. Uses (hect.)	18582	13929	313729
	Net area sown (hect.)	35965	72554	554592
	Total cropped area (hect.)	68938	94034	947542
	Cropping intensity %	191.7	129.6	170.9
	Net irrigated area (hect.)	1718	3023	125506
	Gross irrigated area (hect.)	3161	5258	181275
	Irrigation intensity	184.0	173.9	144.4
15	Number of holding (1995-96)	69193	90005	862897
16	Total area of holdings (hect.)	76579	125917	999676

4.2 Cropping Pattern of Himachal Pradesh

Cropping pattern deals with the type of corps and percentage of area under each crop. Economic studies on cropping pattern normally emphasis two important characteristics of agricultural land viz. its heterogeneity and possibility of crops substitution. Heterogeneity arises from agro-climatic differences, which include soil texture, temperature and rainfall differing from region to region within the State. Differences in irrigation facilities also contribute to land heterogeneity among regions. Cropping pattern studies therefore assume special importance taking consideration of soil, climatic factors and the crop that could be grown within that environment. At the same time the size of cultivable holdings is another important economic factor determining the cropping pattern. Table 4.2 presents the total area under different crops in Himachal Pradesh during 1997-98 to 2001-02. Gross cropped area in Himachal Pradesh was 9,55,540 hectares in 2001-02. Among different crops grown in the State, wheat occupied the first place followed by maize, rice and barley. Nearly 38 to 39 percent of the gross cropped area was under wheat, 31 to 32 per cent under maize , 8 per cent under rice and 3 per cent under barley during 1997-98 to 2001-02. Total food crops accounted for 97 percent, rest was under non-food crops. Total pulses occupied only 3 percent of the gross cropped area. The area under fruits and vegetables was 6.53 and 3.78 percent respectively of the gross cropped area in 2001-02.

Table 4.2: Cropping Pattern in Himachal Pradesh

(Area in hectares)

Crop group	1997-98		1998-99		1999-2000		2000-01		2001-02	
	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	86178	8.74	82125	8.46	80221	8.38	81519	8.60	80579	8.43
Maize	311861	31.62	300976	31.02	299906	31.34	298052	31.45	301282	31.53
Wheat	377343	38.26	379718	39.14	370587	38.73	362680	38.27	366518	38.36
Barley	27693	2.81	26752	2.76	25901	2.71	25643	2.71	25017	2.62
Total Cereal	819560	83.09	806498	83.13	791957	82.77	783609	82.70	787375	82.40
Gram	2379	0.24	1908	0.20	1691	0.18	1403	0.15	1144	0.12
Black gram	16472	1.67	15155	1.56	14612	1.53	14161	1.49	13268	1.39
Total pulses	35930	3.64	33849	3.49	32556	3.40	31093	3.28	29559	3.09
Total food grains	855490	86.73	840347	86.62	824513	86.17	814702	85.98	816934	85.49
Total fruits	55529	5.63	56768	5.85	57722	6.03	59907	6.32	62416	6.53
Total Vegetable	33745	3.42	33240	3.43	34675	3.62	33915	3.58	36086	3.78
Potato	14872	1.51	13831	1.43	14373	1.50	14003	1.48	13869	1.45
Total oilseeds	20158	2.04	18707	1.93	18857	1.97	17721	1.87	18178	1.90
Food Crops	952014	96.52	937737	96.66	923939	96.57	916283	96.70	923760	96.67
Non-food crops	34324	3.48	32399	3.34	32828	3.43	31259	3.30	31780	3.33
Gross cropped area	986338	100.0	970136	100.0	956767	100.0	947542	100.0	955540	100.0

Source: Directorate of Land Records, Shimla, H.P.

4.3 Cropping Pattern of District Hamirpur

Table 4.3 presents the total area under different crops in district Hamirpur during 1997-98 to 2001-02. It was observed from the Table that in Hamirpur, the area under wheat accounted for about 48 to 50 per cent, maize 44 to 46 per cent and rice about 4 per cent of the gross cropped area during 1997-98 to 2001-02. Hence, Maize and wheat are major crops in this district. Total food crops accounted for 99.46 percent of the gross cropped area and rest under non-food crops during 2001-02.

4.4 Cropping Pattern of District Shimla

The cropping pattern of district Shimla is presented in Table 4.4, wherein it may be seen that fruits and vegetables are the important crops accounting for about 33 and 14 per cent of gross cropped area respectively during 2001-02. Apple is the main fruit of this district and is widely known for its quality. Among cereal crops, wheat accounted for 18 per cent, maize 16 per cent, barley 5 per cent and rice 2 percent of the gross cropped area during 2001-02. The total area under cereals to gross cropped area decreased from 55.96 per cent in 1997-98 to 47.06 per cent in 2001-02, while the area under fruits and vegetables increased from 36.60 per cent to 46.60 per cent during the same period. The area under pulses is about 5 per cent of the gross cropped area. Among pulses, blackgram is the major crop of the district accounting for 2.43 per cent of the gross cropped area during 2001-02.

4.5 Tehsil-wise cropping pattern of district Hamirpur

Cropping pattern of selected tehsils in district Hamirpur is presented in Table 4.5. Area under all crops grown in district Hamirpur is 70062 hectares during 2001-02. Tehsil Hamirpur has relatively higher gross cropped area of 18196 hectares followed by Bhoranj 15759 hectares, Barsar 8335 hectares, and Sujanpur 6122 hectares. Among cereals, wheat is the major crop in all the tehsils followed by maize, rice and barley. About 50 to 60 percent of the gross cropped area is under wheat in these tehsils. The area under pulses was found to be higher (0.33 percent of GCA) in Hamirpur, followed by Bhoranj (0.30

percent), Sujanpur (0.21 percent) and Barsar (0.01 percent). The area under oilseeds was higher (0.66 percent of GCA) in Barsar, followed by Sujanpur (0.1 percent), Hamirpur (0.08 percent), and Bhoranj (0.03 percent).

Table 4.3: Cropping Pattern of District Hamirpur

(Area in hectares)

Crop group	1997-98		1998-99		1999-2000		2000-01		2001-02	
	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	2813	3.92	2697	3.76	2487	3.51	2403	3.48	2542	3.63
Maize	32618	45.52	32556	45.46	32036	45.28	30834	44.73	32328	46.14
Wheat	34795	48.56	35035	48.92	34993	49.46	34755	50.41	34245	48.88
Barley	161	0.22	134	0.19	130	0.18	103	0.15	110	0.16
Total Cereal	70412	98.27	70437	98.35	69650	98.45	68119	98.81	69211	98.78
Gram	35	0.05	-	-	22	0.03	12	0.02	8	0.01
Black gram	211	0.29	165	0.23	115	0.16	70	0.10	77	0.11
Total pulses	414	0.58	328	0.46	239	0.34	134	0.19	129	0.18
Total food grains	70826	98.84	70765	98.81	69889	98.78	68253	99.00	69340	98.97
Total fruits	81	0.11	84	0.12	61	0.09	72	0.10	67	0.10
Total Vegetable	206	0.29	199	0.28	202	0.28	169	0.24	171	0.24
Potato	17	0.02	13	0.02	11	0.02	8	0.01	11	0.01
Total oilseeds	226	0.31	255	0.35	256	0.36	168	0.24	157	0.22
Food Crops	71243	99.43	71161	99.37	70280	99.34	68583	99.48	69684	99.46
Non-food crops	411	0.57	454	0.63	468	0.66	355	0.52	378	0.54
Gross cropped area	71654	100.0	71615	100.0	70748	100.0	68938	100.0	70062	100.0

Source: Directorate of Land Records, Shimla, H.P.

Table 4.4: Cropping Pattern of District Shimla

(Area in hectares)

Crop group	1997-98		1998-99		1999-2000		2000-01		2001-02	
	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	3097	2.89	2898	2.77	2923	2.93	2579	2.74	2368	2.43
Maize	17911	16.73	17284	16.55	16685	16.75	16017	17.03	15224	15.63
Wheat	26563	24.81	24294	23.27	19758	19.83	15821	16.82	17668	18.14
Barley	5789	5.41	5234	5.01	4574	4.59	4148	4.41	4872	5.00
Total Cereal	59910	55.96	55977	53.61	50512	50.70	44993	47.85	45845	47.07
Gram	28	0.03	-	2.63	65	0.06	63	0.07	35	0.03
Black gram	2706	2.53	2752	2.63	2755	2.76	2419	2.57	2371	2.43
Total pulses	5982	5.59	6087	5.83	5544	5.57	5118	5.44	4842	4.97
Total food grains	65892	61.55	62064	59.44	56056	56.27	50111	53.29	50687	52.04
Total fruits	25898	24.19	27553	26.39	28758	28.87	29680	31.56	31919	32.77
Total Vegetable	13287	12.41	13062	12.51	13135	13.18	13044	13.87	13468	13.83
Potato	5722	5.34	5947	5.70	5502	5.52	5349	5.69	5308	5.45
Total oilseeds	1190	1.11	1101	1.05	1131	1.13	723	0.77	750	0.77
Food Crops	105785	98.80	103288	98.93	98486	98.86	93306	99.23	96628	99.21
Non-food crops	1280	1.20	1118	1.07	1134	1.14	728	0.77	771	0.79
Gross cropped area	107065	100.0	104406	100.0	99620	100.0	94034	100.0	97399	100.0

Source: Directorate of Land Records, Shimla, H.P.

Table 4.5: Cropping pattern of selected Tehsils in district Hamirpur during 2001-02

(Area in hectares)

Crop Group	Sujanpur		Hamirpur		Barsar		Bhoranj		Total Hamirpur District	
	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	53	0.86	464	2.55	99	1.19	1542	9.78	2524	3.60
Maize	2386	38.97	8569	47.09	3735	44.81	6240	39.60	32328	46.14
Wheat	3640	59.45	8860	48.69	4430	53.15	7811	49.56	34245	48.88
Barley	13	0.21	56	0.31	4	0.04	15	0.09	110	0.16
Total Cereal	6092	99.51	17949	98.64	8272	99.24	15608	99.04	69211	98.78
Gram	4	0.07	37	0.20	-	-	6	0.04	8	0.01
Black gram	4	0.07	21	0.11	-	-	35	0.22	77	0.11
Total pulses	13	0.21	61	0.33	1	0.01	48	0.30	129	0.18
Total food grains	6105	99.72	18010	98.98	8273	99.25	15656	99.35	69340	98.97
Total fruits	1	0.02	4	0.02	-	-	19	0.12	67	0.10
Total Vegetable	3	0.05	47	0.26	5	0.06	26	0.16	171	0.24
Potato	-	-	1	0.005	-	-	5	0.03	11	0.02
Total oilseeds	6	0.10	15	0.08	55	0.66	5	0.03	157	0.22
Food Crops	6110	99.80	18076	99.34	8278	99.32	15708	99.68	69684	99.46
Non-food crops	12	0.20	120	0.66	57	0.68	51	0.32	378	0.54
Gross cropped area	6122	100.00	18196	100.00	8335	100.00	15759	100.00	70062	100.00

Source: Directorate of Land Records, Shimla, H.P.

