CMPA Technical Report Series

30

Socio-economic Baseline Assessment at Gosabara Wetland Complex and Khijadiya Wildlife Sanctuary, Gujarat

June 2016

FOREST DEPARTMENT GOVT. OF GUJARAT

GEER Foundation

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
of the Federal Republic of Germany

Indo-German Biodiversity Programme
Conservation and Sustainable Management of Coastal and Marine Protected Areas

CMPA Technical Report Series No. 30
Socio-economic Baseline Assessment at Gosabara Wetland Complex and Khijadiya Wildlife Sanctuary, Gujarat

Authors
Binoy Acharya and Geeta Sharma

Published by
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Indo-German Biodiversity Programme (IGBP),
GIZ-India, A-2/18, Safdarjung Enclave,
New Delhi - 110029, India
E-Mail: biodiv.india@giz.de
Web: www.giz.de
http://indo-germanbiodiversity.com/

June 2016

Responsible
Director, Indo-German Biodiversity Programme

Photo Credit
Dr. Neeraj Khera

Layout
Aspire Design, Delhi

Citation
Binoy Acharya and Geeta Sharma. 2016. Socio-economic Baseline Assessment at Gosabara Wetland Complex and Khijadiya Wildlife Sanctuary, Gujarat CMPA Technical Series No. 30. Indo-German Biodiversity Programme, GIZ- India, New Delhi. Pp 86.

Socio-economic Baseline Assessment at Gosabara Wetland Complex and Khijadiya Wildlife Sanctuary, Gujarat

Authors
Binoy Acharya and Geeta Sharma
UNNATI, Gujarat

June 2016

CMPA Technical Report Series

30

Indo-German Biodiversity Programme
Conservation and Sustainable Management of Coastal and Marine Protected Areas

Disclaimer

This study has been financed through a contract with the Project on "Conservation and Sustainable Management of Coastal and Marine Protected Areas" (CMPA), of the Indo-German Biodiversity Programme. The Project is jointly implemented by the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India, and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

Contents

List of Acronyms and Abbreviations

ANM	Auxiliary Nurse Midwife
APMC	Agricultural Produce Market Committee
AW	*Anganwadi* Worker
BMC	Bio-Diversity Management Committee
BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
BPL	Below Poverty Line
CMPA	Conservation and Sustainable Management of Coastal and Marine Protected Areas
CPR	Common Property Resources
DEA	Department of Economic Affairs
DPC	District Planning Committee
EDC	Eco-Development Committee
ES	Ecosystem Service
FGD	Focus Group Discussions
GWC	Gosabara Wetland Complex
GEER	Gujarat Ecological Education and Research Foundation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoG	Government of Gujarat
GoI	Government of India
GP	Gram Panchayat
GSDMA	Gujarat State Disaster Management Authority
Ha/ha	Hectare
HHs	Households
IAY	Indira Awas Yojana
JADA	Jamnagar Urban Development Area
JMC	Jamnagar Municipal Corporation
KBS	Khijadiya Bird Sanctuary
KTR	Kerly Tidal Regulator
KWRR	Kerly Water Recharge Reservoir
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoEFCC	Ministry of Environment, Forests and Climate Change
MP	Madhya Pradesh
MSP	Minimum Support Price
NABARD	National Bank for Agriculture and Rural Development
PRA	Participatory Rural Appraisal
SC	Scheduled Caste
SECC	Socio-economic Caste Census
SHG	Self Help Groups
ST	Scheduled tribe
ToR	Terms of Reference
VDMP	Village Disaster Management Plan
VDP	Village Development Plan
VMP	Village Micro Plan

List of Tables

List of Figures

Glossary

Angadias	An unofficial network of banking and courier services
Anganwadi	Early Childhood Care Centres established by the Government of India across the country under the flagship programme 'Integrated Child Development Scheme' (ICDS) to provide nutrition and education support to children below 6 years of age, pregnant and lactating mothers and adolescent girls
Auxiliary Nurse Midwife	Village-level female health worker who works at the grass-roots to promote health services among the community
Bigha	A traditional unit of measurement of land; there are two types of measurements used. However, in Gujarat, 1.75 bighas = 1 acre and 2.5 acre= 1 Ha; hence 4.37 bighas = 1 Ha
Doodh Sahkari Mandali	Milk Cooperative Society
Gaushala	Literally refer to shelters for cows
Gram Panchayat	Village level statutory institution for local self-governance in India
Machhiyaras	Fishermen, mainly from Muslim community
Rabaris	Pastoral, semi-nomadic communities
Rann	Desert area
Sarpanch	Elected head of the *Gram Panchayat*
Talati	An administrative government position in the *Gram Panchayat* that has been created to take care of its revenue functions
Waghris	Marginalised community found in Gujarat and Rajasthan, that was earlier listed as de-notified tribe

Executive Summary

A socio-economic baseline assessment study was carried out in two sites in Gujarat viz. Gosabara Wetland Complex (GWC), Porbandar and Khijadiya Bird Sanctuary (KBS) Jamnagar under the project 'Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas'. It was one of the several studies to assess the current situation for developing an integrated wetland management plan and develop an understanding among the communities dependent on the wetlands about its 'wise use', based on the principles of Ramsar Convention. Eight villages around GWC, Porbandar and four villages near KBS, Jamnagar were finalised after a preliminary visit and meetings with GIZ and other partners to this project.

Participatory Rural Appraisal (PRA) methods were used to enable the communities to share and analyse their life conditions in relation to the wetland. Secondary data from the Census, Government of India (GoI), reports from government departments like Agriculture, Animal Husbandry, Rural Development and Irrigation were used.

Gosabara Wetland Complex, Porbandar

GWC is located near the coastline of the Arabian Sea and comprises a cluster of wetlands. Kerly Tidal Regulator (KTR) and Kerly Water Recharge Reservoir (KWRR) are covered under the study. The KWRR is a natural water reservoir that is fed by 4 local rivers. The KTR receives water from the KWRR and the natural drainage. The Irrigation Department initiated these two schemes in the 1990s for sweet water storage, to improve the water availability and quality for irrigation. Prior to their initiation, the area was an inter-tidal mudflat and water from the sea used to enter the inland leading to salinity and desertification. The average rainfall of the district (1985-2014) is about 676 mm (state average:798 mm).

Of the eight villages, three (Tukda Gosa, Oddar and Ratanpar) are on the downstream of the wetland and are closer to the Arabian sea. The other five villages (Mokar, Pipaliya, Virpur Vanana, Padardi and Bapodar) are on the upstream. A low-lying Bund cum road passing through GWC separates KTR from KWRR and also works as a fair-weather village link road between Tukda Gosa and Mokar and other villages. In the absence of this, the villagers have to take a detour of about 50 Kms. Heavy vehicular traffic is restricted.

The total population of the 8 villages is 16,764 with Oddar having 5379 and Padardi 704. The sex ratio is 967. The SC population is 7.5% (Oddar has half of it) and ST population is 8% (Oddar has 3/4th of it). In half the villages, the literacy rates are lower than the district literacy rate of 75.78%. The BPL HHs are 18%, with Ratanpar (39%) followed by Oddar (25%) and the lowest in Pipaliya (4%).

Twelve stakeholder groups were mapped out in GWC. Farmers and livestock owners have been greatly benefitting from GWC in terms of irrigation, grazing and fodder. The construction of the tidal regulator and reservoir has improved the farm based livelihoods option and considerably reduced incidence of distressed migration. The fishing community (engaged primarily in inland fishing) are adversely affected by the ban imposed by the district administration due to complaints of poaching of birds while fishing. They fear that they may have to migrate if the ban continues. Irrigation department primarily manages both the reservoirs and Forest department looks after the protection of birds and promotion of awareness on its conservation.

Out of the total worker population, 48.5% are engaged in agriculture as main and marginal cultivators and 25% as main and marginal agricultural labourers. Mers, Aboti Brahmins, Rabaris and Dalits are the four predominant caste groups in these villages. Agriculture and animal husbandry are the main sources of livelihood. In absolute numbers in the 8 villages, except Virpur, out of 3672 farmers, 100 are large farmers with more than 10 Ha of land (Oddar 50 and Tukda 41), 1227 are medium holding farmers with 2 - 9.99 Ha, 1484 are small farmers with 1- 1.99 Ha and 861 are marginal farmers with less than 1 Ha of land. As per SECC data, 859 HHs in the 8 villages (24%) do not own land.

Seven per cent of the total land of these villages comprises pasture and grazing land and 21% is forest land. 45% land is under cultivation, of which 22% is irrigated. Ratanpar and Pipaliya have almost 50% of land under irrigation. Agriculture in all the 8 villages is highly dependent on GWC which has led to improved crop diversity, vegetation cover and pasture lands and decline in levels of salinity. The improvements are also reflected in the increase in land prices. The average yield for wheat, groundnut and cumin in the GWC villages is higher than the Taluka, District and State averages. A commonly faced risk by the farmers is the crop destruction by wild boars and Blue bulls that are increasing.

Animal husbandry is the primary source of livelihood for 13% HHs (mainly Rabari community who are traditionally pastoralists) and it is the secondary source of livelihood for 72% HHs, mainly land owners. In most of the villages, there are at least 3 dairies run by milk cooperatives and private owners. The total milk collection during the year is 13,77,375 Kg. (4 villages having more than 2 lakh Kgs.) The price/litre in the cooperative dairies ranges between Rs. 5.15/fat to 5.50/fat.

87 families of Muslim community mainly from Tukda Gosa village are dependent on GWC for fishing. Traditionally, these communities are not exposed to marine fishing. Fishing is done for a period of about 4-5 months between July to February. For 8 months, the community does not have any alternate work. They are adversely affected by the ban on fishing and feel that the issue of poaching has nothing to do with their fishing.

In Mokar, Virpur and Tukda, the courier business started about 30 years back and almost one per family of the Aboti Brahmins in these villages are engaged in it. The less resourced and disadvantaged communities like Kolis and Dalits depend mainly on the opportunities available for manual labour in mining, farm based works and on works under government programmes like MGNREGS. It is well known that mining activity is highly unregulated and workers are not covered under various rights and entitlements.

Currently, there is no apparent conflict around management of the reservoir and regulator constructed by the Irrigation Department. Some of the potential resource management conflicts and risks of adverse change in ecological character of the wetlands relate to use of the Bund cum road between Tukda and Mokar; unrestricted grazing on the wetland, use of water for irrigation, limestone mining and poaching of birds.

Khijadiya Bird Sanctuary, Jamnagar

Khijadiya Bird Sanctuary (KBS) is located at a distance of about 12 Kms. from Jamnagar city in Gujarat. It is an outcome of two earthen reclamation bunds constructed to restrict rapid flow of fresh water from draining into the Gulf of Kachchh and to control salinity ingress from sea tides. Except Vibhapar, all the other three villages (Jambuda, Khijadiya and Dhunvav) share boundaries with KBS. Though Jamnagar district is drought prone, the 4 villages around KBS used to have fertile land with high productivity due to the natural

drainage of rivers flowing into the sea. The last couple of years have also recorded low rainfall and this was evident in the responses of the farming community.

The total population in the 4 villages is 94,021 (Vibhapar alone has 82,019). Vibhapar now falls within city limits. The average sex ratio is 875 (in Vibhapar it is 866). SC population is 5%. The literacy rates in three villages are comparable to the district literacy rates (74%) and in Vibhapar it is higher (81%). The BPL HHs are 4%, Vibhapar has the lowest numbers (.67%) while in Jambuda close to half the HHs are BPL.

Eleven stakeholders in KBS have been mapped. The wetland was declared as a sanctuary in 1984 which gives the Forest department major control over the area. Famers, livestock owners and other vulnerable HHs have restricted access. Jambuda and Dhunvav villagers allege that the village grazing land has been acquired by the Forest department without due compensation. A salt processing unit in the vicinity of the wetland is perceived by the villagers as adversely affecting the land by inducing salinity. The extension of city limit towards the KBS and use of land for solid waste dumping makes the Jamnagar Municipality as a major stakeholder.

The total worker population is 38%. Only 5% are cultivators (main and marginal) and 6% are involved as agricultural labour. However, in Khijadiya and Jambuda together, the dependency on agriculture is much higher (cultivators 30% and agriculture labourers 32%). In Vibhapar and Dhunvav, a large part of the workers (80%) are engaged in 'Other work'. Vibhapar, close to Jamnagar city, has only 301 farmers among 17,008 HHs. Of these, 63% are large farmers, 34% are small farmers and 3% are marginal farmers. In the other 3 villages, there are a total of 15 large farmers. In these three villages, in absolute numbers, 593 are medium farmers, 652 are small farmers and 252 are marginal farmers.

Seven per cent of the total land of these villages comprises pasture and grazing land which is highly degraded, saline, has low vegetation and is covered by Prosopis rendering it barren and of little use. Forest land is 2%. 72% land is under cultivation. 43% of agriculture land is irrigated, mostly through ground water. However, majority of the tube wells are not in use due to high salinity in the ground water. In Vibhapar, people use sewage water for irrigation and growing vegetables. The cropping pattern has undergone a shift in the last 10-15 years. The change is attributed to salinity ingression, soil degradation, low rainfall and an increase in wildlife. Agriculture has become a high risk, high investment and low return source of livelihood. Overall, there is a reduction in the livestock. Decrease in pasture land and its quality is a major contributing factor. There is shift in occupations from agriculture to other forms like transportation, brick kiln, production of small brass parts for industrial use, etc. In 50-60% HHs, at least one member is employed in brass part industry.

Good quality agricultural fields of Khijadiya village are adjacent to the boundary of KBS Part 2 with no buffer land. The Patel families who are the main land owners have turned into absentee landlords. The cultivation is done through tenant farming and share-cropping. Potential good agricultural land is slowly being converted into wasteland with high salinity covered with Prosopis. The areas of conflict between the wetland and the villagers are related to restrictions imposed on their access while permissions being granted to private salt factory and urban solid waste dumping. Secondly, the development of the sanctuary, planning and execution of new embankments without people's participation is creating apprehensions and anxiety for drainage of water of the rivers flowing through the villages. The villagers fear that the new embankment in and around Dhunvav village will lead to submergence of agriculture fields.

1 Context and Rationale

Wetlands are important ecosystems that have globally been under extreme pressure of degradation. Several factors have contributed to it. These include changes in climatic conditions, industrial pollution, urbanisation, changes in land use, excessive use and abuse of the Ecosystem services (ESs) provided by them, inadequate attention at the policy level and many more. In developing countries, a large number of people are dependent on the ESs provided by the wetlands. These services are often very closely linked to their livelihoods which in turn influence the ecological character of the wetlands. The need therefore to adopt strategies that can contribute to their sustainable management without compromising on development outcomes, is even greater.

Wetlands are also the only ecosystem that has attracted attention at the international level for its protection and sustainable use. Starting around the 1960s, several countries expressed their concern about the degradation of wetland habitats for migratory water birds. The discussions and negotiations resulted in the passing of the Ramsar Convention on Wetlands that came into force in 1975. India became a contracting party to the Convention in 1981 indicating its commitment to work towards the goals of the Convention through promoting action at all levels – local, regional, national and international. The Convention recognises the links between wetland ecosystems and the people who depend on them. This is reflected in its focus on the principle of 'wise use' of wetlands that simultaneously emphasises 'the benefit of people and nature'.

India contributes about 8% of the global biodiversity, putting an immense pressure on its natural resources. In the global context of India's commitment towards achieving the Convention on Biological Diversity's Aichi Target, the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India entered into a Technical Cooperation with the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Government of Germany on the project entitled 'Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas' (CMPA). Following approval from the Department of Economic Affairs (DEA), Ministry of Finance, Government of India, the Secretary of MoEFCC has signed an Agreement with GIZ India in October 2013 on the implementation of the aforementioned project (CMPA Project Brief). The CMPA Project is jointly implemented by the Conservation and Survey Division of MoEFCC and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) India on behalf of BMUB. It is implemented in selected coastal states in close collaboration with respective State Governments Gujarat, Goa, Maharashtra and Tamil Nadu.

Amongst several baseline studies that were planned as a part the CMPA project, a socio-economic baseline assessment study was also planned to be carried out in two project sites in Gujarat viz. Gosabara Wetland Complex (GWC), Porbandar and Khijadiya Bird Sanctuary (KBS) Jamnagar. The study is linked to Output 1 of the project that seeks to initiate and implement participatory processes for the management of areas identified for conservation of biodiversity and develop a wetland management plan keeping in mind the existing and future biodiversity issues related to several aspects such as livelihood, climate change, natural disasters, industrial pollution etc.

The emphasis on participatory processes for wetland management is guided by the understanding about the strong linkages and interdependence between people and their

environment. It underscores the importance of engaging with people through processes where they themselves share, analyse and decide on the actions that are necessary for maintaining ecological balance and sustenance of their livelihood and well-being. The socio-economic baseline assessment, while seeking to assess the current situation for developing an integrated wetland management plan, also seeks to develop, in the process, an understanding among the communities dependent on the wetlands about its 'wise use'.

2 Preparation

Based on initial discussions between GIZ and Unnati representatives, the purpose and scope of the study were drafted. As per the ToR (see Annexure 1), the purpose of the socio-economic baseline assessment is *"to support integrated management planning for two coastal wetlands of Gujarat, namely Gosabara Wetland complex, Porbandar and Khijadiya Bird Sanctuary, Jamnagar by conducting socio-economic survey at the two sites."* A list of eight tasks was detailed in the ToR.

A two-day visit was made during October 27-29, 2015 to the two wetlands and some of the villages near them to identify the critical villages and stakeholders for the baseline assessment. Interactions were held with officials of the Forest department, residents of the villages, elected leaders and members of village based institutions such as Eco Development Committees. Information was collected about the different caste groups residing in each village, the sources of their livelihood and the dependence on the wetland for the same. Perceptions of the community about conflicts with the departments managing the wetlands were also explored. Similarly, the views of government functionaries of these departments about the interdependence of the communities on the wetland, conflicts and their reasons were explored. A list of villages and stakeholders was drawn up based on the visit and shared with GIZ and Gujarat Ecological Education and Research (GEER) Foundation.

A meeting was organized on December 2, 2015 at the GEER Foundation office, followed by field-visits to the two project sites on December 3rd and 4th for streamlining the baseline studies being conducted under the CMPA project. This meeting was organised to develop a common understanding of the purpose of baseline studies from the viewpoint of the wetland management planning and to streamline and coordinate the work of different baseline studies for avoiding information gaps and duplication of efforts. Based on the inputs provided by the officials of the Forest department, Government of Gujarat (GoG) and GIZ team as well as the other participating team representatives, the methodologies were updated and elaborated for each individual task as mentioned in the ToR. This, along with the revised time-line for conducting field-visits was submitted to GIZ.

The list of villages finalised for the study are as follows:

Gosabara Wetland Complex, Porbandar	Khijadiya Bird Sanctuary, Jamnagar
• Tukda Gosa	• Jambuda
• Ratanpar	• Khijadiya
• Oddar	• Dhunvav
• Virpur Vanana	• Vibhapar
• Mokar	
• Pipaliya	
• Bapodar	
• Padardi	

A guideline (see Annexure 2) was prepared for the team for collecting data from the villages as well as the government departments. This was shared and the team was oriented about the objectives, design, tasks and methodology to be followed. Local volunteers identified to support the data collection were also informed about the purpose of the study.

3 Methodology

Recognising that conventional survey methods would probably lead to collection of a vast amount of data whose accuracy and relevance for the objectives of this study (to initiate and implement participatory processes for wetland conservation and management) would not be justified, it was decided to use Participatory Rural Appraisal (PRA) methods for the study. The aim was to enable the communities in the project villages to share and analyse their life conditions in relation to the wetland through active engagement in the process and to use this understanding to suggest plans and actions that can help sustain their livelihoods without compromising the goal of wetland conservation.

Primary data was collected through visits by a team to the two wetlands and all 12 identified villages. Consultations were held with special groups including farmers, livestock owners, fisherfolk, manual labourers, mine owners etc. covering 50-75 people in each village. Meetings were held with *Sarpanchs* and *Talatis* in *Gram Panchayats* (GP), representatives of key institutions {Dairy collection centres and Cooperatives, Eco Development Committee (EDC), Bio-Diversity Management Committee (BMC), *Anganwadi*, School} and service providers – Auxiliary Nurse Midwife (ANM), *Anganwadi* worker (AW) etc. Stakeholder meetings were held with Environmental groups, officials and functionaries of government departments, including Department of Forests and Environment, Fisheries, Irrigation, Livestock, Agriculture, Salinity Control Cell and Statistical Unit, District *Panchayat* to collect data on different aspects of livelihood. In addition, these helped to identify the perspective of the officials about resource management conflicts.

