



# Socio-Economic Condition Assessment Report Wakal River Basin, Rajasthan, India







Integrated Management of Coastal and Freshwater Systems

# Socio-Economic Condition Assessment Report Wakal River Basin, Rajasthan, India

Funding for the Socio-Economic Condition Assessment Report for the Wakal River Basin, Rajasthan, India was provided by the people of the United States of America through the U.S. Agency for International Development (USAID), as a component of the Integrated Management of Coastal and Freshwater Systems Leader with Associates (LWA) Agreement No. EPP-A-00-04-00015-00. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Agency for International Development of the United States Government or Florida International University.

# Copyright © Global Water for Sustainability Program – Florida International University

This publication may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. No use of the publication may be made for resale or for any commercial purposes whatsoever without the prior permission in writing from the Florida International University - Global Water for Sustainability Program. Any inquiries can be addressed to the same at the following address:

## Global Water for Sustainability Program

Florida International University Biscayne Bay Campus 3000 NE 151 St. ACI-267 North Miami, FL 33181 USA

Email: glows@fiu.edu

Website: www.globalwaters.net

## For bibliographic purposes, this document should be cited as:

GLOWS-FIU. 2008. Socio-Economic Condition Assessment Report: Wakal River Basin, India. 2008. Global Water Sustainability Program, Florida International University. 57p.

ISBN:

Cover Photographs: Woman drawing water from a well in the Wakal River Basin, Rajasthan, India. (John M Steifel).



#### **PREFACE:** About GLOWS

The Global Water for Sustainability (GLOWS) program is a consortium financed by the United States Agency for International Development (USAID) working to increase social, economic, and environmental benefits to people through clean water, healthy aquatic ecosystems and sustainable water resources management. Launched in early 2005, GLOWS works on-the-ground to implement improved practices, build local capacity through multi-level training activities, and share lessons learned and advancements in the practice of Integrated Water Resources Management.

Because water resources touch so many elements of human systems and ecosystems, management must be integrated across water use sectors, across scales of governance, across space in a river basin context, and across time. Many current water problems stem from the fragmented, single-issue and single-sector approaches that have characterized water resources management in the past. GLOWS works to integrate the environmental, technical, governmental, and management elements of IWRM. The basic goal is to manage the human and environmental elements of IWRM to ensure that abundant quantities of sufficiently clean freshwater are available in the correct place at the correct time. This requires a governance and management system that integrates science-based understanding of the natural controls on water abundance and quality with appropriate and effective human technologies and actions.

Working at a basin, watershed or aquifer scale, the GLOWS partner organizations provide expertise across the policy, governance, institutional, educational, and technical dimensions of IWRM. Approaches combine advanced analytical techniques, innovative mechanisms for sustainable resource management and biodiversity conservation, community-based programs in poverty alleviation, improved sanitation and potable water supply, and global networking of local NGOs to achieve IWRM objectives.

# **TABLE OF CONTENTS**

Chapter	]	Page
ACKNOWLE	CDGEMENTS	
ACRONYMS	5	
LIST OF TA	BLES	
PREAMBLE.	1-2	2
CHAPTER -1	1: WAKAL RIVER BASIN: A BRIEF PROFILE	3-9
11	Location	
1.1.	Geographical Area	
1.2.	Lond Lice & Lond Cover	
1.3.	Tana granhy & Climata	
1.4. 1 <i>5</i>	Topography & Chinate	
1.5.	Drainage Pattern	
1.6.	Road & Transportation	10
CHAPTER -2	2: COMMUNITY IN WAKAL RIVER BASIN10-	18
2.1.	Villages	
2.2	Households	
2.3.	Population	
2.4.	Sex Ratio	
2.5.	Caste Composition	
CHAPTER-3	3: SOCIO-ECONOMIC STATUS19	-34
3.1.	Culture	
3.2.	Food Security	
3.3.	Gender Role	
3.4.	Education Status	
3.5.	Health Status	
3.6.	Sanitation Situation	
3.7.	Livelihood	
3.8.	Institutional Profile	
<b>CHAPTER -</b> 4	4: WATER AS SOCIO-ECONOMIC RESOURCE35	5-37
4.1.	Water Use	
4.2.	Drinking Water	
4.3.	Irrigation Source and Pattern	
CHAPTER -	5: MAJOR FINDINGS & SUGGESTIONS	8-39
ANNEXURES	S40-56	)
Annex	xure-1: Maps	
V	Wakal River Basin	
V	Wakal Basin with Tehsil Boundary	
I	Location of Villages in Wakal River Basin	
I	Location of Micro Watersheds	
F	Households in Wakal Basin	
ŀ	Household Size – Wakal Basin	
Ι	Distribution of Male & Female Population	
Т	Fotal Population 0-6 years Age Group	
F	Population Density	
S	Schedule Caste Population	
Ν	Male and Female Literacy Rate	
S	Sex Ratio	
Γ	Distribution of Working Population	

Work Participation Rate – Female	
Workers and Non Workers	
Wakal River Basin	
Annexure-2: Demographic Information	
Wakal River Basin	
Villages in Gogunda Tehsil	
Villages in Girwa Tehsil	
Villages in Jhadol Tehsil	
Villages in Kotra Tehsil	
REFERENCES	57

### ACKNOWLEDGEMENTS

The study on "Socio-economic condition in Wakal River Basin" was carried out as a part of Global Water for Sustainability (GLOWS) initiative in Wakal River Basin in Rajasthan, India. AFPRO has been assigned to conduct this study by World Vision ADP Navprabhat, Udaipur along with three other consultants who dealt with three different aspects viz. surface water, ground water and biodiversity in Wakal River Basin.

It was our great privilege to be a part of Wakal River Basin study and we acknowledge the GLOWS and World Vision ADP Navpravat for reposing their confidence and faith in AFPRO's competency in assigning the task to study the socioeconomic condition in Wakal River Basin. We extend our sincere thanks for the cooperation and support received from both GLOWS & World Vision.

AFPRO acknowledges the support it received from Ubeswar Vikas Mandal, Bagdunda; Astha, Udaipur; Seva Mandir, Udaipur; Rajastan Bal Kalyan Samiti, Jhadol; Mahan Seva Sansthan, Koliyari in conducting the primary study in the selected micro-watersheds. The field level support and hospitality provided by these organizations is valuable and highly appreciable.

We would also like to extend our sincere thanks to officials of different government departments like Panchyat Samiti, Tehsil office, Education, Health, etc for their valuable support for collection of secondary data.

Last but not the least; the study could not be accomplished without the cooperation and active participation of all the communities of the villages we have visited for primary study. The hospitality and valuable inputs provided by the communities is highly appreciable.

September 2007

P. K. Dutta Unit Manager AFPRO, Udaipur

<u>Study Team</u>

Ms. Mamata Sahoo Specialist – Rural Sociology *Mr. V. D. Pankaj Executive Trainee- Agriculture* 



# ACRONYMS

GLOWS:	Global Water for Sustainability	
USAID:	U.S. Agency for International Development	
AFPRO:	Action for Food Production	
AFU-III:	AFPRO Field Unit –III	
NGO:	Non Government Organization	
IWRM:	Integrated Water Resource Management	
Sq. Km:	Square Kilometer	
G. P:	Gram Panchayat	
SWC:	Soil & Water Conservation	
WHS:	Water Harvesting Structure	
GO-1:	Gogunda – 1	
JH-1:	Jhadol – 1	
JH-2:	Jhadol – 2	
JH-3:	Jhadol – 3	
KO-1:	Kotra – 1	
KO-2:	Kotra – 2	
KH-1:	Khedbrahma – 1	
HH:	Household	
SC:	Schedule Caste	
ST:	Schedule Tribe	
OBC:	Other Backward Caste	
PDS:	Public distribution System	
STD:	Sexually Transmitted Diseases	
CHC:	Community Health Centre	
PHC:	Public Health Centre	
TBA:	Trained Birth Attendant	
RSSC:	Rajasthan State Seed Corporation	
SHG:	Self Help Group	
DAP:	Di-Amonium Phosphate	
DRDA:	District Rural Development Agency	
PRA:	Participatory Rural Appraisal	
NH:	National Highway	
SH:	State Highway	
BFT:	Bare Foot Technician	
TOT_WORK:	Total Worker	
WORK_CL:	Worker – Cultivator	
WORK_AL:	Worker – Agriculture Labourer	
WORK_HHI:	Worker – Household Industry	
WORK_OW:	Worker – Other Worker	
NAREGA:	National Rural Employment Guarantee Act	

### LIST OF TABLES

Table 1:	River basin in India	3
Table 2:	Distribution of basin areas in different tehsils	5
Table 3:	Land classes in Wakal River Basin	6
Table 4:	Distribution of villages of Wakal River Basin in different tehsils	10
Table 5:	Micro watersheds/villages selected for primary study	11
Table 6:	Households in the Wakal Basin	13
Table 7:	Distribution of villages of Wakal Basin in different tehsils	14
Table 8:	Population, family size and population density in Wakal Basin	15
Table 9:	Category of villages in different tehsils as per the population	15
Table 10:	Sex Ratio in Wakal Basin	16
Table 11:	ST & SC population and their proportion to the total population	17
Table 12:	Category of villages as per ST population	18
Table 13:	Category of villages as per Literacy Rate	22
Table 14:	Seed varieties & performance	26
Table 15:	Worker, non worker population and work participation rate	32
Table 16:	Categories of working population and their proportion to total worker	33



# PREAMBLE

**R** ajasthan is the largest State of India with a land area of 3,42,239 Sq. Km. and population 56.47 million of which 43.26 million population is rural and 13.20 million urban (as per the results of the Census of India 2001). It has only 1% water resources whereas total area is 10.41% and total population is 5% of the entire country. Twelve districts of the State, which comprise of 60% of the area fall within the Great Indian Desert of Thar where 64% of its population resides, despite scanty rainfall with all its variation, timing and intensity. This is the most populous desert in the World. Administratively the State is divided into 32 districts and 241 Tehsils. It has 32 Zila Parishads and 237 Panchayat Samities. Wakal River Basin falls under the Udaipur district of Rajasthan and Sabaratkanta district of Gujarat.

