Ad-hoc Study No.64

TRANSPORTATION OF AGRICULTURAL PRODUCTS

THROUGH

BULLOCK CARTS AND OTHER MODES

A Study in Kundam and Katni Blocks of Jabalpur district, Madhya Pradesh

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CHAPTER I

I N T R O D U C T I O N

1.1 Introductory

Agricultural products are of two types: perishable and non-perishable. While fruits, vegetables, milk and milk products, eggs etc. formed the former group, food grains, pulses, oilseeds etc. and their products formed the latter. These can be further classified as processed and unprocessed or partly processed products. The transportation of the agricultural products begins from the threshing floor and ends with the selling it to the wholesalers, or arhatiya or the retailers. Sometimes the products are sold at the threshing floor itself. In a very few cases the products are sold even before these are harvested. Barring few cases as mentioned above the products necessarily need to be transported from the farmers' fields to the market. The marketing of agricultural products has following aspects worth studying:

a/ marketable surplus

b/ processing at the farmers' level

c/ transportation the points to be studied are:
modes of transport, distance travelled and
quantity marketed, costs of marketing

d/ time lag between harvesting and marketing

e/ the agencies to whom sold

f/ prices received

g/ price spread

h/ Seasonal variation in market arrivals, and,

i/ Seasonal variation in prices

In the current study we are concerned only with the means of transport and the reasons for the choice of a particular means. The mode of transport differs according to:

a/ type of product

b/ weight of product

c/ distance to be transported and

d/ available mode

The present means of transportation are :

1. Head loads
2. Cycle/rikshaw
3. Hand Carts
4. Back of horses, ponies
5. Bullock carts
6. Trolleys attached vehicles such as jeeps, tractors, etc.
7. Trucks
8. Buses, and
9. Railways

While some of these need human and bullock power others depend on petrol, diesel, etc. for energy. With the growing crisis of petroleum products the transportation of agricultural products by the petrol and diesel driven vehicles becomes at times uncertain and increasingly costlier. This results ultimately, in the higher prices of agricultural products and the uncertainty of the products reaching the consumers.

1.2 The Study

The Ministry of Agriculture, Govt.of India received a reference from the Prime Minister's office enquiring how far the transportation by bullock carts could be increased rather than trucks and buses from the point of view of diesel and petrol consumption in the long run. Therefore, Ministry of Agriculture asked six Agro-Economic Research Centres and three Institutes sponsored by it to commission a study on the subject.

In view of the above this Centre undertook a study titled "Comparative Economics of Transportation of Agricultural Products through Bullock Carts vis-a-vis trucks and buses in the long run".

1.3 The Objectives

The specific objectives of the study were -

(i) The present status of transportation of agricultural products through bullock carts, trucks, buses and other modes of transportation;

(ii) to analyse the comparative economics of transporting agricultural products by mechanised and non-mechanised modes of transportation, namely, bullock carts/buses;

(iii) to identify constraints/problems faced by different categories of farmers in transportation of agricultural products by bullock carts in place of trucks/buses;

(iv) to study the impact on employment of bullock cart owners vis-a-vis trucks/buses operators, and

(v) to suggest measures for making transportation of agricultural products by bullock carts viable.

1.4 The Sample

As suggested by the Directorate of Economics and statistics, Ministry of Agriculture, Govt.of India the study was undertaken in two Development Blocks viz. Katni and Kundam of Jabalpur district. While Katni was a developed block, Kundam was backward as well as tribal block. In each of the two blocks 5 villages were selected so that some of them were near the main road while others were interior. In each of the villages 10 farmers were selected

representing marginal, small, medium and large categories. Thus in each of the two blocks 50 farmers formed the sample making the total sample of 100 farmers.

1.5 Reference Year

Agricultural year 1991-92 was the reference year for the study. Data were collected in the schedules and questionnaires and were subjected to simple tabulation methods.

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CHAPTER II

SELECTED DISTRICT

Jabalpur is one of the central districts of Madhya Pradesh. It is bounded on the north by Panna district, on the north-east by Satna district, on the east by Shahdol district, on the south-east by Mandla district, on the south by Mandla and Seoni districts, on the the south-west by Narsinghpur district and on the west and north-west by Damoh district. The district covers an area of 10,122 sq.km. and has a population of 21,98,743 or 217 persons per sq.km. according to the census of 1981.

Jabalpur district consists of a long narrow plain running from south-west to north-east flanked by the Bhanrer and Kymore ranges of the Vindhyan system on the west and the various hills and spurs of the Mahadeo range and the Maikal range on the east. The important rivers of the district are the Narmada, the Hiran, the Gaur, the Mahanadi and the Katni.

The climate of the district is, on the whole, pleasant and salubrious. December and January are the coldest months with the mean daily maximum temperature at 25.3°C and the mean daily minimum at 8.2°C in December and 9.0°C in January. Temperature begins to rise steadily from March. May is the hottest month with mean daily maximum temperature of 45°C. With the onset of monsoon, weather becomes cool to a considerable extent. Towards the end of monsoon the day temperature registers a slight increase and reaches a secondary maximum in October.

The average annual rainfall of the district is 1,274.1mm. and occurs in 60 rainy days. The belt of high precipitation is along the south-eastern boundary and the amount of rainfall decreases towards the north-west.

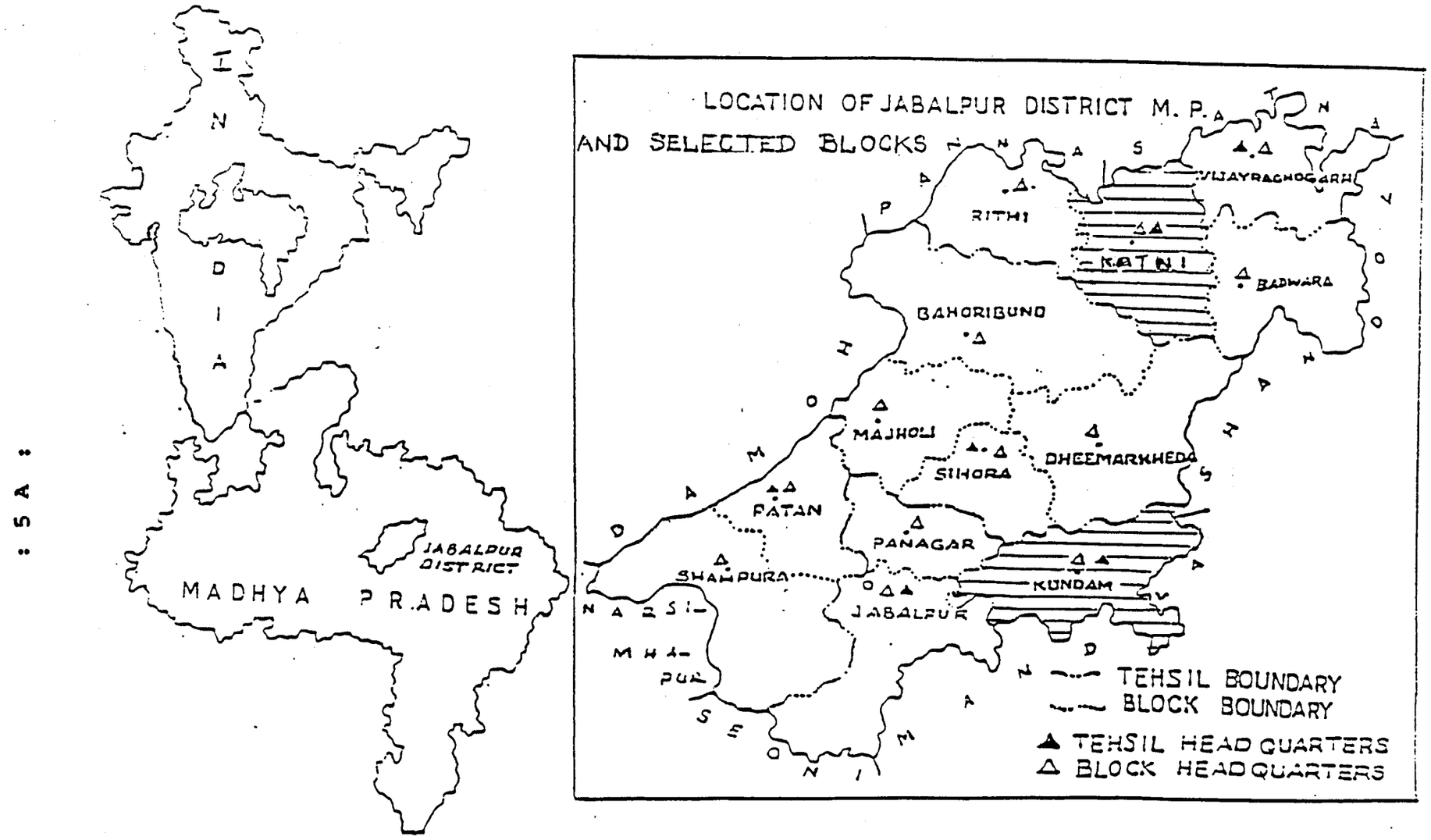
2.1 Land Use

Of the total geographical area of 1,012.5 thousand hectares 45.1 per cent was net area sown. Forests occupied 14.2 per cent and land not available for cultivation, 15.3 per cent. Uncultivated land excluding fallow was 9.9 per cent and the culturable waste land 6.7 per cent. This class is commonly known as wasteland (Table 2.1).

Table 2.1 Land use classification in Jabalpur district, 1990-91

(Area- Thousand hectares)

S.No.	Particulars	Area	%
1.	Forest	143.7	14.2
2.	Land not available for cultivation	155.2	15.3
	a) Land put to Non-Agricultural uses	57.9	5.7
	b) Barren and uncultivated land	97.3	9.6
3.	Other uncultivated land excluding fallow	100.5	9.9
	a) Permanent pastures and other grazing land	100.1	9.9
	b) Land under miscellaneous trees, crops and groves	0.4	-
4.	Culturable waste land	68.0	6.7
5.	Fallow land	89.4	8.8
	a) Current fallow	42.7	4.2
	b) Old fallow	46.7	4.6
6.	Net Area sown	455.7	45.1
	Total geographical area	1012.5	100.00


INDIA
JABALPUR DISTRICT
MADHYA PRADESH
LOCATION OF JABALPUR DISTRICT M. P.
AND SELECTED BLOCKS
RITHI
KATNI
VIJAYRAGHOGARH
BADWARA
BAHORIBUND
MAJHOLI
SIHORA
DHEEMARKHEDA
PATAN
PANAGAR
SHAHPURA
KUNDAM
JABALPUR
TEHSIL BOUNDARY
BLOCK BOUNDARY
TEHSIL HEAD QUARTERS
BLOCK HEADQUARTERS

2.2 Irrigation

Of the gross cropped area of 551.1 thousand hectares 78.3 thousand hectares or 14.2 per cent were irrigated. Among the different sources wells (including tubewells) were most important and commanded 50.4 per cent of the irrigated area. The canals commanded 23.7 per cent (Table 2.2).