4.6 Village-wise cropping pattern of Tehsil Sujanpur of District Hamirpur

Village-wise area under crops in the selected villages of tehsil Sujanpur is presented in Table 4.6. Wheat and maize are the main crops grown in all the selected villages. Area under maize ranges between 45 per cent of gross cropped area in Ghadi village to 50 per cent of gross cropped area in Chamayana village. Wheat occupied about 50 per cent of gross cropped area among all the selected villages. Cultivation of non-food crops is observed in Barogn, Jagadigal and Ghadi villages only.

4.7 Village-wise cropping pattern of Tehsil Barsar of District Hamirpur

Village-wise area under crops in the selected villages of tehsil Barser is presented in Table 4.7. The Table reveals that cereals are the main crops of all these villages covering more than 95 to 100 percent of the gross cropped area. Among cereals, maize is the major crop, followed by wheat. The area under maize varied between 45.83 percent in Makteri to 51.92 percent in Dhabdiyana village.

4.8 Village-wise cropping pattern of Tehsil Bhoranj of District Hamirpur

The area covered by crops in the selected villages of tehsil Bhoranj Rohala is presented in Table 4.8. It can be seen from the Table that cereals accounted for 98 to 100 percent of the gross cropped area in the selected villages. Among cereals wheat is the main crop followed by maize and rice. The area under wheat ranges from 68.86 percent of GCA in village Bhoranj to 45.38 percent in Daileg village. Non-food crops were not grown in selected villages of this tehsil.

Table 4.6: Cropping Pattern of Selected Villages in Tehsil Sujanpur of District Hamirpur during 2001-02

(Area in hectares)

Crop Group	Barogn Jagadiyal		Chamhardi		Chakriyana		Chamayana		Ghadi		Total tehsil Sujanpur	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	-	-	-	-	-	-	-	-	-	-	53	0.86
Maize	24.41	49.66	22.06	49.93	13.37	50.00	56.29	49.87	20.93	44.57	2386	38.98
Wheat	24.50	49.84	22.09	50.00	13.37	50.00	56.41	49.98	23.40	49.83	3640	59.46
Barley	0.03	0.06	-	-	-	-	-	-	-	-	13	0.21
Total Cereal	48.94	99.57	44.15	99.93	26.74	100.00	112.70	99.85	46.42	98.85	6092	99.51
Gram	-	-	-	-	-	-	-	-	-	-	4	0.06
Black gram	0.10	0.20	-	-	-	-	-	-	0.18	0.38	4	0.06
Total pulses	0.10	0.20	-	-	-	-	-	-	0.18	0.38	13	0.21
Total food grains	49.04	99.78	44.15	99.93	26.74	100.00	112.70	99.85	46.60	99.23	6105	99.72
Total fruits	-	-	-	-	-	-	-	-	-	-	1	0.02
Total Vegetable	0.04	0.08	0.03	0.07	-	-	0.17	0.15	0.21	0.45	3	0.05
Potato	-	-	-	-	-	-	-	-	-	-	-	-
Total oilseeds	0.07	0.14	-	-	-	-	-	-	0.15	0.32	6	0.10
Food Crops	49.08	99.86	44.18	100.00	26.74	100.00	112.87	100.0	46.81	99.68	6109	99.79
Non-food crops	0.07	0.14	-	-	-	-	-	-	0.15	0.32	13	0.21
Gross cropped area	49.15	100.0	44.18	100.00	26.74	100.00	112.87	100.0	46.96	100.00	6122	100.0

Source: Tehsildar, Tehsil Sujanpur, District Hamirpur, H.P.

Table 4.7: Cropping Pattern of Selected Villages in Tehsil Barsar of District Hamirpur during 2001-02

(Area in hectares)

Crop Group	Ganoh Brahmana		Dhabadiyan		Samoh		Makteri		Tukhani		Total tehsil Barsar	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	-	-	-	-	-	-	-	-	-	-	99	1.19
Maize	21.00	50.00	27.00	51.92	23.00	47.92	11.00	45.83	29.00	48.33	3735	44.81
Wheat	20.00	47.62	24.00	46.15	23.00	47.92	11.00	45.83	29.00	48.33	4430	53.15
Barley	-	-	-	-	1	2.08	1.00	4.17	-	-	4	0.05
Total Cereal	41.00	97.62	51.00	98.07	48.00	100.00	23.00	95.83	60.00	100.00	8272	99.24
Gram	-	-	-	-	-	-	-	-	-	-	-	-
Black gram	-	-	-	-	-	-	-	-	-	-	-	-
Total pulses	-	-	-	-	-	-	-	-	-	-	1	0.01
Total food grains	41.00	97.62	51.00	98.07	48.00	100.00	23.00	95.83	60.00	100.00	8273	99.26
Total fruits	-	-	-	-	-	-	-	-	-	-	-	-
Total Vegetable	-	-	-	-	-	-	-	-	-	-	5	0.06
Potato	-	-	-	-	-	-	-	-	-	-	-	-
Total oilseeds	-	-	-	-	-	-	-	-	-	-	55	0.66
Food Crops	41.00	97.62	51.00	98.07	48.00	100.00	23.00	95.83	60.00	100.00	8278	99.32
Non-food crops	1.00	2.38	1.00	1.93	-	-	1.00	4.17	-	-	57	0.68
Gross cropped area	42.00	100.0	52.00	100.00	48.00	100.00	24.00	100.00	60.00	100.00	8335	100.00

Source: Tehsildar, Tehsil Barsar, District Hamirpur, H.P.

Table 4.8: Cropping Pattern of Selected Villages in Tehsil Bhoranj of District Hamirpur during 2001-02

(Area in hectares)

Crop Group	Bassi		Daileg		Bhoranj Rohala		Sanlog		Tikkar		Total tehsil Bhoranj	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	6.00	14.15	5.60	11.76	6.40	9.59	2.00	8.20	3.60	1.14	1542	9.78
Maize	13.20	31.13	20.40	42.86	13.60	20.36	10.40	42.62	154.00	48.79	6240	39.60
Wheat	23.20	54.72	21.60	45.38	46.00	68.86	12.00	49.18	156.80	49.68	7811	49.56
Barley	-	-	-	-	-	-	-	-	0.80	0.25	15	0.10
Total Cereal	42.40	100.0	47.60	100.00	66.00	98.80	24.40	100.00	315.20	99.87	15608	99.04
Gram	-	-	-	-	0.40	0.60	-	-	0.40	0.13	6	0.03
Black gram	-	-	-	-	-	-	-	-	-	-	35	0.22
Total pulses	-	-	-	-	0.80	1.20	-	-	0.40	0.13	48	0.30
Total food grains	42.40	100.0	47.60	100.00	66.80	100.00	24.40	100.00	315.60	100.00	15656	99.34
Total fruits	-	-	-	-	-	-	-	-	-	-	19	0.12
Total Vegetable	-	-	-	-	-	-	-	-	-	-	26	0.16
Potato	-	-	-	-	-	-	-	-	-	-	5	0.03
Total oilseeds	-	-	-	-	-	-	-	-	-	-	5	0.03
Food Crops	42.40	100.0	47.60	100.00	66.80	100.00	24.40	100.00	315.60	100.00	15708	99.68
Non-food crops	-	-	-	-	-	-	-	-	-	-	51	0.32
Gross cropped area	42.40	100.0	47.60	100.00	66.80	100.00	24.40	100.00	315.60	100.00	15759	100.00

Source: Tehsildar, Tehsil Barsar, District Hamirpur, H.P.

4.9 Village-wise cropping pattern of tehsil Hamirpur of district Hamirpur

Village-wise area under crops in the selected villages of tehsil Hamirpur is presented in Table 4.9. The table reveals that cereals are the main crop of the selected villages, followed by vegetables and oilseeds. Among cereals the area under wheat is higher as compared to maize in all the selected villages. The area under wheat ranges between 42 to 47 per cent of gross cropped area. Maize accounted for 37 per cent of gross cropped area in Padhar and 51 per cent of gross cropped area in Ropa village. Area under non-food crops ranges between 0.13 to 4.76 percent of the gross cropped area.

4.10 Tehsil-wise cropping pattern of district Shimla

Area under different crops in selected tehsils of district Shimla is presented in Table 4.10. Area under all crops is 97399 hectares in the district. Among selected tehsils gross cropped area is relatively higher in Theog (11243 hectares), followed by Rampur (10853 hectares), Rohru (8612 hectares) and Nerwa (6486 hectares). In Rampur tehsil, area under cereals is higher (57.62 %), followed by pulses (15.06 %), fruits (13.85 %) and vegetables (4.16 %). In Nerwa also, maximum area is devoted to cereals (67.11%), followed by fruits (10.13 %), pulses (7.07 %) and vegetables (4.01 %). In Theog tehsil, vegetables are the major crops accounting for 45.72 percent of GCA. The agro-climatic conditions of Theog tehsil are favourable for growing potato and other off-season vegetables like peas, cauliflower, cabbage, tomato etc. The revenue earned by the cultivators from such vegetables is quite considerable. In Rohru, after cereals, fruits are the most important crop covering 28.29 percent of the GCA, followed by vegetables and pulses. The production of apple in this area provides relatively more income and employment as compared to other crops.

Table 4.9: Cropping Pattern of Selected Villages in Tehsil Hamirpur of District Hamirpur during 2001-02

(Area in hectares)

Crop Group	Padhar		Majhogkhas		Ropa		Guhal		Tibbi		Total Hamirpur tehsil	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	4.54	14.31	7.55	13.71	0.85	5.08	1.34	3.55	2.22	3.74	464	2.55
Maize	11.68	36.81	23.15	42.05	8.47	50.72	17.53	46.50	28.56	48.12	8569	47.09
Wheat	14.95	47.12	24.05	43.69	6.98	41.79	17.73	47.03	25.64	43.30	8860	48.69
Barley	0.04	0.13	-	-	0.04	0.24	-	-	-	-	56	0.31
Total Cereal	31.23	98.42	54.76	99.47	16.35	97.90	36.60	97.08	56.42	95.06	17949	98.64
Gram	-	-	-	-	-	-	-	-	-	-	37	0.20
Black gram	-	-	-	-	-	-	-	-	-	-	21	0.11
Total pulses	-	-	-	-	-	-	-	-	-	-	61	0.33
Total food grains	31.23	98.42	54.76	99.47	16.35	97.90	36.60	97.08	56.42	95.06	18010	98.98
Total fruits	-	-	-	-	-	-	-	-	-	-	4	0.02
Total Vegetable	0.28	0.88	0.22	0.40	0.21	1.25	0.44	1.17	0.11	0.18	47	0.26
Potato	-	-	-	-	-	-	0.05	0.13	-	-	1	0.01
Total oilseeds	0.02	0.06	0.06	0.11	0.14	0.84	-	-	0.75	1.26	15	0.08
Food Crops	31.51	99.31	54.98	99.87	16.56	99.16	37.04	98.25	56.53	95.24	18076	99.34
Non-food crops	0.22	0.69	0.07	0.13	0.14	0.84	0.66	1.75	2.82	4.76	120	0.66
Gross cropped area	31.73	100.0	55.05	100.00	16.70	100.00	37.70	100.00	59.35	100.00	18196	100.00

Source: Tehsildar, Tehsil Hamirpur, District Hamirpur, H.P.