The socio-economic profile of the communities residing in the 8 villages around GWC, Porbandar and 4 villages near KBS, Jamnagar was prepared using a set of locally relevant qualitative indicators on livelihood and habitat practices. The predominant communities residing in and around the project area were mapped through field visits, consultations with local residents, experts and study of secondary sources. PRA methods were used to develop an understanding of the livelihood patterns of these communities, issues faced by women

and men, how the changes in the ecosystems have affected the livelihood patterns and dependence of the people on the ecosystems. These included: social and resource mapping (Annexure 3: Social and Resource Maps, GWC and KBS), Transect walk, stakeholder mapping and analysis, focused group discussions (FGDs) and interviews.

During the community consultations (Annexure 4: Schedule of Community Consultations & Meetings), the caste-wise composition of the villages was noted along with the primary, secondary and additional sources of their livelihood. The number of households (HHs) (5091) mentioned by the communities in 8 villages in GWC and 3141 HHs in KBS has been used for this analysis. It is more than the number of HHs mentioned in the Census (3646) in GWC and much less than the HHs mentioned in the Census in case of KBS (19,344). The difference may be there since the community has also included HHs living on their farmlands who, at times, are not included in the GP records. In the case of KBS, the difference is due to the figures for Vibhapar in the Census that include parts that fall within city and Corporation limits.

Secondary data was collated from websites of central and state government, Census reports Government of India (GoI)[1], sector specific reports published by the government and other institutions and plans developed for the project villages by different government departments as a part of planning exercises for implementation of different projects viz. Village Disaster Management Plans (VDMP) prepared by Department of Revenue and Village Development Plans (VDP) prepared by Rural Development Department and Village Profiles developed for Watershed Programme.

4 Gosabara Wetland Complex, Porbandar

4.1 Background

The Gosabara Wetland Complex (GWC) is located in Porbandar district in the Saurashtra region of Gujarat. It originates near Porbandar city and extends as far as village Tukda Gosa that is about 17.5 kms. from the city. It is located near the coastline of the Arabian Sea and comprises a cluster of wetlands. The two wetlands covered under this study are Kerly Tidal Regulator (KTR) and Kerly Water Recharge Reservoir (KWRR), also popularly referred to as Kerly I and II. There are several villages located around these two wetlands. For the socio-economic baseline assessment, eight villages have been selected. Three of these are in Porbandar *taluka*[2] on the coastal side and five are in Ranavav *taluka* on the upstream side.

The district has hilly terrain in the north-east (forested region of Barda hills), river plains in the south-east (known as the Bhadar, Ojat and Harana river plain) and the coastal ridges. Part of the river plain is also referred to as the *Ghed* area (an inland basin in shape of a saucer) as the coastal ridges have a relatively higher elevation all along the coast line. Approximately 350 square miles, this *Ghed* area is inundated during monsoon due to water flow from the upstream area of Minsar river. GWC is located in this *Ghed* region.

[1] Hereafter, all reference to information sourced from the Census, GoI will be referred as Census.

[2] *Taluka* refers to a group of villages organized for revenue and administrative purposes. Porbandar district is divided into 3 *talukas*.

Watershed projects were initiated in this region from the time of the Princely States to create irrigation facilities for the farmers. Between 1900 and 1908, Rana Bhavsinhji constructed two water reservoirs namely Bhadar Irrigation Tank on Bhadar River (Dam I) and Khambhala Tank on Barda Hill to meet the requirement of water in the drought prone region. This district covers major watershed area of mainly two rivers, viz. Bhadar and Minsar which play an important role in water flow in the district.

In Gujarat, streams are the main source of fresh water as river flow is available only during the monsoon season that is relatively short. Of the 71 rivers in Saurashtra region, Bhadar is an important and major river that flows from Rajkot towards Porbandar. The farmers in this area have since long depended on rain and ground water for irrigation. Until 1993-94, wells were the main source of irrigation and this has been decreasing post the development of KTR and KWRR. The KWRR is a natural water reservoir that is fed by 4 rivers including Minsar, Bhadar, Ojat and Madhuvanti. When there is excess water in KWRR, it overflows into KTR from the water weirs made on a road cum bund that connects two nearby villages, Mokar and Tukda Gosa. The KTR also receives water from the natural drainage.

Records of rainfall in the district show that rainfall is irregular. The average rainfall of the district (1985-2014) is about 676 mm, lower than the state average (798) for the same period.

The Irrigation Department initiated the two schemes of KTR and KWRR in the 1990s for sweet water storage, to improve the water availability and its quality for irrigation of the farmlands situated near and around it. These have positively impacted the socio-economic situation of the villages around the wetland and have strongly influenced the livelihoods of people. Prior to the initiation of these schemes, the area was an inter-tidal mudflat. Water from the sea entered the inland from Kerly creek originating from the Porbandar side of Arabian Sea and spread over the entire basin of the creek leading to salinity and desertification; so much so that the area began to be referred to as '*Rann*'. The sea water mixed with the water collected in the low lying area from the upstream flow. The mixing of the fresh water with the sea water had an adverse impact on the ground water and the agriculture, which the KTR attempted to prevent through building structures across the creek such as tidal regulators (masonry walls) and bunds. These were made at different points and over a period of seven years several modifications were made to increase the storage of fresh water for longer periods of time.

The presence of the wetlands has attracted several birds over the years. The Census had estimated presence of 1.92 lakh birds of 112 species in the wetland. The people living around the wetland are familiar with the special nature of these wetlands and are aware that these are home not only to local birds but also several migratory species. The wetland provides important ecosystem services to the people residing in the villages around it in addition to supporting a diverse and rich biodiversity of flora and fauna.

Records indicate that the origin of the Port city, Porbandar, dates back to AD 1045 and that it was known as Sudamapuri due to its association with the birth of Lord Krishna. The name itself is suggestive of the city being a port. It later became a Princely state during the British rule and was merged with the Sovereign Republic Nation of India in 1947. It is the biggest port of Western India and has been inhabited right from the beginning by communities engaged in fishing and trade. Later on, the area began to be inhabited and developed by

the Mer and Aboti Brahmins, who received land in the region as *Garas* or *Ravnu*[3] from the Jethwa clan of Rajputs from Ranavav *taluka*. They are the two predominant communities in the villages surveyed. There are also some families of Rabaris, Dalits, Muslims, Kolis and Bardai Brahmins in some of these villages.

Apart from being an important port city associated with fishing and trade, it is also known for some other important resources. In the close proximity of the *Ghed* area, the villages of Oddar and Ratanpar are famous for the mining of white stone, which is very commonly used in the construction of houses. Porbandar district is also well-known for its mineral production. The major minerals available in the district are Chalk, Limestone, Bauxite, Mari clay and Laterite while the minor products are Building limestone, ordinary clay, Black stone, ordinary sand etc.

4.2 Location of communities surveyed

The eight villages selected for the baseline assessment are all located around the GWC. Three of them, Tukda Gosa, Oddar and Ratanpar are in Porbandar *taluka* and are located along the Porbandar Somnath Coastal Highway 8E, on the downstream side of the wetland and are closer to the Arabian sea (Figure 1). Some farmlands of Ratanpar and Oddar are located inside the GWC. There is also a large belt of limestone mines near Oddar.

Tukda Gosa is 17.7 kms. from Porbandar towards Madhavpur beach and farthest from Porbandar of the 3 villages. It is located on Gosabara - a passage towards the sea side from where Bhadar watershed finally meets Arabian sea, taking along the water of many small ponds, GWC, rivulets like Minsar and reservoirs, canals, bunds and dams. It has ponds on three sides and agricultural land on the fourth side. Women in the village shared that their village is the best example of *Ghed* in monsoon, when the village remains flooded.

The other five villages viz. Mokar, Pipaliya, Virpur Vanana, Padardi and Bapodar, in Ranavav *taluka*, can be reached from the Porbandar Rajkot National Highway 8B. Bapodar, Padardi and Mokar are on the periphery of KWRR on the upstream side. Padardi is located on a low lying passage – a natural drainage of Minsar. The Cadastral map also indicates that there is a stream that passes through the village. During the monsoon, the village gets flooded and mobility of the community gets restricted. Pipaliya and Virpur are closer to the upstream side of KTR.

[3] 'Garas', a popular term of Sanskrit used at the time of Princely states, means 'share from meal' and 'Ravnu' means make and shift hamlet generally made by nomadic tribes.

Figure 1 Map of surveyed communities in GWC

There is a low-lying Bund cum road passing through GWC which links Tukda Gosa and Mokar. Approximately 10 kms. long, it has been constructed by the Irrigation Department. It is a quick and fast means of access between the two villages that have social and economic ties with each other. It is also used by some communities to reach villages towards the sea side for visits to the temples of their deities. Had it not been for this facility, the connectivity and access between villages on either side of the wetland would be far more difficult and expensive. The distance between Mokar and Tukda Gosa, which can currently be traversed in 10 kms., would have otherwise required a travel of 50 kms. There are barricades along this road that restrict movement of heavy vehicles. During monsoon, this road gets submerged due to overflow, disrupting the vehicular movement between the two villages.

4.3 Demography

4.3.1 Population

As per Census, 2011 (GoI) population data (Table 1), the total population of the 8 villages surveyed is 16,764. Oddar has the maximum population (5379) and Padardi is the least populated (704). The overall sex ratio in these villages is 967. Tukda Gosa has the highest sex ratio (1078) and Virpur has the lowest (804).

The SC population is 7.5% (Oddar has half of it) and the ST population is 8% (Oddar has 3/4th of it). Only in three villages, the SC population is higher than the proportion of SC population in Gujarat (7%) but lesser than the national figure (16.6%). Oddar is the only village that has a higher ST population (19%) than the state (14.8%) and the national figure (8.6%).

Table 1 Population Data for surveyed communities, GWC

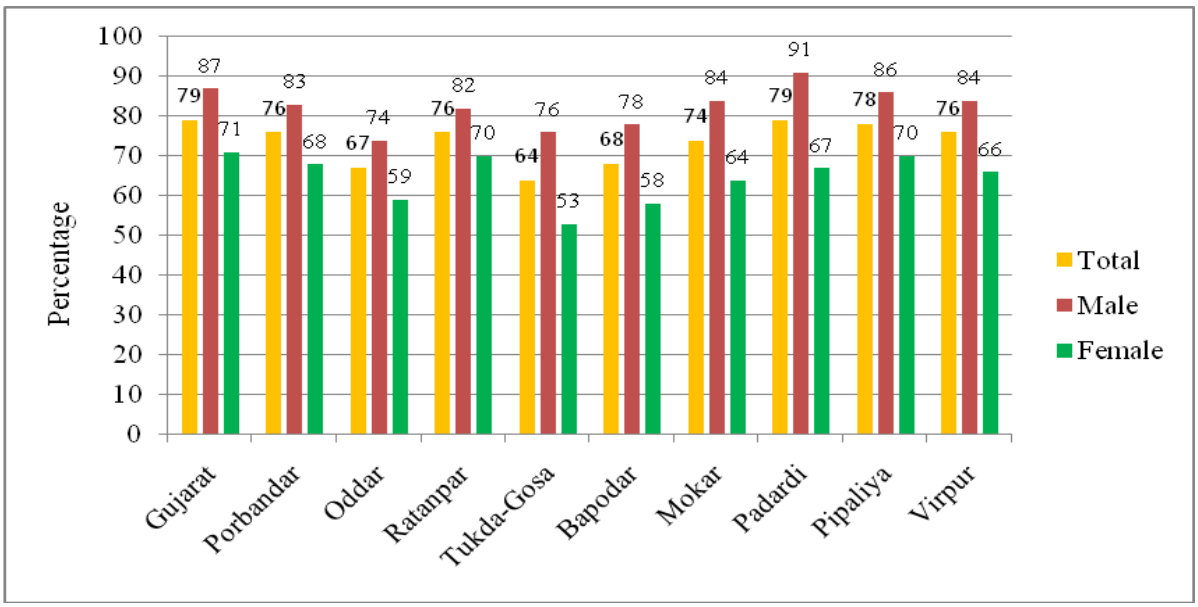
	Oddar	Ratanpar	Tukda Gosa	Bapodar	Mokar	Padardi	Piplaiya	Virpur	Total
Total Population (Person)	5379	1243	1821	1757	3224	704	1198	1438	16764
Male	2808 (52)	646 (52)	876 (48)	856 (49)	1556 (48)	365 (52)	618 (52)	797 (55)	8522 (51)
Female	2571 (48)	597 (48)	945 (52)	901 (51)	1668 (52)	339 (48)	580 (48)	641 (45)	8242 (49)
Sex Ratio	916	924	1078	1052	1071	929	939	804	967
Scheduled Castes	634 (12)	0	146 (8)	60 (3)	419 (13)	0	0	9 (1)	1268 (7.5)
Scheduled Tribes	1005 (19)	0	127 (7)	137 (8)	0	0	10 (1)	68 (5)	1347 (8)

Source: Census, 2011, (Figures in Brackets indicate percentage of Total Population)

4.3.2 Literacy

The overall literacy rate of Porbandar district (75.78%) is lower as compared to the Gujarat literacy rates (79.3%). Similar trends are observed for both male and female literacy. In half the villages studied (Oddar, Tukda Gosa, Bapodar and Mokar), the literacy rates (literate population in the 7+ age group) are lower than the district literacy rates. However, in Ratanpar and Pipaliya, the female literacy rate is the highest among the 4 villages and higher than the district female literacy rate (Figure 2).

Figure 2 Literacy Rates in surveyed communities (in %), GWC



Source: Census, 2011

4.3.3 Poverty index

As per the latest Village Development Plans (2015), out of a total of 3646 HHs in 8 villages, 665 (18%) are Below Poverty Line (BPL)[4] with a score of 0-20 (Table 2). This does not include Virpur since no data for BPL was available for this village. The maximum BPL HHs are in Ratanpar (39%) followed by Oddar (25%). The minimum is 4% in Pipaliya.

Table 2 BPL HHs in surveyed communities, GWC

	Oddar	Ratanpar	Tukda	Bapodar	Mokar	Padardi	Pipaliya	Virpur	Total
Total HHs	1107	293	377	387	820	162	246	254	3646
BPL HHs (0-16 score)	137 (12)	70 (24)	10 (3)	25 (6)	49 (6)	3 (2)	NA	NA	294 (8)
BPL HHs (0-20 score)	277 (25)	114 (39)	32 (8)	70 (18)	133 (16)	29 (18)	10 (4)	NA	665 (18)

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015)

(Figures in Brackets indicate percentage of Total HHs)

4.4 Stakeholder Mapping

Stakeholder identification and analysis was done through community consultations and meetings with officials of the government departments to identify their stakes in the wetland and their narratives about how it is linked to their lives and its importance for them (Table 3 to Table 14). The main stakeholders identified are as follows:

1. Farmers
2. Animal Rearers
3. Fishing community
4. Manual Labour (mining, agricultural labour etc.)
5. Mine Owners
6. Department of Irrigation
7. Department of Fisheries
8. Department of Forest & Environment
9. Environmental /Nature Lover groups
10. Dairy Cooperatives
11. Livestock Department
12. Porbandar Municipal Corporation

The perceptions of the stakeholders relate to the current use of GWC as well as measures and alternate means for its wise use; apprehensions and fears in event its status is altered for its protection, issues faced and how these have and can be resolved.

[4] A HH with a score of 16 or less is regarded as BPL and they are identified for providing support under anti-poverty programmes of the government. This cut-off point is expanded (0-20) by the government for coverage of HHs under different schemes.

Table 3 Stakes and perceptions of Farmers, GWC

Stake in Wetland	What they are saying
Access to farmlands through it **D**ependent on it for irrigation **Q**uality of top soil dependent on it **H**elps in ground water recharge	**W**etland needs to be conserved but needs to be managed so that: • irrigation facilities continue to be available; • top soil is retained and salinity is under control; • we can continue to access our farmlands through it and graze our animals in it; • we can use the connecting Bund cum road for business and social relationships with other villages around Gosabara **H**istorically, communities residing around the wetlands have preserved the wetland and also used it for their livelihood. **W**omen headed HHs will be pressurised more since they do not have access to required capital and necessary skills for non-irrigated farming. **I**mproved situation has considerably reduced migration of people from the village for work.

Table 4 Stakes and perceptions of Animal rearers, GWC

Stake in Wetland	What they are saying
Grazing and taking livestock for roaming **O**btain fodder for the livestock from the wetland	**I**f access for animal grazing is blocked, people will not have any alternate means to sustain their cattle. **P**eople in Mokar face conflicts while taking animals for grazing and fetching fuelwood from their own land, as part of the village land shares its boundaries with land managed by the Forest department in Ranavav.

Table 5 Stakes and perceptions of the Fishing community, GWC

Stake in Wetland	What they are saying
Dependent on it totally for their livelihood **L**inked to their socio-cultural ways of life	**F**ishing is the only skill we have and we have been doing it for generations. **B**an on fishing and attitude of the local authorities even post the ban has adversely impacted our livelihood. **A**pprehensive as to how long we can continue like this and fear that we may have to migrate **N**atural bund raised at the Bara is obstructing the tidal waves from entering the KTR from Arabian Sea. The bund should be removed to facilitate the free flow of saline sea water in the KTR that will facilitate and enhance fishing activity.

Table 6 Stakes and perceptions of Manual Labour, GWC

Stake in Wetland	What they are saying
Fear of losing mining lease around the wetland area	**P**refer to work in mining and other agricultural labour around the village so that we do not have to make distress migration **E**xpectations of regular MGNREGS work

Table 7 Stakes and perceptions of Mine Owners, GWC

Stake in Wetland	What they are saying
Most of the mines around Oddar which is a strategic village with regard to the wetland **T**here is both legal mining and mining without proper lease and permission	**O**wners expect that mining activity is not disrupted

Table 8 Stakes and perceptions of the Department of Irrigation, Porbandar

Stake in Wetland	What they are saying
Have undertaken the key projects of KTR and KWRR **M**anage and undertake new activities for improving water table, quality and quantity of stored water	**C**onscious efforts have been made to improve the irrigation facilities in the region. **K**TR and KWRR have had a significant positive effect on the agricultural yield and reduction in salinity. **D**ue to periodical interventions of the department such as managing the Reduced Levels of the water bodies, construction and renovation of canals, the water availability in the wetland has not only increased but the quality has also improved; the KTR also stores sweet water. **R**egularly making new interventions to regulate the flow of sea water into the KTR and KWRR **F**or the department, it is a project of pride.

Table 9 Stakes and perceptions of the Department of Fisheries, Porbandar

Stake in Wetland	What they are saying
Fisheries Department is not directly involved in rearing fishes in the wetland **T**hey have more interest in promotion of marine fishing in this area rather than inland fishing	**T**he department was issuing *Pagadiya* (fishing on foot) licences to the fishing community living near KTR; since fishing has been banned by the District Magistrate in 2014, the licences have not been renewed **I**nland fisheries is not as developed as marine fisheries **N**o seeding is done in Gosabara wetland and fisherfolk are dependent on fishing in ponds or fresh river water

Table 10 Stakes and perceptions of the Department of Forest & Env., Porbandar

Stake in Wetland	What they are saying
Forest department has 3846 Ha of land which is 21% of the total land area around the 8 villages in the wetland **D**o not have direct influence on wetland management **A**s there is a large population of different varieties of birds in the wetland, protection of birds under Wildlife Protection Act, 1972 increases their responsibility	**P**eople who use water for irrigation use flood irrigation techniques that lead to overuse of water, leading to early drying up of reservoir. This results in an increase of salinity in ground water and surface water. The traditional cycle of resting and nesting in the reservoir of birds takes place during September to February and this cycle gets disrupted due to early drying up of water. **F**ree grazing of animals leads to faster degeneration of grasses around the wetland. Birds dependent on these grasses get affected adversely. **C**hanges in irrigation techniques such as use of drip irrigation and planned grazing patterns can help in sustaining the water resources and grasses for longer duration in particular seasons. **I**f mechanisms can be worked out to protect the birds with community participation with management of water use, fodder, fishing, then external restrictions may not be necessarily required. Most communities have a concern about vegetation and birds and people engaged in illegal poaching are few in numbers.