Table 2.2 Irrigated area by sources, Jabalpur district, 1990-91

(Area-Thousand hectares)

Sources	Area	%
Canals	18.6	23.7
Tanks	0.3	0.4
Wells including tubewells	39.4	50.4
Other sources	20.0	25.5
Gross Irrigated Area	78.3	100.0

2.3 Cropping Pattern

Jabalpur came in the paddy-wheat zone of the state, and rightly so, because paddy accounted for 24.6 per cent of the cropped area and wheat, 30.2 per cent. The third important crop was gram which accounted for 14.2 per cent of the gross cropped area. Kodo-kutki, the minor millets claimed 5.6 per cent. While rabi crops covered 55.88 per cent of the gross cropped area, kharif crops covered 44.12 per cent (Table 2.3).

Table 2.3 Cropping pattern, Jabalpur district, 1990-91

(Area- Thousand hectares)

Crops	Area	Percentage
Paddy	135.5	24.6
Wheat	166.3	30.2
Kodo-kutki	31.0	5.6
Other cereals	23.2	4.2
Total cereals	356.0	64.6
Gram	78.2	14.2
Tur	8.9	1.6
Urad	7.5	1.4
Peas	20.3	3.7
Lentil	25.1	4.5
Other pulses	2.0	0.4
Total pulses	142.0	25.8
Sesamum	5.6	1.0
Rapeseed & Mustard	6.1	1.1
Linseed	13.4	2.4
Niger	4.7	0.8
Soybean	11.3	2.1
Total Oilseeds	41.1	7.4
Total fruits	4.3	0.8
Total vegetables	5.7	1.0
Total fruits & vegetables	10.0	1.8
Total spices	0.8	0.2
Other crops	1.2	0.2
Total Cropped Area	551.1	100.0

2.4 Irrigated Crops

As mentioned earlier the irrigated area formed only about 14 per cent of the gross cropped area. Of the irrigated crops wheat claimed 71.1 per cent and paddy, 6.5 per cent. The crop group of fruits and vegetables formed 3.7 per cent of the gross irrigated area. Gram had 12.8 per cent of irrigated area.

Sugarcane was considerably irrigated. Fruits and vegetables were irrigated to the extent of 29.0 per cent. Among food grains wheat was irrigated to the extent of 33.5 per cent and paddy, 3.8 per cent (Table 2.4).

Table 2.4 Irrigated cropped area and extent of Irrigation in Jabalpur district, 1990-91

(Area in thousand hectares)

Crops	Irrigated area	% to total	Total cropped area	% of irrigated area to cropped area
Paddy	5.1	6.5	135.5	3.8
Wheat	55.7	71.1	166.3	33.5
Total Cereals	60.8	77.6	356.0	17.1
Gram	10.0	12.8	78.2	12.8
Other Pulses	3.7	4.7	54.9	6.7
Total Pulses	13.7	17.5	142.1	9.6
Total Foodgrains	74.5	95.1	498.1	15.0
Sugarcane	0.1	0.1	0.2	50.0
Total Fruits & Vegetables	2.9	13.7	10.0	29.0
Total spices & Condiments	0.3	0.4	0.8	37.5
Total Food Crops	77.8	99.3	508.9	15.3
Total Non-food Crops	0.5	0.7	42.1	1.2
Total	78.3	100.0	551.1	14.2

2.5 Productivity of Crops

As mentioned earlier the main crops of the district were paddy, wheat, gram, kodo-kutki and oilseeds. But all these crops had lower yields in the district than that of the state. The yields in the district were higher than the state average in the case of gram, arhar and ramtil (Table 2.5).

Table 2.5 Yields per hectare of important crops of Jabalpur district compared with Madhya Pradesh, 1990-91

(Yield- Kg. per hectare)

Crop	Madhya Pradesh	Jabalpur district
Paddy	1181	868
Wheat	1587	1052
Jowar	904	892
Maize	1423	975
Kodo-kutki	269	266
Gram	769	836
Tur	995	1287
Urad	256	235
Pea	379	336
Lentil	498	349
Soybean	1016	865
Til	227	126
Ramtil	213	236
Rape & Mustard	926	533
Linseed	270	256

2.6 Livestock

The total number of livestock in the district was 12,03,332. It included cows and bullocks (59.97 per cent), goats (12.9 per cent) and buffaloes (12.1 per cent). Poultry birds also constituted significant (16.8) per centage in total livestock(Table 2.6).

Table 2.6 Livestock population in Jabalpur district, 1990-91

Livestock	Number	%
1. Cow and Bullocks	6,69,452	55.6
Male	2,63,817	21.9
Female	1,67,311	13.9
Youngstock	2,38,324	19.8
2. Buffaloes	1,44,315	12.1
Male	17,844	1.6
Female	55,831	4.6
Youngstock	70,640	5.9
3. Goats	1,55,422	12.9
4. Sheep	12,988	1.1
5. Horses & Ponies	2,533	0.2
6. Mules	304	0.02
7. Donkeys	168	0.01
8. Camel	226	0.01
9. Pigs	15,299	1.3
10. Poultry	2,02,625	16.8
Total	12,03,332	100.0

2.7 Agricultural Implements and Machinery

The total number of implements and machines used for agricultural purposes was 1,61,346. Eighty per cent of these were ploughs. Bullock carts formed 13.00 per cent. The other mode of transport was tractor but accounted for only 1.2 per cent of the implements. Thus clearly the bullock carts still remain the important means of transport in the district. (Table 2.7)

Table 2.7 Agricultural Implements and Machinery in Jabalpur district, 1990-91

Agricultural Implements/Implements and Machinery	Number	Percentage
Ploughs	1,29,044	80.0
Bullock Carts	21,014	13.0
Sugarcane crusher	240	0.2
Oil Engines	3,159	2.0
Electric pumps	5,833	3.6
Tractors	1,973	1.2
Ghanis	83	Neg.
Total	1,61,346	100.0

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CHAPTER III

SELECTED BLOCKS

As mentioned earlier two blocks viz. Kundam and Katni were selected for the study. While Kundam was a backward and tribal block, Katni was a developed block. A brief description of these may be useful.

3.1 Kundam Block

3.1.1 Location

It is the south eastern block of Jabalpur district. On the east and south it is surrounded by Mandla district. On the west it is surrounded by Jabalpur and Panagar blocks. On the north west of it is Sihora block and in the north is Dheemarkheda block. It has a common border with Shahdol district of a very small length in the north east.

It is rectangular in shape except for a protroding area of Jhiria R.A.E.O. circle in the south east.

The total area of the block is 97,111 hectares. The block comprises 14 R.A.E.O. circles, 57 grampanchayats, 197 villages and a total population of 74,775 persons.

3.1.2 Communications

Kundam block is devoid of a railway line. The main communication link for the block is Jabalpur-Dindori all weather road which divides the block horizontally into two equal halves. Four of the 14 R.A.E.O. headquarters viz. Padaria, Bairagi, Kundam and Supawara lie on this road. While 5 of the remaining R.A.E.O. headquarters of Pitkuhi, Dabarakalan, Baghraji, Ghughara and Dadargawan lie on the north of Jabalpur-Dindori road the remaining 5 viz. Khukkham, Imlai, Kastara, Lakhanwara and Jhiria lie on the south of this road. All the R.A.E.O. headquarters except Dadargawan are

approachable all the year round through link roads bifurcating from Jabalpur-Dindori road.

3.1.3 Topography and Soil

The topography of the block is hilly, undulating and sloppy. The soils are light, shallow, gravelly and stoney with low fertility.

A slightly detailed examination of the soil and land use characteristics of the block showed that heavy and fertile soils existed in and around village Baghraji, medium soils occured in other villages of R.A.E.O. circles Bagharaji and Dabarakalan and in the northern portion of R.A.E.O. circle Ghughra. In the remaining parts of the block generally light and poor soils existed.

The important rivers of the block are the Gaur, the Hiran the Pariyat and the Mahanadi.

3.1.4 Land Use

Of the total geographical area of 97,111 hectares about 20 per cent (19.51 per cent) was under forest. The net sown area formed 36.44 per cent. A peculiar characteristic of the land use of the block was 10.27 per cent barren and uncultivated land, 9.21 per cent current fallow and 8.04 per cent old fallow. These three classes total up to 27.52 per cent of the geographical area. (Table 3.1)

3.1.5 Population

The total population of the block was 74,775 in 1981. Of this 51,922 persons or 69.44 per cent belonged to scheduled tribes and 6,185 or 8.27 per cent to scheduled castes. The 'other' castes people formed 22.29 per cent. Evidently the block was tribal dominated. (Table 3.2)