Wakal river basin in Rajasthan has been selected by GLOWS as one of the three river basins i.e. Pastaza in Peru, *Wakal in India* and Mara in Kenya/Tanzania from three critical regions (South America, Asia and Africa) for study of water resources and to find out site-based activities that seek to foster sustainability through the development and implementation of integrated technical, economic, organizational, and political approaches to Integrated Water Resource Management (IWRM).

Global Water for Sustainability Program, Known as GLOWS, is a consortium sponsored by the U.S. Agency for International Development (USAID). GLOWS program was lunched in early 2005, which works on the ground to implement improved practices, build local capacity through multi level training, and share lessons learned and advancements in integrated water resources management with local and global partners.

On behalf of GLOWS, World Vision has been given responsibility as field level facilitator for the Wakal River Basin study in Rajasthan. To conduct the study GLOWS decided to cover four specialised areas such as study on surface water, ground water, biodiversity and socio-economic condition. Accordingly the specialist consultants were consulted and given responsibilities for the respective areas. Finally, four consultants were engaged to conduct the study, out of which AFPRO was selected as one of the consultants to conduct study on socio-economic condition of Wakal river basin.

The study on Socio-Economic condition was carried out with the following objectives;

- To understand the socio-economic conditions of the community living in Wakal River Basin
- To study availability, accessibility, use and management of water resources
- To study women role in water resource management and feasibility of formation of co-gender Water User's Association in the river basin.

The processes/methodologies adopted to carry out the study are as follows;

Demarcation of Wakal River Basin



- Identification of villages coming under Wakal basin
- Collection of secondary demographic data of all villages from census 2001
- Collection of secondary data related PDS, Water Sources, education infrastructure, health, etc. from Panchayat Samiti, PHC/CHC,
- Tehsil, etc. Primary study in the sample villages/micro-watersheds
- Data analysis and interpretation
- Production of different maps
- Report writing

After demarcation of basin boundary, seven micro watersheds were selected, which are spatially spread and located in different tehsils & at different locations of the basin to conduct primary study. For primary study in the selected watersheds, different PRA

tools like village profiling, tree matrix, seasonality, problems analysis, focused group discussion with women, etc were used to understand the ground reality of socioeconomic condition in Wakal river basin. Further, household survey was carried out with sample families and to conduct the same a survey format was prepared and used. Household survey was carried out with 10% of the total households selected randomly from



each of the village selected for primary study. Village wise secondary demographic data like households/families, population, sex ratio, literacy rate, SC & ST population,

working population were collected and compiled. Visit was also made to Panchayat Samiti, Tehsil, PHD, Electricity Department, Hospital, etc. and discussion was held with the officials to generate information about PDS, water sources. BPL families, education infrastructure, diseases, etc. The data collected from the primary and secondary sources were compiled and analyzed to project the socioeconomic condition of the communities living in the villages of Wakal River Basin.



Wakal river basin is located in the southern part of Aravali Mountain and lies between 24°46' 34.65" & 24° 8' 49.41" north latitudes and 73° 6' 23.41" & 73° 35' 54.18" east longitudes. It occupies a total area of 1914.322 Sq. Km in the southern part of Aravali Hills and 98% of its areas is coming under Udaipur district of Rajasthan where as the remaining 2% areas fall under the Sabarkanta district of Gujarat.

There are 313 villages, 49110 households with total population 257266 inhabits the Wakal river basin. Wakal river basin is one of the water scare basin and inhabited by tribal communities. Schedule tribe constitutes 71% of the total population of the Wakal river basin. The findings of the study on socio-economic in Wakal river basin has been elaborated in the subsequent chapters in detail.



# CHAPTER-1 WAKAL RIVER BASIN: A BRIEF PROFILE

A River basin is the portion of land drained by a river and its tributaries. It encompasses the entire land surface dissected and drained by many streams and creeks that flow downhill into one another, and eventually into one river. The final destination is an ocean. As a bathtub catches all the water that falls within its sides, a river basin sends all the water falling on the surrounding land into a central river and out to the sea. Depending upon basin area, Indian rivers have been divided into following three categories:

Table 1					
	River basin in India				
S.No.	S.No. River Basin Area(Sq. Km) Number				
1.	Major	Equal to or more than 20,000	13		
2.	Medium	Between 2000 to 20,000	45		
3.	Minor	Less than 2000	55		

Source: Central Pollution Control Board, Delhi.

Out of 13 *Major River Basins*, three are international and ten are interstate. The three international basins; the Ganga, the Brahamputra, the Indus have snow –fed rivers originating in the Himalayas whereas the interstate basins have rivers originating either in Central India or peninsular regions.

*Medium River Basins* occupy 8% of total basin area and about 119940 million cubic water flows through them. Out of forty-five Medium river basins, four are international and eleven are interstate. A total of seventeen rivers having a combined basin area of 63500 square kilometers join the Arabian Sea, while other 24 having a combined basin area of 210596 square kilometers fall in the Bay of Bengal. Rest four rivers originate in India and ultimately cross the national boundary.

The total area of *Minor Basins* is 9% of total basin areas of Indian rivers while runoff is 127 MCM. There are fifty-five Minor river basins having a combined basin area of about 2 lakh square kilometers. Most of them originate from Eastern and Western Ghats. In addition to these there are few desert rivers too, which flow for some distance and get lost in the deserts.



Sabarmati River is one of the major west flowing rivers of India. The basin drains an area of 21,565 Sq. km, of which 17,441 Sq. km lies in the state of Gujarat and 4,124 km2 in Rajasthan. It is approximately 371 km in length and it originates in the Aravalli Range of the Udaipur District of Rajasthan. In its initial course, it is called as *Wakal*.

As per the classification of river basin based on area, Wakal river basin can be categorized as a minor basin as it occupies as area 1914.322 Sq. Km which is less than 2000 Sq. Km. Different feature of Wakal river basin has been deciphered in the subsequent sections.

# 1.1. LOCATION

Wakal River is one of the tributaries of Sabaramati river basin. This water deficit basin lies on the west coast of India between latitudes  $24^{\circ}$  46'  $34.65^{"}$  N to  $24^{\circ}$  8' 49.41" N and longitudes  $73^{\circ}$  6'  $23.41^{"}$  E to  $73^{\circ}$  35'  $54.18^{"}$  E and spread across the States of Rajasthan & Gujarat. The entire Wakal River Basin is falling in 5 tehsils i.e. Gogunda, Girwa, Jhadol, Kotra tehsil of Udaipur district of Rajasthan and



Khedbrahma tehsil of Sabarakanta district of Gujarat. 98% of the total basin falls in the Udaipur district of Rajasthan.

### 1.2. GEOGRAPHICAL AREA

Table 2

Wakal Basin drains an area of 1914.322 Sq. Km, of which 1867.478 Sq. Km (98%) lies in the state of Rajasthan and 46.844 Sq. Km in Gujarat. In Rajasthan state, the basin is completely fall under Udaipur district though it occupies only 13.1% area of the district total.

Following table and diagram highlights the distribution of total area of Wakal River Basin in different tehsils.

Distribution of basin areas					
in different tehsils					
Tabail	Area (S	q. Km)	0/		
I ensu	Total	Wakal	70		
Gogunda	907.73	268.733	29.6		
Girwa	1887.46	48.415	2.56		
Jhadol	1441.00	715.401	49.64		
Kotra	2422.37	834.929	34.47		
Khedbrahma	NA	46.844	NA		



The geographical spread of Wakal Basin is mainly in Udaipur district of Rajasthan. 98% area of the basin is coming under Udaipur district of Rajasthan where as the remaining 2% area is in Sabarkanta dist of Gujarat State. Major part of the Wakal basin (81%) is coming under Kotra and Jhadol tehsil of Udaipur district.

### 1.3. LAND USE & LAND COVER

Satellite image of Wakal river basin was accessed and processed to know the land use and land cover classes in the basin. Wakal basin is comparatively rich in forest resources, which constitutes 43% of the total area of Wakal Basin. The land use and land cover classes in Wakal river basin are depicted in the following table and figure

Table 3			
Land classes in Wakal River Basin			
Sl. No	Land Classes	Area (Hectare)	
1	Dense Forest	53789.8125	
2	Open Land	71676.8125	
3	Land under River / Lake	1386.6875	
4	Agriculture land	21769.875	
5	Scrub Land	18339.625	
6	Open Forest	25580.875	
7	Settlement	88.4375	



The bird's view of land use and land cover in Wakal River Basin is presented through the following land use & land cover map.