Table 4.10: Cropping pattern of selected Tehsils in district Shimla during 2001-02

(Area in hectares)

Crop Group	Rampur		Theog		Rohru		Nerwa		Total Shimla	
	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	615	5.67	2	0.01	202	2.34	383	5.90	2368	2.43
Maize	1095	10.09	1963	17.45	1139	13.23	1451	22.37	15224	15.63
Wheat	2634	24.27	449	3.99	980	11.38	1201	18.52	17668	18.14
Barley	737	6.76	224	1.99	414	4.81	324	4.99	4872	5.00
Total Cereal	6254	57.62	2604	23.16	3022	35.09	4353	67.11	45845	47.07
Gram	-	-	-	-	-	-	-	-	35	0.03
Black gram	603	5.55	294	2.61	226	2.62	308	4.75	2371	2.43
Total pulses	1635	15.06	470	4.18	431	5.00	459	7.07	4842	4.97
Total food grains	7889	72.68	3110	27.66	3453	40.09	4812	74.19	50687	52.04
Total fruits	1504	13.85	2599	23.12	2436	28.29	657	10.13	31919	32.77
Total Vegetable	452	4.16	5140	45.72	1629	18.91	260	4.01	13468	13.83
Potato	384	3.54	728	6.47	1421	16.50	167	2.57	5308	5.45
Total oilseeds	185	1.70	10	0.09	20	0.23	150	2.31	750	0.77
Food Crops	10668	98.30	11233	99.91	8591	99.75	6336	97.69	96628	99.21
Non-food crops	185	1.70	10	0.09	21	0.24	150	2.31	771	0.79
Gross cropped area	10853	100.00	11243	100.00	8612	100.00	6486	100.00	97399	100.00

Source: Directorate of Land Records, Shimla, H.P.

4.11 Village-Wise cropping pattern of Tehsil Rampur of District Shimla

Village-wise area under crops in the selected villages of tehsil Rampur is presented in Table 4.11. The table reveals that after cereals, fruit is the main crop in all these villages, followed by pulses. The area devoted to fruits ranges between 17 to 43 per cent of the gross cropped area in the selected villages. The area under wheat ranges between 20 to 29 per cent of the gross cropped area. In case of maize, area ranges between 8 to 29 per cent of the gross cropped area Pulses accounted for 15 per cent of the gross cropped area in Rampur. Among pulses, blackgram occupied 5.55 per cent of the gross cropped in Rampur tehsil. Among different selected villages blackgram occupied 1.11 percent of the GCA in Ravi village and 8.4 percent of the gross cropped area in Badhal village.

4.12 Village-wise cropping pattern of Tehsil Theog of District Shimla

Cropping pattern in selected villages of tehsil Theog is presented in Table 4.12. The table reveals that vegetables are the main crop of all these selected villages accounting for 33 per cent of the gross cropped area in Dhali to 55 per cent of gross cropped area in Lailu village. Area devoted to pulses is 3.40 per cent of the gross cropped area in Dhali and 26.01 per cent of the gross cropped area in Sainj village. Maize is observed to be the next important crop in these villages. The same trend is observed in case of area under blackgram in the selected villages of Theog tehsil.

4.13 Village-wise cropping pattern of Tehsil Rohru of District Shimla

Village-wise area devoted to various crops in the selected villages of tehsil Rohru is presented in Table 4.13. Fruits are the main crop of villages of this tehsil. The area under fruit crops ranges between 19 per cent in village Shekhal to 81 per cent of the gross cropped area in village Dhara. Cereals accounted for 14 per cent of gross cropped in village Dhara to 64 per cent in village Shekhai. Area devoted to pulses is 1.69 per cent of gross cropped area in village Dhara and 10.67 per cent in village Shekhal. Similar trend is observed in case of area under blackgram in these villages.

Table 4.11: Cropping Pattern of Selected Villages in Tehsil Rampur of District Shimla during 2001-02

(Area in hectares)

Crop Group	Ravi		Dharali		Tyabal		Majhgaon		Badhal		Tehsil Rampur	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	13.00	7.43	9.00	7.37	13.00	6.19	2.00	1.20	29.00	24.37	615	5.67
Maize	51.00	29.14	26.00	21.31	31.00	14.76	45.00	26.95	10.00	8.40	1095	10.09
Wheat	62.00	35.43	24.00	19.67	81.00	38.57	44.00	26.35	34.00	28.57	2634	24.27
Barley	5.00	2.85	1.00	0.82	9.00	4.29	3.00	1.80	6.00	5.04	734	6.79
Total Cereal	131.00	74.85	60.00	49.18	139.00	66.19	100.00	59.88	81.00	68.07	6254	57.62
Gram	-	-	-	-	-	-	-	-	-	-	-	-
Black gram	3.00	1.71	7.00	5.74	12.00	5.71	3.00	1.80	10.00	8.40	603	5.56
Total pulses	9.00	5.14	10.00	8.20	22.00	10.48	11.00	6.59	18.00	15.13	1635	15.06
Total food grains	140.00	80.00	70.00	57.38	161.00	76.67	111.00	66.46	99.00	83.19	7889	72.69
Total fruits	35.00	20.00	52.00	42.62	45.00	21.43	56.00	33.54	20.00	16.81	1504	13.86
Total Vegetable	-	-	-	-	4.00	1.90	-	-	-	-	452	4.16
Potato	-	-	-	-	-	-	-	-	-	-	384	3.54
Total oilseeds	-	-	-	-	-	-	-	-	-	-	185	1.70
Food Crops	175.00	100.00	122.00	100.00	210.00	100.00	167.00	100.00	119.00	100.00	10668	98.30
Non-food crops	-	-	-	-	-	-	-	-	-	-	185	1.70
Gross cropped area	175.00	100.00	122.00	100.00	210.00	100.00	167.00	100.00	119.00	100.00	10853	100.0

Source: Tehsildar, Tehsil Rampur, District Shimla, H.P.

Table 4.12: Cropping Pattern of Selected Villages in Tehsil Theog of District Shimla during 2001-02

(Area in hectares)

Crop Group	Tikkari		Sainj		Lailu		Bhalayana		Dhali		Theog tehsil	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	-	-	-	-	-	-	-	-	-	-	2	0.02
Maize	8.29	23.53	6.39	18.99	7.13	17.13	5.04	19.31	5.38	31.59	1963	17.45
Wheat	3.69	10.47	-	-	0.90	2.16	-	-	0.72	4.23	449	3.99
Barley	0.67	1.90	0.07	0.21	-	-	0.07	0.27	-	-	224	1.99
Total Cereal	12.65	35.91	6.46	19.20	8.03	19.29	5.11	19.52	6.10	35.82	2604	23.16
Gram	-	-	-	-	-	-	-	-	-	-	-	-
Black gram	4.85	13.77	8.21	24.40	7.21	17.32	3.41	13.00	0.58	3.40	294	2.61
Total pulses	4.85	13.77	8.75	26.01	7.21	17.32	3.41	13.00	0.58	3.40	470	4.18
Total food grains	17.50	49.67	15.21	45.21	15.25	36.63	8.52	32.55	6.68	39.22	3110	27.66
Total fruits	4.23	12.00	1.86	5.53	3.37	8.09	4.65	17.77	4.70	27.60	2599	23.12
Total Vegetable	12.40	35.20	16.48	48.99	22.83	54.84	13.00	49.67	5.62	33.00	5140	45.72
Potato	0.07	0.20	4.76	14.15	14.25	34.23	0.57	2.18	-	-	728	6.47
Total oilseeds	-	-	0.09	0.27	0.16	0.38	-	-	0.03	0.18	10	0.09
Food Crops	34.13	96.88	33.55	99.73	41.46	99.59	26.17	100.00	17.00	99.82	11233	99.91
Non-food crops	1.10	3.12	0.09	0.27	0.17	0.41	-	-	0.03	0.18	10	0.09
Gross cropped area	35.23	100.0	33.64	100.00	41.63	100.00	26.17	100.00	17.03	100.00	11243	100.0

Source: Tehsildar, Tehsil Theog, District Shimla, H.P.

Table 4.13: Cropping Pattern of Selected Villages in Tehsil Rohru of District Shimla during 2001-02

(Area in hectares)

Crop Group	Shekhal		Lower Koti		Dhara		Kiyartu		Parsa		Tehsil Rohru	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	-	-	3.00	1.37	-	-	17.00	17.00	-	-	202	2.35
Maize	19.00	25.33	83.00	37.90	2.00	3.39	22.00	22.00	12.00	15.58	1139	13.22
Wheat	27.00	36.00	40.00	18.26	5.00	8.47	1.00	1.00	13.00	16.88	980	11.38
Barley	-	-	4.00	1.83	2.00	3.39	-	-	-	-	414	4.80
Total Cereal	48.00	64.00	134.00	61.19	9.00	15.25	42.00	42.00	15.00	19.48	3022	35.09
Gram	-	-	-	-	-	-	-	-	-	-	-	-
Black gram	7.00	9.33	8.00	3.65	1.00	1.69	5.00	5.00	5.00	6.49	226	2.62
Total pulses	8/00	10.67	16.00	7.30	1.00	1.69	6.00	6.00	7.00	9.09	431	5.00
Total food grains	56.00	74.67	150.00	68.49	10.00	16.95	48.00	48.00	22.00	28.57	3453	40.09
Total fruits	14.00	18.67	52.00	23.74	48.00	81.35	51.00	51.00	53.00	68.83	2436	28.29
Total Vegetable	3.00	4.00	16.00	7.30	1.00	1.69	-	-	2.00	2.60	1629	18.91
Potato	3.00	4.00	16.00	7.30	1.00	1.69	-	-	2.00	2.60	1421	16.50
Total oilseeds	2.00	2.67	1.00	0.45	-	-	1.00	1.00	-	-	20	0.23
Food Crops	73.00	97.33	218.00	99.54	59.00	100.00	99.00	99.00	77.00	100.00	8591	99.76
Non-food crops	2.00	2.67	1.00	0.46	-	-	1.00	1.00	-	-	21	0.24
Gross cropped area	75.00	100.0	219.00	100.00	59.00	100.00	100.00	100.00	77.00	100.00	8612	100.00

Source: Tehsildar, Tehsil Rohru, District Shimla, H.P.

4.14 Village-wise cropping pattern of Tehsil Nerwa of District Shimla

Cropping pattern in the selected villages of tehsil Nerwa is presented in Table 4.14. The table reveals that area under cereals ranges from 64 to 83 per cent of the gross cropped area. Blackgram is also an important crop accounting for 3.70 per cent of the gross cropped area in village Moolshock to 15.79 per cent in village Tari.