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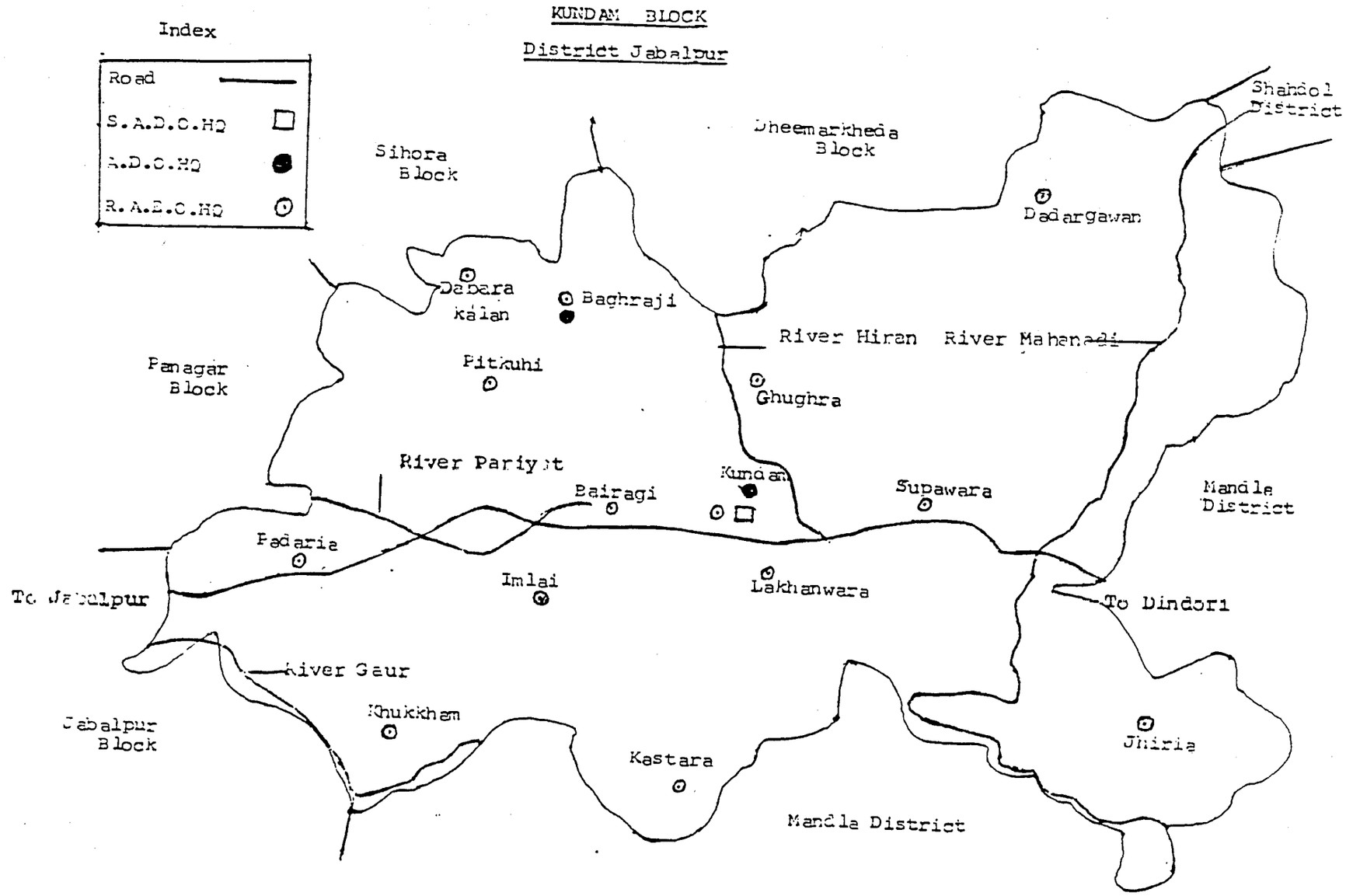

KUNDAM BLOCK
District Jabalpur
Index
Road
S.A.D.C.HQ
A.D.C.HQ
R.A.E.C.HQ
Sihora Block
Dheemarkheda Block
Shahdol District
Dadargawan
Debara Kalan
Baghraji
River Hiran
River Mahanadi
Panagar Block
Pitkuhi
Ghughra
River Pariyat
Kundam
Bairagi
Supawara
Mandla District
Padaria
To Jabalpur
Imlai
Lakhanwara
To Dindori
River Gaur
Khukkham
Jabalpur Block
Kastara
Jhiria
Mandla District

Table 3.1 Land utilisation, Kundam block, Jabalpur district

S. No.	Particulars	Area (Hectares)	Percentage to total
1.	Forest	18,947	19.51
2.	Land not available for cultivation		
	i) Barren and uncultivable land	9,971	10.27
	ii) Land put to non-agricultural uses	3,964	4.08
	iii) Other uncultivable land that can be brought under cultivation immediately	2,362	2.43
	iv) Land that can be brought under cultivation after some improvement.	2,040	2.10
	v) Small & big pieces of land which can be put to agricultural uses after some expenses	1,617	1.67
3.	Permanent Pastures & grazing land	6,066	6.25
4.	Fallow land		
	i) Current fallow	8,943	9.21
	ii) Old fallow	7,812	8.04
5.	Net area sown	35,389	36.44
	Geographical area :	97,111	100.00

Table 3.2 Castewise population, Kundam block, Jabalpur district

Particulars	Population	
	(No.)	Percentage to total
Scheduled Castes	6,185	8.27
Scheduled Tribes	51,922	69.44
Others	16,668	22.29
Total	74,775	100.00

The rainfall varied between 1,250 to 1,400 m.m. Kundam block received highest rainfall among the blocks of the district.

3.1.6 Irrigation

The irrigated area of the block was 213 hectares or less than 1 per cent of the gross cropped area. Two thirds of the irrigated area was commanded by "other sources" which meant rivers and nallahs tapped by means of electric or diesel pumps. (Table 3.3)

Table 3.3 Sourcewise irrigated area, Kundam block, Jabalpur district

S. No.	Source of irrigation	Area (Hectares)	Percentage to total
1.	Govt. Canals	12	5.63
2.	Private tanks	8	3.76
3.	Wells	51	23.94
4.	Other sources	142	66.67
	Gross irrigated area	213	100.00

3.1.7 Cropping Pattern

Foodgrains dominated the cropping pattern. Kodo-kutki, the minor millets, formed 30 per cent of the cropped area. Paddy (17.10 per cent) and wheat (11.81 per cent) were other important cereals. Gram, arhar and urd were the pulses of some significance. Among oilseeds niger constituted 8.93 per cent and mustard, 4.39 per cent. (Table 3.4)

No cash crop found a place in the cropping pattern. While vegetables were grown around irrigation sources a lone papaya garden was in Padaria.

Due to difficult terrain, poor soils and low irrigation the crop yields were poor.

Table 3.4 Cropping pattern, Kundam block, Jabalpur district

S. No.	Crop	Area (Hectares)	Percentage to gross cropped area
1.	Paddy	6,944	17.10
2.	Wheat	4,795*	11.81
3.	Barley	35	0.09
4.	Maize	3,157	7.78
5.	Kodo	8,413	20.72
6.	Kutki	4,148	10.22
7.	Jowar	48	0.12
8.	Sawan	500	1.23
	Total Cereals	28,040	69.07
9.	Gram	2,418	5.96
10.	Arhar	926	2.28
11.	Moong	6	0.01
12.	Urd	1,391	3.43
13.	Pea	306	0.75
14.	Masoor	652	1.61
	Total Pulses	5,699	14.04
	Total Foodgrains	33,739	83.11
15.	Soybean	34	0.08
16.	Linseed	444	1.09
17.	Mustard	1,783	4.39
18.	Ramtil	3,622	8.93
19.	Sunflower	2	-
20.	Groundnut	1	-
21.	Sesamum	802	1.93
	Total Oilseeds	6,688	16.47
22.	Other Crops	169	0.42
	Gross cropped area	40,596	100.00

*Irrigated wheat area- 177 hectares

3.2 Katni Block

3.2.1 Location

Katni block is located in the north central part of Jabalpur district. The upper part of eastern border of the block adjoins Vijayraghogarh block and the lower eastern part of the border adjoins Badwara block. In the south it is bordered by Dheemarkheda block. In the south west it is surrounded by Bahoribund block and in the west by Reethi block. In the north western part lies Panna district and in the north, Satna district.

It is rectangular in shape. The length from north to south is about 50 km. and breadth from east to west is about 30 km.

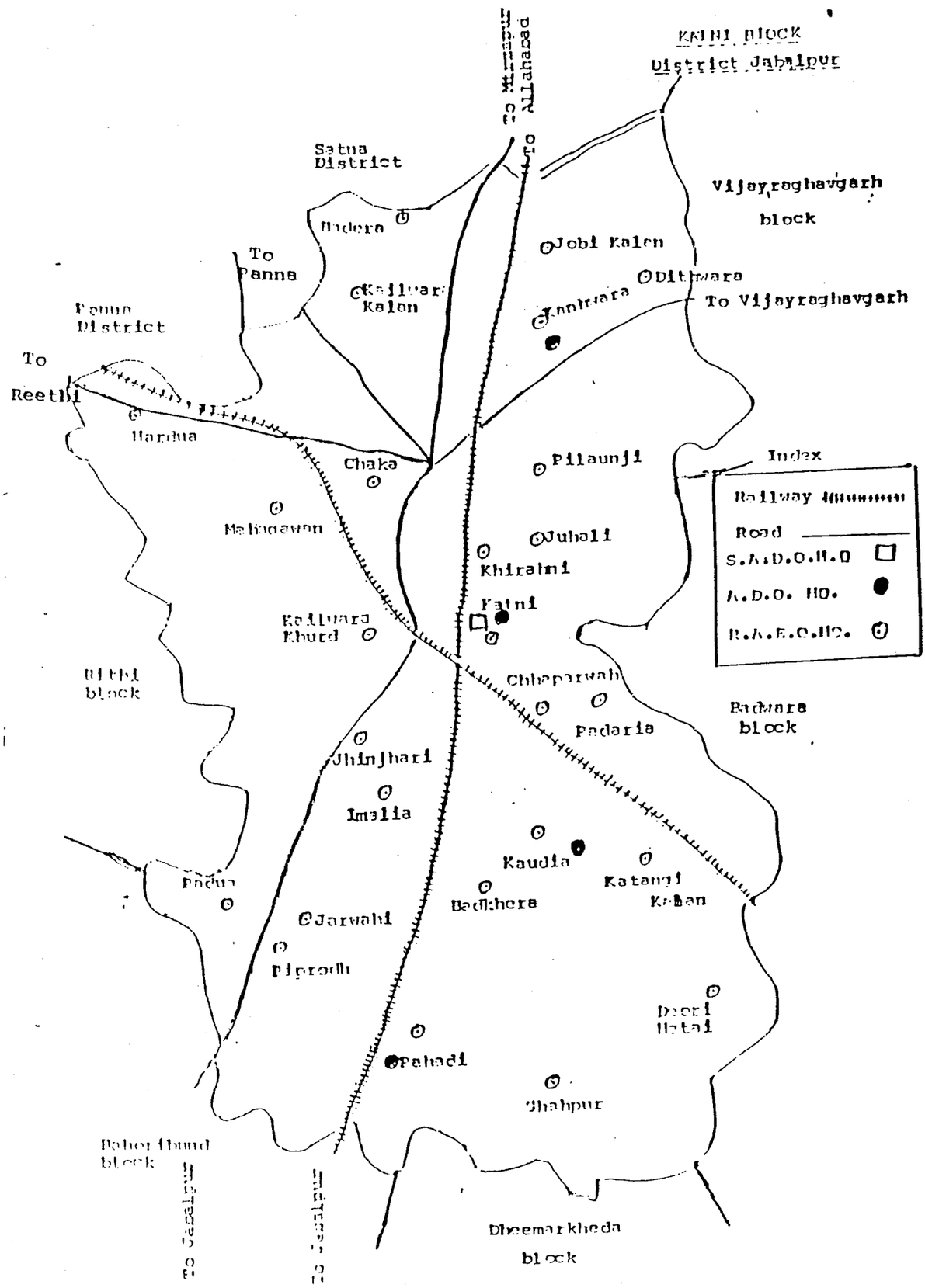
The block has a total geographical area of 59,842 hectares. It has 26 R.A.E.O. circles and 136 villages. The population of the block as per 1981 census was 1,05,413.