Prepared By: AFPRO GIS Lab Source: IRS PS: LISS III Data

### 1.4. TOPOGRAPHY & CLIMATE

The topography of the Wakal river basin is basically undulating one with varying slope. Drainage density is comparatively more in the Wakal Basin and streams are originated from the hill slopes. Climate of the Udaipur district is moderate without significant seasonal variations. January is the coldest month, with daily maximum and minimum temperatures of 22.2° C and 7.3° C. May is the hottest month of the year with a mean daily maximum and minimum of 39.5° C and 27.3° C respectively. Night temperature in June is relatively higher than the May. With the onset of South West monsoon by about mid-June, the temperature goes down considerably. Wakal Basin receives rainfall mainly from South West Monsoon during June to September. Relative humidity is high from July to September.



### **1.5. DRAINAGE PATTERN**

Wakal River originates northwest of Udaipur district near Sran village in Gogunda tehsil of Udaipur districts. On the way of its draining to Sabarmati River, tributaries like Mansi and Pamri rivers feed water to Wakal river. The maximum length of the basin is 71.22 km (N-S) and the maximum width is 41.01 km (E-W). Mansi is the main tributaries of Wakal which meets Wakal near Birothi in Jhadol tehsil. Wakal River drains out to Sabaramati near Delwada in Khedbrahma tehsil of Sabarkanta district of Gujarat.



Prepared By: AFPRO GIS Lab Source: AFPRO GIS Lab



### 1.6. ROAD & TRANSPORTATION

Wakal River Basin is accessible from district head quarter Udaipur through a metal road which goes up to Kotra passing through Jhadol tehsil. Villages of Wakal can also be accessible from Udaipur to Gogunda by NH -76 and then by SH-10 to reach up to Kotra. Majority of villages are connected by *Kachcha* road from the nearest market places.





# CHAPTER-2 COMMUNITY IN WAKAL RIVER BASIN

Rajasthan's population includes many tribals, who constitute 12% of the state population, nearly double the national average. The main tribes of Rajasthan are the Bhils and the Meenas that were the original inhabitants of the area now called Rajasthan. But they were forced into the Aravalli Range by the Aryan invasion. Smaller tribes include the Saharia, Garasias and the Gaduliya lohars. The tribes share common traits, which seem to link their past together but it is the differences in their costumes and jewellery, fair and festivals that set them apart from one another.

Wakal river basin is mainly inhabited by tribal communities which constitutes 71% of the total population of the basin. Out of 313 villages in Wakal Basin, 23% of villages are totally inhabited by tribal population only.

### 2.1. VILLAGES

Wakal River Basin constitutes 313 villages (As per G. T. Sheet – 436 villages), out of

which 305 villages are coming in Udaipur district of Rajasthan where as only 8 villages are in Sabarakanta district of Gujarat State. Most of the villages (84%) are in Jhadol and Kotra tehsil, where as only 3% of villages are in Khedbrahma tehsil. 67% villages of Jhadol tehsils are located in Wakal river basin. All

<b>Total Villages</b>		
Rajasthan	: 39810	
Udaipur	: 2405	

305 villages of Wakal Basin in Udaipur districts are coming under 69 Gram Panchayat (G.P) of which 11 G.P are in Gogunda, 5 in Girwa, 40 in Jhadol and 13 in Kotra tehsil.

The following table and figure reflects the distribution of villages of Wakal Basin in different tehsil.

	Table 4		
Distribution	of villages of	Wakal River	Basin
	in different to	ehsils	
Tehsil		Villages	
	Total	Wakal	%
		Basin	
Gogunda	151	28	18.54
Girwa	305	12	3.93
Ihadol	258	174	67.44
Kotra	304	91	29.93
Khedbrahma	144	8	5.55
Total	1162	313	26.94





Seven villages were selected for primary study, which are located in different tehsils and at different location of the river basin. The selection of these villages is made in such a way which can represent the characteristic of the basin as a whole. The basic profile of these seven villages is deciphered as follows;

Micro watersheds/villages selected for primary study					
Village/	G. P	Tehsil	Code	G.T.	HHs
Micro-				Sheet	<b>Covered</b> for
watersheds					Sample
					Survey
Badundia	Majawad	Gogunda	GO-1	45 H/10	14
Malpur	Chandwas	Jhadol	JH-1	45 H/7	11
Uplisigri	Nichlisigri	Jhadol	JH-2	45 H/8	29
Karauli	Thobawada	Jhadol	JH-3	45 H/7	7
Tandla	Jura	Kotra	KO-1	45 H/2	5
Gaupipla	Badli	Kotra	KO-2	45 H/3	29
Vinchhi	Thadevedi	Khedbrahma	KH-1	45 H/3	29

Table 5Micro watersheds/villages selected for primary study







Propagation By APPEND GL5 cup. Source: Survey of India Topodraw

### 2.2. HOUSEHOLDS

Wakal river basin is inhabited by 49110 households with total population 257266. Total families inhabiting in five tehsils i.e. Gogunda, Girwa, Jhadol, Kotra & Khedbrahma are 284585, out of which 49110 families (17.26%) are residing in the basin area of Wakal river.

Total HHs		
Rajasthan	: 9317675	
Udaipur	: 507829	

Tobail	Households		
I CHSH	Total	Wakal	%
Gogunda	30133	5863	19.46
Girwa	147631	2924	1.98
Jhadol	37648	30357	80.63
Kotra	31449	10261	32.63
Khedbrahma	37724	2246	5.95
Total	284585	49110	17.26

Table 6



Out of 313 villages, 49% of villages inhabit with 100 & below families, 26% of villages with 101-200 families, 12% with 201-300 families and the remaining 13% villages are comparatively bigger villages and inhabiting with more than 300 families.

The following table shows the distribution of villages in different tehsil and Wakal basin as a whole as per the families inhabiting.

Distribution of villages of Wakal Basin in different tehsils							
Tehsil	Villages Having Total Families						
	Below 100	101-200	201-300	< 301	Total		
Gogunda	7	8	5	8	28		
Girwa	3	4	2	3	12		
Jhadol	83	47	21	23	174		
Kotra	59	20	8	4	91		
Khedbrahma	1	3	2	2	8		
Total	153	82	38	40	313		

Table 7Distribution of villagesof Wakal Basin in different tehsils

### 2.3. POPULATION

Rajasthan is the largest State of India with population 56.47 million and the total population is 5% of the entire country. Udaipur district is having total population 2.63 million, out of which only 10% of the population in residing in villages coming under Wakal river Basin.

<b>Total Population</b>						
India	: 1,027,015,247					
Rajasthan : 56,473,122						
Udaipur	: 2633312					



Population, family size and population density in Wakal Basin							
Tehsil		Population			Population		
	Total	Wakal	%	Size	Density		
Gogunda	151575	28768	18.98	5	107		
Girwa	740863	14925	2.01	5	308		
Jhadol	193810	142658	73.61	5	199		
Kotra	183504	57052	31.09	6	68		
Khedbrahma	223502	13863	6.20	6	296		
Total	1493254	257266	17.23	5	134		

Table 8

Population of Wakal basin is 257266, which comprises 130191 male and 127075 female. Children population between the age group of 0-6 yrs is 56354 (Male Child-28269, Female Child-28085). 78% of population is residing in Jhadol & Kotra tehsil of Udiapur district.

The following table depicts the category of villages in different tehsils as per the population.

Tehsil	Villages Having Population					
I CH5H	50-500	501-1000	1001-2000	2001 above		
Gogunda	7	8	11	2		
Girwa	2	5	3	2		
Jhadol	75	53	33	13		
Kotra	56	21	10	4		
Khedbrahma	1	2	4	1		
Total	141	89	61	22		

Table 9 ant tal - 1

It has been found that population varies from 50-500 in 46% villages, 501-1000 in 28% villages, 1001-2000 in 19% of villages and only 7% of villages are having population more than 2000.

2.3.1. Family Size: Family Size is comparatively big in the villages of Wakal Basin. The average family size varies from 5-6 in the different tehsils. As Khedbrahma Kotra & tehsil is comparatively backward and situated in the boarder area of Rajasthan & Gujarat, the average family size is 6 where as the average family size in the villages coming under Gogunda, Girwa & Jhadol tehsil is 5. It has been reported during primary study that there are families having 10-14 children also.



2.3.2. Population Dens	ity: Population density in the wakal river basin is 134 per
	Sq. Km. which comparatively less than the population
<b>Population Density</b>	density of Udaipur district which is 196 per Sq. Km.
India 324 Rajasthan 165 Udaipur 196	Villages of Wakal River Basin coming in Girwa tehsil are highly populated and the population density is 308 per Sq. Km. where as villages in Kotra tehsil are least populated and the population density is only 68 per Sq. Km.

#### 2.4. SEX RATIO

Sex Ratio in Wakal River Basin is 976, comparatively higher than the district, state and national figure. The future trend of Sex Ratio has also shown a positive trend. Sex ratio in the age group of 0-6 yrs in Wakal Basin is 993, which is higher than the present Sex Ratio.