Table 4.14: Cropping Pattern of Selected Villages in Tehsil Nerwa of District Shimla during 2001-02

(Area in hectares)

Crop Group	Moolshock		Tari		Tershanoo		Bagasan		Shawalla		Tehsil Nerwa	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Rice	3.00	5.55	2.00	5.26	-	-	1.00	1.26	2.00	2.22	383	5.90
Maize	20.00	37.04	8.00	21.05	10.00	26.31	21.00	26.58	25.00	27.78	1451	22.37
Wheat	20.00	37.04	10.00	26.31	16.00	42.10	30.00	37.97	14.00	15.55	1201	18.52
Barley	2.00	3.70	2.00	5.26	3.00	7.89	8.00	10.13	10.00	11.11	324	4.99
Total Cereal	45.00	83.33	22.00	57.89	29.00	76.31	61.00	77.21	58.00	64.44	4353	67.11
Gram	-	-	-	-	-	-	-	-	-	-	-	-
Black gram	2.00	3.70	6.00	15.79	4.00	10.52	5.00	6.33	3.00	3.33	308	4.75
Total pulses	2.00	3.70	11.00	28.94	9.00	23.68	18.00	22.78	18.00	20.00	459	7.08
Total food grains	47.00	87.04	33.00	86.84	38.00	100.00	79.00	100.00	76.00	84.44	4812	74.19
Total fruits	1.00	1.85	-	-	-	-	-	-	3.00	3.33	657	10.13
Total Vegetable	6.00	11.11	3.00	7.89	-	-	-	-	6.00	6.67	260	4.00
Potato	-	-	-	-	-	-	-	-	-	-	167	2.57
Total oilseeds	-	-	2.00	5.26	-	-	-	-	5.00	5.55	150	2.31
Food Crops	54.00	100.0	36.00	94.74	38.00	100.00	79.00	100.00	85.00	94.44	6336	97.68
Non-food crops	-	-	2.00	5.26	-	-	-	-	5.00	5.55	150	2.31
Gross cropped area	54.00	100.0	38.00	100.00	38.00	100.00	79.00	100.00	90.00	100.00	6486	100.00

Source: Tehsildar, Tehsil Nerwa, District Shimla, H.P.

Chapter 5

RESULTS AND DISCUSSIONS

5.1 General Features of the sampled Farm Households

In this section an attempt has been made to examine the general features of sampled households particularly size of land holding, land allotted for food grains, pulses, cropping pattern of the sampled farms and productivity per hectare of food grains and pulses.

5.1.1 Size class wise distribution of farms and average size of holding

In the selected villages of district Shimla, out of total sampled farmers, 89.2, 8.5 and 2.3 per cent were small, medium and large farmers respectively. While in district Hamirpur, 78.6, 16.9 and 4.5 percent were small, medium and large farmers respectively. The average size of holding was reported to be more in district Hamirpur as compared to district Shimla. The analysis of net and gross cropped area of sampled farmers has positive relation with the size of holding (Table 5.1). On an average, per household net and gross copped area in Shimla was 1.09 and 1.53 hectares respectively while in Hamirpur gross cropped area was observed to be 1.56 hectares and net cropped area was 0.85 hectares.

5.1.2 Size class-wise distribution of agricultural land of sampled farmers

Irrigation status of sampled farms in Shimla and Hamirpur district is presented in Table 5.2. In district Shimla, on an average 5.27 percent of land of sampled farms was irrigated. The proportion of land under irrigation was relatively higher 6.17 percent on small farms as compared to 1.16 percent on large farms. On the other hand, in district Hamirpur, agricultural land of all the farmers was reported to be un-irrigated.

Table 5.1: Size class-wise distribution of number of farmers and average size of holding for the selected crops

Size of Holding*	Total No. of farmers	Average size of holding (Ha)	Leased in/out area of total area (%)	No. of farmers selected	Average size of holding of selected farmers (Ha)	Average Net cropped area per house hold (Ha)	Average Gross cropped area per house hold (Ha)
SHIMLA							
Small	1630	0.61	-	200	0.96	0.61	0.99
Medium	155	2.49	-	88	1.86	1.85	2.30
Large	42	6.58	-	12	5.67	3.57	4.91
All	1827	0.91	-	300	1.41	1.09	1.53
HAMIRPUR							
Small	788	0.83	-	200	0.94	0.58	0.99
Medium	170	2.68	-	87	2.69	1.27	2.51
Large	45	4.91	-	13	5.24	2.14	3.87
All	1003	1.33	-	300	1.64	0.85	1.56

** Small = 0 to 2 hectare, Medium = 2 to 4 ha. Large =More than 4ha.*

Table 5.2: Size class wise distribution of Agricultural Land for all Sample Farmers

(Area in Hectare)

Size of Holding*	Un-irrigated land	Percentage	Irrigated land	Percentage	Total area
SHIMLA					
Small	180.98	93.83	11.90	6.17	192.88
Medium	214.68	94.43	12.66	5.57	227.34
Large	66.28	98.34	1.12	1.66	67.40
All	461.94	94.73	25.68	5.27	487.62
HAMIRPUR					
Small	188.86	100.00	-	-	188.86
Medium	234.01	100.00	-	-	234.01
Large	68.08	100.00	-	-	68.08
All	490.95	100.00	-	-	490.95

** Small = 0 to 2 hectare, Medium = 2 to 4 ha., Large =More than 4ha.*

5.1.3 Area under Cereals and Pulses on Sampled Farms

A study of cropping pattern of sampled farmers reveals that in district Shimla wheat occupies 22.39 percent, maize 18.45 per cent, blackgram 8.23 per cent and barley 5.27 per cent of the gross cropped area (Table 5.3). The same trend was observed in case of small and medium categories of farmers, while in

large category, barley is next to wheat and maize. In district Hamirpur, area under wheat was relatively higher 48.83 percent of the gross cropped area, followed by maize 48 percent and black gram 1.47 percent. Category-wise also wheat and maize are the major crops grown in this district.

Table 5.3: Cropping Pattern of the Sample Farmers

Area, share and the crop (proportion to GCA) Percent								
Size of holding*	**Maize**	**Paddy**	**Black-gram**	**Other pulses**	**Wheat**	**Barley**	**Millets**	**GCA (Ha)**
SHIMLA								
Small	20.75	2.98	9.78	3.13	25.43	4.52	1.55	198.28
Medium	18.17	3.22	7.47	2.90	21.79	5.14	1.70	202.32
Large	11.68	-	5.64	2.58	14.27	8.29	6.79	58.88
All	18.45	2.71	8.23	2.96	22.39	5.27	2.29	459.48
HAMIRPUR								
Small	49.67	0.28	-	-	50.04	-	-	198.73
Medium	46.45	1.30	2.05	-	49.61	0.59	-	218.34
Large	48.21	-	4.76	-	40.67	6.35	-	50.36
All	48.01	0.73	1.47	-	48.83	0.96	-	467.43

** Small = 0 to 2 hectare, Medium = 2 to 4 ha, Large =More than 4ha.*

5.1.4 Productivity of crops on Sampled Farms

The productivity of various crops grown by sampled farmers is presented in Table 5.4. The Table reveals that in the case of maize it was higher in Shimla 21 qtls/ha as compared to Hamirpur 16,51 qtls./ha. Productivity of black gram was more 4.66 qtls/ha in Shimla as compared to Hamirpur 3.96 qtls/ha. While in case of paddy, wheat, and barley the reverse trend was observed. In Shimla district gross value of production of all crops at farm harvest prices was Rs. 297646, Rs 996466 and Rs.1308287 on small, medium and large farms respectively. In Hamirpur district value of all crops estimated to be Rs.1666210, 1826247 and 332305 on small, medium and large farms respectively. This is due to larger area under food grains in district Hamirpur as compared to Shimla district.

Table 5.4: Productivity per hectare of all crops

Productivity in Qtls.								
Size of holding* crops	**Maize**	**Paddy**	**Black-gram**	**Other pulses**	**Wheat**	**Barley**	**Millets**	**Gross value of production at farm harvest prices**
SHIMLA								
Small	21.82	11.51	4.67	4.85	11.46	8.96	8.20	1308287
Medium	20.51	11.40	4.63	4.40	11.00	8.25	7.90	996466
Large	19.24	-	4.77	5.60	9.70	9.98	8.40	297646
All	21.04	11.45	4.66	4.74	11.12	8.86	8.18	2602399
HAMIRPUR								
Small	16.93	13.21	-	-	12.77	-	-	1666210
Medium	17.08	12.80	3.90	-	12.51	11.39	-	1826247
Large	12.35	-	4.07	-	10.84	11.54	-	332305
All	16.51	12.63	3.96	-	12.47	11.50	-	3824762

** Small = 0 to 2 hectare, Medium = 2 to 4 ha, Large =More than 4ha.*

5.2 Utilization of Grain for Seed

5.2.1 Process of Utilization of Seed: In the case of maize farmers generally separate the maize corn for seed purpose before threshing and kept it separately. On the contrary, wheat is filtered for seed purpose after threshing. The seed of maize is treated with pesticides and in some cases seeds of wheat and pulses are treated by traditional methods i.e. kept in ash. In some cases grains are also filtered to get seed during sowing.

5.2.2 Methods and Assumptions: In Himachal Pradesh due to uneven topography, hilly terrain and small holdings, it is difficult to use heavy machinery in agricultural activities. Agricultural operations are done by using human labour and bullocks. Farmers generally practice the broadcasting method of sowing for food grain crops cultivation.

5.2.3 Crop wise Estimation of Seed

District Shimla

Black gram: District Shimla is relatively larger producer of blackgram in the State. The quantity of seed used was 943.75 kg to produce 17635 kg of blackgram. Out of the total production, 1179 kg quantity was kept as seed for the next year. It may be observed from the Table 5.5 that the quantity of seed

used and quantity kept for seed were 5.3 and 6.7 per cent of the total production respectively.

Maize: Maize is also a main food grain crop of district Shimla. The total production of maize was 178414 kg on the sample farms, out of which 6080 kg was kept as seed for the next year. It was observed that 3331 kg. seed was used to have this production. The quantity used as seed and quantity kept for seed were 1.9 and 3.4 per cent of the total production respectively (Table 5.5).

It was observed during the survey that the farmers used higher quantity of seed than the quantity prescribed. The reasons for such practice are: i) farmers used local seed which has poor germination, ii) low humidity in the soil, iii) the farmers thinned the crop at the time of interculture and excess plants are used as green fodder.

District Hamirpur

Wheat: Wheat is the main Rabi crop of district Hamirpur. The total production of wheat on the sampled farm households was 284540 kg.. The quantity of seed used for producing this total production was 27974 kg seed which is about 9.8 percent of total production. The quantity of seed kept as seed for next year accounted for 9.7 percent of the total production.

Maize: The maize is the second main crop of district Hamirpur. The quantity of seed used to produce 372560 kg of maize was 9998 kg. Out of the total production the farmers retain 12644 kg grain as seed for the next year which is about 3.4 percent of the total produce (Table 5.5).

5.2.4 Farm size wise Estimation of Seed

District Shimla

Black gram: It can be observed from Table 5.5 that farmers of medium category used the lesser quantity of seed 5 percent of the total production, while the large farmers used higher quantity of seed 5.7 percent. The quantity of seed retained for the next year was 6.7, 6.5 and 7.1 per cent of total production on small, medium and large farms respectively.

Maize: It was observed that utilization of seed was 1.8, 2 and 1.6 per cent of total production of maize on small, medium and large farms respectively. Further, it can be seen from Table 5.5 that on an average, sampled farmers retained 3.4 percent of total production of maize as seed for the next year crop.