3.2.2 Communications

Katni is an important junction of the Central Railway and is located in the centre of the block. Jabalpur-Manikpur and Bilaspur-Bina railway lines cross at Katni. Besides, these the Katni-Chopan railway line shoots off at Katni towards east and traverses few km. of Katni block.

National Highway No.7 from Nagpur to Mirzapur enters the block near village Lakhapateri in the south west and runs parallel to the railway line on its west for a length of about 35 km. till village Tikarwara in the north.

About 4 km. north of Katni the road bifurcates to Vijay-raghogarh in the north east direction. Another bifurcation to the west leads one to Reethi and still another to Panna via Shahnagar.


KATNI BLOCK
District Jabalpur
To Allahabad
Satna District
Vijayraghavgarh block
Jobi Kalan
To Panna
Kalwara Kalan
Ditmara
To Vijayraghavgarh
Panna District
To Reetlli
Hardua
Chaka
Pilaunji
Index
Railway
Road
S.A.D.O.H.Q.
A.D.O. HQ.
R.A.E.O.HQ.
Maldawan
Juhali
Khiralni
Katni
Kalwara Khurd
Rithi block
Chhaparwah
Badwara block
Padaria
Jhinjhari
Imalia
Kaudia
Katangi Kalan
Badkhera
Jarwahi
Piprodh
Deori Hatai
Pahadi
Shahpur
Bahoriband block
To Jabalpur
To Jabalpur
Dheemarkheda block

The block was in an advantageous position as far as the rail and road communications were concerned. All the R.A.E.O.head-quarters were approachable by all season roads.

Actually 7 of the 26 R.A.E.O. H.Qs were in the Katni agglomeration and formed parts of Katni Corporation.

3.2.3 Topography and Soil

The topography of the block is, in general, an even plain with spurs of Vindhya ranges on the northern and western borders. The soil was generally light with patches of medium soils in the north northern and the southern ends. The light soils with low water holding capacity were used for the cultivation of paddy and minor millets. Wheat was grown in medium soils with better water retention capacity.

The main rivers of the block were the Katni, the Aloni and the Niwar.

3.2.4 Land Use

The net sown area was 36.70 per cent of the geographical area. Culturable wasteland and fallow land together formed about 30 per cent (28.97 per cent) of the geographical area. Forest, as mentioned above formed only 8.24 per cent of the geographical area (Table 3.5).

3.2.5 Population

Of the total population of 1,05,413 the scheduled tribes population was 25,890 or 24.56 per cent. The investigation showed that the block had significant population dependent on non-agricultural labour and occupations. This was due to the central location of Katni town which had, besides railway junction, heavy passenger

and goods traffic, industries, both government as well as private, lime stone quaries etc. Actually as many as 20 villages formed part of the Katni Corporation and have lost the characteristics of a typical village.

Table 3.5 Land utilisation, Katni block, Jabalpur district

S. No.	Particulars	Area (Hectares)	Percentage to total geographical area
1.	Forest	4,928.256	8.24
2.	Land not available for cultivation		
	i) Land put to non-agricultural uses	5,026.790	8.40
	ii) Barren and un-cultivable land	2,920.373	4.88
3.	Other un-cultivated land excluding fallow land		
	i) Permanent pastures & grazing land	7,449.192	12.45
	ii) Land under misc. tree crops and groves	216.604	0.36
4.	Culturable waste land	7,192.970	12.02
5.	Fallow land		
	i) Current fallow	4,698.792	7.85
	ii) Old fallow	5,444.847	9.10
6.	Net area sown	21,964.930	36.70
	Total geographical area	59,842.754	100.00

3.2.6 Irrigation

In the matter of irrigation the block was not well developed as only 20.26 per cent of the gross cropped area was irrigated. The main sources of irrigation were canals which contributed 49.83 per cent of the irrigated area. The next important sources were rivers and tanks with 31.46 per cent and wells, 18.71 per cent(Table 3.6).

Table 3.6 Sourcewise irrigated area, Katni block, Jabalpur district, 1990-91

S.No.	Source of irrigation	Area (Hectares)	Percentage to gross irrigated area
1.	Wells	1,114.314	18.71
2.	Canals	2,967.988	49.83
3.	Rivers & Tanks	1,874.246	31.46
	Gross irrigated area	5,956.548	100.00

Besides wells and canals drawn from tanks, rivers, and nallahs were exploited for irrigation by fitting electric and diesel pumpus.

3.2.7 Cropping Pattern

The cropping pattern was cereal dominated with 85 per cent of the cropped area under these. Paddy and wheat shared equal area (20 per cent each). Pulses occupied another 5 per cent of the area. Oilseeds, mainly linseed and sesamum, occupied 5 per cent. Cash crops did not figure in the cropping pattern. (Table 3.7)

Table 3.7 Cropping pattern, Katni block, Jabalpur district

S.No.	Crop	Area (Hectares)	Percentage to total gross cropped area
1.	Paddy	11,786.104	40.09
2.	Wheat	11,954.765	40.66
3.	Barley	48.880	0.17
4.	Maize	577.404	1.96
5.	Jowar	59.116	0.20
6.	Kodo-kutki	761.740	2.59
7.	Other Cereals	22.263	0.08
	Total Cereals	25,210.272	85.75
8.	Gram	719.712	2.45
9.	Urd	358.048	1.22
10.	Arhar	97.451	0.33
11.	Masoor	356.635	1.21
12.	Pea	46.805	0.16
13.	Other Pulses	37.593	0.13
	Total Pulses	1,653.335	5.62
14.	Linseed	731.513	2.49
15.	Sesamum	432.690	1.47
16.	Rape & Mustard	125.561	0.43
17.	Soybean	34.356	0.12
18.	Other oilseeds	24.449	0.08
	Total Oilseeds	1,348.569	4.59
19.	Sugarcane	5.410	0.02
20.	Spices	73.333	0.25
21.	Fruits	185.710	0.63
22.	Vegetables	504.842	1.72
23.	Mixed Crops	421.812	1.43
24.	Other Crops	34.466	0.12
	Gross Cropped Area	29,400.658	100.00

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Caste Composition

Of the 100 farmers 58 belonged to other castes. One third belonged to scheduled tribes and remaining were scheduled castes farmers. Since Kundam was a tribal block, it had 54 per cent tribal farmers, whereas, Katni block had only 12 per cent scheduled tribes farmers. This difference was compensated by the percentage of other castes farmers. Katni had as high as 82 per cent farmers belonging to other castes. Kundam block had only 34 per cent farmers of that caste group. (Table 4.1)

4.2 Size of Holdings

As mentioned earlier 50 farmers each were selected in Katni and Kundam blocks of Jabalpur district. These represented 5 categories of marginal, small, semi mediu, medium and large categories. While one third of the total number were marginal another third belonged to the category of small farmers. Semi medium farmers were 26 per cent and medium farmers comprised 9 per cent. Only one farmer represented the category of large farmers. This roughly reflected the land holding structure in the district and not much variation was observed between the two blocks. The total area of the holdings was also about equal (105.72 and 110.82 hectares). The area per holding was 0.68 hectare in the smallest group and was 10.93 hectares in the largest size group. (Table 4.2)

Table 4.1 Operated area and size of holdings, selected farms, Jabalpur district

(Area- hectares)

Size of holdings	Katni			Kundam			Total		
	No.of holdings	Area of holdings	Area per holding	No.of holdings	Area of holdings	Area per holding	No.of holdings	Area of holdings	Area per holding
Less than 1.00 hect.	15	8.96	0.60	16	12.08	0.75	31	21.04	0.68
1.01 - 2.00	16	23.98	1.50	17	27.52	1.62	33	51.50	1.56
2.01 - 4.00	13	37.58	2.89	13	40.06	3.08	26	77.64	2.99
4.01 - 10.00	6	35.20	5.87	3	20.23	6.74	9	55.43	6.16
10.01 & above	-	-	-	-	10.93	10.93	1	10.93	10.93
All farms	50	105.72	2.11	50	110.82	2.22	100	216.54	2.16

Table 4.2 Distribution of heads of households by castes, selected farmers, Jabalpur district

Size of holdings	Katni				Kundam				Total			
	S.C.	S.T.	Others	Total	S.C.	S.T.	Others	Total	S.C.	S.T.	Others	Total
Less than 1.00 hect.	1	5	9	15	1	7	8	16	2	12	17	31
1.01 - 2.00	2	-	14	16	2	10	5	17	4	10	19	33
2.01 - 4.00	-	1	12	13	3	7	3	13	3	8	15	26
4.01 - 10.00	-	-	6	6	-	3	-	3	-	3	6	9
10.01 & above	-	-	-	-	-	-	1	1	-	-	1	1
All farms	3	6	41	50	6	27	17	50	9	33	58	100

S.C. denotes Scheduled Caste
S.T. denotes Scheduled Tribe

4.3 Irrigation

Of the total area of 216.54 hectares about one fourth (23.32 per cent) was irrigated. The percentage of irrigated area was nearly five times (40.01 per cent) in Katni block that of Kundam block (7.39 per cent). The percentage was highest on marginal farmers (54.35 and 23.43 per cent in the selected blocks respectively). However, no definite relationship was observed between the size of holdings and percentage of irrigation (Table 4.3).