<u>Sex Rat</u>	io	
India	<i>933</i>	
Rajasthan	922	
Udaipur	<i>972</i>	

Sex Ratio in Wakal Basin Sex **Tehsil** Sex ratio Ratio 0 6 995 Gogunda 989 997 Girwa 980 976 Jhadol 989 Kotra 965 1000 Khedbrahma 996 999 Wakal Basin 976 993

Table 10



### 2.5. CASTE COMPOSITION

The population of Scheduled Tribes in Rajasthan is 70.97 lakhs or 12.56% of total population. The tribes in the State are of varied ethnic composition and cultural patterns comprising the Bhil, Damor, Meena, Garasia, Kathodi and Saharia. The first three tribes are concentrated mainly in Banswara, Dungarpur, Southern half of Udaipur district and parts of Chittorgarh, the fourth in Sirohi district and the Saharia in parts of Baran district.

Bhils are the most dominant tribes in Udaipur district; derive their name from the Dravidian word, Billu, meaning a bow. They live in scattered hutments separated widely, or parched on hilltops, depending upon the topography. There are 1,861,502 Bhils (Census of India, 1981) in Rajasthan; they constitute 44.50 percent of the total population of Scheduled Tribes. They inhabit the villages of the state where they



practice agriculture, wherein both men and women participate. They are spread all over the state but are mainly concentrated in the districts of Udaipur, Banswara and Dungarpur. Kathodis are a small, primitive and isolated community inhabiting Jhadol and Kotra tehsils in Udaipur district. Garasias are also found in Udaipur district, but with less numbers.

Tribes are the dominant caste group inhabiting the Wakal River Basin. Total population of Schedule Tribe (ST) is 181748 which are about 71% of the total population of the Wakal Basin. Population of Schedule Caste (SC) in Wakal Basin is very meager which constitutes only 2.89% of the total population. Other communities inhabits in the river basin are Rajput, Suthar, Mahajan, etc. The following table shows the tehsil wise ST & SC population and their proportion to the total population.

Table 11

ST & SC population and								
their pro	their proportion to the total population							
Tehsil	Popul	lation	Prop	ortion				
	ST	SC	ST	SC				
Gogunda	16004	1939	55.63	6.74				
Girwa	13511	79	90.53	0.53				
Jhadol	95298	4136	66.80	2.90				
Kotra	43354	1283	75.99	2.25				
Khedbrahma	13581	5	97.97	0.04				
Wakal Basin	181748	7442	70.65	2.89				



From the analysis of the status of villages on the basis of ST population, it has been found that out of 313 villages, 73 villages are having 100% tribal population. The following table highlights the category of villages as per the tribe population.



Tehsil	No. of Villages Having ST Population						
	0%	1-25%	26-50%	51-75%	76-99%	100%	
Gogunda	1	3	10	6	6	2	
Girwa	0	1	0	1	9	1	
Jhadol	10	14	22	29	71	28	
Kotra	11	8	5	7	23	37	
Khedbrahma	0	0	0	0	1	7	
Wakal Basin	22	26	37	43	110	75	

Table 12 Category of villages as per ST population

From the household survey with 124 sample families, it has been found that 89% of families covered under survey were ST, 4% SC, 4% OBC and the remaining 3% families were belong to General category. It has been concluded from primary as well as secondary data that Wakal Basin is dominated by tribal population of Bhil, Gameti, Garasia, Mina and Kathodi tribe. The population of Bhil tribe is comparatively higher than the other tribal communities.

# CHAPTER -3 SOCIO-ECONOMIC STATUS

Our society consists of different categories of people having differing economic and social status and strength. Neglected sections which remained away from the main stream of development are termed as weaker sections. Central and State Governments are providing special attention to these sections to enhance their socioeconomic status. Though Central and State government are lunching several schemes for development of these people, it has not been reached to the ground or target populace owing to low education profile and lack of awareness of these communities. Wakal river basin is largely inhabited by the weaker sections i.e. tribal communities with poor economic status. Poor financial status forced the communities to suffer in the vicious circle of poverty. Small land holding coupled with rain fed farming results low agriculture production and food insecurity for the rural poor families. Insufficient income from agriculture, lack of alternate source of income and employment avenues forced rural poor families to migrate from their village which has a great impact on their social life.

The socio-economic status of communities of Wakal River Basin has been depicted in the following sections;

## 3.1. CULTURE

It has been well known that tribe loves to live in nature. They have a strong bond with nature and they derive their life style and livelihood from the nature and natural resources. The influence of modern civilization is now found in the life style of the tribes. Men wear pant & shirt where as women wears the traditional dress but not the *saree*. Wearing *saree* by women is not the culture in the villages of Wakal Basin.

Diwali, Holi and Rakhya Bandhan are the three major festivals that have been celebrated by all communities residing in Wakal Basin in the month of November, March and August respectively. Tribes celebrate Holi festival in the month of March with lots of fun and enjoyment. They wear new dress, prepare sweets for their own families and also distribute it to their neighbor and relatives. Get together at a common place and dancing together in night is a peculiar feature of tribal communities to celebrate Holi. Get together and dancing continues for 5-6 days from

the date of Holi. Villagers spend Rs.1, 000.00 to Rs. 3,000.00 on the occasion of Holi depending upon their financial condition.

Different tribes restrict to marry their child in the same tribe, for example Bhil communities marry their son or daughter in Bhil only. From the primary survey it has been found that in most of the tribes, the marriage age of a girl varies between 13 - 17 years while a boy gets marry at the age between 16-20 years.





### 3.2. FOOD SECURITY

Agriculture in Wakal River Basin is basically rain fed. The rainfall receives is mainly erratic in nature which results in frequent crop failure and food insecurity. Due to low agriculture production and big family size, the total grain produce from the own field is not sufficient to feed the family round the year. From the sample household survey it has been found that 2% of families have no food security as they are land less. 28% of families have food security only for 3-4 months, 38% of families can survive from their own produce for 5-6 months and, 26% of families for 7-8 months. Only 6 % of families are comparatively in better position due to food security.

**Public distribution System** (PDS) run by Government has a great help to the poor communities of Wakal Basin. During the discussion with the local dealer of PDS outlet at Kotra tehsil in Rajasthan, it has been reported that a BPL family is eligible for 35kg of wheat per month at the rate of Rs. 4.60/kg, 600gm of sugar per member per month at the rate of Rs. 13.50/kg and 3 litres of Kerosine per month at the rate of Rs. 10.00/litre. In case of Gujarat state, the quantity and rate of the items supplied through PDS is found different. At a discussion with the local dealer in the Kotda in Gujarat, it has been reported that the quantity of grain supply for a BPL family depend upon the family size. The supply of Wheat to a BPL family through PDS outlet is 3kg/2 members, 4.5 kg/3 members, 7.5 kg/5 members and 9 kg/6 members & above with a rate of Rs. 2/kg. The quantity of Sugar is 500gm per member per month with the similar rate as prevailed in Rajasthan i.e. Rs. 13.50/kg. Kerosin is being distributed twice in a month with a total of 10 litres per family at a rate of Rs. 9.20/litre.

BPL families are mostly dependent on PDS outlet to feed their families as they can get the grains with reasonable price than the market.

As per the discussion with the communities during field study, it has been reported that they are supposed to receive the above mentioned items on monthly basis but they receive the same with an interval of 2-3 months. The quality of wheat supplied through PDS is also not good.

**3.2.1. Food Habits:** From the sample survey, it has been found that 93% of the families have two meals a day mainly and it is in the morning and evening. Chapatti and Kadi (made by curd) or Chapatti & Rabdi (Prepare with Maize) or Chapatti & Dal is mainly the food habits of the communities of Wakal Basin. Consumption of vegetables is rarely found in the Basin. Villagers love to consume *Chhach* (Butter Milk) with their meal. Vegetable consumption is meager in the food habits of the tribal communities and they mostly have Chapati with onion and chilly.

There are several traditions prevailing among tribes about food intake by pregnant and lactating mother. The pregnant mother is prohibited to eat ghee, oil seeds, groundnuts, curd and hot foods. Newly delivered mother is given several types of herbal products and wax with ghee to eat. It is believed that during pregnancy rich foods containing ghee and fat is injurious to health of womb and after the delivery it is good for the health of mother as well as child. Kathodi and Garasia tribe believe that during pregnancy use of forest foods and animal foods are good for health of mother and child. Kathodi women eat monkey meat during delivery.



### 3.3. GENDER ROLE

Gender division of labour is very prominent in the domestic, community and economic sphere. 90% of domestic works are being done by women folk where as their involvement in community work or decision making process is less. Collection

of water, fodder and fuel wood is the sole of responsibility of Women folk. A woman spends almost 4-5 hrs daily for these activities. Technology promotion for increasing availability of water, fodder and fuel wood would be great help to reduce women drudgery. In the patriotic society, it is the woman who cooks for the family which devours almost 2-3 hr of women's time daily. In villages people uses traditional chullah for cooking, which not only take more time to



cook but also consume more fuel wood and generate more smoke which is hazardous for women health.