Table 11 Stakes and perceptions of Environmental / Nature Lover groups, GWC

Stake in Wetland	What they are saying
Wetland is used for eco-tourism and it is not yet well developed **O**nly one agency in association with Forest department and a few individuals have been promoting Eco-tourism in the area **P**romotion of awareness on wetland conservation and eco services	**N**atural resources should be protected and conserved and communities living around the wetland can be involved in wise use of eco services **V**iolation of law like Wildlife Protection Act should be discouraged and regularly monitored **A** few people have been using the wildlife for personal gains and this needs to be stopped **P**oaching needs to be stopped **T**he wetland should be declared as Ramsar site, else industries will take over and the wetland will be destroyed

Table 12 Stakes and perceptions of Dairy Cooperatives, Porbandar

Stake in Wetland	What they are saying
Due to vast grazing land around the wetland and improvement in agriculture, rearing of livestock has increased; because of this there are multiple dairies even in a single village; for example, in Oddar, there are 17 collection centres of 4 Cooperatives	**W**etland is a great source of support for the livestock owners who use it for grazing, fodder and water **P**eople have received training and support from the dairies for better care of livestock. There is an increase in the number of livestock that people own; they are investing more in it. Natural resources are also required to sustain them. **M**ilk production and sales have increased over the last decade and the income of the households who own livestock has also increased **S**pecial efforts are being made to promote involvement of women through extra subsidies and other schemes

Table 13 Stakes and perceptions of the Livestock Department, Porbandar

Stake in Wetland	What they are saying
Over years the livestock population has increased in this area because of availability of grazing land and fodder	**V**eterinary care for livestock is inadequate and it is difficult for the handful veterinary doctors to reach out to all villages **M**ore staff needs to be appointed

Table 14 Stakes and perceptions of the Porbandar Municipal Corporation

Stake in Wetland	What they are saying
Virpur is adjacent to the Municipal Corporation and there is a plan to incorporate the village into the Municipal Corporation. Also there is a plan to set up solid waste disposal near it. **O**ddar, Ratanpur and Tukda are on the Porbandar-Somnath Highway and there is continuous movement between the village and the city. **T**he Corporation is unaware of the strategic location of Virpur with reference to the wetland.	**M**aintaining silence with regard to the wetland as it does not fall within their jurisdiction

GWC supports the livelihood of the farmers, fishing community and households engaged in animal husbandry. Irrigation department is the key stakeholder that has been responsible for creation of KWRR and KTR and for its management and improvement. Over the last decade, the groups promoting and facilitating bird watching, forest and district administration have developed their stake in regulation and development of the wetland.

The resourceful farmers, Irrigation department and the *Gram Panchayats* of the eight villages are important stakeholders who can also influence the conservation and management of the wetland. Households who are engaged in animal husbandry, fishing community, women across these livelihood groups and Department of Fisheries are of high importance but have little influence. These stakeholders have very little say in the planning, management and regulation of the wetland.

The community are ready to participate in preparation of the wetland development plan and consider it important that user rights and needs of the locals are given due consideration and secured in the plan.

4.5 Livelihoods

Agriculture and animal husbandry are the main sources of livelihood of majority of the population in the 8 villages. Even though some youth are moving into non-farm based livelihoods such as government jobs, courier services, mining and jobs in solar power plants, agriculture continues to be an area of pride for the farmers. It is also reflected in the preference of the community for agri-land owners while deciding marriage of their daughters. Land is perceived as an asset for the secured future of the family. Fishing is practiced by two communities in Tukda Gosa and Oddar. The landless communities are engaged mainly in manual labour on a daily wage basis.

This section presents data based on Census, 2011 on the participation of different categories of workers in the labour market as well as the understanding of livelihood patterns that emerged from the community consultations and meetings with stakeholders.

4.5.1 Participation in the labour market

The total worker population in the eight villages is 39%, with the maximum in Padardi (49%) and the lowest in Pipaliya (29%). This includes main and marginal workers[5].

Table 15 Participation of different categories of workers in the labour market

S. No.	Category	Oddar	Ratanpar	Tukda Gosa	Bapodar	Mokar	Padardi	Pipaliya	Virpur	Total
1.	Total Population	5379	1243	1821	1757	3224	704	1198	1438	16764
1A.	Total Workers	2181 (41)	439 (35)	745 (41)	704 (40)	1225 (38)	348 (49)	344 (29)	490 (34)	6476 (39)
1B.	Non-Workers[6]	3198 (59)	804 (65)	1076 (59)	1053 (60)	1999 (62)	356 (51)	854 (71)	948 (66)	10,288 (61)
1A.1	Main Workers[7]	1586 (73)	437 (99)	518 (70)	700 (99)	1036 (85)	274 (79)	323 (94)	366 (75)	5240 (81)
1A.2	Marginal Workers[8]	595 (27)	2 (1)	227 (30)	4 (1)	189 (15)	74 (21)	21 (6)	124 (25)	1236 (19)
1A.3	Main Cultivators	709 (33)	297 (68)	137 (18)	570 (81)	347 (28)	156 (45)	212 (62)	116 (24)	2544 (39)
1A.4	Marginal Cultivators	490 (22)	1	6 (0.8)	0	19 (1.5)	12 (3)	11 (3)	77 (16)	616 (9.5)
1A.5	Main Agricultural Labourers	233 (11)	25 (6)	96 (13)	110 (16)	437 (36)	111 (32)	67 (19)	99 (20)	1178 (18)
1A.6	Marginal Agricultural Labourers	64 (3)	0	123 (17)	3 (0.4)	167 (14)	57 (16)	3 (.87)	8 (16)	425 (7)

Source: Census, 2011 (*Figures in brackets for 1A.1-1A.6 are percentage of Total Workers)

In all eight villages 81% workforce is engaged in main work. Ratanpar and Bapodar have the highest percentage (99) of main workers (Figure 3). Out of the total worker population, 48.5% are engaged in agriculture as main cultivators as well as marginal cultivators. 25% are main and marginal agricultural labourers (Table 15).

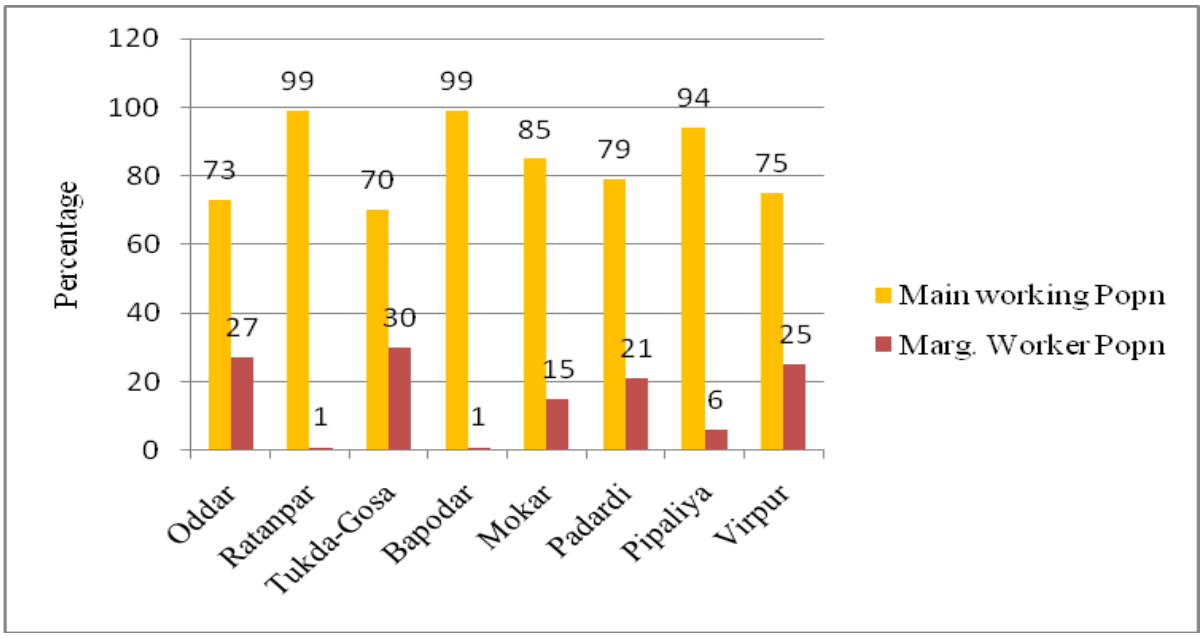
[5] Workers who had worked for 6 months or more in the year proceeding the time that the data was collected were considered as 'Main workers'. Workers who worked for less than six months (180 days) in the reference period are termed as Marginal Workers. (Meta Data, Census, 2011)

[6] A person who did not work at all in any economically productive activity during the last one year preceding the date of enumeration was treated as non-worker. This category includes students, persons engaged in household duties, dependents, pensioners, beggars, etc. provided they were not engaged in any economically productive activity during the last one year preceding the date of enumeration (Meta data Census, 2011)

[7] 'Main Workers' include Cultivators, Agricultural Labour, persons engaged in Household Industry and Others. (Meta Data, Census, 2011) Data has been presented here for the first two categories.

[8] In case of Marginal workers, there are two categories: those who worked for 0-3 months and 0-6 months. In this study, only those who received work for 3-6 months have been included.

Figure 3 Main and Marginal Workers (in %), GWC



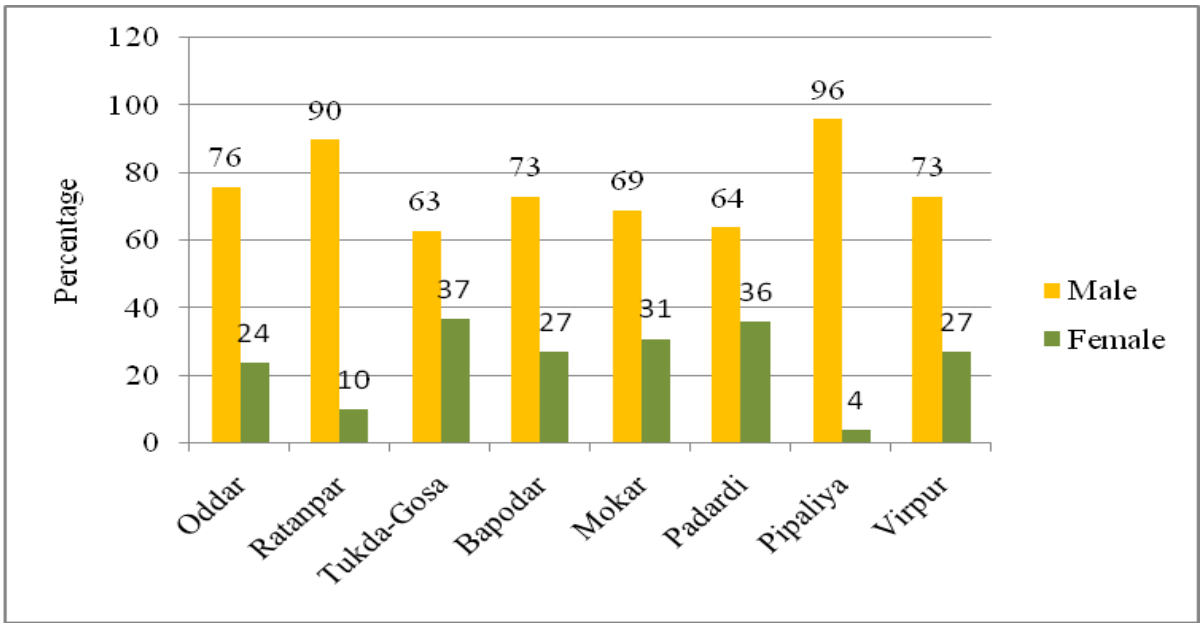
Source: Census, 2011

Overall, in the eight villages, there are 26.5 workers who are engaged in 'Other work'[9] and 'Household Industry'.

The female workforce participation (Figure 4) is the highest in Tukda Gosa (37%) and the lowest in Pipaliya (4%). It is lower in the villages that are inhabited predominantly by the Mer community, where women are engaged mainly in household work or in reproductive tasks related to agriculture and animal husbandry. Mobility for women in this community, especially for engagement in visible livelihood options is restricted. Similar trends are also observed among the Brahmin community, although some women are receiving education and moving into government or school jobs, the traditionally accepted arenas for women. Where participation rates are high, it is because of women from the vulnerable communities who are engaged in manual labour.

[9]Other workers include those who are engaged in some economic activity during the last one year, but are not cultivators or agricultural labourers or in Household Industry; The type of workers in this category include all government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport banking, mining, construction, political or social work, priests, entertainment artists, etc. (Meta Data, Census, 2011)

Figure 4 Workforce participation by Gender (in %), GWC



Source: Census, 2011

In 2015-16, in four out of the eight villages, of the total active workers in 'Mahatma Gandhi National Rural Employment Guarantee Scheme' (MGNREGS) projects, more than 50% were women. This includes Tukda Gosa (74%), Pipaliya (64%), Mokar (63%) and Bapodar (59%). The lowest was in Padardi (22%).

4.5.2 Caste groups and their economic role

Figure 5 Caste-wise livelihood patterns in surveyed communities, GWC

Caste	Households	Agriculture	Animal Husbandry	Agricultural Labour	Daily wage/ Manual lab.	Service/ Jobs	Trade/ Business	Fishing	Others
Mer	2342	Primary	Secondary			Additional	Secondary		
Aboti Brahmins	1209	Primary	Secondary				Additional		
Rabaris	667	Secondary	Primary				Additional		
Bardai Brahmins	112	Primary	Secondary				Additional		
Kolis	54			Secondary	Primary				
Dalits	502			Primary	Secondary				Additional
Muslims	118					Additional	Secondary	Primary	
Ahirs	6	Primary	Secondary						Additional
Others	81								Primary
Total	5091								

Source: Data collated through community consultations

Primary Secondary Additional

Mer, Aboti Brahmins, Dalits and Rabaris are the four predominant caste groups in the surveyed villages (Figure 5). Mer community migrated from Sindh via Kutch and little Rann of Kutch. As per the community consultations, except Mokar and Virpur, Mers are there in all villages. Aboti Brahmins, residing mainly in Tukda, Mokar and Virpur, share business and

social relationships with each other that involve sharing of food and daughters in marriage. The Rabaris are there in all villages except in Ratanpar. Muslims, Bardai Brahmins, Ahirs, Kolis, Waghris and Others are in a minority across villages. The number of HHs indicated against each caste group is based on an approximation shared by the communities. The economic roles and engagement of these different caste groups is captured in the following sections.

4.5.3 Agriculture

Agriculture is the primary source of livelihood for majority HHs (72%) of the Mers, Aboti Brahmins, Bardai Brahmins and Ahirs (Figure 5). For 13% Rabari HHs, it is the secondary source. 9.8% are working primarily as agricultural labour while for another 1.06% HHs, agricultural labour is an additional source of livelihood. Land is perceived as an asset for a secured future. Many communities accord preference to agricultural land owners while deciding the marriage of their daughters.

Table 16 Farmers size of Landholdings

Village	Total HHs	Total Farmers[10]	Large Farmer	Medium Farmer	Small Farmer	Marginal Farmer	Landless HHs (SECC)*
Oddar	1107	480	50 (10)	100 (21)	250 (52)	80 (17)	381 (34)
Ratanpar	293	180	0	20 (11)	40 (22)	120 (67)	36 (12)
Tukda	377	651	41 (6)	180 (28)	270 (42)	160 (25)	93 (25)
Bapodar	387	514	2 (0.4)	193 (38)	209 (41)	110 (21)	47 (12)
Mokar	820	1217	4 (0.3)	496 (41)	472 (39)	245 (20)	234 (29)
Padardi	162	451	2 (0.4)	179 (40)	170 (38)	100 (22)	26 (16)
Pipaliya	246	179	1 (0.6)	59 (33)	73 (41)	46 (26)	26 (11)
Virpur	254	NA	NA	NA	NA	NA	16
Total	3646	3672	100 (3)	1227 (34)	1484 (40)	861 (23)	859 (24)
Large Farmer: more than 10 ha land; Medium Farmer: 2 – 9.99 ha land;				Small Farmer: 1 – 1.99 ha land; Marginal Farmer: less than 1 ha land			
*Data extracted from Deprivation criteria 7, Socio-Economic Caste Census, 2011							

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015), *Jila Panchayat*, Porbandar

(Figures in brackets are percentages of Total farmers)

[10] As per the Sarpanchs and Talatis, the number of farmers per HH may be more than one; hence in some villages the number of farmers is more than the number of HHs. Also, some HHs have moved their residence to their farmlands and are not formally counted under HHs covered by the GP.

Land holdings: In absolute numbers in the 8 villages, except Virpur (Table 16), out of 3672 farmers, 100 are large farmers with more than 10 Ha of land (Oddar 50 and Tukda 41), 1227 are medium holding farmers with 2 - 9.99 Ha, 1484 are small farmers with 1- 1.99 Ha and 861 are marginal farmers with less than 1 Ha of land. As per SECC data, 859 HHs in the 8 villages (24%) do not own land. As per the data of Village Disaster Management Plan (VDMP), 2014, Padardi has the highest average land holding at 3.88 Ha. In Bapodar, Oddar, Virpur and Tukda it ranges between 2.49-2.98 Ha. In the rest of the villages, it is between 1.75-1.99 Ha.

Land use: Mokar is the largest village with 6815 Ha land while Ratanpar is the smallest with 887 Ha (Table 17) and they also have the largest (1217) and lowest number of farmers (180) respectively (Table 16). Seven per cent of the total land of these villages comprises pasture and grazing land and 21% is forest land. 45% land is under cultivation. The cultivated area under irrigation is 22%. Ratanpar and Pipaliya have almost 50% of land under irrigation.

Table 17 Land use (in ha)

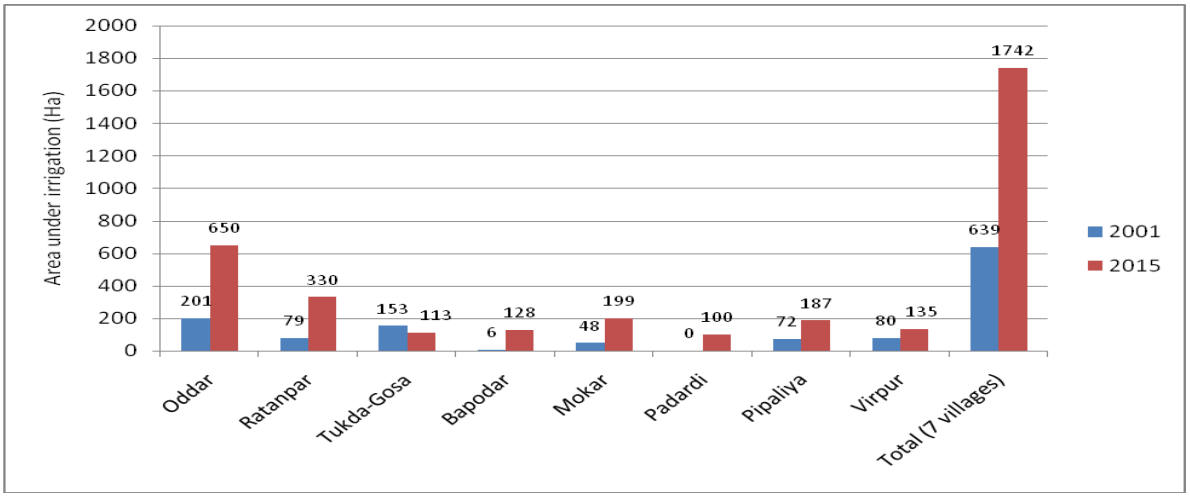
Village	Total area under GP	Forest land	Permanent Pastures and grazing land	Area under cultivation	Area irrigated by source of irrigation	Canal	Well/ tube well	Lift irrigation	% area irrigated
Oddar	3024	1	10	1517	650	0	120	530	43
Ratanpar	887	36	121	649	330	0	280	50	51
Tukda	1571	57	91	901	113	16	97	0	13
Bapodar	1755	242	131	1198	128	0	128	0	11
Mokar	6815	2500	387	2276	199	0	199	0	9
Padardi	1822	0	177	1074	100	0	100	0	9
Pipaliya	1572	1010	80	379	187	0	187	0	49
Virpur	1001	0	268	292	135	0	135	0	46
Total	18447	3846 (21)	1265 (7)	8286 (45)	1842 (22)	16 (1)	1246 (68)	580 (31)	

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015), *Jila Panchayat*, Porbandar

Irrigation: Except Tukda, which uses a canal, the rest of the villages depend on wells and tube wells for irrigation. During community consultations, people in almost all villages shared that they practice lift irrigation from the wetland.

Comparatively, Padardi has greater land area per HH and the farmers prefer to keep part of their land uncultivated to obtain a better yield in subsequent years. This practice of shifting cultivation is not commonly found elsewhere. Here, agriculture is predominantly rain-fed though two crops are taken depending on the monsoon and availability of water for irrigation. The farmers lift water from the stream where there are shallow depressions locally known as '*Jawar*'. These '*Jawars'* are in the wetland area and retain water even in winter season and support cultivation of 70% of the agriculture land.

Figure 6 Area under Irrigation (2001 and 2015)



Source: Census, 2001 and www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015), *Jila Panchayat*, Porbandar

There is a marked increase in the area under irrigation in all the villages in the past 15 years (Figure 6). The data for Padardi was not available in the Census, 2001. In the rest of the seven villages, the total land under irrigation has increased almost three times. This is attributed by the community to the enhanced availability of water from the wetland. However, in Tukda Gosa, a part of the land has become uncultivable due to increased salinity.

Cropping pattern: Agriculture in all the 8 villages is highly dependent on GWC. Over the last two decades, the diversity in the crops has improved and people in almost all the villages sow more than one crop (Table 18).