Of the different sources of irrigation, wells commanded the highest percentage (62.33). In the selected blocks the percentage was about the same (62.70 in Katni and 60.44 in Kundam). Katni also had area commanded under tanks (21.54 per cent) and canals (9.80 per cent). Kundam was devoid of any irrigation facility from tanks and canals. "Other" irrigation sources which meant area irrigated by diesel and electrical pump sets fitted on the banks of rivers, rivulets and nalahs constituted 5.96 per cent in Katni and 39.56 per cent in Kundam block. It may, however, be remembered that irrigated area in Kundam itself was 8.19 hectares. (Table 4.4)

4.4 Cropping Pattern

As mentioned in the second chapter Jabalpur came under paddy- wheat zone and this was reflected in the cropping pattern of the selected farms. While wheat occupied 37.70 per cent of the cropped area, paddy had 29.88 per cent. Niger (6.90 per cent), Kodo (5.80 per cent) and arhar (5.36 per cent) were other important crops. However, there was some difference between the cropping patterns of the two blocks. Wheat and paddy undoubtedly were two most important crops in both the blocks. In Katni block these dominated to such

Table 4.3 Irrigation on selected farms, Jabalpur district

(Area - Hectares)

Size of holdings	Katni			Kundam			Total		
	Irri-gated	Unirri-gated	Total	Irri-gated	Unirri-gated	Total	Irri-gated	Unirri-gated	Total
Less than 1.00 hect.	4.87	4.09	8.96	2.83	9.25	12.08	7.70	13.34	21.04
1.01 - 2.00	6.39	17.59	23.98	3.74	23.78	27.52	10.13	41.37	51.50
2.01 - 4.00	17.69	19.89	37.58	1.62	38.44	40.06	19.31	58.33	77.64
4.01 - 10.00	13.35	21.85	35.20	-	20.23	20.23	13.35	42.08	55.43
10.01 & above	-	-	-	-	10.93	10.93	-	10.93	10.93
All farms	42.30	63.42	105.72	8.19	102.63	110.82	50.49	166.05	216.54

Table 4.4 Sources of irrigation, selected farms, Jabalpur district

(Area- Hectares)

Size of holdings	Katni					Kundam					Total				
	Well	Tank	Canal	Others	Total	Well	Tank	Canal	Others	Total	Well	Tank	Canal	Others	Total
Less than 1.00 hect.	2.34	1.42	0.81	0.30	4.87	2.22	-	-	0.61	2.83	4.56	1.42	0.81	0.91	7.70
1.01 - 2.00	2.73	0.32	2.13	1.21	6.39	1.11	-	-	2.63	3.74	3.84	0.32	2.13	3.84	10.13
2.01 - 4.00	9.31	6.16	1.21	1.01	17.69	1.62	-	-	-	1.62	10.93	6.16	1.21	1.01	19.31
4.01 - 10.00	12.14	1.21	-	-	13.35	-	-	-	-	-	12.14	1.21	-	-	13.35
10.01 & above	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All Farms	26.52	9.11	4.15	2.52	42.30	4.95	-	-	3.24	8.19	31.47	9.11	4.15	5.76	50.49

an extent (51.05 and 37.25 per cent) that none of the other crops had more than 5 per cent area under each. In Kundam block, however, the dominance of two crops was lower (21.62 and 21.00 per cent). This, conversely, was due to significantly higher percentage of area under niger (14.14 per cent), arhar (11.79 per cent) and kodo (11.63 per cent).

It was observed that in Katni block the number of crops was higher in two size groups having holding size between 1.01 - 2.00 hectares and 2.01 - 4.00 hectares. In Kundam block the number of crops grown was larger than Katni block. However this was neither due to higher fertility of soil nor due to irrigation facilities. The larger number was to safeguard against the draught conditions. (Tables 4.5, 4.6 and 4.7)

4.5 Production

Since paddy and wheat were important crops these dominated the volume of output. The paddy production was 1,374.40 quintals and wheat production was 1,138.75 quintals. Vegetables, although occupied only 3.70 per cent of the gross cropped area had a production of 256.70 quintals due to their weightiness and good yields. In Katni block the production comprised mainly of paddy (1,050.15 quintals), wheat (874.75 quintals) and vegetables (194.95 quintals). In Kundam block, on the other hand, the diversity in production was more due to diverse cropping. Paddy (324.25 quintals), wheat (264.00 quintals), kodo (128.25 quintals), vegetables (61.75 quintals), gram (43.50 quintals) and niger (42.20 quintals) contributed to the total production. The production roughly represented the area under the crops in different size groups and the yield was not calculated since that was not the subject matter of the study. (Tables 4.8, 4.9 and 4.10)

Table 4.5 Cropping pattern, selected farms, Jabalpur district

(Area- hectares)

Crop	Size groups											
	Upto 1.00		1.01 - 2.00		2.01 - 4.00		4.01 - 10.00		10.01 & above		All farms	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Paddy	14.13	42.73	23.18	33.43	22.35	23.07	20.83	30.56	4.04	26.32	84.53	29.88
Maize	0.79	2.39	1.68	2.42	1.21	1.25	-	-	-	-	3.68	1.30
Kodo	0.96	2.90	4.20	6.06	4.55	4.70	4.85	7.11	1.82	11.86	16.38	5.80
Wheat	11.35	34.33	21.45	30.92	38.64	39.88	31.16	45.70	4.04	26.32	106.64	37.70
Total cereals	27.23	82.35	50.51	72.83	66.75	68.90	56.84	83.37	9.90	64.50	211.23	74.68
Urad	0.10	0.30	-	-	0.80	0.82	-	-	-	-	0.90	0.32
Arhar	0.96	2.90	2.78	4.01	4.75	4.91	4.86	7.13	1.82	11.86	15.17	5.36
Gram	1.62	4.89	3.85	5.56	4.25	1.38	-	-	-	-	9.72	3.44
Pea	0.10	0.30	0.81	1.17	1.91	2.00	-	-	-	-	2.85	1.01
Lentil	0.97	2.95	1.52	2.19	4.65	4.80	1.22	1.79	0.40	2.60	8.76	3.09
Total pulses	3.75	11.34	8.96	12.93	16.39	16.92	6.08	8.92	2.22	14.46	37.40	13.22
Niger	0.61	1.84	3.54	5.10	8.50	8.77	3.64	5.34	3.23	21.04	19.52	6.90
Soybean	-	-	1.21	1.74	-	-	-	-	-	-	1.21	0.43
Rapeseed	-	-	0.81	1.17	-	-	-	-	-	-	0.81	0.29
Linseed	-	-	1.21	1.74	1.01	1.04	-	-	-	-	2.22	0.78
Total oilseed	0.61	1.84	6.77	9.76	9.51	9.81	3.64	5.34	3.23	21.04	23.76	8.40
Vegetables	1.48	4.47	3.11	4.48	4.23	4.37	1.62	2.37	-	-	10.44	3.70
Gross cropped Area	33.07	100.00	69.35	100.00	96.88	100.00	68.18	100.00	15.35	100.00	282.83	100.00

Table 4.6 Cropping pattern, selected farms, Katni block, Jabalpur district

(Area- hectares)

Crop	Size groups											
	Upto 1.00		1.01-2.00		2.01- 4.00		4.01- 10.00		10.00 & above		All farms	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Paddy	7.35	44.64	12.46	39.77	20.93	36.43	16.79	34.14	-	-	57.53	37.26
Maize	0.04	0.24	0.26	0.83	-	-	-	-	-	-	0.30	0.19
Kodo	-	-	1.42	4.53	-	-	-	-	-	-	1.42	0.92
Wheat	8.21	49.84	11.94	38.12	29.34	51.06	29.34	59.68	-	-	78.83	51.05
Total cereals	15.60	94.72	26.08	83.25	50.27	87.49	46.13	93.82	-	-	138.08	89.42
Urad	-	-	-	-	0.40	0.69	-	-	-	-	0.40	0.26
Arhar	-	-	-	-	0.20	0.35	-	-	-	-	0.20	0.13
Gram	-	-	2.43	7.76	-	-	-	-	-	-	2.43	1.58
Pea	-	-	-	-	0.12	0.91	-	-	-	-	0.12	0.07
Lentil	-	-	-	-	0.81	1.41	0.61	1.24	-	-	1.42	0.92
Total pulses	-	-	2.43	7.76	1.53	2.66	0.61	1.24	-	-	4.57	2.96
Niger	0.10	0.61	-	-	0.42	0.73	0.81	1.64	-	-	1.33	0.84
Soybean	-	-	1.21	3.86	-	-	-	-	-	-	1.21	0.78
Linseed	-	-	1.21	3.86	1.01	1.75	-	-	-	-	2.22	1.44
Total oilseed	0.10	0.61	2.42	7.72	1.43	2.48	0.81	1.64	-	-	4.76	3.08
Vegetables	0.77	4.67	0.40	1.27	4.23	7.37	1.62	3.30	-	-	7.02	4.54
Gross cropped Area	16.47	100.00	31.33	100.00	57.46	100.00	49.17	100.00	-	-	154.43	100.00

Table 4.7 Cropping pattern, selected farms, Kundam block, Jabalpur district

(Area - hectares)

Crop	Size groups											
	upto 1.00		1.01-2.00		2.00 - 4.00		4.00 - 10.00		10.00 & above		All farms	
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
Paddy	6.78	40.85	10.72	28.20	1.42	3.58	4.04	21.26	4.04	26.32	27.00	21.00
Maize	0.75	4.52	1.42	3.73	1.21	3.05	-	-	-	-	3.38	2.63
Kodo	0.96	3.78	2.78	7.32	4.55	11.48	4.85	25.51	1.82	11.86	14.96	11.63
Wheat	3.14	18.91	9.51	25.01	9.30	23.48	1.82	9.57	4.04	26.32	27.81	21.62
Total cereals	11.63	70.06	24.43	64.26	16.48	41.60	10.71	56.34	9.90	64.50	73.15	56.88
Urd	0.10	0.6	-	-	0.40	1.01	-	-	-	-	0.50	0.39
Arhar	0.96	5.78	2.78	7.32	4.75	11.99	4.86	25.56	1.82	11.86	15.17	11.79
Gram	1.62	9.77	1.42	3.73	4.25	10.72	-	-	-	-	7.29	5.67
Pea	0.10	0.60	0.81	2.13	1.82	4.59	-	-	-	-	2.73	2.12
Lentil	0.97	5.84	1.52	3.99	3.84	9.69	0.61	3.21	0.40	2.6	7.34	5.71
Total pulses	3.75	22.59	6.53	17.18	15.06	38.01	5.47	28.77	2.22	14.46	33.03	25.68
Niger	0.51	3.07	3.54	9.31	8.08	20.39	2.83	-	3.23	21.04	18.19	14.14
Soybean	-	-	-	-	-	-	-	-	-	-	-	-
Rapeseed	-	-	0.81	2.13	-	-	-	-	-	-	0.81	0.63
Total Oilseed	0.51	3.07	4.35	11.44	8.08	20.39	2.83	14.89	3.23	21.04	19.00	14.77
Vegetables	0.71	4.28	2.71	7.12	-	-	-	-	-	-	3.42	2.66
Gross cropped Area	16.60	100.00	38.02	100.00	39.62	100.00	19.01	100.00	15.35	100.00	128.60	100.00