Women have less access and control over economic activities. Women are equally involved in agriculture and wage employment like men. In case of agriculture, women are mainly involved in seed preservation, sowing, weeding, harvesting, etc where as ploughing, fertilizer application, irrigation, threshing and marketing of produce are look after by men folk. There is no technological innovation in the work sphere of women.

From the daily routine, it has been noted that a woman works for 16-17 hrs daily and could rest only for 1-2 hrs in between, where as the working hours for a man is generally of 12-13 hrs and leisure hours for them is also more i.e. 3-4 hrs daily.

Promotion of water harvesting and ground water recharge, renovation of drinking water sources like open wells, creating of new drinking water source will save women time and reduce physical labour by increasing availability & accessibility to water sources. There is a great potential to protect and develop private and common pasture land in order to increase the availability of fodder and fuel wood. Promotion of simple technology like improved chullah will help in saving women time for cooking, reduce physical labour of women for collection of fuel wood and also help in improving health status of women.

### 3.4. EDUCATION STATUS

The state of Rajasthan is educationally one of the most backward states in India in spite of the government efforts of opening educational institutions and providing other factors for educating people. Only 39 percent of the population (age 7 years and above) have been found literate in the Census, 1991, as compared to 52 percent in the whole country, and 90 percent in the state of Kerala. The crude literacy rate for the present Scheduled Tribe population, on the whole, despite concerted efforts of government and non-governmental organizations is found a dismal 14 percent, with a

large range of difference (4.2 among Garasias to 25.3 percent among Damors) existing between individual tribal groups.

Literacy rate of Udaipur district is 59.26% (2001) and its 74.47% in case of male and 43.71% for female population. In case of rural areas, literacy rate is 52.52% where in male and female literacy rate is 69.52% and 35.46% respectively.

Literacy Rate (%)			
India	65		
Rajasthan	61		
Udaipur	59		

As per census 2001, literacy status of the Wakal River Basin is 47.91 percent. There also seems to be a wide gender gap in literacy, with only 33.11 percent of females as against 62.29 percent of males being literate. Literacy among women can serve as a major pointer towards assessing their status to a large extent. There is no doubt that the scheduled tribe womenfolk in Wakal Basin are still burdened with ignorance.



From the secondary data analysis, it has been found that only 6% of villages are having literacy rate above 80%. These villages are mainly in Jhadol tehsil.

Tehsil	No. of Villages having Literacy Rate					
	Below 10%	11-30%	31-50%	51-80%	81% & Above	
Gogunda	1	1	18	6	2	
Girwa	0	1	4	6	1	
Jhadol	0	16	49	94	15	
Kotra	13	41	29	8	0	
Khedbrahma	1	7	0	0	0	
Wakal Basin	15	66	100	114	18	

Table 13Category of villages as per Literacy Rate

**3.4.1. Community Awareness:** Education appears to be one of the most important factors influencing the demographic profile of the basin. The important vital events, fertility and mortality (particularly infant mortality – a development indicator as well),



vary with the educational attainment of a population/community. Low education profile and lack of awareness forced the communities to suffer in the vicious cycle of poverty.

### 3.5. HEALTH STATUS

It is generally presumed that tribals in India tend to be healthy, as they living in unpolluted surroundings away from the stresses and strains of modern living. This no longer hold good as evident from the many health reports appearing with health related problems. One of the basic factors which affect the tribal health is the physical environment from which majority of them draw their sustenance. Degraded ecosystems are no longer able to support tribal population, many of whom have registered a higher growth rate than the national average. On the contrary, there are tribal communities, which are actually declining and being threatened with extinction, because of malnutrition which renders them more susceptible to disease. The diseases which can be easily cured assume epidemic proportion among tribals because of isolation of their habitats, illiteracy and lack of access to medical care.

Health status of the communities inhabiting Wakal river basin are very poor. Food insecurity coupled with bad habits and lack of access to health services makes the situation worst. Early marriage, illiteracy and big family size results in malnutrition and frequent affliction of different diseases.

**3.5.1. Common Diseases:** It is observed during the study that apart from many seasonal diseases like fever, headache, cold and cough, skin disorders like boils, itching, eye diseases like conjunctivitis, trachoma, bronchitis, diarrhea, stomach ache, constipation, people also suffer from tuberculosis, typhoid, asthma, malaria, anemia, worm infestation and sexually transmitted diseases.

Firstly, the most frequent diseases among adult men are pain in different parts and joints of the body, fever and STDs, among women the headache, back/body pain, cough, cold, fever and STDs whereas the children mostly suffer from stomach disorders, skin diseases, diarrhea, measles and worm infestation.

**3.5.2. Water Borne Diseases:** During the discussion with the doctor of CHC-Kotra & Jhadol, it has been informed that Helminth Infection (Worm), skin diseases are the common water borne diseases in the basin. Other water borne diseases in the Wakal Basin are Diarrhea, Vomiting, Jaundice, Hepatitis, Typhoid, etc. Malaria, Dengue and Chicken Gunea fever are some of the water related diseases that afflict the communities of Wakal Basin. White discharge has found in women folk due to unhygienic condition and use of dirty water.

**3.5.3. Health Care System:** Health care system obviously becomes a major component towards the better quality of life of the people. In tribal areas, 3,000 populations are served by a sub centre and 20,000 populations have one Public Health Centre (PHC). Where as, for general population 5,000 persons are served by a sub centre and 30,000 populations have one PHC (Government of India, 1999). Community Health Centre (CHC) is generally located at tehsil headquarter. In tribal areas, the situation is actually worse than the figures indicate because, deficiencies in



modern equipment and medical supplies. The effectiveness of doctors in tribal area is less than the areas of total population. It has been observed in that lack of availability of doctor and other health workers in the PHC and CHC has also a great impact on the health status of tribal communities of Wakal basin.

During primary study and interaction with communities, it has been found that tribal communities of Wakal Basin are more dependent on Bhopa, the tribal priest. The tribal Priest known as Bhopa, whose service are sought after find out the cause of illness. The Bhopa worship the deities when epidemics and diseases are there in the village, he offers a sacrifice at the sacred place (Devra). He is mainly entrusted with the benevolent deities. Bhopa controls the malevolent deities. The dependency and believe on Bhopa are often responsible for the non-acceptance of modern medicine. The traditional approach established faith and assurance in the patients while modern medicine lacks it. The Bhopa share the common cultural beliefs and practices of the patients, naturally they have more faith in them.

In case of illness, villagers access the service of Bhopa first and if not cured then they approach the physician of the nearest PHC.

Asha Sahyogini and Trained Birth Attendant (TBA) are playing a vital role for the health care of women and children in the villages of Wakal River Basin.

To improve the health status of the communities, there is a need of health education especially for the women as they have a great contribution for family health.

## 3.6. SANITATION SITUATION

Sanitation condition of the villages of Wakal Basin is very poor. Low education profile and lack of knowledge on health education, personal hygiene is also very poor. Affliction of children as well as adult with skin diseases is commonly found due to poor hygienic practices. Sometime, animal and man stay in the same house, which also affect the health status.

Open defecation is the common practice in all most all villages. During the primary study, it has been reported that only one family, out of 124 families surveyed is having sanitary facility in their home. That is also not being used regularly as people are habituated with open defecation.



## 3.7. LIVELIHOOD

Communities of Wakal Basin derive their livelihood from the resource bases available within the village. Agriculture is the main source of livelihood for the communities. Due to small land holding and low agriculture production, the income from the agriculture is not sufficient to support the family expenses and therefore all most all the families depend on wage employment for the survival of their family. Due to lack



of employment opportunities within the village, many families migrate either to Udaipur or to different places of Gujarat for wage employment. Though most the family rears livestock but they derive a very meager income due to low productive animal, fodder scarcity and lack of knowledge on animal husbandry.

### 3.7.1. Agriculture

Agriculture is the main source of livelihood for the villagers of Wakal basin. Agriculture is mainly rain fed in nature and dependent on erratic rainfall results in frequent crop failure and therefore food insecurity.

**3.7.1.1.** *Cropping Pattern*: Maize and wheat are the major crop during Kharif (Rainy) & Rabi (Winter) season in the Wakal basin respectively. Single cropping practice is most prevalent in the Wakal basin due to rain fed farming. Cropping pattern differs from tehsil to tehsil. Monoculture is practiced in the villages of Gogunda i.e. Maize during Kharif season. Cropping practice in the villages of Jhadol during Kharif is mainly mixed one i.e. people cultivate both Maize and Tuar in the same piece of land, where as three crops are being taken as mixed crop in most of the villages in Kotra and Khedbrahma tehsil. It has been found that mixed cropping is less vulnerable to climatic variability and therefore more profitable. Green Gram is generally cultivated during Jayad (Summer) season and only few farmers having sufficient water in their wells goes for the third crop. Due to good rain fall during last two year helped few farmers to cultivate third crop.

**3.7.1.2.** Land Type & Holding: Wakal basin falls in Aravali range and therefore topography is undulation with varying slope. The scope for agriculture is limited due to degraded undulating land. Agriculture land are generally located at the hill slope and valley portion. The soil depth in the agriculture land varies from 30cm to 2.0m.