District Hamirpur

Wheat: Use of seed for production of wheat was higher on large farms 10.8 percent of the total production), followed by medium 10.1 and small farms 9.3 percent, revealing increasing trend with the size of holding (Table 5.5).

Maize: The quantity of maize seed used by small, medium and large farmers was 2.6, 2.7 and 3 per cent of total production in district Hamirpur district.

Table 5.5: Seed Requirement for food grains/pulses

Size of Holding	Area (Ha)	Production (Kg)	Quantity of seed (Kg)		Percentage of seed with production	
			Used	Kept	Used	Kept
District Shimla						
Black-gram						
Small	19.40	9055	502.25	611	5.5	6.7
Medium	15.10	6997	351.00	456	5.0	6.5
Large	3.32	1583	90.50	112	5.7	7.1
All	37.82	17635	943.75	1179	5.3	6.7
Maize						
Small	41.10	89685	1616.00	3060	1.8	3.4
Medium	36.80	75489	1509.50	2590	2.0	3.4
Large	6.88	13240	206.00	430	1.6	3.3
All	84.78	178414	3331.50	6080	1.9	3.4
District Hamirpur						
Wheat						
Small	99.29	126840	11819	12085	9.3	9.5
Medium	108.32	135500	13760	13005	10.1	9.6
Large	20.48	22200	2395	2435	10.8	10.9
All	228.09	284540	27974	27435	9.8	9.7
Maize						
Small	98.87	167360	4410	5834	2.6	3.5
Medium	102.52	175200	4663	5725	2.7	3.3
Large	24.28	30000	915	1085	3.0	3.6
All	225.67	372560	9998	12644	2.7	3.4

5.3 Utilization of Grain for Feed

5.3.1 Process of Utilization: In Himachal Pradesh Maize and wheat are important cereal crops of kharif and rabi seasons respectively. In terms of percentage share to the total area, wheat occupied the first place followed by maize, rice and barley. Maize and wheat in the State are consumed by both people and animals. The maize flour and wheat flour are used to prepare '*Roti'* which is the main staple food of the State. The flour is made by grinding the grains in small units of flour mills in urban as well as in rural areas. In these mills feed for animals is also prepared by grinding these grains slightly rough as compared to grain grinded for human consumption. The maize is processed for feed and also sent out of the state for the processing units for making cornflakes and other items. Maize is also utilized to make popcorn in traditional way of roasting as well as to make in small roasting machines. Blackgram (Mash) are used only to cook *'Dal',* a traditional dish of the State used with *roti* as well as rice. The pahari mash are in great demand due to its taste but the production is not so much to meet demand. Blackgram produced in hills is superior to that of plains.

5.3.2 Crop-wise estimates for feed: Crop wise estimates of blackgram, maize and wheat among sampled farmers of Shimla and Hamirpur districts are presented in Table 5.6 and 5.7.

District Shimla

Black gram: It can be seen from Table 5.6 that average quantity of blackgram produced was 4.66 qtls/ha in Shimla. Out of the total produce, 93.20 qtls was used as feed for home consumption by all the sampled farmers. Home consumption constitutes 52.8 per cent of the total produce (Table 5.7). The practice of feeding blackgram to animals was not reported by the sampled farmers.

Maize: The average quantity of maize produced in district Shimla was 21.04 qtls./ha. Out of the total produce on all farms 1005.74 qtls. was used for home consumption and 175 qtls. as animal feed (Table 5.6) by the sampled farmers.

On an average, 56.4 per cent of the total produce was retained for home consumption and 9.8 per cent was fed to animals (Table 5.7).

District Hamirpur

Wheat: The average quantity of wheat produced by sampled farmers in district Hamirpur was 12.47 qtls./ha. Out of the total produce, 1217.95 qtls was used as home consumption and 182 qtls. as animal feed by the sampled farmers (Table 5.6). Home consumption of wheat constitutes 42.8 per cent of the total produce, and 6.4 per cent is used as animal feed (Table 5.7).

Maize: The average quantity of maize produced in district Hamirpur was 16.51 qtls.,/ha. which was lesser as compare to district Shimla. In Hamirpur district 1100.46 qtls. was retained as home consumption and 261.90 qtls. as animal feed by the sampled farmers (Table 5.6). On an average, the proportion of home consumption and animal feed is 29.5 and 7 per cent of the total produce respectively (Table 5.7).

5.3.3 Farm Size-wise Estimates

District Shimla

Blackgram: Farm size wise production of blackgram varied from 4.63 qtls./ha on medium farms to 4.77 qtls./ha. on large farms in district Shimla (Table 5.6). The quantity of blackgram consumed in the family is inversely related to the size of holding and consumption varied from 35.9 per cent on large farms to 60.9 per cent on small farms (Table 5.7). Certainly the economy has positive relation with the size of holding, the families which are economically better are able to afford for vegetables reducing the consumption of pulses. That is why, the consumption of pulses has negative relation with that of the size of holding.

Maize: Farm size-wise production of maize varied from 19.24 qtls./ha on large farms to 21.82 qtls./ha. on small farms (Table 5.6). The quantity of maize consumed by family is inversely related to the size of holding and it varied from 43.1 per cent on large farms to 67.1 per cent on small farms. The proportion of

total produce used as animal feed was 7.2, 13.7 and 5.3 per cent on small, medium and large category of farms respectively (Table 5.7).

District Hamirpur

Wheat: The per hectare quantity of wheat produced in Hamirpur was relatively higher on small farms (12.77 qtls./ha.) and lesser on large farms (10.84 qtls./ha.). The proportion of total produce used as farm family consumption was 53.7, 34.1 and 33.8 per cent on small, medium and large category of farms respectively, revealing inverse relationship with the size of holding (Table 5.7). Economically better families are also using rice as a substitute for food grains making inverse relation with the size of holding.

Maize: The per hectare quantity of maize produced in district Hamirpur was 16.93, 17.08 and 12.35 qtls. on small, medium and large category of farms respectively (Table 5.6). Farm size wise proportion of maize used as human feed varied from 22.5 per cent on medium farms to 38 per cent on small farms (Table 5.7). The proportion of total produce used as animal feed was 8.2. 5.8 and 7.7 per cent on small, medium and large category of farms respectively.

Table 5.6: Production and disposal of food grains/ pulses

(Quantity in qtls)

Size of holding	Production (Qtls/ha)	Previous years seed used	Kept for seed for next time	Exchange as seed	Sold for seed	Home consumption	Kind wages to labour	Used as animal feed	Used as poultry feed	Marketed surplus
District Shimla										
Black-gram										
Small	4.67	5.02	6.11	-	-	55.13	-	-	-	29.31
Medium	4.63	3.51	4.56	-	-	32.39	-	-	-	33.02
Large	4.77	0.90	1.12	-	-	5.68	-	-	-	9.03
All	4.66	9.44	11.79	-	-	93.20	-	-	-	71.36
Maize										
Small	21.82	16.16	30.60	-	-	601.84	-	64.51	-	199.90
Medium	20.51	15.09	25.90	-	-	346.80	-	103.49	-	278.70
Large	19.24	2.06	4.30	-	-	57.10	-	7.00	-	64.00
All	21.04	33.31	60.80	-	-	1005.74	-	175.00	-	542.60
District Hamirpur										
Wheat										
Small	12.77	118.19	120.85	-	-	681.30	-	83.30	-	382.95
Medium	12.51	137.60	130.05	-	-	461.65	-	88.30	-	675.00
Large	10.84	23.95	24.35	-	-	75.00	-	10.40	-	112.25
All	12.47	279.74	275.25	-	-	1217.95	-	182.00	-	1170.20
Maize										
Small	16.93	44.10	58.34	-	-	636.71	0.50	137.80	-	840.25
Medium	17.08	46.63	57.25	-	-	394.50	-	101.10	-	1199.15
Large	12.35	9.15	10.85	-	-	69.25	-	23.00	-	196.90
All	16.51	99.98	126.44	-	-	1100.46	0.50	261.90	-	2236.30

Table 5.7: Proportion of production and disposal of Food grains/Pulses

Size of holding	Production	Previous years seed used	Kept for seed for next time	Exchange as seed	Sold for seed	Home Consumption	Kind wages to labour	Used as animal feed	Used as poultry feed	Marketed surplus
District Shimla										
Blackgram										
Small	100.0	5.5	6.7	-	-	60.9	-	-	-	32.4
Medium	100.0	5.0	6.5	-	-	46.3	-	-	-	47.2
Large	100.0	5.7	7.1	-	-	35.9	-	-	-	57.0
All	100.0	5.3	6.7	-	-	52.8	-	-	-	40.5
Maize										
Small	100.0	1.8	3.4	-	-	67.1	-	7.2	-	22.3
Medium	100.0	2.0	3.4	-	-	46.0	-	13.7	-	36.9
Large	100.0	1.6	3.3	-	-	43.1	-	5.3	-	48.3
All	100.0	1.9	3.4	-	-	56.4	-	9.8	-	30.4
District Hamirpur										
Wheat										
Small	100.0	9.3	9.5	-	-	53.7	-	6.6	-	30.2
Medium	100.0	10.1	9.6	-	-	34.1	-	6.5	-	49.8
Large	100.0	10.8	10.9	-	-	33.8	-	4.7	-	50.6
All	100.0	9.8	9.7	-	-	42.8	-	6.4	-	41.1
Maize										
Small	100.0	2.6	3.5	-	-	38.0	Neg.	8.2	-	50.2
Medium	100.0	2.7	3.3	-	-	22.5	-	5.8	-	68.4
Large	100.0	3.0	3.6	-	-	23.1	-	7.7	-	65.6
All	100.0	2.7	3.4	-	-	29.5	Neg.	7.0	-	60.0

5.4 Food grains/pulses fed to animals

5.4.1 Crop wise Consumption Pattern

The various livestock possessed by the sampled farmers in both the districts under study are presented in Table 5.8 and in 5.9. Consumption of food-grain/pulse by animals is also given in these tables. Per farm number of animals were 2.92 and 2.64 heads in district Shimla and Hamirpur respectively. The composition of livestock possessed shows that cows dominate in the herd accounting for 44.5 per cent of total livestock, followed by bullock 21.9 percent, buffaloes 14.5 percent, calves 13.9 percent and other 5.2 percent in district Shimla. In Hamirpur, 55.4 percent of total livestock population is buffaloes. Feeding of food grains/pulses was observed in case of cows and buffaloes. Per animal annual consumption of maize was 57.13 kg among buffaloes and 32.42 kg among calves in district Hamirpur. In district Shimla, on an average, quantity of maize fed to cows and buffaloes were 30.27 and 45.66 kg per head respectively. In Hamirpur district, on an average, per animal quantity of wheat fed to animals was 34.44 kg in case of cows and 38.72 kg in case of buffaloes. The wheat is considered better animal feed as compared to maize. It was observed that there is no practice of giving blackgram as feed to animals in the study area.