Table 4.8 Production of different crops, selected farms, Jabalpur district

(Production-Quintals)

Crop	Sige groups					All farmers
	Up to 1.00	1.01-2.00	2.01-4.00	4.01-10.00	10.00& above	
Paddy	163.15	275.00	483.25	403.00	50.00	1374.40
Maize	8.15	8.20	9.00	--	--	25.35
Kodo	10.50	25.50	34.25	48.00	15.00	133.25
Wheat	120.50	194.00	430.25	334.00	60.00	1138.75
Total Cereals	302.30	502.70	956.75	785.00	125.00	2671.75
Urad	0.25	--	2.25	--	--	2.50
Arhar	2.50	4.50	7.50	9.00	10.00	33.50
Gram	9.00	19.50	25.00	--	--	53.50
Pea	2.00	3.85	9.50	--	--	15.35
Lentil	5.25	9.25	17.75	4.00	1.00	37.25
Total Pulses	19.00	37.10	62.00	13.00	11.00	142.10
Niger	2.52	8.75	10.25	5.50	16.00	43.02
Soybean	--	3.00	--	--	--	3.00
Rapeseed	--	3.00	--	--	--	3.00
Linseed	--	4.00	2.50	--	--	6.50
Total Oilseed	2.52	18.75	12.75	5.50	16.00	55.52
Vegetables	39.25	62.35	69.00	86.10	--	256.70
Total Production	363.07	620.90	1100.50	889.60	152.00	1326.07

Table 4.9 Production of different crops, selected farms, Katni block, Jabalpur district

Production-Quintals

Crop	Size groups					
	Up to 1.00	1.01-2.00	2.01-4.00	4.01-10.00	10.00 & above	All farms
	Production (Quintals)	Production (Quintals)	Production (Quintals)	Production (Quintals)	Production (Quintals)	Production (Quintals)
Paddy	106.90	182.00	406.25	355.00	--	1050.15
Maize	0.50	1.70	--	--	--	2.20
Kodo	--	5.00	--	--	--	5.00
Wheat	85.00	119.00	348.75	322.00	--	874.75
Total Cereals	192.40	307.70	755.00	677.00	--	1932.10
Urad	--	--	2.00	--	--	2.00
Arhar	--	--	1.00	--	--	1.00
Gram	--	10.00	--	--	--	10.00
Pea	--	--	1.00	--	--	1.00
Lintil	--	--	1.00	1.00	--	2.00
Total Pulses	--	10.00	5.00	1.00	--	16.00
Niger	0.02	--	0.30	0.50	--	0.82
Soybean	--	3.00	--	--	--	3.00
Rapeseed	--	--	--	--	--	--
Linseed	--	4.00	2.50	--	--	6.50
Total Oilseed	0.02	7.00	2.80	0.50	--	10.32
Vegetables	25.25	14.60	69.00	86.10	--	194.95
Total Production	217.67	339.30	831.80	764.60	--	2153.37

Table 4.10 Production of different crops, selected farms, Kundam block, Jabalpur district

Production-Quintals

Crop	Size groups					
	up to 1.00	1.01-2.00	2.01-4.00	4.01-10.00	10.00 & above	All farms
Paddy	56.25	93.00	77.00	48.00	50.00	324.25
Maize	7.65	6.50	9.00	--	--	23.15
Kodo	10.50	20.50	34.25	48.00	15.00	128.25
Wheat	35.50	75.00	81.50	12.00	60.00	264.00
Total Cereals	109.90	195.00	201.75	108.00	125.00	739.65
Urad	0.25	--	0.25	--	--	0.50
Arhar	2.50	4.50	6.50	9.00	10.00	32.50
Gram	9.00	9.50	25.00	--	--	43.50
Pea	2.00	3.85	8.50	--	--	14.35
Lentil	5.25	9.25	16.75	3.00	1.00	35.25
Total Pulses	19.00	27.10	57.00	12.00	11.00	126.10
Niger	2.50	8.75	9.95	5.00	16.00	42.20
Soybean	--	--	--	--	--	--
Rapeseed	--	3.00	--	--	--	3.00
Linseed	--	--	--	--	--	--
Total Oilseed	2.50	11.75	9.95	5.00	16.00	45.20
Vegetables	14.00	47.75	--	--	--	61.75
Total Production	145.40	281.60	268.70	125.00	152.00	972.70

4.6 Marketed Surplus

Of the total production of 3,126.07 quintals the marketed surplus was 1,157.49 quintals or 37.03 per cent. The proportion of marketed surplus varied from crop to crop. The most marketed product was vegetables as 97.37 per cent of its produce was marketed. The next group of crops with high proportion of marketed surplus (68.07 per cent) was oilseeds. Pulses which also need processing were marketed to the extent of 38.18 per cent. The least marketed group of crops was cereals with only 30.53 per cent marketed surplus.

In both the blocks the percentage of marketed surplus was about equal (38.60 and 33.53 per cent). While there was not much variation in the percentage of marketed surplus of vegetables and cereals, The percentage varied considerably in the case of oilseeds and pulses. In both the crop groups the percentages of marketed surplus were much higher in Kundam than Katni (Table 4.11). This was due to -

a) lack of processing facilities in and around the villages in Kundam which was a tribal, hilly and backward block as far as transport facilities were concerned.

b) due to lack of demand for these crop groups for home consumption.

The proportion of marketed surplus had a definite relationship with the size of holdings. On the selected farms the percentage of marketed surplus was 37.03. It increased from 16.38 in the smallest size group to 57.17 in the largest group with the size of holdings. Of course, this is a universal phenomenon. In Katni block the percentage of marketed surplus was 38.60. It increased

Table 4.11 Marketed surplus, selected farmers, Katni and Kundam block, Jabalpur district

(Figures- Quintals)

Crop	Katni				Kundam				All farms			
	Total production	Sale	Home consumption and others	% of sale to total production	Total production	Sale	Home consumption and others	% of sale to total prod.	Total production	Sale	Home consumption and others	% of sale to total production
Paddy	1050.15	334.75	715.40	31.88	324.25	74.50	249.75	22.98	1374.40	409.25	965.15	29.78
Maize	2.20	1.50	0.70	68.18	23.15	--	23.15	--	25.35	1.50	23.85	5.92
Kodo	5.00	--	5.00	--	128.25	32.90	95.35	25.65	133.25	32.90	100.35	24.69
Wheat	874.75	297.00	577.75	33.95	264.00	75.00	189.00	28.41	1138.75	372.00	766.75	32.67
Total Cereals	1932.10	633.25	1298.85	32.78	739.65	182.40	557.25	24.66	2671.75	815.65	1856.10	30.53
Urad	2.00	2.00	--	100.00	0.50	--	0.50	--	2.50	2.00	0.50	80.00
Arhar	1.00	--	1.00	--	32.50	16.45	16.05	50.62	33.50	16.45	17.05	49.10
Gram	10.00	--	10.00	--	43.50	13.25	30.25	30.46	53.50	13.25	40.25	24.77
Pea	1.00	--	1.00	--	14.35	7.30	7.05	50.87	15.35	7.30	8.05	47.56
Lentil	2.00	--	2.00	--	35.25	15.25	20.00	43.26	37.25	15.25	22.00	40.94
Total Pulses	16.00	2.00	14.00	12.50	126.10	52.25	73.85	41.44	142.10	54.25	87.85	38.18
Nigor	0.82	0.45	0.37	54.88	42.20	30.84	11.36	73.08	43.02	31.29	11.73	72.73
Soybean	3.00	--	3.00	--	--	--	--	--	3.00	--	3.00	--
Rapeseed	--	--	--	--	3.00	2.70	0.30	90.00	3.00	2.70	0.30	90.00
Linseed	6.50	3.80	2.70	58.46	--	--	--	--	6.50	3.80	2.70	58.46
Total Oilseed	10.32	4.25	6.07	41.18	45.20	33.54	11.66	74.20	55.52	37.79	17.73	68.07
Vegetables	194.95	191.80	3.15	98.38	61.75	58.00	3.75	93.93	256.70	249.80	6.90	97.31
All Crops	2153.37	831.30	1322.07	38.60	972.70	326.19	646.51	33.53	3126.07	1157.49	1968.58	37.03

from 13.23 in the smallest size group to 47.80 in the size group of 4.01 - 10.00 hectares. In the case of Kundam block while the average was 33.53, it increased from 21.10 in the smallest size group to 57.17 in the largest one (Table 4.12).

The marketed surplus in Kundam block was not destined to far away markets. As will be observed from table 4.13 the marketed surplus in Kundam was disposed mainly within the villages. In Katni block the sale within the villages was 21.51 per cent of the total sale. In Kundam block it was just double (42.28 per cent). In the case of pulses the percentage of sale within the villages was 70.91 and that of oilseeds 51.61 (Table 4.13).

4.7 Sale Outside the villages

Our main objective is to study the existing transportation methods of agricultural products. While we have so far discussed the total production and marketed surplus our concern is mainly with regard to the produce that goes out of the villages to various destinations. In the following paragraphs, therefore, the concern would be that part of produce which is sold outside the villages or 72.65 per cent of the total sale.

The quantity so sold by the selected farmers was 840.93 quintals. The proportion of sale outside the villages was generally higher on the larger size groups (Table 4.14).

This situation is observed elsewhere in the country.