In Tukda, when after monsoon the water recedes, the moisture retention in the soil facilitates growing of winter crops. Cash crops such as cumin and coriander provide good yield and produce. With good facilities for irrigation from the KTR, there has been a substantial improvement in the ground water in Oddar. Farmers sow crops in three rounds and also some practice horticulture. Some of the farmlands are located in the midst of the wetland and farmers have easy access to water. They have developed a well-defined network of canals for irrigation for the entire village.

In Pipaliya, usually two crops are sown, one immediately post monsoon and the other depending on the water availability. An improvement in the irrigation facilities due to GWC as well as canals and ponds constructed for storing rain water has contributed to this trend. Cash crops such as groundnut, coriander, cumin and BT cotton are fetching good returns for the farmers. Sorghum, maize and pearl millet are the other two commonly sown crops.

The improvements are also reflected in the increase in land prices. A farmer in Virpur shared that the price of land has increased over the last two decades from Rs. 2000/bigha to Rs. 1 crore.

Table 18 Community perceptions of status of salinity & agricultural productivity

Village	Status of Salinity in Agricultural land	Status of Common Property Resources (CPR)	Agricultural productivity
Oddar	Low (Substantial improvement)	CPR improved because of KTR (despite mining)	Improved : Women started wearing more gold jewellery
Ratanpar	Low (Despite mining in proximity to the farmlands)	CPR improved because of KTR (despite mining)	Increased
Tukda Gosa	Medium (In large pocket of land salinity has increased and land is becoming fallow)	A section of CPR has turned saline. Fisher folks dependent on the water body	Medium agriculture and moving into newer occupations.(Only Rabi crop as the land remains submerged in the monsoon)
Mokar	Medium (Mixed response)	Quality of *Gauchar* has improved. Other villagers leave there cattle in the village for grazing.	People have lost agri-land to reservoir Per unit productivity increased but income reduced – loss of land
Virpur Vanana	Low (Substantial improvement) Price of 1 *bigha* land has risen from Rs 2000 to 1 crore	Real turnaround of CPR after KTR (Part of *Gauchar* gets submerged by the KTR)	Increased Our land produces gold.
Pipaliya	Low (Substantial improvement)	People in our village who used to earn a little over a rupee through manual labour are now livestock owners	We do not produce small quantities. Our future is linked to our land and agriculture, we have infinite source of food for our family, our progeny and for entire society. We feed the earth.
Padardi	Low (Use of Water from natural drainage and not using ground water for irrigation as it is saline)	Reduction in soil erosion and moisture retention; Protection of grazing land Salinity in Water table increased	Increased; If it does not rain, the village land is covered with salt; if it rains, people benefit and enjoy. We need only one crop to feed us through the year.
Bapodar	High (Increased) No limestone reserve Lost land to the solar power plant	There are less people and more animals in our village. Large village pond Greater moisture retention and increase in vegetation cover Reduction in top soil erosion	Two crops, use of lift irrigation from local pond. Productivity increased.

Source: Community Consultations

Agricultural yield: Discussions were held with farmers in 3 villages to arrive at an estimate of the average agricultural yield of 5 key crops in the project villages. The average yield for

Ranavav *Taluka* of Porbandar and Gujarat state is compared with the average village level yield (Table 19). The average village yield for wheat, groundnut and cumin is higher than the *Taluka*, District and State averages. For cotton, it is lower than the *Taluka* average but is comparatively higher than the District average. The yield for Moong is lower than the *Taluka* and District averages. Overall, it can be said that the agricultural productivity in the project villages compares favourably with the *Taluka*, District and State average yield.

Table 19 Agricultural Yield in kg/ha

S.No.		Wheat	Moong (Pulse)	Groundnut	Cotton	Cumin
1.	Village Tukda Gosa	3010	380	3740	1000	2000
2.	Village Padardi	3120	-	2500	2740	1500
3.	Village Virpur	4120	140	3120	2860	1000
4.	Average Yield of Villages (2015-16)	3416	260	3120	2200	1500
5.	Average Yield Ranavav *Taluka*, Porbandar	2850	650	2850	2600	980
6.	Average Yield Porbandar District (2013-14) and (2012-13)	2825	675	1280	500	650
7.	Average Yield Gujarat State (2011-12)	3015	-	1611	587	-

Source: Community Consultations (S. No. 1-4); Department of Agriculture, Porbandar (5-7)

The practice of share cropping varies across villages. Usually, one third to one fifth of the produce is shared with the labour who takes the full responsibility of the cultivation whereas the agricultural input is provided by the owner farmer. Tribals from Panchmahal and Dahod in Gujarat and border areas of Madhya Pradesh (MP) migrate to the district and work as agricultural labourers. Farmers also employ migrant as well as local labourers on daily basis with a wage rate of around Rs. 200-250/day. In some villages like Pipaliya and Oddar, labour is available in the village.

Usually the farmers sell the agricultural yield to local traders who visit the villages to purchase the produce. Even though all the villages are connected well to the Agricultural Produce Market Committee (APMC) in Porbandar, farmers use this facility only in emergency when they need immediate returns.

A commonly faced risk by the farmers is the crop destruction by wild boars and Blue bulls that are increasing in numbers. Large farmers are able to protect their fields with '*jhatka*' fencing (fencing with a low voltage electric wire). It costs about Rs. 30,000-35,000/*bigha* (about Rs. 2,00,000/Ha). Also, farmers use sparkling lights, torches and other forms of lighting to ward off the wild animals. Many guard their farms during the peak season by moving to the farmlands. In Mokar, Rabaris leave their cattle on the farmlands after they stop giving milk and this is another cause of destruction to the crops. Here, due to salinity as well as crop raiding, there has been an adverse impact on the relationship and business dealing between farmers and the farm labourers. Land owning female headed HHs find it difficult to employ share croppers or labourers to cultivate their land due to which their land remains barren.

4.5.4 Animal Husbandry

Animal husbandry is a primary source of livelihood for 13% HHs, mainly from the Rabari community. It is a secondary source of livelihood for 72% that includes families who own

land and practice agriculture. In the current scenario, owning land and availability of water are basic pre-requisites for taking care of fodder and water needs of livestock. Over the years, productivity of common lands has reduced and the major source of fodder is farm based fodder and crop residue. Due to an improvement in agriculture in the surveyed villages, there is a positive trend in investing in livestock. In addition, in the post monsoon season and when the water dries up, the wetland provides space for grazing of livestock. The traditional community practice of taking the animals in large numbers for open grazing in the wetland and surrounding areas is provided by the Rabari communities in the region. People shared that the GWC is reducing their drudgery by providing for the water and fodder needs of livestock. Women across villages perform the caring and rearing functions while the men are engaged in the grazing, purchase and marketing functions.

Maximum HHs own buffaloes as these provide good monetary returns (Table 20). This trend is observed both in the surveyed villages as well as in the district figures. In some villages, people own bullocks that are being used for farming.

Table 20 Livestock data of surveyed villages

Village	Cows		Buffaloes		Sheep		Goats		Total No. Of Livestock
	No. Of HHs	No. Of live-stock	No. Of HHs	No. Of live-stock	No. Of HHs	No. Of live-stock	No. Of HHs	No. Of live-stock	
Tukda Gosa	75	234	94	289	0	0	0	0	523
Ratanpar	122	284	218	868	0	0	0	0	1333
Oddar	302	787	480	2347	5	566	3	87	3787
Virpur Vanana	155	519	61	347	6	336	7	97	1299
Mokar	249	624	358	813	1	156	0	0	1594
Pipaliya	162	390	161	571	0	0	2	4	965
Bapodar	294	604	304	774	61	43	10	81	1507
Padardi	82	181	161	537	0	0	0	0	725
Total	1441	3623	1837	6546	73	1101	22	269	11733
District Porbandar	30,939	84,711	40,509	1,44,573	614	21,669	2402	17,891	2,73,793

Source: Department of Animal Husbandry, *Jila Panchayat*, Porbandar

Pasture and grazing land: On an average 7% land is available as permanent pasture and grazing land in the villages surveyed, with maximum in Virpur (27%), followed by Ratanpar (14%) and lowest in Pipaliya (5%) (Table 21). In Padardi, pasture land, farms and a big pond adjoining GWC provide possibilities for grazing for 7-8 months. In the post harvesting season, farmers use these farms for producing fodder or allow livestock to clean and enrich their farmlands. Fodder is generated from the agri-produce only or from the *Gauchar* land.

Table 21 Pasture and Grazing Land in surveyed villages

	Oddar	Ratanpar	Tukda	Bapodar	Mokar	Padardi	Pipaliya	Virpur	Total
Surface as % of GP Land	0.3	14	6	7	6	10	5	27	7

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015)

Oddar used to face famine like situation recurrently. However, with increased irrigation potential the fodder grown in the agricultural fields is more than enough for the livestock of the village. Even though the village has a small pasture land, being close to the city limits, it has been alleged that the Porbandar Municipal Corporation regularly abandon the stray bulls here for grazing. Oddar villagers also feed them. The Rabari community use the large patches of land near the KTR-KWRR Complex as grazing grounds for their animals. In one case, a temple situated in the periphery of the village owns more than 500 animals which are being reared solely on this wetland area. Large farmers in this village help the marginal and small farmers by providing fodder as well as free access to their lands.

In majority of the villages, there are atleast 3 dairies. Some operate in a cooperative mode while others are private. Community members shared that since there is more than one dairy, their bargaining power is higher and the rates are competitive. In Oddar, there are as many as 17 dairies and also collection centres have been set up at different points in the village for the ease of many farmers who have shifted to their farmlands that are located in or near the wetland. The main dairies are in the core of this village and hence inaccessible to these farmers. The total milk collection during the year is 13,77,375 kgs. with 4 villages having more than 2 lakh kgs. (Table 22). The price/litre in the cooperative dairies ranges between Rs. 5.15/fat to 5.50/fat.

Table 22 Milk collection and Income of villages from Sudama Dairy (2015-16)

Village	No. of producers	HHs owning buffaloes	Buffaloes	Qty (in Kgs)* during the year	Avg. Fat	Solid Non Fat	Amount (Rs.) Paid to producers	Avg. Income /producer
Mokar	58	358	813	1,27,681	7.8	9	54,35,206	93,710
Ratanpar	98	218	868	2,10,627	7.5	9	86,94,814	88,722
Oddar	215	480	2347	3,03,157	7.8	9	1,30,77,339	60,824
Tukda Gosa	35	94	289	84,773	6.9	8.9	31,36,422	89,612
Bapodar	115	304	774	2,10,291	7.5	9	85,12,162	74,018
Padardi	25	161	537	83,366	7.2	9	35,38,493	1,41,539
Pipadiya	45	161	571	2,37,479	7.5	8.9	97,25,993	2,16,133
Virpur Vanana	22	61	347	1,20,001	7.3	8.8	47,77,981	2,17,180
Total (avg./ village)	613 (77)	1837 (230)	6546 (818)	277,386 (1,72,171)			521,20,429 (65,15,053)	9,81,738 (1,22,717)

Source: Doodh Sahkari Mandali, Porbandar (Sudama Dairy, Porbandar)
(*100 litres=103 Kgs.)

For the health needs and upkeep of the livestock, both government and private veterinary services are available. Usually, livestock owners call private doctors as government facilities are inadequate. In situations when a disease affecting the livestock is not recognised as an epidemic, it requires considerable expense to address it through private sources.

From July-January, grasses such as *Saz* are available to meet the fodder needs of livestock. February onwards, wetland shrubs locally known as *Pario* and *Kharia* are collected by women and cleaned to wash off the salt before feeding it to the animals. Other fodder crops grown are *Rachko* (Alfa Alfa) and sorghum. *Rachko* specially requires irrigation. In most villages, sorghum is grown twice, once for human consumption and in the next round for fodder. Fodder is also stored by the livestock owners to meet the fodder needs during drought and summer. In Padardi, some farmers are generating more fodder than required and sell it to people within and outside the village. Stall feeding is also being practiced by many farmers. Since the price of the milk is determined by the fat content, there is a practice of mixing crop residue, processed commercially available fodder and other forms of nutrients like residues of cotton seeds etc. in the fodder to improve its nutritional value for the animals.

In villages where the livestock owners are from communities other than Rabaris, mechanisms have been worked out by hiring a Rabari to help graze the animals. Payment on a per animal basis is made for the same. Collective cattle care centres (*Gaushalas)* in almost all villages help care for the animals in a cooperative mode. In addition to small regular contributions by the users, in some villages like Oddar and Mokar, additional resources are generated for fodder and veterinary care through functions, donations etc.

4.5.5 Fishing

In Tukda Gosa, 87 HHs (with an approximate population of 600) of the Muslim community are engaged in inland fishing in shallow water. Popularly known as *Machhiyaras*, they reside at Gosa *Machhiyara Vas*, 3 kms. away from main village of Tukda on the bank of the wetland. There are also a few *Waghri* families in Oddar who are dependent on fishing for a livelihood. Traditionally these communities are not exposed to marine fishing. Some fisherfolk of Tukda Gosa are occasionally involved to assist in the mechanised trawlers or large scale fishing.

Men, women and children all engage in different aspects of fishing and its trade. Every family has at least one small boat and there are more than 200 small fishing boats in the community. The boat size varies between 12-18 feet and these can usually accommodate only two people. They are purchased at a price varying between Rs. 15,000-20,000 from Mangrol (nearby sea coast besides Chorwad). It costs around Rs. 5000/- for its upkeep and maintenance once every 2-3 years. Fishing nets cost Rs. 2000 to 3000 depending on the weight of the net (Rate of the net is Rs. 400-500/kg) and families purchase these based on their capacity to invest as they last only for one season.

The annual earning is dependent on the availability of sweet/fresh water in the wetland area. In the monsoon, the upstream dam overflows and the fish collect in the wetland as they move downstream. There is no seeding done in the KTR. Fishing is done for a period of about 4-5 months between July to February. During the peak season, families move their residence to the wetland. Usually the fisherfolk cast their nets for a period of 7-8 hours on the eastern side of the wetland towards Tukda. It is also done in a pond in the main village.

The fish catch is usually sold at the Porbandar market yard. For 8 months, the community does not have any work. Few of the more resourceful families go to Jhakau in Kutch and Dwarka for fishing. The senior leaders of Tukda shared that due to their low economic resources, people are physically weak. Their physical condition, coupled with their lack of alternate skills, prevents them from engaging in other kinds of available manual labour.

In addition to the fish catch sold in Porbandar, some varieties of fish are dried during winter and the first two months of summer and sold to traders. Depending on the quality, this can fetch them anywhere between Rs. 50-100/kg. The rest of the fish is also similarly priced. The average income of a family per season varies between Rs. 30,000 to 1 lakh. Since most of the families have no other source of income, they save their income and purchase grains for the entire year after the fishing season. Vegetables from nearby Tukda and small crustacean like crabs in the shallow muddy waters near their village are also consumed.

The *Machhiyaras* need to obtain a license from the Fisheries department which costs Rs. 200. It has to be renewed every year. No licenses have been renewed in the past 5-6 years due to a ban that was imposed on fishing in Kerly-Gosabara reservoir (vide two circulars issued on February 18, 2010 and November 24, 2014)[11] by the District Magistrate after complaints were received that those involved in fishing are also poaching birds, especially the common crane. There is a strong public perception that poaching is carried out by the Tukda Gosa fisherfolk during fishing. However, they counter it saying the poachers are outsiders. Penalty to the tune of Rs. 5000-7000 is levied on those caught fishing. People have had to mortgage their minimal assets to pay such fines.

During the monsoon, when the road between Tukda Gosa and Mokar gets submerged, this community ferries the villagers. It is an important service rendered by them. There are only 2-3 households in this area that own 5-7 *bighas* of land each. They usually grow groundnuts during monsoon and coriander during winter and some vegetables to meet their daily needs. Water for irrigation is sourced at a distance of 2 km. and even though it is not very sweet, the quality is conducive for farming. The better resourced families own vehicles that they use in transportation business. This fetches them about Rs. 1500-2000/day.

4.5.6 Courier services

Courier business was started from Mokar village about 30 years ago by a member of the Aboti Brahmin community. Traditionally, this community was engaged as *Angadias* (an informal courier cum banking service). Moving into courier services was thus an extension and a formalisation of their previous engagement. Several big and small popular courier services have mushroomed over the years. Many youth, almost one per family of the Aboti Brahmins in Mokar, Virpur and Tukda Gosa are engaged in this business. About 25%, all males, manage courier collection centres and the rest serve as delivery boys or office assistants. The latter, on an average, earn Rs. 3500-4000 with additional allowances for outstation posting. Those managing the centres earn upto a maximum of Rs. 25,000. Earnings from this work help to support expenses of the daily needs of these households.

[11] The circulars stated that looking into protection of birds, nesting and their habitat, fishing activity has been declared illegal. It also mentions the prevalence of poaching in the reservoir which is a natural habitat to many birds. It classified fishing as a criminal activity leading to sentence of one month of simple imprisonment. The circular also bans entry of motorised vehicle (except vehicles under emergency duty) in the divider/road between Tukda Gosa and Mokar.

4.5.7 Manual labour

The less resourced and disadvantaged communities like Kolis and Dalits depend mainly on the opportunities available for manual labour. This includes working in mines, on farms and on works under government programmes like MGNREGS.

Mining in Oddar, parallel to the coastal region (Figure 7), has become an important source of livelihood due to the good belt of sub-surface limestone present throughout the village and the wages that the workers earn. It is alleged that there are many illegal mines near this village. The Koli community in Tukda, few Mer and Rabari HHs in Oddar and Ratanpar are engaged in these mines.

Figure 7 Mining belt near surveyed villages, GWC

Of the 54 Koli families in Tukda, approximately 50 HHs and 70-80 men and women are involved in stone cutting, filling and transportation. In a year, they work for about 8 months. During monsoon, the work is discontinued and during this period, they are engaged as agricultural labour. For loading stones on the trucks, the daily wage varies between Rs. 150-200.

The cutting and extracting of stones has been mechanised in the last 5 years. As observed during the visit to the mines, limestone cutting was generating enormous amount of dust and water control application was not being used at the cutting wheels. This increases the vulnerability of the labour to respiratory illnesses.

Pricing for stone cutting is decided on the compactness of the cut stone. The price is inversely proportional to the level of perforations on its surface. Stones having more perforations per inch of stone surface are priced at about Rs. 15 whereas stones with lesser

perforations fetch about Rs. 35. Market for the extracted stones is mainly in cities like Jamnagar, Ahmedabad and Rajkot where in a good season, 10 trucks/mine/leased machines of good stone is being sold. Even though mining is an attractive source of livelihood, it is quite an unpredictable option. The stone which can go as deep as 30 feet, may not have uniform texture. After one feet of extraction of costly stone, layers of perforated stones might show up.

Community members shared that in a 5 km. stretch from Miyani to Madhavpur on the coastal belt, there are 9 large registered mines with more than 5 stone extraction machines each on an average. There is nearly double the number of small to medium sized mines with 2 to 3 stone extraction machines at each site. The mines are leased for a 5 year period. Once stone extraction is over, these have to be closed down and filled up with the remains of the process i.e. soil layer, mining dust and deformed stone pieces. Regardless of the reason for closing of a mine, it needs to be ensured that the site is covered compactly and is made ready for agriculture use.

Overall, there are 22.5% Main Agricultural labour in the eight villages, with the lowest in Ratanpar (6%) and the highest in Mokar (42%). Work is sourced both within the village and outside. Almost in all villages, the percentage of male workers is more than female agricultural labour (Table 23). The wage rate per day across villages varies between Rs. 200-250/day.

Table 23 Main agricultural labour (in persons), GWC

Village	Main workers	Main Agricultural Labour –Total		Main Agricultural Labour Male		Main Agricultural Labour Female	
	Persons	Persons	In % of total Main Workers	Persons	In % of total Main Agricultural Labour	Persons	In % of total Main Agricultural Labour
Oddar	1586	233	15	170	73	63	27
Ratanpar	437	25	6	16	64	9	36
Tukda	518	96	19	66	69	30	31
Bapodar	700	110	16	61	55	49	45
Mokar	1036	437	42	264	60	173	40
Padardi	274	111	41	61	55	50	45
Pipaliya	323	67	21	59	88	8	12
Virpur	366	99	27	75	76	24	2
Total	5240	1178	22.5	772	66540	406	34

Source: Census, 2011

On the one hand, there are positive stories of abundance of food and high and increased agricultural productivity. On the other, there are also many landless people. As per SECC data, there are 859 HHs in the 8 surveyed villages (24%) that do not own land. There is a need for providing safety nets for this vulnerable population. *Indira Awas Yojana* (IAY), a housing scheme for the poor, is not being implemented effectively in Gujarat. It was evident that in villages where work was available under MGNREGS, as in Mokar, the landless are likely to seek and work as labour. The data on work generation under MGNREGS (Table 24) does not reflect the level of demand at the village level.