Table 5.8: Food grains/Pulses Consumed as feed by Livestock in District Shimla

Size of holding	Name of the animal	In Milk		Dry		Total No of animals	Total consumption (kg)	Consumption of crop/animal (kg)
		No	Qty (kg)	No	Qty (kg)			
Blackgram								
Small	Cow	190	-	54	-	244	-	-
	Buffalo	63	-	26	-	89	-	-
	Bullock	-	-	-	-	117	-	-
	Calves	-	-	-	-	80	-	-
	Others	-	-	-	-	45	-	-
Medium	Cow	101	-	19	-	120	-	-
	Buffalo	27	-	7	-	34	-	-
	Bullock	-	-	-	-	60	-	-
	Calves	-	-	-	-	30	-	-
	Others	-	-	-	-	-	-	-
Large	Cow	18	-	6	-	24	-	-
	Buffalo	3	-	-	-	3	-	-
	Bullock	-	-	-	-	14	-	-
	Calves	-	-	-	-	11	-	-
	Others	-	-	-	-	-	-	-
Overall	Cow	309	-	79	-	388	-	-
	Buffalo	93	-	33	-	126	-	-
	Bullock	-	-	-	-	191	-	-
	Calves	-	-	-	-	121	-	-
	Others	-	-	-	-	45	-	-
Maize								
Small	Cow	190	4323	54	-	244	4323	17.72
	Buffalo	63	2128	26	-	89	2128	23.92
	Bullock	-	-	-	-	117	-	-
	Calves	-	-	-	-	80	-	-
	Others	-	-	-	-	45	-	-
Medium	Cow	101	6934	19	-	120	6934	57.78
	Buffalo	27	3415	7	-	34	3415	100.44
	Bullock	-	-	-	-	60	-	-
	Calves	-	-	-	-	30	-	-
	Others	-	-	-	-	-	-	-
Large	Cow	18	490	6	-	24	490	20.42
	Buffalo	3	210	-	-	3	210	70.00
	Bullock	-	-	-	-	14	-	-
	Calves	-	-	-	-	11	-	-
	Others	-	-	-	-	-	-	-
Overall	Cow	309	11747	79	-	388	11747	30.27
	Buffalo	93	5753	33	-	126	5753	45.66
	Bullock	-	-	-	-	191	-	-
	Calves	-	-	-	-	121	-	-
	Others	-	-	-	-	45	-	-

Table 5.9: Food grains/Pulses Consumed as feed by Livestock in District Hamirpur

Size of holding	Name of the animal	In Milk		Dry		Total No of animals	Total consumption (kg)	Consumption of crop/animal (kg)
		No	Qty (kg)	No	Qty (kg)			
Wheat								
Small	Cow	22	750	3	-	25	750	30.00
	Buffalo	212	7580	36	-	248	7580	30.56
	Bullock	-	-	-	-	50	-	-
	Calves	-	-	-	-	44	-	-
	Others	-	-	-	-	71	-	-
Medium	Cow	7	400	1	-	8	400	50.00
	Buffalo	129	8430	34	-	163	8430	51.72
	Bullock	-	-	-	-	32	-	-
	Calves	-	-	-	-	33	-	-
	Others	-	-	-	-	57	-	-
Large	Cow	3	90	-	-	3	90	30.00
	Buffalo	19	950	8	-	27	950	35.18
	Bullock	-	-	-	-	11	-	-
	Calves	-	-	-	-	8	-	-
	Others	-	-	-	-	8	-	-
Overall	Cow	32	1240	4	-	36	1240	34.44
	Buffalo	360	16960	78	-	438	16960	38.72
	Bullock	-	-	-	-	93	-	-
	Calves	-	-	-	-	85	-	-
	Others	-	-	-	-	136	-	-
Maize								
Small	Cow	22	620	3	-	25	620	24.80
	Buffalo	212	13160	36	-	248	13160	53.06
	Bullock	-	-	-	-	50	-	-
	Calves	-	-	-	-	44	-	-
	Others	-	-	-	-	71	-	-
Medium	Cow	7	455	1	-	8	455	56.88
	Buffalo	129	9655	34	-	163	9655	59.23
	Bullock	-	-	-	-	32	-	-
	Calves	-	-	-	-	33	-	-
	Others	-	-	-	-	57	-	-
Large	Cow	3	92	-	-	3	92	30.66
	Buffalo	19	2208	8	-	27	2208	81.78
	Bullock	-	-	-	-	11	-	-
	Calves	-	-	-	-	8	-	-
	Others	-	-	-	-	8	-	-
Overall	Cow	32	1167	4	-	36	1167	32.42
	Buffalo	360	25023	78	-	438	25023	57.13
	Bullock	-	-	-	-	93	-	-
	Calves	-	-	-	-	85	-	-
	Others	-	-	-	-	136	-	-

5.4.2 Farm Size wise Estimates of Food grains Fed to Animals

Farm size wise quantity of food grain fed to animals (per animal) is presented in Tables 5.8 and 5.9. In district Shimla the maize fed to cows is higher 57.78 kg. on medium farms, followed by large farms 20.42 kg and small farms 17.72 kg. The same trend was also observed in case of maize fed to buffaloes. In district Hamirpur, quantity of wheat fed to cows was 30 kg each on small and large farms and 50 kg on medium farms. In the case of buffaloes, consumption of wheat was 30.56 kg on small farms, 51.72 kg on medium farms and 35.18 kg on large farms. The quantity of maize fed to cow was 24.80 kg on small farms, 56.88 kg on medium farms and 30.66 kg on large farms. The quantity of maize fed to buffaloes increased with an increase in the farm size. Quantity of maize fed to buffaloes was 53.06 kg on small farms, 59.23 kg on medium farms and 81.78 kg on large farms (Table 5.9).

Table 5.10: Consumption of food grains/pulses as feed by poultry

S. No.	District	Crop	No. of birds in thousands	Consumption of crop (Kg)	Consumption per bird (Gms)
1	Shimla	Blackgram	-	-	-
		Maize	-	-	-
2	Hamirpur	Wheat	-	-	-
		Maize	-	-	-

5.5 Wastage in Food grains

5.5.1 Wastage at different Production Stages and Assumption and Methods

At various stages of food-grain handling i.e. harvesting, threshing, clearing, storage, transportation etc. a considerable portion of the produce goes waste. While harvesting some grains of the maize and wheat fell on the ground due to shattering. Similarly in threshing process some grains pass into the straw and some grains get mixed with dust/dirt on threshing floor. While storing the produce for home consumption, seed and for later disposal, some wastage occurs due to insects, rats and dampness etc. The wastage of food-grains also occurs during loading/un-loading and transit of the produce. The losses covered under this study are: losses at harvesting of crop, threshing, scattered

on ground, mixed in straw, losses during transportation from field to home, losses in storage, losses during home consumption and left in animal/poultry feed. For the purpose of estimation, all losses were asked from each cultivator in each crop during the field investigation and these losses are added in net production to get the gross production and percentage of losses is calculated from gross production. The crops taken for the estimation of losses are blackgram and maize in district Shimla and wheat and maize in district Hamirpur. The wastage of food grains and pulses during different harvest and post harvest operations are presented in Table 5.11 and percentage of losses is presented in Table 5.12.

5.5.2 Crop-Wise Estimates of Wastages

District Shimla

Wastage of Blackgram

As shown in Table 5.11, the total losses in blackgram were estimated about 1460 kg. These are highest 481 kg in storage whereas lowest 112 kg. during transportation of the produce. In percentage terms, total losses to gross production worked out to be 8.26 per cent (Table 5.12). It comprises 1.31 percent at the time of harvesting, 1.36 per cent at threshing and shattered, 0.95 per cent as left in straw, 0.63 per cent during transportation, 2.72 percent in storage and 1.29 per cent at the time of home consumption.

Wastage of Maize

Total losses of maize were worked out to be 14211 kg. Wastage varies from about 81 kg left in animal feed to 5222 kg at the time of the storage (Table 5.11). Table 5.12 revealed that total losses are 8 per cent. It comprises, 2.93 per cent at storage level followed by threshing and shattered 1.6 percent, at harvesting 1.33 percent and home consumption 1.07 percent.

District Hamirpur

Wastage of Wheat

In the case of wheat crop total losses were estimated to be 31975 kg (Table 5.11). In this crop also storage losses are highest i.e. 9417 kg and losses left in animal feed are lowest i.e. 46 kg. In percentage terms, total losses reported to

be 11 per cent (Table 5.12). Losses during storage of wheat were relatively higher 3.31 percent followed by losses during threshing and shattered 2.39 percent, left in straw 2.19 percent, harvesting 1.47 percent and transportation 1.05 percent.

Wastage of Maize

It can be seen from Table 5.11 that total losses of maize were 25522 kg which include maximum losses of 7969 kg during threshing and shattered, followed by 7188 kg. at storage level and 5465 kg at harvesting and rest for others. In percentage terms total losses were estimated to be 7.66 per cent, which are maximum in the case of threshing and shattered 2.14 percent and minimum in left in animal feed 0.02 percent (Table 5.12).

5.5.3 Farm Size-Wise Estimates

District Shimla

Wastage of Blackgram

Table 5.11 reveals that in absolute terms losses were highest 730 Kg on small farms followed by 612 kg. on medium farms and 117 kg on large farms. The losses of blackgram ranges between 7.40 per cent on large farms to 8.75 percent on medium farms (Table 5.12). The losses at the stage of storage had highest place in all type of farms. Medium farmers reported more losses 2.94 percent while large farmers reported lowest losses 2.40 percent among all the category of farms at the time of storage. Transportation losses were lowest in all size of farms.

Wastage of Maize

The analysis of Table 5.11 reveals that total losses were highest on small farms 7696 kg. and lowest on large farms 931 kg. Small farmers reported highest losses of 8.57 percent followed by medium farmers 7.49 percent and large farmers 7.02 percent (Table 5.12). At the time of storage the losses were more i.e. 3.04, 2.90, and 2.30 per cent in small, medium and large category respectively. This shows that the percentage of losses decreases with increase in farm size. Threshing and shattered had second place in the losses with 1.71 percent on small, 1.46 per cent on medium, and 1.57 per cent on large farms.

At the time of harvesting, the losses were worked out to be 1.45 percent for small 1.19 percent for medium and 1.26 percent for large farms.

District Hamirpur

Wastage of Wheat

It may be seen from Table 5.11 that total losses of wheat were 13753 kg on small farms, 15402 kg on medium farms and 2820 kg. on large farms. Losses in percentage terms were highest during storage which was 3.11 percent for small, 3.38 percent for medium and 3.97 percent for large farms. It may be noticed from the table that losses were lowest in case of left in animal/poultry feed. The threshing and shattered and left in straw also had significant quantity of losses. The quantity of losses on different category of farms for threshing including shattered was 2.30 percent on small, 2.45 percent on medium and 2.57 percent on large farms. Harvesting losses were 1.39 percent for small, 1.52 percent for medium and 1.67 percent for large farms. Transportation losses were 0.92, 1.15, and 1.23 percent for small, medium and large farms respectively. Losses in home consumption were 0.94, 0.69 and 0.74 percent for small, medium and large farms respectively. Total losses were found to be 10.84, 11.37 and 12.70 per cent for small, medium and large category respectively.