4.8 Means of Transportation

Of the total quantity of 840.93 quintals sold out of villages the largest proportion (40.11 per cent) was transported by bullock carts. The trolleys attached to the tractors carried

Table 4.12 Marketed surplus, selected farms, Jabalpur district

(Figures - Quintals)

Size of holdings	Katni				Kundam				Both			
	Total production	Sale	Home consumption and others	% of sale to total production	Total production	Sale	Home consumption and others	% of sale to total production	Total production	Sale	Home consumption and others	% of sale to total production
up to 1.00 Hect.	217.60	28.80	188.87	13.23	145.00	30.68	114.72	21.10	363.07	59.48	303.59	16.38
1.01- 2.00 Hect.	339.30	67.30	272.00	19.83	281.60	86.06	195.54	30.56	620.90	153.36	467.54	24.70
2.01 4.00 Hect.	831.80	369.75	462.05	44.45	268.70	54.00	214.70	20.10	1100.50	423.75	676.75	38.51
4.01- 10.00 Hect.	764.60	365.45	399.15	47.80	125.00	68.55	56.45	54.84	889.60	434.00	455.60	18.79
10.01 and above	--	--	--	--	152.00	86.90	65.10	57.17	152.00	86.90	65.10	57.17
All farms	2153.37	831.30	1322.07	36.60	972.70	326.19	646.51	33.53	3126.07	1157.49	1968.58	37.03

Table 4.13 Marketed surplus of different crops, within the villages and outside, selected farms, Jabalpur district

(Figures- Quintals)

Crop	Katni			Kundam			All farms		
	Total sale	Within village	Outside	Total sale	Within village	Outside	Total sale	Within village	Outside
Paddy	334.75	52.25 (15.61)	282.50 (84.39)	74.50	36.50 (48.99)	38.00 (51.01)	409.25	88.75 (21.69)	320.50 (78.31)
Maize	1.50	--	1.50 (100.00)	--	--	--	1.50	--	1.50 (100.00)
Kodo	--	--	--	32.90 (72.64)	23.90 (72.64)	9.00 (27.36)	32.90	23.90 (72.64)	9.00 (27.36)
Wheat	297.00	123.00 (41.41)	174.00 (50.59)	75.00	23.00 (30.67)	52.00 (69.33)	372.00	146.00 (39.25)	226.00 (60.75)
Total Cereals	633.25	175.25 (27.67)	458.00 (72.33)	182.40	83.40 (45.72)	99.00 (54.28)	815.65	258.65 (31.71)	557.00 (68.29)
Urad	2.00	--	2.00 (100.00)	--	--	--	2.00	--	2.00 (100.00)
Arhar	--	--	--	16.45	9.95 (60.49)	6.50 (39.51)	16.45	9.95 (60.49)	6.50 (39.51)
Gram	--	--	--	13.25	6.25 (47.17)	7.00 (52.03)	13.25	6.25 (47.17)	7.00 (52.83)
Pea	--	--	--	7.30	6.00 (82.19)	1.30 (17.81)	7.30	6.00 (82.19)	1.30 (17.81)
Lentil	--	--	--	15.25	14.85 (97.38)	0.40 (2.62)	15.25	14.85 (97.38)	0.40 (2.62)
Total Pulses	2.00	--	2.00 (100.00)	52.25	37.05 (70.91)	15.20 (29.09)	54.25	37.05 (70.91)	17.20 (29.09)
Niger	0.45	--	0.45 (100.00)	30.84	15.31 (49.64)	15.53 (50.36)	31.29	15.31 (48.93)	15.98 (51.07)
Rapeseed	--	--	--	2.70	2.00 (74.07)	0.70 (25.93)	2.70	2.00 (74.07)	0.70 (25.93)
Total Oilseed	4.25	3.00 (70.59)	1.25 (29.41)	33.54	17.31 (51.61)	16.23 (48.39)	37.79	20.31 (53.74)	17.48 (46.26)
Vegetables	191.80	0.55 (0.29)	191.25 (99.71)	58.00	--	58.00 (100.00)	249.80	0.55 (0.22)	249.25 (99.78)
All Crops	831.30	178.80 (21.51)	652.50 (78.49)	326.19	137.76 (42.23)	188.43 (57.77)	1157.49	316.56 (27.35)	840.93 (72.65)

Table 4.14 Marketed surplus within the villages and outside by size groups, Jabalpur district

(Figures- Quintals)

Size of holdings (Hectares)	Katni			Kundam			All farms		
	Total sale	Within village	Outside village	Total sale	Within village	Outside village	Total sale	Within village	Outside village
Up to 1.00	28.80	4.55 (15.80)	24.25 (84.20)	30.68	17.05 (55.57)	13.63 (44.43)	59.48	21.60 (36.31)	37.88 (63.69)
1.01-2.00	67.30	15.00 (22.29)	52.30 (77.71)	86.06	18.66 (21.68)	67.40 (78.32)	153.36	33.66 (21.95)	119.70 (78.05)
2.01-4.00	369.75	79.25 (21.43)	290.50 (78.57)	54.00	33.50 (62.03)	20.50 (37.97)	423.75	112.75 (26.61)	311.00 (73.39)
4.01-10.00	365.45	80.00 (21.89)	285.45 (78.11)	68.55	68.55 (100.00)	--	434.00	148.55 (34.23)	285.45 (65.77)
10.01 & above	--	--	--	86.90	--	86.90 (100.00)	86.90	--	86.90 (100.00)
Total	831.30	178.80 (21.51)	652.50 (78.49)	326.19	137.76 (42.23)	188.43 (57.77)	1157.49	316.56 (27.35)	840.93 (72.65)

Figures in brackets are percentages

25.11 per cent of the transported quantity. Trucks came next in which 20.99 per cent of the marketed production was transported. Cycles (6.89 per cent), buses (4.46 per cent) and head loads (2.44 per cent) were other means of transport. There was some variation in the proportion of quantity transported by different means between Katni and Kundam blocks. In Katni block bullock carts were the most important means (45.36 per cent). Trucks (7.05 per cent) and trolleys attached to tractors (16.75 per cent) were the other important means. In Kundam block, on the other hand, trolleys attached to tractors transported more than half (54.07 per cent) of the marketed surplus. The bullock carts were second important means which carried 21.92 per cent of the marketed surplus.. Cycles (13.13 per cent) and head loads (10.88 per cent) shared about equal proportion of marketed quantities (Table 4.15).

It will thus be observed that bullock carts continued to be the most important means of transport in both the blocks of the district. The use of buses and trucks for transportation depended on the nearness to the pucca road and frequency and reliability of the services. The transportation by trolleys attached to tractors depended on the availability of these within the villages.

4.9 Transportation Charges

In the following paragraphs description of different means of transportation, their capacity, limitations and charges are given.

4.9.1 Bullock Cart

This was the most traditional means of bulk transport in the villages. It worked on the rough roads and served as means of transport from the door step or threshing floor to the consumer or the market place. It generally had a capacity to carry 10 quintals of produce.

Table 4.15 Quantities of marketed surplus outside villages by different means of transport, selected farms, Jabalpur district

(Figures- Quintals)

Mode of transport	Katni			Kundam			All farms		
	Own	Hired	Total	Own	Hired	Total	Own	Hired	Total
Head load	--	--	--	0.50	20.00	20.50 (10.88)	0.50	20.00	20.50 (2.44)
Cycle	1.00	32.20	33.20 (5.09)	9.75	15.00	24.75 (13.13)	10.75	47.20	57.95 (6.89)
Bullock Cart	12.00	284.00	296.00 (45.36)	21.30	20.00	41.30 (21.92)	33.30	304.00	337.30 (40.11)
Bus	--	37.50 (5.75)	37.50	--	--	--	--	37.50	37.50 (4.46)
Tractor trolley	--	109.30	109.30 (16.75)	86.90	14.98	101.88 (54.07)	86.90	124.28	211.18 (25.11)
Truck	--	176.50	176.50 (27.05)	--	--	--	--	176.50	176.50 (20.99)
Total	13.00	639.50	652.50 (100.00)	118.45	69.98	188.43 (100.00)	131.45	709.48	840.93 (100.00)

The average transportation charge was Rs.1.18 per quintal per kilometre. It is costlier than mechanically operated means because the charges of bullock pair maintenance and the driver are to be included.

4.9.2 Trolley attached to Tractor

This transport was restricted to the areas where big farmers owned tractors and trolleys and used them regularly. The small producers took the benefit of this and paid the charges according to the weight and volume of the produce. This was restricted to a distance of about 20 km. with reasonably good roads. The carrying capacity of this means was 30 quintals and the charge was Re 0.60 paise per quintal per kilometre, the lowest among all the means. The charges were low because the contract was informal and suited the convenience of the owner who combined his work with the transport business. The means was faster than bullock cart but slower than truck or bus.

4.9.3 Trucks

This means was available only on State and National highways. This was again an informal contract as the truck driver and the other staff of truck treated such income as "extra" income for them. The rate was, therefore, lower. The transportation was quick. The charge was Re 0.75 paise per quintal per kilometre.

4.9.4 Bus

This means was also available on State and National highways only. The contract was formal with the necessity for the farmer to purchase the ticket and pay the minimum charges for the luggage to be transported on the bus top. For this reason the transportation was costlier (Re 1.00 per quintal per kilometre) than the other

fast moving vehicles of trucks and trolleys attached to tractors. The advantage of this means was regularity and punctuality alongwith faster movement.

4.9.5 Cycle

This was the most versatile means of transport. However, it could carry a weight between 50 to 60 kg. to a maximum distance of 10 to 15 km. This means was not available on hire and also slow moving. The charges were Rs.3.25 per quintal per kilometre considering the wages equivalent to own labour.

4.9.6 Headload or Kawar

This was the costliest means of transport as the carrying capacity was only 50 kg. to a maximum distance of 8 km. Morecver, the speed was low and charges had to include wages lost in alternative employment. The charges were Rs.7.50 per quintal per kilometre (Table 4.16) This means was generally not offered for hire.

Table 4.16 Transportation charges by different means, Jabalpur district

Modes of transport	Transportation charges in rupees/km./quintal		
	K a t n i	K u n d a m	Average
Head load	8.00	7.00	7.50
Cycle	3.50	3.00	3.25
Bullock Cart	1.25	1.10	1.18
Bus	1.00	1.00	1.00
Tractor trolley	0.60	0.60	0.60
Truck	0.75	0.75	0.75

4.10 Reasons for using/not using Bullock Carts

From the foregoing discussion following conclusions were drawn.

In the present situation bullock cart transported the maximum (40.11 per cent) quantity of marketed surplus.

The reasons were :

1. It was versatile and carried 10 quintals at a time on even rough roads.

2. It carried the product right from the threshing floor/door step of the producer to consumer's door or market place.

3. It was easily available within the village.

The reasons for not using were:

1. It was costlier than the other mechanical means of trolley, bus or truck especially when smaller quantities than 10 quintals were to be transported.

2. It was a slower means of transport.

3. The maximum distance travelled at a time could be only 10 to 12 kilometres.

4. It was bulky and needed parking place for the vehicle and the pair of bullocks. Arrangements for their feeding and drinking water were needed and one person had to be engaged for these activities.

5. In some villages bullock carts were not available.

6. In some villages the produce of large number of farmers was transported by the buyer in his own truck or trolley attached to tractor.

7. In some villages the bullocks were only occasionally used for transportation and therefore these were not conversant to transport conditions of towns and were prone to accidents on State and National highways.

One of the objectives of the study was to know the impact on employment of bullock cart owners.

