

Sampling Design and Research Methodology

The sampling design used for the study in selection of sample districts, sample blocks and sample households as well as methodology used for the collection of survey data, secondary data and analysis of the same have been discussed in this chapter.

2.1 Selection of Study Crops: Rajasthan is a leading state of India in respect of food grains production. In terms of production of bajra, Rajasthan state occupied first rank and in India's total bajra production, share of Rajasthan was almost 48.20 percent in 2008-09. In terms of production of gram, Rajasthan state ranks second in the country. It is also a major producer of wheat (9.03 %) and maize (9.30 %). Keeping in views, the importance of these four food grains crops, co-coordinator of the study suggested us to take ***Bajra, Wheat, Maize and Gram*** as study crops for the purpose of estimation of marketable and marketed surplus in Rajasthan state.

2.2 Sampling Design and Sample Size: The study used both, primary as well as secondary data. For primary data collection, using multi-stage stratified random sampling design, selection of sample districts, blocks, villages and sample farmers was made in the following manner:

1) Selection of districts: There are 33 districts in the state. For each crop, number of major producing (production share >5%) districts varying between 5 to 12. However, it was decided to select about 10 percent of major producing districts (minimum 2 districts per study crop) of the selected crop in the state. While selecting districts, we also take care to select those districts which are growing more than one selected crops with a view to economies on survey. Accordingly, at first stage, for each study crop, two sample districts were selected purposively by considering their share in state's production of the selected crop. The crop-wise list of selected districts is shown in below given Table 2.1:

Table 2.1: Crop-wise Selected Districts and Crops Covered.

Study Crop	Selected Districts
Wheat	Hanumangarh (9.04%), Alwar (9.54%)
Bajra	Alwar (10.91%), Churu (6.41%)
Maize	Chittorgarh (25.93%), Udaipur (13.67%)
Gram	Churu (11.62%), Hanumangarh (11.73 %)

Note: Figures in brackets denote percentage share of crop production of the district to total crop production in the state, TE 2008-10.

These districts besides major producers of the selected crops also represent five distinct agro-climate zones of the state.

2) Selection of Blocks/Tehsils: At second stage, from each selected district, two tehsils having significantly large area under study crops and have large share in production of study crops were selected purposively in consultation with concern agriculture as well as marketing officers at district level. For Maize crop, one block from each selected district was purposively selected as per criterion shown above (Table 2.2).

3) Selection of Sample Villages: At third stage, for conducting household survey, two sample villages from each of selected tehsil/block were selected purposively considering location criteria shown below:

- a) Selected villages must have large area under selected crops and adequate number of growers of selected study crops.
- b) One village near to (within 15 kms.) market yard/town
- c) One village which is at least 15 kms. away from market yard / town

The basic aim of choosing sample villages at different distances and locations was to take care of differences in marketable and marketed surplus and price received by the farmers at different locations and distances. The list of selected districts/tehsils/blocks/villages is given in Table 2.2.

4) Selection of Sample Households: Finally, from each selected village, atleast 25 cultivator households which were growers of selected crops in reference year and representing different farm categories (Marginal 0-1 ha., Small 1-2 ha., Semi-Medium 2-4 ha., Medium 4-10 ha., and Large >10 ha.) based on size distribution at district/block level were selected in such a manner that we may get at least 20 sample households in each category for each study crop in a state as a whole. Further, for each study crop, we must have data on marketable and marketed surplus for minimum 100 households in a state.

Further, it was decided that total sample households to be selected for the study should be atleast 300. The crop-wise, minimum sample size decided for study was as follow:

Crop	Wheat	Bajra	Gram	Maize	Total
Sample size (hhs.)	150	150	150	100	550

Further, to economies household survey (to reduce the canvassing of number of households), care was taken to select those households who had grown more than one study

crops. The possible crop combination available in the selected villages was Wheat + Bajra + Gram and Maize +Wheat. Using this combination, we able to reduce number of households to be surveyed form 550 to 453 (See Table 2.2). Category-wise number of sample households selected from each selected district is shown in Table 2.2.