Wastage of Maize

It was revealed from Table 5.11 that total losses in case of maize were 13674 kg on small farms, 12568 kg. on medium farms and 2280 kg on large farms. In percentage terms, losses were highest on small farms 8.17 percent of total produce while lowest on medium farms 7.17 percent (Table 5.12). The breakup of the losses on small farms among harvesting, threshing including shattered, straw, transportation, storage, home consumption, left in animal/poultry feed were 1.22, 1.42, 2.09, 1, 0.33, 2.36, 0.95 and 0.02 percent respectively. Similarly for medium farms the figures were 1.49, 2.16, 0.93, 0.42, 1.55, 0.61 and 0.01 per cent respectively. Like wise in case of large farms 1.61, 2.24, 0.97, 0.41, 1.70, 0.60 and 0.02 per cent respectively.

Table 5.11: Wastage of Food grains/Pulses at different Harvest and Post Harvest Stages

(Wastage in kg.)

Size of holding	Gross Production (kg)	Harvesting	Threshing Shattered	Straw	Transportation	Storage	Home consumption	Left in animal/ poultry feed	Total Losses
District Shimla									
Blackgram									
Small	90.55	118.84	120.50	91.06	48.82	236.60	114.14	-	729.96
Medium	6997	93.10	100.50	65.55	53.82	206.00	93.40	-	612.37
Large	1583	20.30	19.50	10.50	9.00	38.05	19.90	-	117.25
All	17635	232.24	240.50	167.11	111.64	480.65	227.44	-	1459.58
Maize									
Small	89685	1298.00	1535.70	727.70	328.00	2725.00	1050.80	31.00	7696.20
Medium	75489	901.50	1105.50	422.30	255.70	2193.00	743.50	43.70	5665.00
Large	13240	167.50	208.50	82.50	46.50	304.00	115.50	6.2	930.70
All	178414	2367.00	2849.70	1232.50	630.20	5222.00	1909.80	80.90	14211.20
District Hamirpur									
Wheat									
Small	126840	1765.30	2917.71	2738.67	1170.00	3949.00	1190.45	21.70	13752.83
Medium	135500	2060.00	3314.68	2927.65	1559.00	4587.00	932.00	21.83	15402.16
Large	22200	372.00	570.62	557.20	273.00	881.00	164.00	2.57	2820.39
All	284540	4197.30	6803.01	6223.52	3002.00	9417.00	2286.45	46.10	31975.38
Maize									
Small	167360	2374.00	3507.80	1662.00	558.90	3949.80	1586.04	35.70	13674.24
Medium	175200	2607.00	3788.00	1632.00	733.00	2719.50	1064.20	24.85	12568.55
Large	30000	484.00	673.50	292.50	124.50	519.00	181.50	4.70	2279.70
All	372560	5465.00	7969.30	3586.50	1416.40	7188.30	2831.74	65.25	28522.49

Table 5.12: Percentage of Wastage in Food grains/Pulses at different Harvest and Post Harvest Stages

Size of holding	Gross production (kg)	Harvesting	Threshing Sheltered	Straw	Transport ation	Storage	Home consumption	Left in animal/ Poultry feed	Total Losses
District Shimla									
Blackgram									
Small	9055	1.31	1.33	1.00	0.54	2.61	1.26	-	8.05
Medium	6997	1.33	1.44	0.94	0.77	2.94	1.33	-	8.75
Large	1583	1.28	1.23	0.66	0.57	2.40	1.26	-	7.40
All	17635	1.31	1.36	0.95	0.63	2.72	1.29	-	8.26
Maize									
Small	89685	1.45	1.71	0.81	0.36	3.04	1.17	0.03	8.57
Medium	75489	1.19	1.46	0.56	0.34	2.90	0.98	0.06	7.49
Large	13240	1.26	1.57	0.62	0.35	2.30	0.87	0.05	7.02
All	178414	1.33	1.60	0.69	0.35	2.93	1.07	0.04	8.01
District Hamirpur									
Wheat									
Small	126840	1.39	2.30	2.16	0.92	3.11	0.94	0.02	10.84
Medium	135500	1.52	2.45	2.16	1.15	3.38	0.69	0.02	11.37
Large	22200	1.67	2.57	2.51	1.23	3.97	0.74	0.01	12.70
All	284540	1.47	2.39	2.19	1.05	3.31	0.80	0.02	11.23
Maize									
Small	167360	1.42	2.09	1.00	0.33	2.36	0.95	0.02	8.17
Medium	175200	1.49	2.16	0.93	0.42	1.55	0.61	0.01	7.17
Large	30000	1.61	2.24	0.97	0.41	1.70	0.60	0.02	7.54
All	372560	1.47	2.14	0.96	0.38	1.93	0.76	0.02	7.66

5.6 Seed, Feed & Wastage Ratios

5.6.1 Crop-wise Estimation of Seed, Feed and Wastage Ratio

District Shimla

Crop-wise percentage of seed, animal & poultry feed and wastage of the selected crops (blackgram, maize and wheat) are presented in Table 5.13. It can be seen from the table that in district Shimla, area under blackgram on all the sample farms was 37.82 hectares with the total production of 17635 kg. Out of the total produce, on an average, wastage estimated to be 8.3 percent and seed retained 6.7 percent. The quantity of seed, feed and wastage was found to be 15 per cent of the total production.

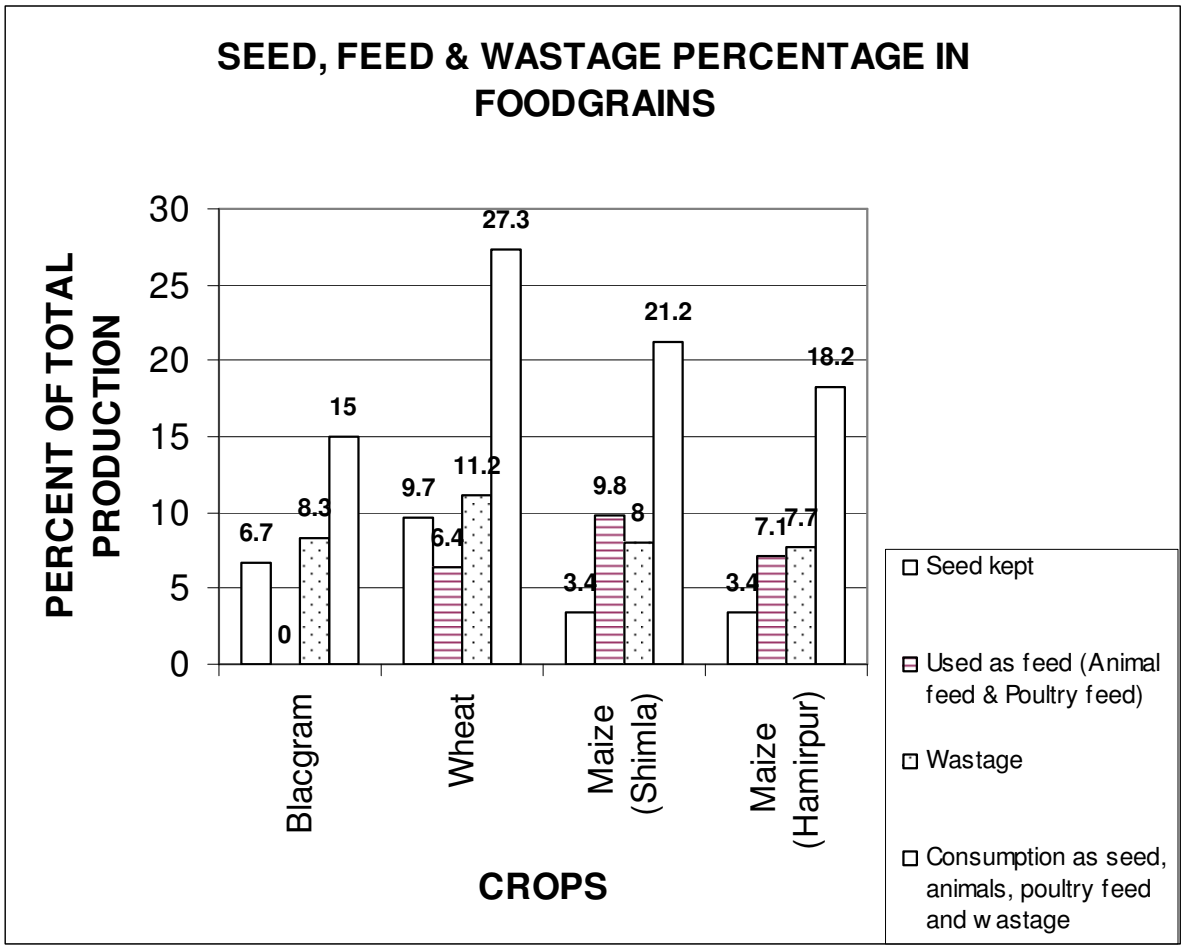
As far as maize is concerned, in district Shimla, sampled farmers cultivated 84.78 hectares area under maize with the total production of 178414 kg. On an average, 9.8 percent of the total maize was used as feed, followed by 8 per cent wastage and 3.4 percent kept for seed. Seed, feed and wastage accounted for 21.2 per cent of the total production.

District Hamirpur

In district Hamirpur, the total area under wheat of sampled farmers was found to be 228.09 hectares whereas its production was 284540 kg. On an average, 11.2 per cent of the total wheat production was estimated as wastage, followed by 9.7 percent as seed kept and 6.4 per cent as feed. Thus the total quantity of seed, feed and wastage in wheat has been estimated to be 27.3 percent of the total production. The reasons of relatively higher proportion of seed, feed and wastage in wheat are: (i) farmers use higher quantity of seed due to rainfed agriculture, (ii) poor germination of the seed, (iii) general practice of giving home produced grain as feed to the animals, and (iv) the wastage is higher because maximum operations are done manually and the system of storing the produce adopted by the farmers is based on traditional methods. Moreover, per farm production of wheat is relatively lesser than that of Punjab, Haryana and other wheat producing States in the country.