The land holding of farmers in Wakal Basin is very small and marginal. Due to more children, the land holding gradually decreases from generation to generation. It has found from the primary sample survey that 2% families were found landless and majorities (88%) of families are marginal farmer having agriculture land below 1 acre.

**3.7.1.3.** *Inputs Supply:* Most of the villages are using local seeds for cultivation of different crops. They store the seeds of their own field for cultivation in the next season. Farmers have also started cultivation of certified and hybrid seeds of Maize, Wheat, Tuar.

During the discussion with a local seeds retailer at Kotra, it has been reported that Rajasthan State Seed Corporation (RSSC), Udaipur is supplying certified seeds to the local retailers. As reported by the retailer, different varieties of certified seeds by RSSC that are suitable to the soil and climatic condition of Wakal basin are as follows;



Table 14

Сгор	Seed Variety	Seed Rate (Rs/Kg)	Harvesting Period (Days)	Seed Required (Kg/Ha)	Production (Qt/Ha)
Maize	PHEM 2	21.00	80	18-20	22-28
	Navyot	17.00	80	18-20	22-28
	PHEM 1	21.00	80	18-20	22-28
Wheat	LOK-1	16.50	120-130	100-120	40-45
	Raj 3077	16.50	135	100-120	45-50
	SW 273	15.00	125-130	100-120	40-50
	SW173	14.00	125-135	100-120	40-50
Tuar	BDN-2	45.00	135-140	12-15	12-15
Udad	Т9	55.00	65	18-20	15-18
Chana	Dhad Yellow	24.00	100-120	70-80	15-25
Til	RT-46	55.00	90-100	3-4	12-15
Mustard	Pusa Jaikisan	24.00	90-100	5-7	10-12
Green Gram	K 851	50.00	60	12-15	10-12

Seed varieties & performance

As per discussion with Agriculture Officer, Falasia; PHEM 2 and Novyot variety of Maize is most suitable to the soil and climatic condition of Wakal Basin.

Further to certified variety of Maize mentioned in the above table, villagers in Kotra and Khedbrahma tehsils prefer for hybrid variety of Maize seeds (Paras, Boom VMH 2015) which costs about Rs. 60-65 per kg in a motive to get good production from their small piece of land. They have to depend upon the market every year to purchase seed.

To reduce the dependency of people on market and to preserve local seeds, it is proposed to create seed bank at village level. Good quality of local seeds to be preserved in the seed bank to meet the seed requirement of farmers. Certified seeds are comparatively good than the hybrid variety as the seed can be used for 3 consecutive years. Due to water scare situation, it is recommended to promote seeds, which requires less water and also to be of short duration.

To enhance the production from their small land holding to feed their families and also due to use of hybrid seeds, use of chemical fertilizers has now been boosted in the Wakal basin. From the sample survey it has been reported that about 74% of families are using chemical fertilizer. Use of Urea and DAP is commonly found for the cultivation of Maize as well as Wheat. As per the local fertilizer retailer, the cost of Urea is Rs. 251/50 kg and DAP is Rs. 485/50 kg, where as villagers of all most all sample villages informed that they purchase a bag (50 kg) of Urea and DAP with a cost of Rs. 350.00 and Rs. 500.00 respectively. This indicates the exploitation of tribal communities by the local traders.

Use of chemical fertilizers not only affect the land fertility but also increase the cost of product and henceforth less return to the farmer. The farm yard manure that has


been used for crop production is not of proper quality, which encourages attack of termite and other pest resulting crop loss. To discourage use of chemical fertilizer, it has been recommended to promote organic farming practice. Promotion of Vermi Compost, NADEP technology for preparation of quality manure can be the best solution.



#### 3.7.2. Animal Husbandry:

The total livestock population of the Udaipur district is 2540369 as per Livestock Census of Rajasthan 1997, which constitutes 5% of the state livestock population. Livestock comprises cattle, buffalo, sheep, goat, camel, horse, donkey, pig and others. Poultry population of the district is

Livestock Population (1992)							
India	: 470860000						
Rajasthan	: 48441000						

432613, which is 10% of the state poultry population, comprising mostly cock and hens.

Livestock has been treated as secondary source of income next to agriculture, for the rural communities. It has a great contribution for the survival of poor families in drought years. Cow, Bullock, Buffalo are the big ruminants that are being reared by the communities of Wakal Basin. Tribal communities mainly prefer to rear small

ruminant i.e. goat as it is drought resistant and hardy animal. Due to water and fodder scarcity, goat rearing is the most profitable and suitable venture for the poor communities of Wakal Basin. In case of poultry, chicken are mainly reared by the tribal communities.

Big ruminants like cow and buffaloes are being reared by the tribal communities with a purpose of manure but not for milk.



These animals are of local breeds and due to fodder scarcity, the productivity is found very low. A cow gives only ½ to 1 liter of milk per day, while in case of buffalo; it is 2-5 liters per day. Communities of Wakal Basin also use goat milk for making tea and



a goat gives 100 to 400 gm of milk per day. Milk is generally not sold but consumed at the family level. Only small children consume milk and milk is used for tea purpose. Villagers generally prefer to drink *Chhach* (Butter milk) and they sell Ghee in the market as well as within the village.

From the primary survey with sample families, it has been found that goats constitute the larger proportion among the livestock population. Most of the families in Wakal Basin rears goat for selling purpose. Local traders come to the village and purchase bucks from the villagers with cost vary from Rs. 1000 - 1200 for a 12 months old buck. There is a great scope for promoting goat rearing on commercial basis. To ensure a good return from the goat rearing, it is proposed to introduce Shirohi breed goat, which is a local improved breed. Breed improvement through Shirohi will definitely help poor farmers to receive a good return as the growth and productivity of Shirohi breed is comparatively good than the local breed.

From the primary study, it has been found that 2% of families have no livestock, 14% rears big ruminants and 9% of families rears only small ruminants i.e. goat. Most of the families i.e. 75 % of families possess both small and big ruminants. The productivity of livestock reared by the communities is very low.



The composition of livestock as found in the primary survey has shown through the following diagram.

Due to lack of veterinary services at village level or even the locality, livestock are frequently affected with different diseases like Foot & Mouth diseases, throat disease, loose motion, Swelling of stomach, etc. To provide better health service to the livestock, Bare Foot Technician (BFT) can be developed at the village. Village youth can be trained as BFT to provide first aid service to livestock.

The productivity of animals is low also due to non-availability of sufficient fodder. It has also been observed that the wastage of fodder is also very high due to lack of awareness about the fodder saving technologies. Villagers generally serve fodder for their animal on the open ground and therefore there is huge wastage of fodder. To reduce the fodder wastage, construction of feed menzer can be an alternate solution.



 Wastage of fodder
 Fodder saving technique-Feed Menzer

Capacity building of communities on fodder preservation and improving fodder quality and animal care and management will be an added advantage.

#### 3.7.3. Wage Employment & Migration:

Migration has been a feature of all society historically. There have been different forms of migration - nomadic migration, migration for labour, migration due to war, displacement, etc. Perhaps today it is the changing context of the world and the extent and scale of migration which makes it a key feature of the time. Globalization has today precipitated the process due to increased opportunities at one level and disruption of livelihood and food security at the other. Migration in search of employment opportunities is quite prevalent in the villages of Wakal River Basin.

Family size is comparatively big and land holding is marginal in the villages of wakal basin. The income from the agricultural activities is not suffix to feed the family round the year. Lack of alternate source of income forced the villagers to depend on the wage employment for survival of their families.

For wage employment, villagers, mainly the male folk, from Jhadol, Girwa & Gogunda are generally come to Udaipur daily during the off season and they employed as labour in construction sites and also work for unloading goods. It has also been the trend that for wage employment, villagers come to Udaipur and different places of Gujarat and stay for 10-15 days in a month and go back to their home with a little saving.



Seasonal migration has also been quite prominent in Wakal River Basin. Villagers from Jhadol, Kotra and Khedbrahma tehsils are generally migrate to different place of Sabarakanta, Banaskanta and Mehsana district of Gujarat for wage employment. The destinations for the migrants to Gujarat are generally the agriculture field in places like Idor, Khedbrahma, Himatnagar, Disa, Planpur, etc. Migrants are generally



employed in two types of works in Gujarat, one is the employment in cotton field and received wage as cash and the second type of employment is working in other agriculture field and receive wage in term of grain.

These migrated villagers who work on the cotton fields get only Rs.35.00, even after working 8-10 hours in a day. The exploitation of labour who involves in other agricultural activities is worse than the worker of cotton field. In the second type of employment, all members of the migrated family work for the whole cropping period. In return, they receive 1/7<sup>th</sup> of the total produce for which the family devotes their labour. If the wage in terms of grain received by the family will be converted in term of cash payment, then the figure is very meager i.e. only Rs. 10-12 per person per day.

Migration is not only affecting the socio-cultural life of the migrant families but also have a tremendous impact on the education of the children as they also accompany their parent during migration.

During discussion with the Ajeevika Bureau, a leading NGO working actively on migration issue in Kotra and Gogunda tehsil of Udaipur district, it has been reported that lack of employment opportunities, lack of irrigation facilities, deforestation, continuous drought are the major reason for outward migration. Migration is now being emerged as employment opportunities for the communities of Wakal Basin.