Table 2.2: List of Selected Districts, Blocks, Villages & Number of Sample HHs. in Rajasthan State

No	Agro-Climatic Zone	Selected			MF	SF	SMF	MDF	LF	All
		District	Block/ Tehsil	Villages						
1	III b-Flood prone eastern plain zone	Alwar	Alwar	Shahpura	5	25	14	12	2	58
				Malakheda						
			Tijara	Malekpurturk	12	28	10	5	2	57
				Mainaki						
<i>District's Total</i>					17	53	24	17	4	115
2	I b-Irrigated north western plaine zone	Hanumnagarh	Nohar	Parlika	2	10	16	22	8	58
				Dalpatpura						
			Bhadra	Karanpura	3	15	13	25	2	58
				Chhanibadi						
<i>District's Total</i>					5	25	29	47	10	116
3	II a- Transitional plaine of luni basin zone	Churu	Churu	Untawalia	0	7	10	7	5	29
				Mikhala						
			Taranagar	Bhanil	2	9	18	42	16	87
				Buchawas						
<i>District's Total</i>					2	16	28	49	21	116
4	IV a-Sub humid southern plaine zone	Chittorgarh	Kapasan	Rupakheri	4	17	15	10	6	52
				Singhpur						
			<i>District's Total</i>					4	17	15
5	IV b-Humid southern plain zone	Udaipur	Bhinder	Khetakhera	5	18	15	14	2	54
				Menar						
			<i>District's Total</i>					5	18	15
6	<i>Total Sample HHs.</i>				33	129	111	137	43	453

NoteS: MF=Marginal (<1Ha.), SF=Small (1-2 Ha.), SMF=Semi-Medium (2-4 Ha.), MDF=Medium (4-10 Ha.), LF=Large (>10Ha.) Farmers.

Source: Field survey data.

5) Crop-wise Number of Selected Sample Households: From the selected sample households, many households had grown more than one-study crops. Some households had grown two study crops whereas some households had grown three study crops. Out of 453 sample households, 300 households had grown bajra, 213 households had grown gram, 293 households had grown wheat and 118 households had grown maize crop (Table 2.3). From the 115 selected sample households of Alwar district, 109 were bajra growers, 110 wheat growers and 19 gram growers. This suggests that most of the sample households of the Alwar district had grown more than one study crops. Similar situation also prevailed in

other selected districts. Category-wise and crop-wise data on number sample farmers in each district have been presented in Table 2.3.

Table 2.3: District, Crops-wise & Category-wise Nos. of Selected Sample Farmers in Rajasthan

No.	Districts	Crop	MF	SF	SMF	MDF	LF	All
1	Alwar	1 Bajra	14	51	23	17	4	109
		2 Gram	1	7	3	7	1	19
		3 Maize	0	0	0	1	0	1
		4 Wheat	13	52	24	17	4	110
		5 Total	28	110	50	42	9	239
2	Chittorgarh	1 Bajra	0	0	0	0	0	0
		2 Gram	0	0	0	0	0	0
		3 Maize	4	19	17	12	7	59
		4 Wheat	3	15	14	9	6	47
		5 Total	7	34	31	21	13	106
3	Churu	1 Bajra	2	15	27	48	21	113
		2 Gram	2	12	23	44	20	101
		3 Maize	0	0	0	0	0	0
		4 Wheat	0	0	1	2	4	7
		5 Total	4	27	51	94	45	221
4	Hanumnagarh	1 Bajra	2	13	19	34	8	76
		2 Gram	2	14	19	41	10	86
		3 Maize	0	0	0	0	0	0
		4 Wheat	4	17	19	38	7	85
		5 Total	8	44	57	113	25	247
5	Udaipur	1 Bajra	0	1	0	1	0	2
		2 Gram	0	2	1	3	1	7
		3 Maize	5	19	16	16	2	58
		4 Wheat	1	16	12	13	2	44
		5 Total	6	38	29	33	5	111
6	Gross Total	1 Bajra	18	80	69	100	33	300
		2 Gram	5	35	46	95	32	213
		3 Maize	9	38	33	29	9	118
		4 Wheat	21	100	70	79	23	293
		5 Total	53	253	218	303	97	924

Note: MF=Marginal Farmer (<1ha.), SF=Small Farmer (1-2 ha.), SMF=Semi-Medium Farmer (2-4 ha.), MDF=Medium Farmer (4-10 ha.), LF=Large Farmer (>10 ha.).

Source: Field survey data.

2.4 Data Collection for Study: The relevant data used in this study have been collected from both, primary as well as secondary sources.

i) Primary data: For primary survey, questionnaire was prepared by coordinator CMA, IIM, Ahmedabad after consultation with all associated AERCs. The primary data for study in respect of four selected crops were collected by recall method from the selected farmers through comprehensive field survey by interviewing personally the decision maker of selected households. The quantitative/qualitative data were collected in a structured questionnaire; keeping in view the objectives of the study. The collected data relate to aspects such as socio-economic aspects, educational background, landholdings, cropping pattern, irrigation, production, quantity sold and marketing pattern, crop retention pattern, crop losses at post harvest stages and transportation, factors influencing marketable and marketed surplus, access to credit and warehousing / storage facilities etc. Further, opinions from selected farmers on various aspects related with marketing of crops, storage etc., were also collected.

ii) Secondary data: The secondary data required for the study were collected from the state government offices including Directorate of Economics & Statistics, Commissionerate of Agriculture, Rajasthan state and regional offices of Agricultural Marketing Board, websites of Rajasthan government and central government and various private as well as state/central government publications. District-wise time series data on area, yield and production for selected study crops were collected. Also data on irrigation, number of regulated market etc., were collected from different sources mentioned above.