Table 5.13: Percentage of Seed, Feed and Wastage in Gross Production of food grains/pulses

Size of holding	Area (ha)	Gross production (kg)	Seed used		Seed kept		Used as feed (Animal feed & Poultry feed)		Wastage		Consumption as seed, animals, poultry feed and wastage	
			Qty (kg)	%	Qty (kg)	%	Qty (kg)	%	Qty (kg)	%	Qty (kg)	%
District Shimla												
Blackgram												
Small	19.40	9055	502.25	5.5	611.00	6.7	-	-	729.96	8.1	1340.96	14.8
Medium	15.10	6997	351.00	5.0	456.00	6.5	-	-	612.37	8.7	1068.37	15.2
Large	3.32	1583	90.50	5.7	112.00	7.1	-	-	117.25	7.4	229.25	14.5
All	37.82	17635	943.75	5.3	1179.00	6.7	-	-	1459.58	8.3	2638.58	15.0
Maize												
Small	41.10	89685	1616.00	1.8	3060.00	3.4	6451.00	7.2	7696.20	8.6	17207.2	19.2
Medium	36.80	75489	1509.50	2.0	2590.00	3.4	10349.00	13.7	5665.20	7.5	18604.2	24.6
Large	6.88	13240	206.00	1.6	430.00	3.3	700.00	5.3	930.70	7.0	2060.7	15.6
All	84.78	178414	3331.50	1.9	6080.00	3.4	17500.00	9.8	14292.10	8.0	37872.10	21.2
District Hamirpur												
Wheat												
Small	99.29	126840	11819.00	9.3	12085.00	9.5	8330.00	6.6	13752.83	10.8	34167.83	26.9
Medium	108.32	135500	1376.00	10.1	13005.00	9.6	8830.00	6.5	15402.16	11.4	37237.16	27.5
Large	20.48	22200	2795.00	10.8	2435.00	10.9	1040.00	4.7	2820.39	12.7	6295.39	28.3
All	228.09	284540	27974.00	9.8	27435.00	9.7	18200.00	6.4	31975.38	11.2	77610.38	27.3
Maize												
Small	98.87	167360	4410.00	2.6	5834.00	3.5	13780.00	8.2	13674.24	8.2	33288.24	19.9
Medium	102.52	175200	4663.00	2.7	5725.00	3.3	10110.00	5.8	12568.55	7.2	28403.55	16.3
Large	24.28	30000	915.00	3.0	1085.00	3.6	2300.00	7.7	2279.70	7.6	5664.70	18.9
All	225.67	372560	9998.00	2.7	12644.00	3.4	26190.00	7.1	28522.49	7.7	67356.49	18.2



As far as maize in district Hamirpur is concerned, total area under the cultivation of maize by sampled households was 225.67 hectares. The production of this crop was 372560 kg. On an average 7.1 per cent of the total production was used as feed, 7.7 percent as wastage and 3.4 percent kept for next crop season.

5.6.2 Farm-Size-Wise Estimation of Seed, Feed and Wastage Ratio

Seed kept, feed to animals and post harvest losses in black gram in district Shimla accounts for 15 percent of the total production. The proportion of seed kept and wastage has no relation with the size of farm. In case of maize the consumption of seed, feed and wastage was estimated to be 19.2, 24.6 and 15.6 per cent on small, medium and large farms respectively. In case of maize also, there is no relationship between farm size and seed kept and crop used as

feed. But the wastage during harvesting and post harvesting operations is decreasing with the increase in the farm size (Table 5.13).

In the case of wheat in district Hamirpur, quantity used as seed, feed including wastage at harvest and post harvest stages came out to be 26.9, 27.5 and 28.3 per cent on small, medium and large farms respectively. As far as maize is concerned, total quantity used as seed and feed along with harvest and post harvest wastage was worked out to be 19.9 per cent on small farms, 16.3 per cent on medium farms and 18.9 per cent on large farms.

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Annexure I

STUDY FOR ESTIMATION OF SEED, FEED AND WASTAGE RATIOS FOR MAJOR FOODGRAINS

Schedule I: Stratum-wise list of selected villages for each crop covered under study

Crop: _____ State: _____ District: _____

Stratum No.	Tehsil	Name of Selected Village
I		
II		
III		
IV		

STUDY FOR ESTIMATION OF SEED, FEED AND WASTAGE RATIOS FOR MAJOR FOODGRAINS

Schedule II: Complete Enumeration Respondents of the Selected Village

State: _____ District: _____

Stratum: _____ Tehsil/Block: _____

Village: _____ Date of visit: _____

Crops to be covered:

Kharif: Foodgrain _____ Pulse _____

Rabi: Foodgrain _____ Pulses _____

Sl. No.	Name of the Cultivator	Father's/Husband's Name	Area Owned (acres)	Cultivated Area (acres)	Holding size code

Holding Size: Small (0-2 ha) [S]; Medium (2-4 ha) [M] and Large (more than 4 ha) (L)

Sl. No.	Name of the Cultivator	Father's/Husband's Name	Area Owned (acres)	Cultivated Area (acres)	Holding size code

STUDY FOR ESTIMATION OF SEED, FEED AND WASTAGE RATIOS FOR MAJOR FOODGRAINS

Schedule III: Detailed enquiry from the Selected Farmer

(A) IDENTIFICATION PARTICULARS

Date of visit: _____

State: _____ District: _____

Stratum: _____ Tehsil/Block: _____

Village: _____ Season: _____

Name of Farmer:_____ Father's/Husband's Name: _____

Agricultural Year:_____

(A) Number of members in Household:

Children = (below 18 years)_____Adults = (above 19 years) _____

(B) Caste: BC _____ SC/ST _____ Others _____

Crop-Wise Distribution of Agricultural Land

Name of Crops	**Area (ha)**		
	Irrigated	**Un-Irrigated**	**Total**

(C) PRODUCTION AND DISPOSAL OF CROPS:

S. No.	Name of the crop	Total production (kg)	Seed used	Kept for seed	Sold	Home consumption	Later disposal	Labour	Animal Feed	Poultry Feed

(D) Consumption of feed fed to Cow and Buffaloes:

Season With Code	Cow			Buffaloes			Bullocks	He buffaloes	Sheep/Goat	Poultry	Other
	Dry	In Milk	Calves	Dry	In Milk	Calves					
No. of animals											
Rainy Season											
1. G.fodder											
2. Dry fodder											
3. Hay											
4. Concentrate											
5. Tree looping											
6. Other											
Winter											
1. G.fodder											
2. Dry fodder											
3. Hay											
4. Concentrate											
5. Tree looping											
6. Other											
Summer											
1. G.fodder											
2. Dry fodder											
3. Hay											
4. Concentrate											
5. Tree looping											
6. Other											

Feed Code = 1 – Green fodder, 2 – Dry Stover/Straw, 3 – Hay, 4 – Concentrate, 5 – Tree Looping, 6 – Any other (Specify)

(E) Wastage (kg) at different harvest and post harvest stages:

Crop	At harvest*		At threshing floor	Shattered on ground	Left in straw	In Transport**		
	Sickle	Combine				F-T	T-S	S-M
Total								

* *After collection of ear-heads called 'Sila' collected by labour*

** *F-T: Field to threshing floor, T-S.: Threshing floor to storage, S-M: Storage to market*

(F) Wastage (kg) in storage at cultivator's level:

Crop	Quantity stored	Wastage in storage due to		Wastage during home consumption		Wastage during animal/poultry feeding			
						Cattle		Poultry	
		Rats	Dampness/ other causes	Cleanliness	Cooking eating	Qty. given	Qty. unconsumed (waste)	Qty. given	Qty. unconsumed (waste)

Annexure II

June 2, 2006

Comment on the Draft report on Estimation of Seed, Feed and Wastage Ratio for Major Food grains of Himachal Pradesh.

This has reference to your letter dated April 25, 2006 along with draft report on "Estimation of Seed, Feed and Wastage Ratio for Major Foodgrains in H.P." the report is well planned, and good work. A few suggestions are given below.

Comment on Objectives of the Study:
The study covers all the objectives but it does not fully satisfy the treatment to the objectives. The chapter scheme and the scheme of tabulation have not been followed.

Comment on Chapters:
The chapter scheme provided by the coordinator (Prof. Batla) has not been followed, we suggest the authors of the report to put the chapters in the manner suggested (chapter scheme is enclosed). It will be essential to keep a common design. We suggest to follow the tentative chapter scheme enclosed and the table formats circulated earlier.

Chapter I
In the first chapter, it was expected that the history of method of estimation of seed, feed and wastage ratio followed in the State Income Accounting process of the state be reviewed across the decades, this has not been done properly. Here you may give priority for trends in seed, feed and wastages. If data are available on Net Availability of Cereals and Pulses in HP, Please add a table.

Chapter II
In this chapter you need to add sampling design, Profile of regions (State, Selected Districts, and villages) cropping pattern of the State, District-wise, selected village wise, which is very important to show the portion of area under different crops only for latest five years. Please provide this data. You may provide methodology in the chapter separately. This was clearly indicated in the chapter scheme. Similarly, holding sizes used are quite different than those mentioned in the proposal and schedule (Letter dated on November 4, 2004 which contains Schedule in the second page, Holding Size small: 0 to 2

hectare, 2.01 to 4 hectare, Large: Above 4 hectare) these data are quite different than those provided by other states. Your selection should be properly justified and also explain the method of selection.

Chapter III

This chapter is very small section it does not need separate analysis, Authors may merge this chapter it with earlier or fourth chapters.

Chapter IV

This chapter needs to be properly organized, along with the results (Tables from 6^{th} to 13^{th} in the earlier provided table formats) and a summary of field observation should be provided as indicated in the chapter scheme. This chapter should deal with the process of utilization, methods, assumptions, crop-wise estimates, and farm size-wise estimates for seed, feed and wastage. This was clearly indicated in the chapter scheme. Please add a table on the land size class-wise consumption of selected crops of cereal and pulses as feed by the livestock.

Total share of seed, animal feed and wastage of wheat is very high (around 27%) compared to the other states like Uttar Pradesh (12.03) and Punjab (7%). This should be checked and if corrected, needs proper justification. Please recheck the data and justify your results.

Table No. 5.1, 5.2 and 5.3 are completely misinterpreted the result of seed, feed and wastage. In these tables no need to add the quantity of home consumption. Please rectify this mistake otherwise these results do not serve the objective of the study.

In the Summary and Conclusion chapter authors should provide analysis from earlier chapters in a critical and analytical way. Please try to bring out the importance and changing trends in seed, feed and wastages along with purchased seeds, Authors should follow analytical style of highlighting these issues.

Report is not acceptable in the present form. It will be acceptable only after incorporation of the above comments.

With regards

Yours sincerely,

R.S.

Deshpande

Annexure III

Action Taken Report

1. Title of the Draft Report Examined	Estimation of Seed, Feed and Wastage Ratios for Major Food grains in Himachal Pradesh
2. Date of Receipt of Comments	June10, 2006
3. Comments on the Objectives of the Study	The report has been written to fully satisfy the given objectives
4. Comments on Chapters	Chapters modified accordingly

The maximum possible information regarding the history of method of estimation of seed, feed and wastage ratio, followed in the State Income Accounting process, has been extracted from the related State Govt. Departments and the same has been given in the report. The information related to trends in seed and feed ratio has now been given. Regarding wastage ratio, no such type of study has been conducted in Himachal Pradesh. The table on net availability of cereals and pulses in H.P. has been given in the report.

The methodology is modified accordingly and presented in detail in chapter III. It includes sampling design, methods of data collection and the procedure for getting the ratios and other results. The holding sizes are categorized accordingly to the proposal of report i.e. small (0 to 2 ha.), medium (2.01 to 4 ha.) and large (above 4 ha.).

Chapter IV pertains to general information about the study area. It includes profile of regions (Himachal Pradesh & districts) upto the district level for the year 2001-02. The cropping pattern of the last five years ending 2001-02 is given for state and districts.

The results of the study are discussed in chapter V. Process of utilization, methods, assumptions, crop-wise estimates and farm size wise estimates of seed, feed and wastage are discussed in this chapter. Table on the land size class wise consumption of selected crops of wheat (cereal) and blackgram (pulse) as fed by livestock has also been added. This chapter has been modified as suggested.