From primary survey, it has been found that 94% of families are depending upon wage earning for the survival of their families.

#### 3.7.4. Forest & Forest Produces:

Tribes have a strong relationship with forest. They live in the forest and derive their livelihood from forest from the time immemorial. Earlier tribals are fully dependent on forest resources for their survival. Due to population growth and continuous depletion of forest resources, forest can no more meet the emerged demand.

Wakal basin is rich in forest resources as 53790 ha of the total basin are covered under dense forest. The forest map of the basin is present as follows;



Bource SOIToposheet

Tree Matrix exercise was carried out in the sample villages to know about the tree species available in the Wakal Basin and the dependency of communities on those tree resources.

Common plant species that are found in the basin are Sisam, Kaliya, Teak, Bamboo, Dhauda, Tamti, Neem (Azadirachta indica) Salar (Boswellia Karanj, Babliya, Mahua serrata) (*Madhuca* indica) Khajur (Phoenix sylvestris ) Jamun (Syzygium cuminii) Ranjia etc. These species are able to met different needs like fuel wood, fruit house value. fodder. construction. agriculture implements, and gum for selling and wine preparation for the



community. Species like *Dhauda, Neem (Azadirachta indica), Babliya and Khaini* are mostly used for fuel wood. For fodder, communities are dependent on species like *Dhauda, Neem (Azadirachta indica), Bamboo, Gotla, Salar (Boswellia serrata).* 



*Dhauda, Babliya and Ranjia* are mainly used for house construction and preparation of agriculture implements.

Villagers of Wakal River basin collect non-timber forest produces from the forest. *Mahua (Madhuca indica)* trees are very precious for the communities of Wakal basin as the flower is being used for wine preparation and villagers sell its' seeds in the market. Villagers collect Mahua flowers from the forest during February and March where as *Mahua (Madhuca indica)* seeds are available during May and June. Gum from *Dhauda and Salar (Boswellia serrata)* trees is being collected by villagers to sell it in the market. Gum of *Dhauda* is comparatively costly and villagers receive a return of Rs. 60/kg where as Gum of *Salar (Boswellia serrata)* is being sold with Rs. 35.00/kg. Gum of *Dhauda* is being used for preparation of sweets, where as the use of sssGum from *Salar (Boswellia serrata)* tree is for preparation of Bangles. Gum is being collected during April & May. Further villager collect fuel wood and fodder from the forest.

Horticulture species that are generally found in the Wakal basin are Mango (*Mangifera indica*), *Jamun (Syzygium cuminii*), *Khajur (Phoenix sylvestris*) and villagers proposed Mango, Anwla, Lemon, Guava, Papaya for plantation which will help in generating additional income for the families. The proposed timber species for plantation are Bamboo, Teak, *Karanj, Babliya, Su Babul, Salar (Boswellia serrata*), *Dhauda, Sisam, Tendu.* 

At present forest resources are in great threat due to continuous degradation and increased population pressure.

#### 3.8. Work Participation Rate

Total working population in Wakal Basin is 117759. The work participation rate in the basin is 44.77% which shows that more than half of the total population in the basin is not involved in any economic activities which may be one of the reasons for poverty. Work participation rate in female in comparatively less i.e. only 39.66% in comparative to the male counter part which is 51.74%.

The following table depicts the work participation rate in different tehsil and Wakal basin as a whole.

Tehsil	Total Worker	Non	Work Participation Rate			
		Worker	WPR_P	WPR_M	WPR_F	
Gogunda	14915	13853	51.85	57.02	46.62	
Girwa	6580	8345	44.09	53.15	34.84	
Jhadol	65307	77351	45.78	51.83	39.58	
Kotra	25057	31995	43.92	49.09	38.56	
Khedbrahma	5900	7963	42.56	49.44	35.66	
Wakal Basin	117759	139507	44.77	51.74	39.66	

 Table 15:

 Worker, non worker population and work participation rate



Agriculture is the main sector, which provides direct employment to 84% of the total work force of Wakal basin. Out of 84% of work force that are involved in agriculture 67% are cultivator and 18% are working as agriculture labourer. The following table reflects the distribution of work force in different work/economic activities.

Tehsil	TOT_ WORK	Cultivator		Agriculture Labour		Household Industry Worker		Other Worker	
		WORK_ CL	%	WORK_ AL	%	WORK_ HHI	%	WORK_ OW	%
Gogunda	14915	9311	62.43	1932	12.95	128	0.86	3544	23.76
Girwa	6580	4116	62.55	519	7.89	102	1.55	1843	28.01
Jhadol	65307	44855	68.68	11150	17.07	855	1.31	8447	12.93
Kotra	25057	16453	65.66	5263	21.00	236	0.94	3105	12.39
Khedbrahma	5900	3653	61.91	1841	31.20	120	2.03	286	4.85
Wakal Basin	117759	78388	66.57	20705	17.58	1441	1.22	17225	14.63

 Table 16

 Categories of working population and their proportion to total worker



#### 3.9. INSTITUTIONS

Organized people have more bargaining power and therefore village level institutions play a crucial role for overall development of the villages. Non Government Organizations are involved in developing and strengthening various village level institutions at village level like Self Help Group (SHG), Village Development Committee, Forest Protection committee, Lift Irrigation Committee, etc.

It has been observed that several NGOs are working in the Wakal Basin with different programs like health, education, pasture development, watershed, etc. They are



playing a very active role in organizing people in to groups and building their capacities through awareness camp, training, exposures, etc.

Government departments like Forest department, Soil & Water Conservation department, DRDA and Education Department are also promoting village level institutions.

The people's institutions are generally formed under different project and it has been observed that after completion of the project, these institutions are comparatively less active or defunct. SHGs play very vital role in women empowerment by increasing women access to economy.

As there are already many institutions, it is suggested that instead of forming new institutions as Water User group, it is better to identify the active existing village level institutions and to be linked it with the Integrated Water Resource Management (IWRM). Proper education, awareness generation and capacity building will play very vital role.

## CHAPTER -4 WATER AS SOCIO-ECONOMIC RESOURCE

Water is essential to sustain human life, economic development and functioning of ecosystems. Water must be therefore managed as a holistic system, recognizing all the characteristics of the operation of the hydrological cycle and associated natural resources and ecosystem.

Status of water in Rajasthan is critical, complex and explosive. Rajasthan with more than 10.4% of the country's geographical area, supporting more than 5.5% of the human population and 18.7% of livestock population, having about 14% of the country's cultivable area, has only 1.16% of the total surface water available in the country. Ground water table is depleting across the state at the fast rate. 90% of the drinking water and 60% of the irrigation requirement is dependent on ground water. There is over exploration of the ground water, which is adversely affecting the quantity as well as quality of water. With asymmetric increase in population and water demand for various purposes, the state is heading towards absolute water scarcity. The per capita annual water availability in the state is presently 850 cum against minimum requirement of 1000 cum.

Banas is the main river flows through the eastern parts of the Udaipur district. Other rivers in the district include Som, Jakham, Wakal. Sei, Sabarmati and Berach. All these are non-perennial rivers, which flow through the rainy season only. Besides, there are several artificial tanks and lakes in the district.

Wakal river basin is one of the water scare basin in Rajasthan. Villagers inhabiting Wakal basin are facing water scarcity not only for the irrigation but also for drinking water during peak summer. Water availability in Wakal basin is mainly in the form of river, stream, water holes, artificial tanks, open wells, hand pumps, etc.

Water is the basic requirement for the survival of lives. It is considered as a socioeconomic resource. The main source of livelihood of the communities i.e. agriculture is totally dependent on the availability of water. Agriculture production will be enhance with the availability of sufficient water for irrigation and therefore improved the economic condition of the communities. Improved agriculture production and better economic condition will ensure food security, reduce outside migration and therefore improved education status of children. Availability of potable drinking water will reduce health hazard and women drudgery.

#### 4.1. WATER USE

Water available in the basin is mainly used to meet out the water demand of communities for domestic purpose and also for crop production. Undulating topography of the Wakal Basin encourages high run off and the total precipitation received in the basin goes out of the basin boundary with no time. There is a need to conserve and harvest the rain water through different Water Harvesting Structures in order to improve the water availability in the Wakal Basin.

#### 4.2. DRINKING WATER

Open wells and hand pumps are the major sources for drinking water for the communities of Wakal river basin. From the primary survey it has been found that 62% of families are accessing drinking water from the open wells where as the remaining families are mostly rely on hand pumps. In few cases, families are also accessing drinking water by digging whole in the river beds.

10-20 families are dependent on a single water source for accessing drinking for their families and livestock. Majority of open wells are found without parapet walls and therefore the water got polluted due to direct intrusion of run off water from agriculture fields during rainy seasons. Consumption of polluted water causes many water borne diseases and therefore increase expenditure on health.



Wells without parapet walls are sometime causes death of children and animal. It is also risky for the pregnant and elder women. There is a need to develop these wells which are being used for drinking purpose. Construction of parapet and fixing of pulley will be a great advantage to safe guard the water quality and reduce the women drudgery.

Hand pumps are mainly the common resources which are installed by Government.