Table 24 Employment under MGNREGS in surveyed villages (2015-16), GWC

Village	HH provided employment	HH working during reporting month	Cumulative person days generated					HH completed 100 days	Beneficiary of IAY/Land Reform
			Scheduled Caste	Scheduled Tribes	Others	Total	Women		
Oddar	9	8	34	0	481	515	238	0	0
Ratanpar	0	0	0	0	0	0	0	0	0
Tukda	29	22	645	0	352	997	819	0	0
Bapodar	28	25	313	0	1420	1733	1067	5	2
Mokar	253	0	4608	277	8583	13,468	9554	10	2
Padardi	0	0	0	0	0	0	0	0	0
Pipaliya	26	15	0	0	1843	1843	1507	3	0
Virpur	0	0	0	0	0	0	0	0	0
Total	345	70	5600	277	12679	18,556	13185	18	4

Source: www.nrega.nic.in/ (accessed on April 12, 2016)

4.6 Interdependence of livelihoods and ecological character of wetland

All the villages surrounding the GWC have benefitted from it in more than one way and this is widely acknowledged. The local community considers it a lifeline for its existence. People in Bapodar, however, feel that the benefits they receive are limited because of their upstream location; the condition of agriculture and farming may improve if a canal from KWRR is developed towards the village farmland. In Mokar, farmlands closer to the wetland have been facing flooding due to Kerly Reservoir, especially in the monsoon.

In Oddar, there is a close link between agriculture and animal husbandry and any change in availability of water for irrigation will affect people's ability to own and sustain livestock. Some farmers shared their apprehensions, of the effect of mining that is being done near the village, on the physical capital of the village.

In Padardi, the interdependency of the community on the wetland is clearly reflected in their statement, "This '*Timbo*' (hillock) was totally saline when the first group came to reside here. The situation of water and soil culture was adverse for farming. People used to sow a lower quality pearl millet ('*ghummad kapas*' or '*Kodri*') and their living conditions were very different. Post Kerli, irrigation facilities have improved and farmers have begun to sow pearl millet and also groundnut. Even if monsoon fails in our village, our agriculture depends on monsoon in Bhadar catchment area."

In Tukda Gosa wetland services are used by almost all the farmers, animal rearers and fishing community for irrigating their farmlands, for grazing their animals and for fishing respectively. The community recognizes that due to the dam and canal network and bund construction, salinity has reduced. However, the *Sarpanch* and few farmers also shared that the embankment that has been constructed between Tukda and KWRR prevents the flow of sweet water towards Tukda. This has adversely affected the possibility of growing certain winter crops. There is no moisture in the soil of the receiving side and salinity has also increased double-fold as the area is receiving only tidal water. They described this vast

patch of land as '*kharabo*' literally meaning barren land. The villagers have applied for compensation for the land rendered uncultivable.

The *Machhiyara* community is of the opinion that the dams and reservoirs constructed by the department have obstructed the flow of the water, adversely affecting and reducing the period in which fishing can be done. Some community members took the team to see the natural bund raised at the *Bara* (gate or entrance) which they said is obstructing the tidal waves from entering the KTR from Arabian Sea. They have demanded that the bund should be demolished to facilitate the free flow of saline sea water in the KTR that will facilitate enhanced fishing activity.

The fisherfolk are perceived by local communities as socio-politically voiceless in negotiation and decision making processes. Being a minority community makes their negotiation/ arguments weaker. Community feels that once the wetland is announced as sanctuary or notified area then there will be more restrictions on their entry in the wetland. The feelings of the community were evident in the words of a member who said, "If someone snatches away our only source of livelihood, we will be forced to retaliate."

The community in Pipaliya shared that *Chhel* (the flow of water from the upstream) is the Grace of Nature because it provides water to the entire area and washes away salinity in land and ground water and improves surface water storage. Another observation shared was that 'Bund at the *Bara*' is playing an important role as it stops water flowing towards sea; if that bund is removed, it will adversely affect the eight villages. Post 1983, village has not experienced floods. Since past 10-15 years, the village has good water supply, improved agriculture and finances that have changed the standard of life of the community. An old lady shared, "Now people are able to store ration and basic grocery for 12 months; earlier, they used to bring ration on daily basis. The journey from daily wager to a land owner farmer is due to Kerly. People have started building *pucca* (permanent) houses, facilities are being repaired and renovated and the village has prospered."

Another farmer added, "25 years back we used to work on daily wages in factories of Ranavav. Most of the people were labourers and very few owned livestock. Today the entire community is engaged in agriculture and animal husbandry."

Ecologically, the GWC is very healthy and productive and rich in biodiversity. The wetland is mainly managed by the Irrigation department by treating upper catchment and water bodies. It is managed as a water resource body and not as wetland. Water availability in the wetland during good monsoon is for 6 to 8 months and on an average, monsoon is for 4 to 6 months. The last three years in the region are of average monsoon. Wetland development may require specific technical interventions for sustenance as an ecological unit and not merely as water body for irrigation.

The community has sustained the wetland area all along with their wisdom and concern about the ecological unit. This makes the villages important partners in the process of wetland conservation. The community hopes for improved ways of its development and conservation which complements their livelihood and existence in the area and ensures user rights of farmers, livestock owners and fishing community.

4.7 Resource Management Conflicts

Currently, there is no apparent conflict around management of the reservoir and regulator constructed by the Irrigation Department. These two structures are part of GWC and are a habitat for a large number of birds including migratory birds. There are informal discussions on conservation of the wetland. If wetland is isolated from the communities around it, many forms of conflict may arise.

Presently, there is open access of people to and around the wetland for a variety of uses. Some of the resource management conflicts and risks of adverse change in ecological character of the wetlands are mentioned below.

i. The separator between KTR and KWRR which is used as a road connectivity between Mokar and Tukda Gosa, if stopped or restricted, will require both side of the villagers to cover almost 50 to 60 Km. to access each other's village. Today, heavy motorised vehicles are banned over this connecting road. Movement of human beings and motorised vehicles over the connectivity over the 'wetland' had an adverse impact on the survivability of the birds. Use of the KTR and KWRR separator is an important issue to minimise the adverse ecological impact.
ii. The land mass around the wetland is used for grazing without restrictions. However, grazing itself can have potential adverse ecological impact in a wetland inhabited by birds. The dairy is so well developed and has such high dependence on the wetland that any restriction can cause conflict. Full stall feeding of cattle will be expensive for cattle rearing and for milk production.
iii. The other issue having potential adverse ecological impact is use of water for irrigation. People in Bapodar shared that since their village is on the upstream side, farmers lift water using diesel run pump sets from KWRR for irrigation. In Tukda, in monsoon farmlands get denuded, however, they use the land around the reservoir for cultivation for Rabi crop as the soil retains moisture for longer time. In Oddar, village agriculture land falls inside the wetland area. In Padardi, farmers use bore-well for irrigation which depletes the water level in the wetland.
iv. The limestone mining in Oddar is another source of potential adverse impact on the wetland ecology. So far no discussion has happened with regard to restrictions over mining. As the mining lobby is very powerful, any restriction can cause major conflict.
v. A major area of conflict that has often surfaced is the issue of bird poaching. It has been alleged that the fisher-folks in Tukda Gosa are involved in this. This is a major reason for the ban on fishing. However, the fisherfolk strongly deny it. They state that poachers come from outside.

It needs to be understood that at present, all the eight villages included in this study are living in harmony with the wetland and have very high dependence on it for livelihood activities, primarily, agriculture, dairy and fishing. The villagers claim that they not only protect the birds but also birds feed is largely dependent over the agricultural produce. They care for injured birds and also inform the concerned organisations if any bird gets injured. The potential adverse ecological impact needs to be weighed against the interdependence of the local communities and the wetland.

4.8 Livelihood assets and opportunities

The construction of KTR and KWRR has created the possibilities of lift irrigation for agricultural production. The Department of Irrigation has estimated that about 10,000 acres of land is being benefitted by the newly created irrigation structure. Of this, cultivated land

covers about 3400 acres. As per the records of the Irrigation Department, lift irrigation alone covers about 3200 acres of land and 4400 acres of land has been reclaimed from salinity. In the area, the main source of livelihood is agriculture and dairy. There is enough scope to further improve the current livelihood situation.

The lift irrigation facilities are individual initiated facilities. A water cess is levied by the Irrigation Department based on the command area under the lift irrigation pump set and the number of crops covered. (It is about Rs.425/ per Ha per year). All the lift irrigations can be covered under a formal institutional framework like cooperative so that small and marginal famers having very little asset for irrigation like diesel pump-set can also benefit. Gujarat has proven track record of cooperative management of lift irrigation. Out of the total 3646 HHs, the number of small and marginal farmers is 2324. Looking into such large number of small and marginal farmers, promotion of lift irrigation cooperative can be a major intervention to improve agricultural productivity.

Besides this, the small and marginal farmers do not have agricultural implements for cultivation. Tilling of the land is mostly done through tractor based cultivation. The small and marginal farmers bring the mechanised cultivator on rent from the big farmers. Agriculture implements lending library can be another major intervention. Almost all the farmers do not have access to agriculture extension services like soil testing, choice of crop, crop disease surveillance and control, crop insurance, Minimum Support Price (MSP) etc. So far none of the farmers met during the study has gone for 'soil health card', which has been repeatedly announced by the Prime Minister. The area under study has not explored horticulture which can be a major alternative to improve livelihood. It is being practiced with good returns in a village in KBS. As the villages around Gosabara area have moved to agriculture in a systematic way after 1990s, subsequent to land and water development interventions, perhaps, now the time has come to cultivate vegetable and horticulture which are less water intensive and resistant to droughts.

In recent years, National Bank for Agriculture and Rural Development (NABARD) and many other institutions has been promoting Farmers Producers Companies. Such a form of company which can manage the agriculture implements library, disseminate extension services including crop insurance, veterinary services can improve the agricultural productivity of the small and marginal farmers.

As per BPL data in the 8 villages there are only 1% BPL families under 0 -16 score. However, the SECC survey indicates that 859 families (one fourth of the HHs) are landless. In Oddar the number is 381 and in Mokar it is 234. Other six villages have very smaller number of landless families. About 10% of families are involved in agricultural labourers and for only 1% of households it is an additional source of livelihood. It has been observed that at one given point of time about 200 workers were working in the MGNREGS work site. Livelihood opportunity for the bottom one fourth of households in the villages, particularly in Mokar and Oddar is an issue. The mining operations are in Oddar village. It is well known that mining activity is highly unregulated and workers are not covered under various rights and entitlements. There is a need to organise the unorganised workers and ensure their rights and entitlements. Besides it, appropriate skilling can be initiated after exploring the people's interest and market potential.

In the context of the available fishing skills of the Tukda Gosa fishing community and protection of habitat of the birds, the only option is to make alternate inland fishing

opportunity available. The fishing community is not inclined to take up any new economic activity like eco-tourism or wage labour. It will be useful if new inland fishing opportunities are created based on cooperative principle nearer the village.

5 Khijadiya Bird Sanctuary, Jamnagar

5.1 Background

Khijadiya[12] Bird Sanctuary (KBS), the second wetland selected for the baseline assessment is located at a distance of about 12 kms. from Jamnagar city in Gujarat and covers an area of 605 hectares. There are about 300 species of birds that have been recorded in this unique ecosystem. Khijadiya wetland was declared a sanctuary on 6 November 1982. It is an outcome of two manmade structures, earthen reclamation bunds that were constructed in the pre-independence phase by the Princely State 'Nawanagar' in 1920 and subsequently by the State government in 1956, in the midst of natural relief features. These bunds have been constructed to restrict rapid flow of fresh water from draining into the Gulf of Kachchh and to control salinity ingress from sea tides.

KBS is divided into 2 major parts: Part 1 (Dhunvav side) (Figure 8) and Part 2 (Jambuda Side) (Figure 9) dividing tidal salt waters and fresh waters. Both these sides are distinct and their water quality and depth, vegetation and soil texture are varied. The entire area has marshy lands, mangroves, thorny forests of Prosopis, mudflats, salt pans, creeks, forest scrub and sandy beaches. Apart from other wildlife seen here, there are other trees and shrubs where birds roost and nest. A large variety of migratory birds usually visit the sanctuary between September and March due to the diverse micro-habitats available here.

Figure 8 Khijadiya Bird Sanctuary, Part 1

[12]The name Khijadiya has been derived from the native tree '*Khejadl*' (Prosopis cineraria-native species), prominently found in the area. *Khijado* Tree was once considered very pious and a temple of *Khijado* exists even today in Jamnagar city.

Figure 9 Khijadiya Bird Sanctuary, Part 2

The sanctuary is located at the watershed of Ruparel river and Kalindri at the North East side of this region and on the other side watershed of important rivers of Rajkot region Aji and Und contribute fresh water which creates a unique ecosystem in the Gulf of Kachchh in Jamnagar district. All the streams of both these rivers meet near Jodia-Balachadi-Jambuda. Due to flood and siltation of these major rivers, rivulets and other drainage streams, the busiest port of Gulf of Kachchh – Jodia turned into a mudflat. In this coastal belt, natural mangroves have been protected and further strengthened by consistent mangrove restoration and plantation.

Since 1519, Jamnagar was named after Jam Raval who established the region. Thereafter, it came to be known as Haalar based on the name of the popular ruler Haalaji, son of Jam Raval. The Haalar border of Gulf of Kachchh was once busy with several ports like Bedi, Rozi, Nagna, Sachana and Jodia. Since 1980, it is also popularly known for India's first Marine National Park.

Of the several villages located around KBS, 4 villages were selected for the baseline assessment viz. Jambuda[13], Khijadiya, Dhunvav and Vibhapar. Except Vibhapar, all the other three villages share boundaries with KBS. A road connecting Khijadiya to Sachana passes through the sanctuary. The area, being protected, provides limited access to outsiders.

Jamnagar district and its adjoining areas are famous for their drought prone characteristics. The last couple of years have also recorded low rainfall and this was evident in the responses of the community, especially those directly affected by it viz. those engaged in agriculture and animal husbandry.

Such extreme and unpredictable climatic conditions have led the people to diversify from the traditional occupations of farming and animal husbandry to craft sector such as tie and dye, embroidery of silver and gold and activities like pearl collection, preparation of brass machine parts and export-import of goods and other port related services.

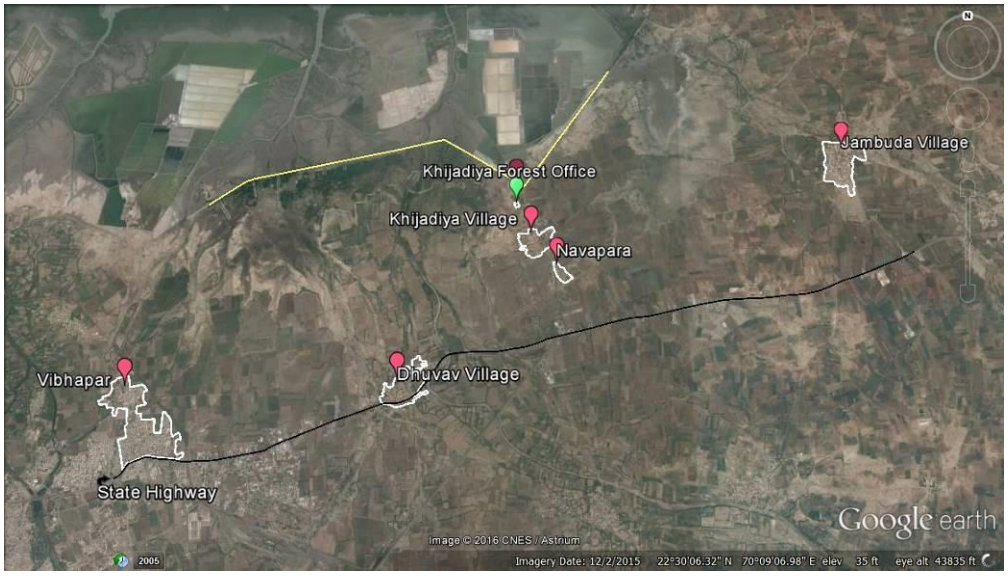
[13] The village got its name 'Jambuda' as several trees of Jamun (Indian Blackberry (Syzygium Cumini)) used to grow along the banks of the river Kalindri that flows near the village. It is said that this village was established by the Jam Saheb of Jamnagar and both the fruit and king have found a place in the folklores of this village.

5.2 Location of communities surveyed

Khijadiya, Jambuda, Dhunvav and Vibhapar, the four villages covered for the baseline are all located on the periphery of the KBS at varying distance and proximity (Figure 10). Khijadiya is located near the main entry to the KBS and is about 15 kms. from Jamnagar city.

Jambuda is approachable from the road connecting Rajkot-Jamnagar Highway to Mailya. It is 3 kms. from KBS and 16 kms. from Jamnagar city. Dhunvav is located on the Rajkot – Jamnagar Highway and from the Highway side, it is situated about 5 kms. from KBS. A large part of Vibhapar now falls within city limits. It is also situated on the Highway and is the farthest from KBS as compared to the other three villages.

Figure 10 Map of surveyed communities in Khijadiya Bird Sanctuary



Khijadiya has two hamlets, the '96 salt colony' and Navapara which is newly formed village since last 10 years. This area is in the basin of river Aji and Und flowing from Rajkot. All the tributaries of both the rivers meet near Jodia-Balachadi-Jambuda. Other small rivers of the area like Ruparel, Kalindri and Kankavati flowing from over the villages of Dhunvav, Khijadiya and Jambuda form an estuary in which KBS has been located.

In Jambuda, there are five hamlets divided by the road to Maliya. The village is known for its educational achievements. People recalled that the well-known pre-independence politician, Mohammad Ali Jinnah used to study here. The *Talati* who is from Gadhvi community teaches English in the village school as well as in Sainik School at Balachadi which is 28 kms. from Jambuda. He is conversant with many poets and playwrights of English Literature. People proudly shared that some residents have moved on to the film industry and are famous Indian Film Producers.

Patel caste groups are in majority and are the dominant caste in terms of their numerical strength and voice in village politics. The others communities are Kolis, Gadhvis, Dalits, and Rajgor in descending order of numbers. The Patels and Gadhvis are very well to do communities and many of their family members are settled in U.S.A and U.K. Under the *Sansad Adarsh Gram Yojana*, (a scheme for development of model villages by Members of Parliament) Ms. Poonam Madam, Member of Parliament from Jamnagar has adopted this village for development initiatives.

Vibhapar has got its name from Jam Vibhaji. It shares its borders with Nagna village on one side (once Prime Port of Jamnagar state) and Nagamati River on the other. Dhunvav is close to KBS and is inhabited mainly by the Sathwara community who settled here at the behest of the *Jam Saheb.* He wanted them to stay near the city so that fresh vegetables could be brought for his horses.

5.3 Demography

5.3.1 Population

As per Census, 2011, the total population in the four villages is 94,021 (Vibhapar alone has 82,019). A major part of Vibhapar is adjoining Jamnagar city limits but falls under GP. Hence, this data is an aggregate of both rural Vibhapar as well as its parts that are now urbanised. Khijadiya is the smallest with a population of 2246. The average sex ratio of these villages is 875. Vibhapar has the lowest sex ratio at 866.

The SC population is 5%. In Jambuda and Khijadiya, it is higher than the proportion of SC population in Gujarat (7%) but lesser than the national figure (16.6%). The ST population is negligible with 1% or less (Table 25).