2.5 Reference year: Agricultural year 2011-12 was selected as reference year. Therefore, field survey data relates to crop year 2011-12.

2.6 Concepts and Definitions: It is always desirable to clearly define the various concepts used in the study so as to avoid ambiguity in understanding the analysis.

1. Cultivating household: Household is a unit in which all the members of family carry out joint operations for their livelihood. Some members may be engaged in cultivating activities and some in other activities, but there is a single decision making body for the household. The household will be treated as cultivating household, if it had cultivated some land (own/leased-in/mortgage-in) during the reference year.

2. Size of operational holding: Operational holding here refers to land size operated by a household during the reference year i.e.

$$\text{O.H.} = \text{Own land} + \text{L.I. /M.I. land} - \text{uncultivated land} - \text{L.O. /M.O. land}$$

Where, O.H. =Operational holding size
 L.I. = Leased-in land
 L.O. = leased-out land
 M.I. = Mortgage-in land
 M.O. = Mortgage-out land

3. Marketed Surplus: Marketed surplus refers to the actually marketed quantities of the produce. No consideration of repurchase quantity.

4. Marketable Surplus: Marketable Surplus is a theoretical ex ante concept which represents the surplus which the farmer/producer has available with himself for disposal once the genuine requirements of the farmer of family consumption (retention + purchase), payment of wages in kind, feed, seed wastage and purchases have been met.

The marketable surplus is computed by the following algebraic formula,

$$\text{MS}=\text{P}-\text{C},$$

Where MS=Marketable surplus,

P=Gross production in the year,

C=Total requirements in the same year for family consumption (retention+purchase), payment of wages in kind, feed, seed, barter, payment of loan/irrigation and physical losses/wastage in storage/transportation/threshing.

2.7 Analytical Framework: The basic purpose of the primary survey of the present study is to generate state level estimates of marketed / marketable surplus for the study crops as well as to study retention pattern of selected food grain crops at household level in the selected districts and state. Therefore, principal findings of the study are based on a cross-section field data of 453 households surveyed from 16 villages of five districts of Rajasthan State. The data of sample households are tabulated and analysed to study the marketed and marketable surplus by farm size and to identify factors affecting them. However, households in each category are pooled together crop-wise and hence no separate analysis attempted for district/block/village level. The tabular analysis across farm size categories is done to examine the effect of specified factors on marketed and marketable surplus. The multiple regression analysis has been undertaken as an analytical tool. For state level

regression analysis, all classes of farmers pooled together and no separate regressions analysis attempted for different districts and farm size categories.

An important limitation of the household data collected was that only one agricultural year was taken into account. The reference year was good year in terms of monsoon, climatic conditions, price realization etc. Hence, conclusions drawn from the analysis may not be fully applicable for non-normal/other years, owing to variations in rainfall, climatic conditions, farm harvest price etc. Generally, the responses of farmers were based on memory bias of the farmers and personal bias. However, investigators took care to verify data by cross questioning so that collected data have more reliability and minimum loss of accuracy.

As field data pertained to short period of one year, the variation in cross sectional farm price of study crops was not so significant. Thus, the effect of price on marketed surplus not measured.

2.8 Organization of study report: The study is divided into five chapters. Chapter-1 presents the introductory notes, need of the study and sets out the main objectives of the study. Methodology used for selection of districts/blocks/sample households, sample size, crop-covered, data base, analytical and conceptual framework and concepts used in the study are presented in second chapter. Chapter three presents macro overview of agriculture in state and selected districts. It also analyse major trends in area, production and productivity of selected crops in selected districts using time series data. It also presents trends in consumption of major inputs and services such as HYVs, irrigation, fertilizers, credit etc. in state. It also discusses structural transformation of the state economy. Chapter four presents the socio-economic background of surveyed households according to different farm size categories. It also deals with marketable and marketed surplus, crop-wise, size group-wise and at aggregate level of the households surveyed. Further crop losses at different stages are estimated. Tabulation and regression analysis has been used for working out the factors affecting the marketed and marketable surplus. Lastly, Chapter five presents the summary, conclusions and policy implications.