Of the 100 sample farmers only 6 (3 each in Kundam and Katni blocks) hired their bullock carts to others. The total number of days so hired was (280) or 47 days per farmer. The wages earned were Rs.9,200 or Rs.1,533 per farmer and Rs.33 per day. (Table 4.17)

Table 4.17 Hired labour days and wages earned by 6 sample farmers, Jabalpur district

(Wages in Rs.)

Block	Total No.of days hired	Days per farm	Total wages earned	Wages per farm	Waged per day
Katni	50	17	1,900	633	38
Kundam	230	77	7,300	2,433	32
Total	280	47	9,200	1,533	33

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CHAPTER- V

SUMMARY AND CONCLUSIONS

5.1 The Prime Minister's Office enquired with the Ministry of Agriculture whether and how far the transportation by bullock carts could be increased than the trucks and buses from the point of view of diesel and petrol scarcity. The Ministry of Agriculture, therefore, asked the various Agro-Economic Research Centres to conduct a study with the following objectives.

(i) The present status of transportation of agricultural products through bullock carts, trucks, buses and other modes of Transportation;

(ii) To analyse the comparative economics of transporting agricultural products by mechanised and non-mechanised modes of transportation, namely, bullock carts/buses;

(iii) To identify constraints/problems faced by different categories of farmers in transportation of agricultural products by bullock carts in place of trucks/ buses.

(iv) To study the impact on employment of bullock cart owners vis-a-vis trucks/buses operator's, and,

(v) to suggest measures for making transportation of agricultural products by bullock carts viable.

As per the suggestion of the Ministry of Agriculture the study was undertaken in two development blocks of Katni and Kundam of Jabalpur district. While Katni was a developed block, Kundam was backward as well as tribal block. In each of the two blocks

5 villages were selected so that some of them were near the main road while others were interior. In cash of the villages 10 farmers were selected representing marginal, small, medium and large categories. Thus, in each of the two blocks 5C farmers farmed the sample making the total sample of 100 farmers. The reference year was agricultural year 1991-92.

5.2 Jabalpur is centrally located district of the state. It covered an area of 10,122 sq.km. and had a population of 21,98,743 or 217 persons per sq.km. according to the census of 1981. The average rainfall of the district was 1,274.1 mm. Jabalpur came in the paddy-wheat zone of the state, and rightly so, because paddy accounted for 24.6 per cent of the cropped area and wheat, 30.2 per cent. The third important crop was gram which accounted for 14.2 per cent of the gross cropped area. Kodo-kutki, the minor millets claimed 5.6 per cent. Wheat was irrigated to the extent of 71.1 per cent and paddy, 6.5 per cent. The productivity of all the important crops of the district was lower than the average of the state. The total number of livestock in the district was 12,03,332. Of this 59.97 per cent were cows and bullocks. The total number of implements and machines in the district was 1,61,346. Of these bullock carts were 13 per cent and tractors, 1.2 per cent only.

5.3 Kundam was the south eastern block of Jabalpur district. The total area of the block was 97,111 hect. and population of the block in 1981 was 74,755 persons. The block was devoid of railway line. The main communication link for the block was Jabalpur-Dindori all weather road which divided the block horizontally into two equal halves. Several link roads bifurcated from this road

to the RAEO headquarters. The topography of the block was hilly, undulating and stony. The soils were light, shallow, gravelly and stoney with low fertility. Of the total population 69.44 per cent belonged to scheduled tribes. Thus it is a tribal dominated block. The block had less than 1.00 per cent area under irrigation. Kodo-kutki and other minor millets formed 30 per cent of cropped area. Paddy formed 17.10 per cent and wheat formed 11.81 per cent. No cash crop was in the cropping pattern. Due to difficult terrain, poor soils and low irrigation the crop yields were very poor.

Katni block was located in the north central part of the district. It had a total geographical area of 59,842 hectares. The total population of the block in 1981 was 1,05,413. Katni was an important junction of the Central Railway and was located in the centre of the block. Jabalpur-Manikpur and Bilaspur-Bina railway lines crossed at Katni. Besides these the Katni- Chopan railway line shot off at Katni towards east and traversed few km. of Katni block. National Highway No.7 from Nagpur to Mirzapur entered the block in the south west and ran parallel to the railway line. The block was in an advantageous position as far as the rail and road communications were concerned. All the RAEO headquarters were approachable by all season roads. The topography of the block was, in general, an even plain. The soil was generally light with patches of medium soil. Paddy and wheat shared equal area (20 per cent each).

5.4 Of the 100 farmers selected for the study 58 belonged to "Other" castes. One-third belonged to scheduled tribes and remaining were scheduled castes farmers. Scheduled tribe farmers were in larger number in Kundam block. One-third of the total number of farmers were marginal and another third were small farmers. Semi-

medium farmers were 26 per cent and medium farmers, 9 per cent. Of the total area about one-fourth (23.32 per cent) was irrigated. The percentage of irrigated area in Katni block was nearly five times (40.01 per cent) that of Kundam block (7.39 per cent). Wheat and paddy were two most important crops in both the blocks. Their dominance was more (51.05 and 37.25 per cent respectively) in Katni block than Kundam block (21.62 and 21.00 per cent respectively).

In Katni block the production comprised mainly of paddy (1,050.15 quintals), wheat (874.75 quintals) and vegetables (194.95 quintals). In Kundam block, on the other hand, the diversity in production was more due to diverse cropping. Paddy (324.25 quintals) wheat (264.00 quintals), kodo (128.25 quintals), vegetables(61.75 quintals), gram (43.50 quintals) and niger (42.20 quintals) contributed to the total production. Of the total production of 3,126.07 quintals the marketed surplus was 1,157.49 quintals or 37.03 per cent. The proportion of marketed surplus varied from crop to crop. The percentage of marketed surplus increased from 16.38 in the smallest size group to 57.17 in the largest size group with the size of holdings. Further, it was observed that in Kundam block the marketed surplus was disposed mainly within the villages (42.28 per cent). In Katni block the sale within the villages was half of Kundam block. It was also observed that the proportion of sale outside the villages was generally higher on the longer size groups. As regards means of transportation it was seen that the largest proportion (40.11 per cent) was transported by bullock carts. The trolleys attached to the tractors carried 25.11 per cent of the transported quantity. Trucks came next in which 20.99 per cent of the marketed production was transported. Cycles (6.89

per cent), buses (4.46 per cent) and head loads (2.44 per cent) were other means of transport. There was some variation in the proportion of quantity transported by different means between Katni and Kundam blocks. In Katni block bullock carts were the most important means (45.36 per cent). Trucks (7.05 per cent) and trolleys attached to tractors (16.75 per cent) were the other important means. In Kundam block, on the other hand, trolleys attached to tractors transported more than half (54.07 per cent) of the marketed surplus. The bullock carts were second important means which carried 21.92 per cent of the marketed surplus. Cycles (13.13 per cent) and head loads (10.88 per cent) shared about equal proportion of marketed quantities.

It will thus be observed that bullock carts continued to be the most important means of transport in both the blocks of the district. The use of buses and trucks for transportation depended on the nearness to the pucca road and frequency and reliability of the services. The transportation by trolleys attached to tractors depended on the availability of these within the villages.

Transportation Charges

In the following paragraphs description of different means of transportation, their capacity, limitations and charges are given.

1) Bullock Cart

This was the most traditional means of bulk transport in the villages. It worked on the rough roads and served as means of transport from the door step or threshing floor to the consumer or the market place. It generally had a capacity to carry 10 quintals of produce.

The average transportation charge was Rs.1.18 per quintal per kilometre. It is costlier than mechanically operated means because the charges of bullock pair maintenance and the driver are to be included.

2) Trolley attached to Tractor

This transport was restricted to the areas where big farmers owned tractors and trolleys and used them regularly. The small producers took the benefit of this and paid the charges according to the weight and volume of the produce. This was restricted to a distance of about 20 km. with reasonably good roads. The carrying capacity of this means was 30 quintals and the charge was Re 0.60 paise per quintal per kilometre, the lowest among all the means. The charges were low because the contract was informal and suited the convenience of the owner who combined his work with the transport business. The means was faster than bullock cart but slower than truck or bus.

3) Trucks

This means was available only on State and National Highways. This was again an informal contract as the truck driver and the other staff of truck treated such income as "extra" income for them. The rate was, therefore, lower. The transportation was quick. The charge was Re 0.75 paise per quintal per kilometre.

4) Bus

This means was also available on State and National highways only. The contract was formal with the necessity for the farmer to purchase the ticket and pay the minimum charges for the luggage to be transported on the bus top. For this reason the transportation was costlier (Re 1.00 per quintal per kilometre)

than the other fast moving vehicles of trucks and trolleys attached to tractors. The advantage of this means was regularity and punctuality alongwith faster movement.

5) Cycle

This was the most versatile means of transport. However, it could carry a weight between 50 to 60 kg. to a maximum distance of 10 to 15 km. This means was not available on hire and also slow moving. The charges were Rs.3.25 per quintal per kilometre considering the wages equivalent to own labour.

6) Headload or Kawar

This was costliest means of transport as the carrying capacity was only 50 kg. to a maximum distance of 8 km. Moreover, the speed was low and charges had to include wages lost in alternative employment. The charges were Rs.7.50 per quintal per kilometre. This means was generally not offered for hire.

Reasons for using/not using Bullocks carts

From the foregoing discussion following conclusions were drawn.

In the present situation bullock cart transported the maximum (40.11 per cent) quantity of marketed surplus.

The reasons were :

1. It was versatile and carried 10 quintals at a time on even rough roads.

2. It carried the product right from the threshing floor/door step of the producer to consumer's door or market place.

3. It was easily available within the village.

The reasons for not using were :

1. It was costlier than the other mechanical means of trolley, bus or truck especially when smaller quantities than 10 quintals were to be transported.

2. It was a slower means of transport.

3. The maximum distance travelled at a time could be only 10 to 12 kilometres.

4. It was bulky and needed parking place for the vehicle and the pair of bullocks. Arrangements for their feeding and drinking water were needed and one person had to be engaged for these activities.

5. In some villages bullock carts were not available.

6. In some villages the produce of large number of farmers was transported by the buyer in his own truck or trolley attached to tractor.

7. In some villages the bullocks were only occasionally used for transportation and therefore these were not conversant to transport conditions of towns and were prone to accidents on State and National highways.

One of the objectives of the study was to know the impact on employment of bullock cart owners.

Of the 100 sample farmers only 6 (3 each in Kundam and Katni blocks) hired their bullock carts to others. The total number of days so hired was 280 or 47 days per farmer. The wages earned were Rs.9,200 or Rs.1,533 per farmer and Rs.33 per day.

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