Table 25 Population data for surveyed communities, KBS

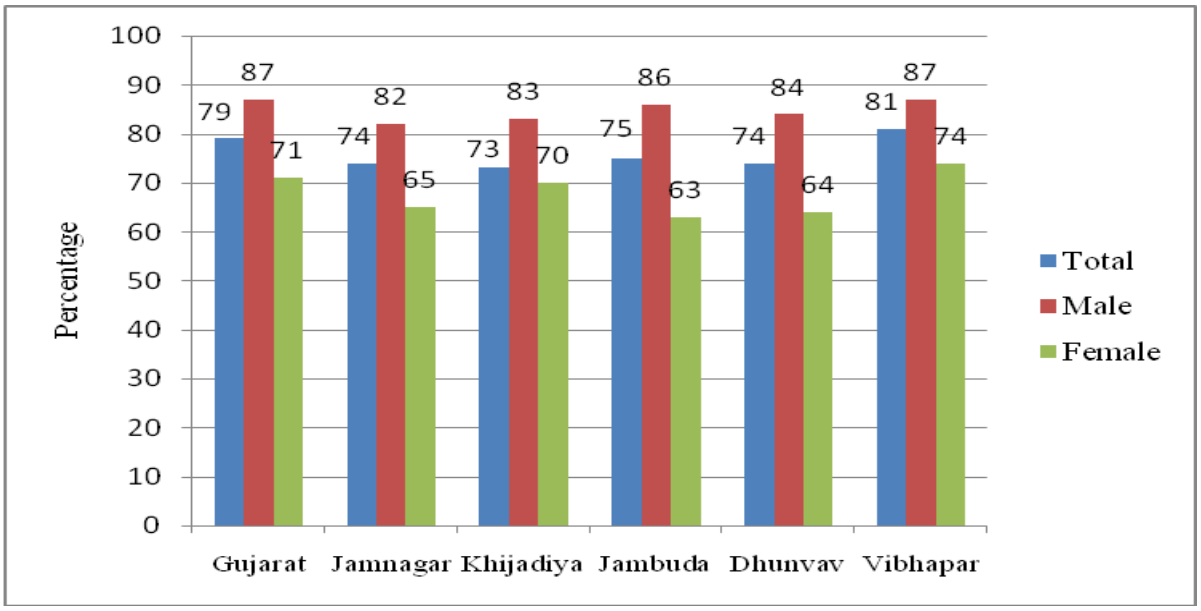
	Khijadiya	Jambuda	Dhunvav	Vibhapar	Total
Total Population (Person)	2246	3507	6249	82,019	94,021
Male	1166 (52)	1810 (52)	3212 (51)	43,951 (54)	50,139 (53)
Female	1080 (48)	1697 (48)	3037 (49)	38,068 (46)	43,882 (47)
Sex Ratio	926	938	946	866	875
Scheduled Castes	176 (8)	390 (11)	198 (3)	4225 (5)	4989 (5)
Scheduled Tribes	0	27 (1)	0	654 (1)	681 (0.7)

Source: Census, 2011 (Figures in Brackets indicate percentage of Total Population)

5.3.2 Literacy

The overall literacy rate of Jamnagar district (74%) is lower than the Gujarat literacy rates (79%). Similar trends are observed for both male and female literacy. Vibhapar has the highest literacy rate (81%) as well as male and female literacy rates (87 and 74% respectively). Vibhapar, being closest to the city, also has maximum access to educational services. The literacy rates in all the other three villages are comparable to the district literacy rate (Figure 11).

Figure 11 Literacy rates in surveyed communities (in %), KBS



Source: Census, 2011

5.3.3 Poverty index

As per the latest Village Development Plans (2015), 4% HHs in the surveyed villages are below poverty line in the 0-20 category. Vibhapar has the lowest numbers (.67%) while in Jambuda, close to half the HHs are BPL (Table 26).

Table 26 BPL HHs in surveyed communities, KBS

	Khijadiya	Jambuda	Dhunvav	Vibhapar	Total
Total HHs	443	739	1154	17,008	19,344
BPL HHs (0-16 score)	39 (9)	159 (22)	59 (5)	NA	257 (1)
BPL HHs (0-20 score)	123 (28)	360 (49)	244 (21)	115 (.67)	842 (4)

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015)
(Figures in Brackets indicate percentage of Total HHs)

5.4 Stakeholder mapping

The community consultations and meetings with officials of the government departments helped to identify stakeholders who have a stake in the wetland and gather their perceptions about the wetland and their interface with it (Table 27 to Table 37). In Jamnagar, the wetland was declared as a sanctuary in 1982 and it is now over 30 years since the people living around KBS have been experiencing the changes due to the area having received a protected status. Many farmers have their land near the KBS; some of the more vulnerable HHs (Kolis and Muslims of 96, Salt Colony in Khijadiya and the Kolis and Dalits in Jambuda) who used to fetch firewood from the wetland area and the livestock owners who used the grazing lands in this area have gradually reduced their dependency on the wetland. They continue to face the inconveniences due to this change and are vocal about it.

The main stakeholders identified are as follows:

1. Farmers
2. Animal Rearers
3. Brass part workers
4. Brick kiln owners and brick makers
5. Manual Labour
6. Department of Irrigation
7. Department of Forest & Environment
8. Environmental groups/EDCs
9. Dairy Cooperatives
10. Livestock Department
11. Jamnagar Municipal Corporation

The perceptions of the stakeholders relate to the changes in their livelihoods after declaration of the sanctuary, the impact of the restrictions imposed on use of the wetland, measures and alternate means for its wise use; issues and conflicts in resource management and how these have and can be resolved through dialogue and community participation.

Table 27 Stakes and perceptions of Farmers, KBS

Stake in Wetland	What they are saying
Producing crops and incidental irrigation services from the wetland area	**P**rior to the declaration of the wetland as a sanctuary, the quality of water was good and farmers were able to grow crops such as groundnut, chicory and chasiya wheat. There were no instances of crop raiding by wildlife. The need for protective measures such as fencing has increased the cost of cultivation. It has led to a shift to crops that require less effort and time and low dependence on water from the wetland. **R**eclamation of bund is important. **C**anal from Dhunvav to Maliya needs to be completed as this will help to decrease salinity level. **R**etention of moisture in the land is dependent on how the wetland receives and stores the rainwater runoff as the wetland and Jambuda village both are in the depression contour of the river system. **I**rrigation facilities are a major source of worry. In drought years, like in the last 3 years, farmers have had to resort to other small jobs or rely on their savings. **F**orest Department does not allow the cutting of Prosopis vegetation in the riverbed and this obstructs the free flow of water into the sea, causing flooding in the farms. **A**gricultural land that is lying unused due to inability of farmers to invest has been acquired by the Forest department. It requires sustained efforts and resources to find out the extent of land that has been included under forest land and reclaim it. **G**round water level has improved, but the salt/chemical plants in the vicinity of the wetland have led to salinity ingression and degradation of land.

Table 28 Stakes and Perceptions of Animal Rearers, KBS

Stake in Wetland	What they are saying
Incidental grazing and fetching of fodder in post monsoon season	**T**here was a much larger population of the village that was engaged in animal rearing and now fewer people own livestock. **T**he number of cattle has decreased significantly over the last 20 years mainly due to salinity and reduction in availability of fodder. **F**eeding of livestock (both fodder and water) is dependent on external sources. Almost 50% fodder has to be purchased. **C**attle are mostly stall fed in collective cattle shades which are managed by the village community. **T**here is waterlogging in the *Kharabo* i.e. barren, uncultivable land (Dhunvav) and no fodder can be grown here; some part of it has also been acquired by the Forest department. **A** large part of the pasture land in Dhunvav has been taken by the Forest Department; it has not been measured and fencing has been done; there is lack of clarity on how much land has actually been taken away.

Table 29 Stakes and Perceptions of Brass part workers, KBS

Stake in Wetland	What they are saying
Shifting from agriculture labour to brass part work	**P**refer to work in brass part units nearby than migrate; since demand for agricultural labour has reduced and this work provides more compensation.

Table 30 Stakes and Perceptions of Brick kiln owners and brick makers, KBS

Stake in Wetland	What they are saying
Not directly dependent on the wetland resources; obtain soil and water for brick making from the village and periphery of the wetland	**W**e are able to get free land from the GP for setting up of kilns. **W**ater and soil is also readily available in the village and the periphery of the wetland.

Table 31 Stakes and Perceptions of Manual Labour, KBS

Stake in Wetland	What they are saying
People collect and sell the wood of Prosopis collected from the periphery of the sanctuary when they are not engaged in salt production work. They also use fodder for their animals from the surroundings and periphery of the KBS. **S**hifting from agriculture labour to other forms of labour	**N**atural resources available to us earlier are decreasing and it has led us to shift to jobs involving loading, unloading, working in or setting up petty shops and in the brass part industry.

Table 32 Stakes and Perceptions of the Department of Irrigation, Jamnagar

Stake in Wetland	What they are saying
Construction and maintenance of canals, dams and percolation tanks for improvement of irrigation facilities	**D**ue to the different measures taken by the department, salinity has been arrested, water table has improved, farmers can do lift irrigation and the percolation tanks are especially helpful to farmers if rain is delayed. It has also increased the agricultural productivity and people's well-being and economic status has improved. It has also helped prevent distress migration. **N**o taxes are levied on farmers for lift irrigation and water. **T**he importance and benefits of these interventions are reflected in people's statement "when the percolation tanks were not there, the tea used to get spoilt due to the bad quality of water."

Table 33 Stakes and Perceptions of the Department of Forest & Env., Jamnagar

Stake in Wetland	What they are saying
Conservation of the sanctuary and protected area **P**lantation of trees*;* deepening of ponds, making mounds for bird resting, road construction and cleaning of KBS	**W**etland area will be protected from trespassing and illegal fetching of natural resources (wood and water) **A**lternate methods for replenishing of wetland need to be explored as the rain water is not adequate to sustain the birds and the other services of the wetland **P**ractices that disturbed the equanimity of the birds and were adversely affecting the wetland services have reduced considerably due to educational interventions and dialogue with the community (using bombs and loud music to scare wildlife; using water for irrigation, using mangroves for feeding livestock etc.) **C**onstruction of a pond in Khijadiya village has helped the farmers to access an alternate source of water for irrigation and it reduced their dependence on KBS. Responding to community needs and creating options for meeting their needs for water for irrigation, fodder and fuelwood can help reduce their reliance on KBS and ensure its conservation. **V**ulnerable communities are allowed to use the unprotected areas for collecting fuelwood as there are no commons that can meet this need.

Table 34 Stakes and Perceptions of Environmental groups/EDCs, KBS

Stake in Wetland	What they are saying
Wetland is used for eco-tourism and local youth are being trained and inducted as tourist guides, generating employment in the nearby village **P**romotion of awareness on wetland conservation and eco services **E**DCs have been formed by the Forest department and function under the Deputy Conservator of Forests, Marine National Park (MNP). The EDC creates awareness among the community on ecology and biodiversity and provide alternate resource and technology (bio-gas, solar lights etc.) to reduce the burden on the protected area **W**omen in the neighbouring village are making and selling handicrafts to tourists through the EDCs **N**ature Education Camps held regularly for local school children as well as children from other districts	**N**atural resources should be protected and conserved and communities living around the wetland can be involved in 'wise use' of ESs **A** balance needs to be maintained between the community needs as well as protection of biodiversity and ecology.

Table 35 Stakes and Perceptions of Dairy Cooperatives, Jamnagar

Stake in Wetland	What they are saying
Due to the reducing grazing land around the wetland and increasing salinity, rearing of livestock has decreased; milk is sold directly in Porbandar or within the village	**W**etland resources are not available for the livestock owners for grazing, fodder or water **T**here is a decrease in the number of livestock that people own; they are moving to other livelihoods.

Table 36 Stakes and Perceptions of Livestock Department, Jamnagar

Stake in Wetland	What they are saying
Over years the livestock population has decreased in this area because of low availability of grazing land and fodder	**V**eterinary care for livestock is inadequate and it is difficult for the handful veterinary doctors to reach out to all villages **M**ore staff needs to be appointed

Table 37 Stakes and Perceptions of Jamnagar Municipal Corporation

Stake in Wetland	What they are saying
Parts of village Vibhapar are now in city limits and it is considered as an Outgrowth ward of Jamnagar **D**hunvav and Vibhapar are on the Rajkot-Jamnagar Highway and there are strong links between the village and the city for livelihood.	**N**o issues with regard to the wetland as it does not fall within their jurisdiction

The farmers, animal rearers (dependent on CPR), tenant farmers/ share croppers, brick makers and agricultural labour are dependent on natural resources for their survival and existence that are sharply degrading. Department of Forest and Environment, Department of

Irrigation, Eco-development Committees and Salinity Control department are major stakeholders who are managing the resources of KBS and developing the surrounding area. The large farmers and resourceful villagers have diversified their livelihood sources over the years but small and marginal farmers, animal rearers, manual labourers, brick kiln workers and people keeping small ruminants are the most vulnerable. The proposed development plan should focus on these stakeholders.

The people have accepted the status of KBS as a protected area; however, they are concerned about the development of CPR, land development, development of irrigation facilities through rainwater harvesting etc. for sustainable livelihood. They are also concerned about the low importance accorded to their needs and rights in decisions taken for wetland management.

Forest department has initiated Eco development committees for education of and support to the local community to reduce their dependency on the forest resources; more sustained and focussed efforts are required. Irrigation department has provided support for construction of water bodies which has helped the communities. This support needs to be continued and developed systematically. Salinity control department has constructed a canal for rain water harvesting to control salinity of soil and ground water that has raised the hope for improved resources. A systematic, integrated and collaborative plan of action needs to be prepared for land, water and biomass development of the area. A multi department (Forest, Irrigation, Salinity Control, Rural development, Agriculture and Animal husbandry) task force needs to be formed to assess the need of the area and work accordingly.

Forest department is one of the major stakeholders of the area and concern over protection of KBS needs support from the community particularly from those dependent on KBS and surrounding CPR. Eco development committees and GPs of the villages could play an important role to support the vulnerable communities in important negotiations for the development of the area.

5.5 Livelihoods

Traditionally, these villages were known for agriculture and animal husbandry and were the main suppliers of grains and milk to the city. Over the years, due to recurring drought, low rainfall in the region and salinity ingression, the productivity of land has reduced. Cost of cultivation and animal rearing has also increased resulting in the decline in these livelihoods. Besides, Jamnagar city being within easy reach of all these villages has also offered job opportunities in trade, business, private companies etc.

The ex-*Sarpanch* of Vibhapar shared that there has been a major shift noticed in the lifestyle and in the preference of livelihoods over the last 30 years. The entire village that was once residing in mud-houses has become prosperous; infrastructure has improved as majority of the Patels have sold a major part of their agriculture land and invested in brass parts business. The youth are no longer interested in agriculture and animal husbandry. No pasture land is spared for livestock. Senior citizens have continued farming with support of the older women and seasonal migrant labourers. Women from Patel community shared that educated young women are not ready to work on their farms or take care of cattle; so much so that this is laid down as a pre-condition for marriage. They predict that within next 10-15 years, Vibhapar will not have any farmer by occupation. In Dhunvav, tenant farming is becoming popular.

Animal husbandry which was a major source of livelihood is also on the decline due to low availability of fodder, water and high cost of maintaining livestock. There is also a move among Dalit HHs towards working in or starting small brick kilns or working as masons or in construction work in the city.

This section presents data based on Census, 2011 on the participation of different categories of workers in the labour market as well as the understanding of livelihood patterns that emerged from the community consultations and meetings with stakeholders.

5.5.1 Participation in the labour market

The total worker population in the four villages is 38%. On an average, there are more main workers (87%) than marginal workers (13%). In Jambuda, however, there is comparatively a much higher proportion (32%) of marginal workers (Figure 12). Of the total workers, the main and marginal cultivators are 5% and 6% are involved as agricultural labour (Table 38). However, in Khijadiya and Jambuda together, the dependency on agriculture is much higher (cultivators 30% and agricultural labourers 32%). This includes main and marginal workers of these two villages as percentage of total worker population. Males constitute a much higher proportion of the main workers (81-89%) as compared to females (11-19%).

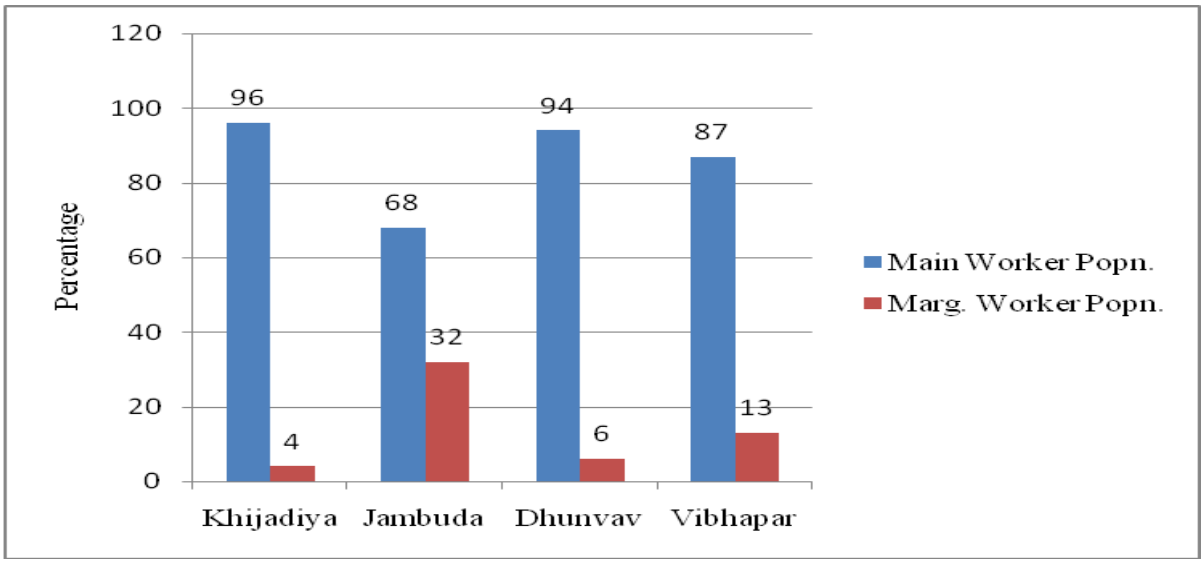
Table 38 Participation of different categories of workers in the labour market

S. No.	Categories	Khijadiya	Jambuda	Dhunvav	Vibhapar	Total
1.	Total Population	2246	3507	6249	82019	94021
1A.	Total Workers	928 (41)	1617 (46)	2076 (33)	30,768 (38)	35,389 (38)
1B.	Non-Workers	1318 (59)	1890 (54)	4173 (67)	51,251 (62)	58,632 (62)
1A.1	Main Workers	890 (96)	1105 (68)	1944 (94)	26,679 (87)	30,618 (87)
1A.2	Marginal Workers	38 (4)	512 (32)	132 (6)	4089 (13)	4771 (13)
1A.3	Main Cultivators	259 (28)	425 (26)	186 (9)	611 (2)	1481 (4)
1A.4	Marginal Cultivators	3 (.32)	80 (5)	13 (.62)	282 (0.9)	378 (1)
1A.5	Main Agricultural Labourers	299 (32)	264 (16)	93 (5)	707 (2)	1363 (4)
1A.6	Marginal Agricultural Labourers	19 (2)	239 (15)	11 (.52)	307 (1)	576 (2)

Source: Census, 2011 (*Figures in brackets 1A.1-1A.6 are percentage of Total Workers)

In Vibhapar and Dhunvav, a large part of the workers (80%), both main and marginal are engaged in 'Other work' viz. in brass part industry, brick kilns, transportation and other non-farm based jobs.

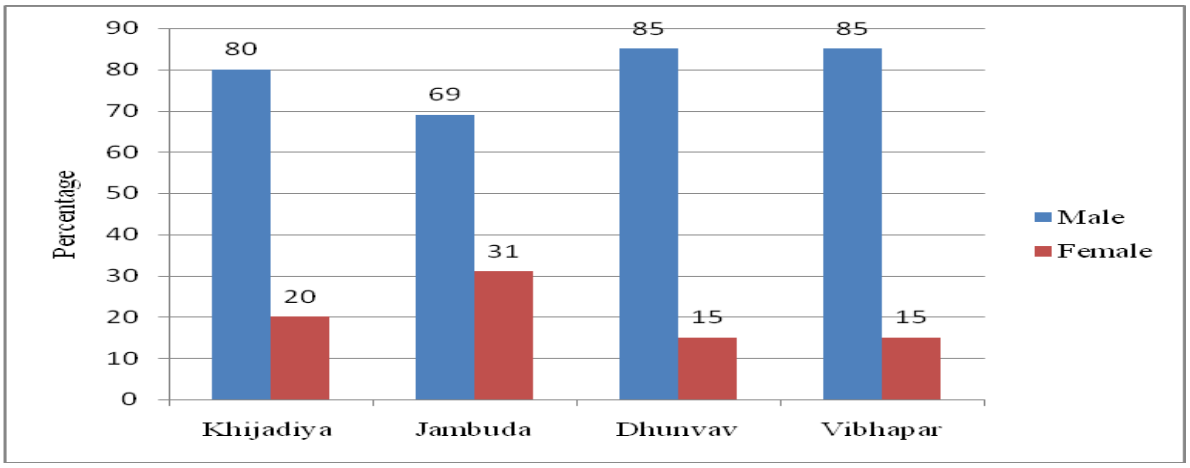
Figure 12 Main and Marginal Workers (in %), KBS



Source: Census, 2011

The female workforce participation (Figure 13) is the highest in Jambuda (31%), with the lowest in Dhunvav and Vibhapar (15%). Among the main caste communities viz. Patels and Sathwaras, women are engaged in household work and reproductive activities related to agriculture and animal husbandry. Women from the economically vulnerable communities (Dalits and Kolis) engage as labour, in agriculture, brick kilns, brass parts and other construction work. In Khijadiya, some women also make handicrafts which are sold through Self Help groups (SHGs) or Eco-Development Committees to tourists who come to visit KBS.