Most of these sources are defunct due to minor technical problems and lack of management by the communities due to lack of ownership. Village youth and women can be trained on repair and maintenance of hand pump so that they can easily repair the defunct hand pumps with minor problems. Families which are accessing water from these common sources can be organized as Water user's group which will ensure better management of the water source.





#### 4.3. IRRIGATION SOURCE AND PATTERN

There are four major sources of irrigation in Rajasthan, viz., canals, tanks, wells and tube wells. There is no major irrigation infrastructure in the Wakal River Basin. Lack of irrigation facilities forced the villagers to depend on monsoon which is always erratic in nature. Water for irrigation is one of the prime needs of the farmer and it has been told by people of Wakal that *"If water is made available, all of our problems will be solved.*"

Irrigation department has implemented 17 minor and medium dam in Wakal Basin. But only few villages got benefits from those irrigation infrastructures. Open wells are the most reliable and prevalent irrigation of infrastructure in the Wakal Basin. Most of the irrigated land in the basin depends upon the open well for irrigation. The most prevalent factor with regards to irrigation from open well is that all most all potential open wells are being shared by number of farmers. As many farmers are dependent on an open well not only for irrigation but also for drinking water, there is a great scope to develop these sources to improve their capacity and water availability.

Due to lack of electricity in most of the villages, the water from the wells is being lifted for irrigation through diesel pumps. Earlier there were several traditional water lifting systems like *Rahat* & *Chadas* was prevalent in the Basin. *Chadas* system is mostly disappeared in the basin, where as *Rahat* system if irrigation is also in practice in most of the villages in Gogunda tehsil. These traditional methods of irrigation need to be encouraged to reduce the exploitation of ground water.

After lifting the water either through diesel pump or *Rahat*, the water is allowed through mud irrigation channel to irrigate the field in its command area and the water goes to the tail end



through gravity. *Haran* System is also commonly found in the Wakal river basin. Villagers made a temporary embankment in the river or stream and divert the water through mud channel and water goes through gravity to irrigate their field. *Haran* system irrigation is also found near the WHS.

Water is the precious resource for the community of Wakal river basin as it is a water scare area. While transporting water to agriculture field through mud irrigation channel, there is heavy water loss due to seepage. Henceforth, it is strongly recommended to renovate the irrigation system by strengthening the water source and also the channel in order to improve their potential. Lining of the mud irrigation channel will help in increasing the irrigated areas and therefore more families will be benefited.

Due to low education status and lack of access to information, the irrigation practice is also found inefficient. Farmers have no knowledge about the different water saving irrigation practices like drip, sprinkler, etc. In the water scare areas, farmers need to oriented on different water saving applications and also about the irrigation management so that they can even cope during the stress period.

## CHAPTER-5 MAJOR FINDINGS & SUGGESTIONS

W akal river basin is located in the southern part of Aravali Mountain and it lies between 24°46' 34.65" & 24° 8' 49.41" north latitudes and 73° 6' 23.41" & 73° 35' 54.18" east longitudes. It occupies a total area of 1914.322 Sq. Km and 98% of its total areas are coming under Udaipur district of Rajasthan.

- There are 313 villages, 49110 households with total population 257266 inhabits the Wakal river basin.
- Wakal river basin is one of the water scare basin and inhabited mostly by tribal communities. Schedule tribe constitutes 71% of the total population of the Wakal river basin.
- Agriculture is the main source of livelihood for the community which provides employment to 84% of the total families. Lack of knowledge on improved farming, irrigation facilities, high input costs, etc. results in low agriculture production and less return from agricultural activities. Henceforth, it is very much essential to orient and train farmers on improved agriculture techniques, organic farming practices in order to enhance income from their small piece of land. Land development through various Soil & Water Conservation (SWC) measures is essential to enhance the productivity of land. Water harvesting need to be promoted for ensuring life saving irrigation for the crops.
- ↓ To reduce the dependency of people on market and to preserve local seeds, it is proposed to create seed bank at village level. Good quality of local seeds to be preserved in the seed bank to meet the seed requirement of farmers. Due to water scare situation, it is recommended to promote seeds, which requires less water and also to be of short duration.
- The productivity of animal in Wakal basin is very low due to non-availability of sufficient fodder, water and lack of knowledge on proper health care. It has also been observed that the wastage of fodder is also very high due to lack of awareness about the fodder saving applications. Villagers serve fodder to their animal on the open ground and therefore there is huge wastage of fodder. To reduce the fodder wastage, construction of feed menzer and introduction of chaff cutter can be very useful. To ensure good quality of water for livestock, water troughs can also be introduced. Capacity building of communities on fodder preservation, improving fodder quality and animal care & management will be an added advantage.
- There is a great scope for promoting goat rearing on commercial basis. To ensure a good return from the goat rearing, it is proposed to introduce Shirohi breed goat, which is a local improved breed. Breed improvement through Shirohi will definitely help poor farmers to receive a good return as the growth and productivity of Shirohi breed is comparatively better than the local breed.
- ♣ As the income from agriculture is not sufficient to support the family, villagers depend on wage employment for the survival of their families. It has been found that 94% of families are dependent on wage employment and therefore migrate to Udaipur or different places in Gujarat. Migration is now emerged as

employment opportunities. To enhance the income of migrants at destination places, it required to organize skill development training like Mason, Carpenter, Plumping, House wiring, computer operator, Motor repairing etc for the skill enhancement so that the migrants can earn better income. Further, scope for different income generating programs need to be explored.

- Open wells and hand pumps are the major sources for drinking water for the communities of Wakal river basin. Majority of open wells are found without parapet walls and therefore the water got polluted due to direct intrusion of run off water from agriculture fields during rainy seasons. Consumption of polluted water causes many water borne diseases and therefore increases expenditure on health. Development of open wells by lining, parapet construction and fixing of pulley will reduce the health hazard and also women drudgery.
- Lack of irrigation facility forced the villagers to depend on the monsoon precipitation which is erratic in nature and often results crop failure and therefore food insecurity. Water harvesting can be the alternate solution to enhance the water table of irrigation wells and also to ensure life saving irrigation. Revival of traditional irrigation system like *Haran* through lining of irrigation channel and strengthening the existing sources will be very much essential.
- Several NGOs are working in the Wakal Basin with different programs like health, education, pasture development, watershed, etc. Potential NGOs can be identified to promote Integrated Water Resource Management (IWRM) in Wakal River basin. As there are already many village level institutions formed by the NGOs, it is suggested that instead of forming new institutions as Water User group, it is better to identify the active existing village level institutions for linking them with the Integrated Water Resource Management (IWRM) purpose. Proper education, awareness generation and capacity building will play very vital role.
- Education plays a crucial role for the development of socio-economic condition of the communities of Wakal river basin. Due to low education profile and lack of awareness, villagers don't have access and knowledge about the health care, improved farming technique, livestock management, etc. Early marriage, big family size, poor health forced the communities to live in the vicious circle of poverty from generation to generation. It is imperative to increase the awareness level of the communities through awareness camp, training, exposure visit, on the job demonstration, etc. Well awared communities will be in a better position to access the benefits of different Government programs/schemes for the improvement of their socio-economic condition and also for the over all development of their village.
- As there are several government departments, universities, research organizations working though different schemes for rural development, community organizations are needed to capacitated so as they can develop linkages to access such programs and get benefit. Community should be capacitated enough to take the benefits of potential ongoing programs like NREGA.







Prepared By: AFPRO GIS Lab





Prepared By: AFPRO GIS Lab Source: SOI Toposheet



Prepared By: AFPRO GIS Lab Source: SOI Toposheet





Prepared By, AFPRIC GIS Lab Source Census of India - 2001





Prepared By, AFPRIC GIS Lab Source: Census of India - 2001





Prepared By AFPRO GIS Lab Source: Census of India - 2001





Prepared By, AFPRO GIS Lab Source, Census of India - 2001





Prepared By AFPRO GIS Lab Source: Census of India - 2001



Prepared By: AFPRO GIS Lab Source: Census of India 2001



Prepared By, AFPRIC GIS Lab Source: Census of India - 2001





Prepared by, AFPRO GIS Lab Source: Census of India - 2001



Prepared By, AFPRIC GIS Lab Source Census of India - 2001





Prepared By, AFPRIC GIS Lab Source: Census of India - 2001



Prepared By, AFPRIC GIS Lab Source: Census of India - 2001





Prepared By APPRO GIS Lab Source: SOI Toposheet



### REFERENCES

M.K. Bhasin and Shampa Nag, Department of Anthropology, University of Delhi, Demography of the Tribal Groups of Rajasthan

Veena Bhasin (University of Delhi, Delhi, India); Medical Anthropology: Tribals of Rajasthan

Dr. Dalbir Singh, Seva Mandir, Udaipur, India; Drought Coping Strategies in Rajasthan

B.L. Nagda, Population Research Centre, Mohanlal Sukhadia University, Udaipur 313 001, Rajasthan, India; Tribal Population and Health in Rajasthan

Census of India 2001

Statistical Abstract – Rajasthan 2002, Directorate of Economics & statistics, Rajasthan, Jaipur

Notes

Notes

Notes

# **Global Water for Sustainability Program**



Florida International University

Biscayne Bay Campus 3000 NE 151St. ACI-267 North Miami, FL 33181 USA Phone: (+1-305) 919-4112