Figure 13 Workforce participation by Gender (in %), KBS



Source: Census, 2011

5.5.2 Caste groups and their economic role

The major caste groups in these villages are the Patels, Sathwaras, Gadhvis, Kolis, Dalits and Muslims (Figure 14). As per the community consultations, Patel community is there in all villages, except Dhunvav that is predominantly inhabited by the Sathwara community. The Dalit HHs (205) are there in all villages, with the maximum in Jambuda (70). Kolis (245) and Bharwads (140) are the two other caste groups that are there in atleast 3 of the 4 villages. Muslims (175) are concentrated in Dhunvav, while Gadhvis reside mainly in

Jambuda. The number of HHs indicated against each caste group is based on an approximation shared by the communities. The economic roles and engagement of these different caste groups is captured in the following sections.

Figure 14 Caste-wise livelihood patterns in surveyed communities, KBS

Caste	Households	Agriculture	Animal Husbandry	Agricultural Labour	Daily wage/ Manual lab.	Service/ Jobs	Trade/ Business	Others
Patels	880							
Gadhvis	60							
Rajgor	40							
Rajput	15							
Sathwara	1200							
Bharwad	140							
Koli	245							
Ahir	40							
SC/Dalits	205							
Sadhu	30							
Devipujak	5							
Others	56							
Muslims	175							
Kumhar	10							
Darbar	25							
Darjee	15							
Total	3141							

Source: Data based on community consultations (including number of HHs)

Primary Secondary Additional

5.5.3 Agriculture

Agriculture is a primary source of livelihood for approx. 2000 HHs (64%); this includes the Patels, Gadhvis, Sathwaras and a few Darbars. For about 8% (Kolis), agri-labour is the primary source of livelihood and for another 12% (Dalits, Bharwad and Rajgor), it is a secondary source.

Table 39 Farmers size of land holdings

S. No.	Village	Total Households	Total Farmers	Large Farmers	Medium Farmers	Small Farmers	Marginal Farmers	Landless (SECC, 2011)
1.	Khijadiya	443	349	4 (1)	113 (32)	139 (40)	93 (27)	Data not available
2.	Jambuda	739	780	8 (1)	331 (42)	309 (40)	132 (17)	176 (24)
3.	Dhunvav	1154	481	3 (1)	149 (31)	204 (42)	125 (26)	354 (31)
4.	Vibhapar*	17008	301	190 (63)	-	101 (34)	10 (3)	Data not available
	Total	19344	1911	15 (.78)	593 (31)	753 (39)	353 (19)	
	Large Farmer: more than 10 ha land; Medium Farmer: 2 - 9.99 ha land;				Small Farmer: 1 - 1.99 ha land; Marginal Farmer: less than 1 ha land			

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015) *Jila Panchayat*, Jamnagar (*Data on Vibhapar is from VDMP, GSDMA, 2014, as it was not available from the other source)

Land holdings: Vibhapar, close to Jamnagar city, has only 301 farmers among 17,008 HHs. Of these, 190 (63%) are large farmers, 101 (34%) are small farmers and there is a negligible percentage of marginal farmers (3%). In the other 3 villages, there are a total of 15 large farmers. In these three villages, in absolute numbers, 593 are medium farmers, 652 are small farmers and 252 are marginal farmers. Jambuda and Dhunvav have approximately 24 and 31% landless HHs respectively (Table 39). In Khijadiya, the community shared that there are roughly 10% landless. Average land holding (VDMP, 2014) in the 4 villages is 2 Ha.

Table 40 Land use (in ha)

Village	Total area under GP	Forest land	Permanent Pastures and grazing land	Area under cultivation	Area irrigated by source of irrigation	Area irrigated by Canal	Area irrigated by well/ tube well	Area irrigated by other (lift irrigation)	% area irrigated
Khijadiya	1052	0	89	941	470	130	230	110	50
Jambuda	2349	145	220	1797	860	0	860	0	48
Dhunvav	2309	32	104	1092	546	0	546	0	50
Vibhapar	1625	0	102	1501	413	0	413	0	28
Total	7335	177 (2)	515 (7)	5331 (72)	2289 (43)	130 (6)	2049 (89)	110 (5)	

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015), *Jila Panchayat*, Jamnagar

Land use: The forest land in the four villages is 2%. Seven per cent of the total land of these villages comprises pasture and grazing land. Jambuda has the maximum forest as well as pasture and grazing land (Table 40). However, the pasture land is highly degraded, saline and has low vegetative cover. People refer to it as '*Kharabo*' or barren land. About 15-20 years back, it was used for grazing of animals but now it has been discontinued. The area is

covered heavily with Prosopis which is used by the community as fuelwood and for charcoal. People also shared that the Forest department hires contractors to clear the KBS and surrounding CPR of the villages of Prosopis and this is used to make charcoal. But the community or the GP hardly receive any benefit from it. Since the villages are near the protected area, parts of the private land of the farmers have got covered with Prosopis due to which they are unable to use it. Moreover the Department does not grant them permission to clear it. This is a major concern and worry of the community and they are keen that positive action is taken in this regard so that they can use it for agricultural or other productive purpose. One farmer summed it up succinctly when he said, "We have to bear the consequences of being near the protected area."

Irrigation: 72% GP land of the four villages is under cultivation. Except for Vibhapar, 48-50% of the cultivable land is irrigated (Table 40). The main source of irrigation is ground water. According to the community, the figures are inaccurate in the present context because majority of the tube wells are not in use due to high salinity in the ground water. Agriculture in this area is mostly rain-fed. The availability of water for irrigation is a big problem. In Jambuda, farmers are using wells and bore wells for irrigation and these wells are being recharged with the passing waters of Kalindri. In Khijadiya, lift irrigation is done using diesel pumps from ponds and natural depressions in the village where the excess water from the dam and/or rain gets stored. Because they are in the vicinity of the KBS, they have some access to the water bodies of KBS and this also helps to retain moisture in their farmlands. In Vibhapar, there are around 300 bore wells but most are not in use as the salinity has increased. People use sewage water for irrigation and growing vegetables. It is not sure whether this water is properly treated for irrigation. Hence, it not only affects the quality of the crop but also leads to soil degradation.

In Dhunvav, most of the farmers have linked small reservoirs connected with the river water with small canals. This is a common practice used for irrigation. There is no drip irrigation. During the last year, across villages, only one crop could be grown due to limited water availability. The yield is only one fifth of the normal quantity. The community in Jambuda shared that the dam constructed on the river has helped somewhat in solving the issue of ground water recharge. Local authorities have also started digging connecting canals joining Kankavati to the Und Dam, an initiative appreciated by the villagers as water stored in these depressions can significantly reduce the increasing salinity in the land.

Cropping pattern: The cropping pattern has undergone a shift in the last 10-15 years. The change is attributed to salinity ingression, soil degradation and low rainfall. Some other reasons given by the farmers include the drought during the 70's, cyclone in 1998, the presence of salt factory near KBS and the village and the increase in the wildlife, especially Blue bulls and wild boars post the declaration of the wetland as sanctuary in 1982.

Table 41 Trends in cropping patterns

Village	Crops sown (15-20 years ago)	Crops Sown (current)	Remarks
Khijadiya	pearl millet, sugarcane and pulses	sorghum (juwar), castor and BT cotton, wheat and groundnut in good monsoon	Due to crop raiding, protection measures are required and this is cost intensive; Irrigation is done using diesel pumps from pond in the village that is filled during rain or from dams; post KBS construction of ponds, percolation tanks etc. by the Irrigation department have helped the farmers to receive critical support irrigation in Kharif (monsoon) crops
Dhunvav	Vegetables such as tomato, chilli, java plum, lady finger, brinjal, wheat, pearl millet	BT Cotton, vegetables, pearl millet	Salinity ingression and water shortage; Small reservoirs connected with river water through small canals
Jambuda	pearl millet, sorghum, wheat, chasiya wheat, ground nuts	BT cotton	Salinity ingression, risk of crop raiding by Black bulls and Wild Boar; check dams help recharge ground water table
Vibhapar	groundnuts, wheat, pearl millet, sorghum and other millets, tomatoes	BT cotton, juwar, wheat and vegetables (potatoes and onions)	Own water sources mildly saline; irrigation support from sewage; 30 % agriculture rain fed, 40% supported by bore well (which is turning saline at a fast pace) and rest is supported by sewage water

Source: Community consultations

Currently, the main Kharif crops are sorghum (juwar) and BT cotton. Wheat and groundnut are grown in a good monsoon year. Table 41 provides a summary of the trends in cropping patterns across the four villages, with reasons cited for the shifts.

Cultivation of BT cotton on saline, semi-arid land is likely to have an adverse impact on its quality. Farmers shared that when they made this shift they hoped to have higher productivity and overcome the problem of pests that they were facing earlier. After almost a decade of this shift, they realize that the productivity has not increased substantially, cost of production has increased and the problem of pests has also resurfaced. They are therefore worried about the sustainability of the current cropping patterns and practices.

Since this region is a saline, rain fed coastal and semi-arid area, monsoon (Kharif) is the major agriculture season. Due to lack of assured irrigation, sowing only happens after rainfall during July to September. Farmers continue to practice traditional mono-cropping instead of mixed crops. This also increases the risk due to single crop dependency. There has been some diversification of crops, especially in Vibhapar and Dhunvav. However, this is very limited and has been tried by resourceful farmers. In the last decade or so, people have begun to use fertilizers, especially DAP and Urea if there is irrigation support.

Table 42 Community Perceptions of status of salinity and agricultural production

Village	Status of Salinity in Agricultural land	Status of Common Property Resources	Agricultural productivity
Khijadiya	High	Community is bitter about the village common resources being taken away under the sanctuary area.	Productivity in the last 3 years has drastically reduced due to recurrent drought and no other source of irrigation. Increase in salinity and decreased ground water table have adversely impacted agriculture and vegetation. People believe that increase in salinity is due to the release of effluents in ground water by the Century Salt works in the wetland.
Jambuda	High	Due to increase in salinity, fodder growth and vegetation cover has decreased.	Yield reduces drastically in poor monsoon. "Agriculture has become a high risk, high investment and low return source of livelihood."
Dhunvav	High	It is feared that the embankment constructed by the Forest department towards the sea side will result in obstruction of the flow of river water into the sea, flooding of the farmlands and increase in salinity.	Change in cropping patterns to those that do not require too much water; number of crops depends on rainfall and in drought, yield can reduce to almost one fifth of normal.
Vibhapar	High	CPR is gradually being subsumed under Jamnagar city limits, reducing the access and control of the villagers.	Availability of sewage water has aided vegetable cultivation and other cash crops. Towards the agricultural land, salinity in the ground water is increasing due to the salt factory and no systems for rain water harvesting.

Source: Community consultations

Agricultural yield: There has been lower than average rainfall over the past three years and the region has been experiencing drought and severe decline in agricultural production. Vibhapar and Dhunvav have support irrigation from surface water sources, from sewage supply and River Kalindri. Jambuda and Khijadiya have particularly had a low yield during the last three years.

Table 43 Agricultural Yield: kg/ha

Particular	Kharif		Rabi
	Groundnut	Cotton	Wheat
Yield in good monsoon	5000	5500	4319
Yield in poor monsoon	1850	2500	3085
Yield in drought	600	600-800	Hardly any

Source: Agricultural experts and community

During Kharif season, farmers grow BT cotton and groundnut along with juwar. In winter, depending on the availability of water, they grow wheat. According to the community and agriculture experts, the yield of these three crops varies based on the rainfall. (Table 43)

The decrease in agricultural yield is due to multiple factors: unpredictable monsoon, low rainfall, low access to irrigation facilities, high cost of agricultural production, reduction in net profit, crop infestation, destruction of crops by wildlife etc. Table 42 summarises the community perceptions of the status of salinity, CPR and agricultural productivity.

5.5.4 Animal Husbandry

Animal husbandry is practiced as a primary occupation (Figure 14) mainly by the Bharwads (pastoralist community) and Rajputs who constitute only 5% of the total HHs. Some families of the Patels and Gadhvis pursue it as an additional source of livelihood.

Mixed trends are observed in the practice of animal husbandry in the 4 villages. While in Dhunvav, Jambuda and Vibhapar, the number of livestock has reduced, in Khijadiya, it is still the second most preferred source of livelihood. The livestock owners in this village are affiliated with the Mahi Dairy. There are 55 members and daily about 300 litres of milk is collected at the local milk collection centre of the dairy. Services of veterinary doctors and Livestock Inspectors are available from Jamnagar city. Despite the decrease in fodder regeneration and its availability post the declaration of the periphery of the village as a protected area, the presence of cooperative dairy activities and the collective caring facilities like *Gaushala* (collective livestock care centres) managed mainly by the Bharwads and Ahirs have helped improve animal husbandry practices.

In Jambuda, the community shared that in the last 20 years, the number of livestock, particularly cows and buffaloes, has reduced by about 25%. The same trend has been observed in the case of small ruminants (goats and sheep). Most of the small ruminants are owned by the Bharwad community. Besides 10 Gadhvi households, a very small number of households of Koli, Rajgor and Rajputs have livestock. In Vibhapar too, there has been a steady decline in the livestock as most people have shifted to brass parts. GP has developed cattle pound and water facility for livestock. GP collectively purchases fodder and stall feeding is in practice as no pasture land has been spared. These practices are also on the decline. Farmers in Jambuda who used to meet the fodder needs through cultivating chasiya wheat, bajra (pearl millett) and sorghum are now purchasing fodder from Jamnagar.

As per the Provisional data of the Livestock Census, 2012, across the four villages, cows and buffaloes are the more preferred livestock and in absolute numbers, these are three times the small ruminants (Table 44).

Table 44 Livestock data of surveyed villages

Village	Cows		Buffaloes		Sheep		Goats		Total Livestock
	No. of HHs	No. of live-stock	No. of HHs	No. of live-stock	No. of HHs	No. of live-stock	No. of HHs	No. of live-stock	
Khijadiya	151	368	113	310	55	174	49	199	1051
Jambuda	235	680	275	994	7	198	11	227	2099
Dhunvav	232	616	52	322	10	313	39	203	1454
Vibhapar	238	621	147	390	2	50	5	35	1096
Total	856	2285	587	2016	74	735	104	664	5700

Source: Provisional data Livestock Census, 2012 accessed from Dept. of Statistics, Dist. *Panchayat*, Jamnagar

Under the *Adarsh Gram Yojana*, 200 farmers in Jambuda were eligible to purchase cattle, out of which 130 small and marginal farmers who own less than 1-2 *bighas* of land were provided Rs. 80,000 to buy cattle. Fifty per cent of this amount is in the form of subsidy. This further proves the issue of low levels of fodder availability. The initiative will lead to new cattle owners and the new asset ownership will not go in the hands of the 300 landless households, mainly the Dalit and Koli families.

Table 45 Pasture and Grazing land in surveyed villages

	Khijadiya	Jambuda	Dhunvav	Vibhapar	Total (in 4 villages)
Surface as % of GP Land	8.5	9.4	4.5	6.3	7

Source: www.villageprofile.gujarat.gov.in (2014-15 as on 1.4.2015)

Dhunvav has the lowest pasture and grazing land (4.5%) while Jambuda has the maximum (9.4%). (Table 45). The quality of this land has degraded and it no longer provides quality fodder for the livestock. In addition, people cannot access the grazing lands that they used in the past as they are now in the protected area. A group of women from the Bharwad community in Dhunvav returning from near the wetland shared the drudgery they have to face due to the limited access to grazing land that is now in the protected area. Even on their day off from their work as manual labour, they had to traverse a long distance to fetch fuelwood. While Bharwad families in Jambuda take the village cattle for grazing, other caste groups depend on stall feeding. Six Bharwad families migrate to Una, Junagadh for grazing post Diwali and return on arrival of monsoon.

The presence of dairy cooperatives, establishment of *Gaushalas* and availability of pipe line water supply in some villages offer possibilities for improving animal husbandry in the region.

5.5.5 Manual labour

The surveyed communities shared that agricultural work provides not more than 3 months of work in a year. As per Census 2011, there are 3 and 5% Main agricultural labourers in Vibhapar and Dhunvav respectively (Table 46). In Jambuda and Khijadiya, it is much higher (24 and 35% respectively). Male agri-labour are more than female agri-labour across all four villages. Farming patterns are changing and the predictability in agri-production is low; landless families get work only during sowing, weeding and harvesting.

Table 46 Main Agricultural Labour (in persons), KBS

Village	Main Workers	Main Agricultural Labour (Total)		Main Agricultural Labour (Male)		Main Agricultural Labour (Female)	
	Persons	Persons	In % of total Main Workers	Persons	In % of total Main Agricultural Labour	Persons	In % of total Main Agricultural Labour
Khijadiya	890	299	34	178	60	121	40
Jambuda	1105	264	24	242	92	22	8
Dhunvav	1944	93	5	53	57	40	43
Vibhapar	26679	707	3	555	78	152	22
Total	30618	1363	4.5	1028	75	335	25

Source: Census, 2011

Many HHs now also take up other forms of manual work like loading, unloading, working in petty shops, labour work in the brass part industry or in the more recently set up brick kilns. Closeness to Jamnagar offers several daily wage work opportunities and hence people do not migrate to other places in search for work.

Jamnagar is known for its Brass part industry which has been expanding over the years. 50-60% HHs have atleast one member from the family who either owns a manufacturing unit or else is employed in the same. The Sathwaras, Patels and Gadhvis have a high stake in this business. Many families work on a contractual basis. Women from the Muslim community in Dhunvav work from home and are involved in sorting and assembling of brass parts. At times, children are also engaged in this work. They usually earn Rs. 30-35/bag that involves about 2 hours of labour. People earn more in this work as compared to agriculture and the predictability of getting work is higher. For skilled tasks, a person can earn Rs. 150-200/day, while semi-skilled tasks fetch about Rs. 75-100.

Brick kilns are a recent and new source of livelihood in which the Kumhar (potter) and the Dalit communities are engaged. In Jambuda, 6 Kumhar families and 10 Dalit families have their own brick making units as well as kilns. The potter community hires labourers from outside the village for about 8 months whereas the Dalits work themselves and occasionally, they employ labourers. The mud for the bricks is collected from around the village. The Kumhar brick owners bring the mud from the wasteland on both sides of the embankment. The Dalit families, who live across the road in the other half of the village, collect the mud from the wasteland on their side. Similarly, both the communities collect the firewood for the kilns from their respective locations. The brick making is done on the *Panchayat* land without any payment of fee or revenue. Most of the brick kilns are small stack/piles type furnaces (not chimney type). The entire brick kiln is based on natural resources without any payment with access to free mud, space to lay out the bricks as well as to put up the kiln and collection of firewood. The brick is sold at Rs. 2500-3000 per 1000 bricks and a family of 5 members can make about 2000 unbaked bricks/day. The brick kilns have their own bore well. Buyers come to the kilns and purchase the bricks directly from the owners. It involves strenuous work, especially the straining of the rough soil (removal of stones, thorns etc.), kneading that is done manually and manually laying the bricks.

In Vibhapar, Dalit HHs engaged in brick making do the production work in their backyard but the land does not belong to them. They fear that they can be asked to vacate the land anytime by the JMC. They are not at all interested in the traditional livelihood activities associated with their community members viz. manual scavenging, disposal of dead animals and selling of raw leather, sweeper and agricultural labour. Unlike Jambuda, the Dalits in Vibhapar are facing problems due to low availability of soil for brick making. Presently, they are purchasing soil from nearby places.

The records available on the MGNREGS website show that no significant work has been undertaken in the 4 villages during the last two years (2014-16). In Dhunvav and Vibhapar, there has been no demand for work. The *Sarpanch* shared that people do not prefer to take up this work as the wages they receive are less as compared to the other wage work available in the city. Only 10 and 12 families in Khijadiya and Jambuda respectively have been engaged in MGNREGS work.

5.5.6 Services and small trades

In Khijadiya, the Patel and Koli community are engaged in the service sector. 11 people are in government jobs. In the 96 Salt Colony area, since last three generations people are working in salt production companies (Nirma Chemicals and Century Salts Pvt. Ltd.). Currently, 17 of the 40 families staying in this area are engaged in this work. The numbers are decreasing due to mechanization of the salt production process.

In Jambuda, all Patel families and some Koli and Rajgor families are involved in service or in minor trade. All young people of Patel community have moved outside the village for service. They are mainly involved in either government jobs or in businesses such as transport, brass part, construction etc. In the village, mostly adults of the families are seen.

In Vibhapar, in the last couple of decades the major engagement of the villages is in Brass part industry. Patels of the village own the workshops/ production units and others are working as labourers. In fact, the major income in the village is from this business and trade.

5.6 Livelihood systems and conflicts in resource management

Except Vibhapar, the other three villages are dependent on agriculture and animal husbandry. While the agricultural activities in Dhunvav and Khijadiya are well developed, in Jambuda agricultural productivity is declining. The rivers like Kalindri (Jambuda), Ruparel and Kankavati (Dhunvav and Khijadiya) bring rain water in monsoon and wash out salinity and increase the soil moisture. It was observed that at the edge of the agricultural farmlands, the sanctuary officials have been building large embankments. The villagers allege that the embankments are built without any consultation with them and with no planning for salinity prevention. Villagers in Dhunvav fear that a new embankment built on the boundary of their village will lead to submergence of agricultural fields from the water coming from Ruparel river. It will prevent water from flowing into the sea. Both Dhunvav and Jambuda villagers strongly feel that no activity has been initiated for years to de-silt the check dams built earlier. Agricultural land of all the villages is close to the sanctuary. Good quality agricultural fields of Khijadiya village are adjacent to the boundary of KBS Part -2 with no buffer land.

In Jambuda, due to high salinity, farmers have shifted from producing food crops and groundnut to cultivating only cotton and castor. The *Patel* families who are the main land owners have turned into absentee landlords. The cultivation is done through tenant farming and share-cropping. The GP alleged that 75 hectares of GP wasteland has been captured by the Forest department and it is still under dispute (Survey No. 59, 130 and 161). Because of the enclosure of the waste land which is a potential grazing land, the villagers claim that they have been facing difficulty in accessing fuelwood and fodder. However, the major resource management issue is with regard to high salinity ingression which has seriously

impacted agricultural productivity. To reduce salinity, a water channel has been constructed separating the sea-face land and agricultural land. Unfortunately, the water channel has not become functional. The check-dam which has been constructed to protect fresh rain water has been silted for many years with no water retention capacity. The powerful farming Patel community accompanied the research team to show the status of the check dam. The reason, for not initiating desalinity activity by any of the departments like Irrigation, Agriculture or Rural Development, is not known. A potential good agricultural land is slowly being converted into a saline waste land. The Kalindri river brings fresh water during monsoon which can be tapped in the village land to reduce salinity.

There are as many as 16 brick kilns found operational during the visit. It was observed that in part of the wasteland that is in the possession of the GP, fuelwood is lifted in tractors for burning the bricks. Villagers claim that a large part of agricultural land has degraded into wasteland and it is filled with Prosopis. The fuelwood is collected from the private land.

People of Khijaidiya village strongly feel that while restrictions have been imposed on the villagers to access the sanctuary, the salt works and salt processing industry is being permitted and no questions are being raised about the salinity ingression caused by their presence in the midst of the wetland.

The villagers of Dhunvav stated that their village has been declared a silent zone to prevent causing disturbance to birds. They are not allowed to use earth movers to dig the soil. This means that for any development work, they have to take materials from other villages. However, no action has been taken when recently a plot in the village land was used by Jamnagar Municipal Corporation for solid waste dump yard without any ground preparation to prevent leaching. The entire dump site is continuously under fire emitting foul smoke. It can be harmful for the habitat including the birds.

During the roosting of the migratory birds, the whole sanctuary comes alive. It is quite a short period of time. There have been efforts by the Forest department to hold camps for school children and the villagers to popularise the importance of maintaining and conserving the sanctuary. Eco-tourism, as livelihood generating option, has not yet been fully developed.

The areas of conflict between the wetland and the villagers are related to restrictions imposed on their access while permissions being granted to private entities without attention to the damage caused by them to ecology. Secondly, the development of the sanctuary, planning and execution of new embankments without people's participation is creating apprehensions and anxiety among the villagers. It is not known why watershed activities are not being taken up in the villages to reduce salinity.

5.7 Livelihood assets and opportunities

The dependence on agriculture in three of the four villages is high. As there has been no intervention to harvest the rain water flowing in the rivers running through the villages and the check dams are not maintained, agricultural productivity has slowly been getting affected. The livelihood assets can be best improved if intensive land and water development activities are initiated. This has been neglected since the area was declared a sanctuary. Villages like Dhunvav have been practicing horticulture and growing vegetables. All the four villages being close to the city and on the national Highway, marketing of fruits and vegetables shall not be a problem. It is natural that as part of development, some part

of the population will move to secondary occupations like manufacturing of brass parts, construction etc. However, land and water development for agriculture, horticulture and vegetable is the most sustainable option. All development interventions need to be carried out in a participatory manner. Today, the villagers are alienated from the wetland because of lack of active participation in the creation and conservation of the sanctuary.

Many other modernisation processes (in terms of institutional mechanism, financing, production process) can be introduced for brick kilns, management of waste land and grazing land, dairy, etc.

6 Framework for micro-planning

The Village Development Plan (VDP) or Village Micro Plan (VMP) in the eight villages of GWC or four villages around KBS cannot be complete without looking at the interdependence between the wetland eco-system and the community. From the study, it can be safely stated that so far the VDP or any other development interventions have not comprehensively looked at the interdependence. Each activity has been viewed in an isolated manner, whether it is land and water development, arresting salinity ingression, irrigation, dairy development, fishing, protection of birds, promotion of eco-tourism or developing the water reservoir into a protected bird sanctuary. No development project can be successful without people's participation. The Khijadiya wetland development projects needs to restore people's confidence. While according any new status to GWC, there is a need to be more careful about stakeholder participation with empowered participation of all the village level vulnerable communities.

To cite an example, the restriction on heavy vehicular movement over the road between KTR and KWRR or fishing in the reservoir is more of an administrative and legal injunction without much people's participation in the decision making process. There are allegations and counter allegations over issues of fishing and poaching of birds. It is easy to blame a community which is both numerically small in number and have very little influencing power. Each community group living around the reservoir/ wetland has their own interest and dependence. Also each form of occupational, economic, livelihood and social activity has potential adverse impact on the ecosystem. The local residents fear that in the name of protection of the wetland and sanctuary, unnecessary restrictions may be imposed, not fully considering the fact that the new set of proposed activity like eco-tourism may have other adverse impact which has not been considered. Similarly, the villagers around KBS have a right over implementation of land and water development activities which have been neglected over years.

Building Genuine Community Consensus: In the context of the complexity of the issue, any micro-plan must centrally involve the local people. From the interaction with the villagers, it was also revealed that most of the decisions are taken in consultation with a select group of articulate experts or administrative officials from various departments. The fear and apprehension of local people is valid. Any VDP or VMP must be initiated by having community consultations that are empowering in nature. There are many alternatives available that can make a balance between improving community livelihood potential and simultaneously minimising adverse impact on the ecology which the community can be made to understand in a most sensitive way. However, often such consultations are abrupt

without generating any community confidence. Various user restrictions are often introduced in a manner that community feels as adversarial intrusions to their life and living. Outsiders' consensus is often imposed viewing it is an agreement reached by the community. The community consensus building on matters of such a high importance must be preceded by active participatory action research through which the community discovers alternative choices that can help strike a balance between community needs and ecological issues.

Annexure 1: Terms of Reference

Special Agreement

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Contract no:	83213716
Project:	Nachhaltiges Management von Küsten-und Meeresschutzzonen
Project no:	11.9299.6-001.00
Contractor:	UNNATI-Organisation for Development Organisation

1. Terms of Reference

Context and background

In the global context of India's commitment towards achieving the Convention on Biological Diversity's Aichi Target, the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India has entered into a Technical Cooperation with the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Government of Germany on the project entitled "Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas" (CMPA).

Following approval from the Department of Economic Affairs (DEA), Ministry of Finance, Government of India, the Secretary of MoEFCC has signed an Agreement with GIZ India in October 2013 on the implementation of the aforementioned project.

The CMPA Project is jointly implemented by the C&S Division of MoEFCC and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) India on behalf of BMUB. It is implemented in selected coastal states in India in close collaboration with respective State Governments Gujarat, Goa, Maharashtra and Tamilnadu.

The project's duration is until July 2017 and the project activities will include capacity development, advisory services, consulting support, exchange visits, targeted studies and research.

In the State of Gujarat, the project activities are planned to be implemented on the following project sites: Khijadiya Wildlife Sanctuary Jamnagar, Gosa Bara wetland and Madhavpur Turtle area Porbandar.

In Gujarat, the project aims at facilitating measures that result in the following outputs:

- Participatory processes for the management of areas identified for conservation of biodiversity have been implemented;
- A capacity development system for the sustainable management of coastal and marine protected areas has been made available in Gujarat;
- Relevant stakeholders are aware of – and sensitized for – the importance of conserving biodiversity in coastal and marine areas.

An overview of the activities in Gujarat is provided in Annex 1

giz

DESCRIPTION OF THE ASSIGNMENT

1.1. Objectives and scope of work

The purpose of assignment is to develop the socioeconomic baseline to support integrated management planning for two coastal wetlands of Gujarat, namely Gosabara wetland complex and Khijadiya Bird Sanctuary by conducting socio-economic survey at the two sites.

The studies are to be conducted at the following two sites:

1. Gosabara wetland complex, Porbandar district Gujarat
2. Khijadiya Bird sanctuary, Jamnagar district Gujarat

The studies will planned and conducted in close cooperation with the GIZ project team, Gujarat Forest Department, and other experts and institutes engaged by the project such as Wetlands International India and the Leibniz Center for Tropical Marine Ecology (ZMT) Germany.

1.2. Requested services

Socio-economic studies:

1. Develop a baseline socioeconomic profile of the communities living around the wetland complex using a set of qualitative and quantitative livelihood asset indicators
2. Map direct and indirect stakeholders in relationship with full range of wetland biodiversity and ecosystem services values
3. Characterize the interrelationship between the livelihood systems of key stakeholders and ecological character of the wetland
4. Analyse livelihood assets and opportunities for interventions for supporting additional livelihood options for communities
5. Review the current status of fisheries development and identify specific projects to enhance fish yield using traditional and environmentally sound techniques
6. Identify resource management conflicts and risks of adverse change in ecological character of the wetlands
7. Develop microplanning framework for integration of gender and equity related issues to ensure that benefits from interventions reach the poor and disadvantaged
8. Suggest measures for improvement of quality of life of stakeholders through improved access to social and economic infrastructure

giz

2. DELIVERABLES

2.1. Reporting to:

Day to day reporting on the work will be to the following:

- Director, GEER Foundation, Gujarat
- Dr Neeraj Khera, Senior Advisor, CMPA project

2.2. Nature/ form of deliverables

- Draft methodology and plan for assessment (soft copy)
- Participation in a meeting at Gandhinagar to finalize methodology
- Final methodology and plan (soft copy)
- One Interim report submitted and presented at Gandhinagar
- Draft report (soft copy)
- Participation in meeting to share the finding of the draft report
- Final report, including all formats, data, photographs, maps and any other material procured for the purpose of this study (in hard copy, as well as soft copy in a hard disk)

2.3. Submission/comments timing, deadline of deliverables

The work shall be delivered as per following timeline:

SN	Tasks and Deliverables	Number of days required	Expected time of delivery
1	Assignment starts		October 15, 2015
2	Draft methodology and plan for study is submitted		October 31, 2015
3	Draft methodology and plan for study is presented at a meeting in Gandhinagar		November 10, 2015
4	Final methodology and plan for study is submitted		November 20, 2015
5	Interim report submitted and presented		January 15, 2016
6	Submission of draft report		March 31, 2016
7	Presentation of report at Gandhinagar		April 10, 2016
10	Submission of final report		April 30, 2016

giz

2.4. Format (hard copy, soft copy, CD, photos, etc.)

All the product deliverables/reports in soft copy as well as in hard copy as mentioned in the section 4.2

2.5. Number of deliverables / report(s) copies

One copy each

2. Place(s) of Assignment & Travel Sectors

New Delhi, Jamnagar and Porbandar districts of Gujarat

3. Reporting

The consultant has to submit the reports / deliverables as per ToR to Mr. Edgar Endrukaitis, Programme Director, Indo-German Biodiversity Programme

4. Procurement of Equipment and Materials

The Contractor shall procure and enter into the inventory the following equipment in accordance with Section 11 of the General Terms of Contract (local):

All equipment procured at GIZ's expense shall be surrendered to

Not Applicable

5. Other Provisions

1) As per Indian Tax Law, tax at source has to be deducted on payments to consultants, if such payments exceed indian rupees 30.000, -- per year

2) Service tax will be paid as per law and as per the current prevailing rates.

3) The detailed budget mentioned at the end of the contract is integral part of this contract

4) Travel expenses will be reimbursed as and when the travel by the consultant takes place and submits his travel claim to GIZ

5) Confidentiality

All information and documentation given to the Consultant is strictly confidential and may be used only for the purposes of completing this assignment. All documentation and illustration material must be returned immediately on completion or termination of the assignment.

6) Amendments of the Terms of Reference

These Terms of Reference may be amended in writing only, subject to the agreement of both parties.

giz

7) Others

- The consultant will take utmost care in providing an appropriate introduction to the CMPA project of GIZ while interacting with stakeholders in this assignment. The consultant should use the information provided in section 1 of this document for this purpose.
- The consultant will discuss the detailed workplan and travel schedule with GIZ, well in advance.
- This assignment is a part of the overall baseline study being conducted at the project pilot sites in Gujarat. The consultant, therefore, will be bound to extend full cooperation to the Gujarat Forest Department, as well as other consultants engaged by GIZ for related studies on the same site.
- **Clause on Intellectual Property Rights**:

The data collected in the context of this contract are the property of the CMPA Project. The consultant/ organisation will be free to use the data and results of the study for academic publications, if scientific ethics about anonymity are guaranteed. Sensitive data which relate to unlawful activities, trade secrets, medical or well-being formulations obtained in the course of this study shall only be published in a manner that does not violate intellectual property rights or any other personal rights. GIZ shall be intimated of any publication using data collected in the context of this contract prior to its publication. The consultant shall ensure that any use of the data, be it for publications or for other purposes, properly acknowledges the role of the CMPA Project and that of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as the commissioning agency

Annexure 2: Guidelines for Community Consultations

Please make sure that the following have been achieved by the end of the visit to the village:

1. Meet *Sarpanch* and collect all data about village available at the Gram *Panchayat* (refer guidelines)
2. Meet representatives of different livelihood groups (preferably 10-15 members of each group) and collect livelihood related information – types of livelihood and resources, are resources under stress, why, how is it affecting livelihood outcomes
3. Prepare a social and/or resource map with the community
4. Do a transect to understand the interface between wetland and the village and especially to areas that are mentioned as concern areas by community
5. Information on response to shocks
6. Perceptions on health of wetland services
7. List of Stakeholders and understanding of their influence and importance for community
8. Stakeholder perception of current use of wetland and solutions for wetland conservation
9. List of existing institutions in village and their roles in wetland management, if any
10. Has Biodiversity Management Committee been formed? Information on its role and People's Biodiversity Register
11. Areas of conflicts – inter community conflicts, inter-departmental, use of resources
12. Information for Livelihood analysis

Details of information to be collected:

a. General Information: (some of the data can be collected through secondary sources)
    1. History of the area and the village
    2. Key composition (females, males, senior citizens, working population, children)
    3. Different communities residing in the village – since when and the original area they belong to
    4. Demarcation of boundaries of the village in relation to the wetland
    5. Who owns land - forest, irrigation depts., agri land, *Gauchar* – secondary sources
    6. Gender based task distribution in livelihood, women headed households dependent on farming

b. Information on livelihood
    1. Primary/secondary occupations/sources of livelihood of each community (for both men, women)
    2. Approx. number of families engaged in each occupation
    3. Use of wetland resources by different communities

Farming

1. Irrigated and non-irrigated land (Sec. source)
2. Practices used by farmers for use of water resources and higher production levels
3. Support taken from external resources: alternative means of water generation against the assisted means for the regeneration of water sources
4. Access to farms – is it through the wetland
5. Use of wetland area for farming – which seasons, for what, how much land
6. Issues and perceptions of people regarding use of wetland resources
7. Ways of improving wetland conservation/management
8. Alternate practices that can be adopted for irrigation
9. When and how much fodder is being used; alternate sources of fodder, difference in practices of farmers who are also engaged in animal husbandry and those only in animal husbandry in use of fodder

Information on cropping patterns

1. Type of Crops (Kharif, rabi)
2. Season when sown
3. Area being cultivated and irrigated
4. Source of water for irrigation – wetland, rainfed, supply water, other
5. Use of machines for irrigation
6. Use of fertilizers
7. Changes observed in crop patterns – Reasons – Ecological or Economical?

Animal Husbandry

1. Types of cattle (big, small, and other), numbers and their usage for the livelihood generation
2. Trends in cattle purchase and ownership
3. Modes of sale of milk (Cooperatives/individual)
4. Sources of fodder
5. Issues in care and upkeep of livestock
6. Dependence on wetland and perceptions of stakeholders about the available resources for livestock care

Fishing

1. Where the fishing is done
2. What are the methods used
3. Issues related to conservation
4. Good practices followed by communities
5. Issues related to livelihood

Information on response to shocks

1. Adverse impact of drought/flood/cyclone and coping strategies
2. Where does help come from during normal and disaster situations?

c. Perceptions about livelihoods in the communities:
   1. Are traditional occupations increasing or shrinking? (Identify reasons viz. increase in population, barriers faced in pursuing them or acceptance of new livelihood options etc.)
   2. Happenings in the environment (bunds, dams, industries, soil surface characteristics etc) and how this has affected the livelihoods
   3. For improvement of livelihood base, what can be done? Interlinking livelihood issues with alternative activities
   4. Do the communities have to migrate for livelihood- if yes, when and for how long; what are the alternate sources of livelihood during such periods
   5. Difficulties faced (financial, access to natural resources, availability through the year, legal barriers, market barriers, natural and other calamities esp drought, flood, increase in salinity, cyclones) – any specific difficulties faced by women

d. Health of the wetland services:
   1. Over the years, has there been any improvement in livelihood base (esp. natural and physical capital – machines, coverage of area etc.)
   2. Changes in the ecosystem (quality and quantity of land, water and biomass)
   3. Effect of the changes in the ecosystems on the livelihood patterns and dependence of the people on the ecosystems
      - Type and quality of land
      - Water Table Changes
      - Impact on vegetation
      - Vegetation Change Cover
      - Salinity Ingress

e. Resource mapping:
   - Land, water and bio-mass
   - Use of resources (quantity and frequency)
   - Purpose of use of resources

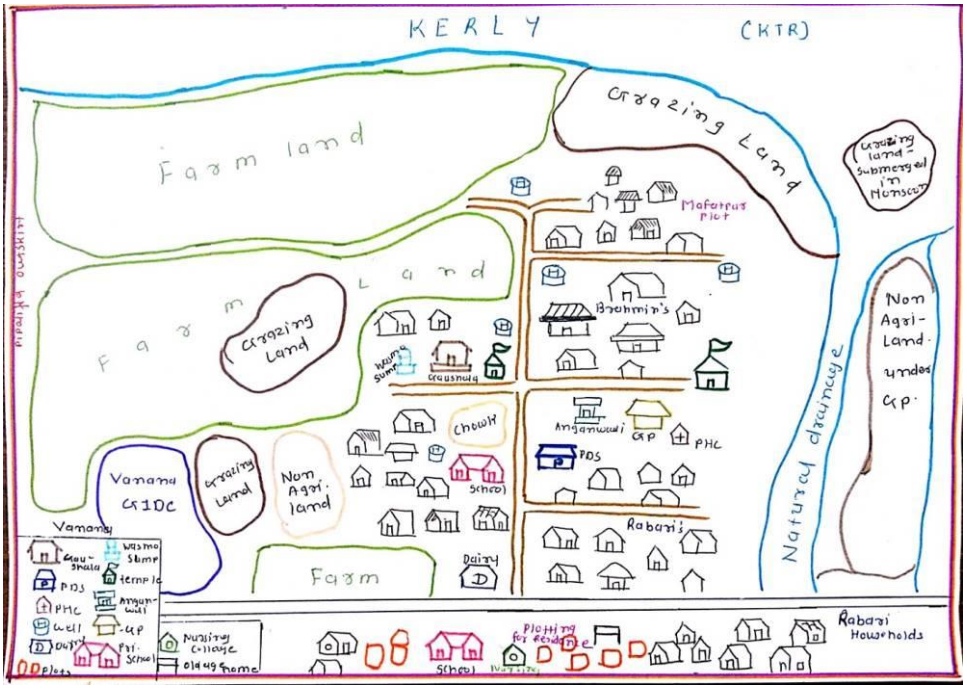
f. Service mapping
   Health, *Anganwadi*, education, PDS, fishery centres/cooperatives, dairy, veterinary services (available, availed, govt/pvt)
   Infrastructure (road, irrigation, transport, electricity)

g. Stakeholders
   1. Primary/secondary/tertiary (farmers, fishing community, livestock owners, youth groups, EDCs, PRIs, labour etc.) - Influence and importance and their capacity for wetland management
   2. Role of Biodiversity Management Committee (BMC) and prepared PBRs
   3. Perceptions of stakeholders about current use of ecosystem services and alternate solutions for wetland conservation

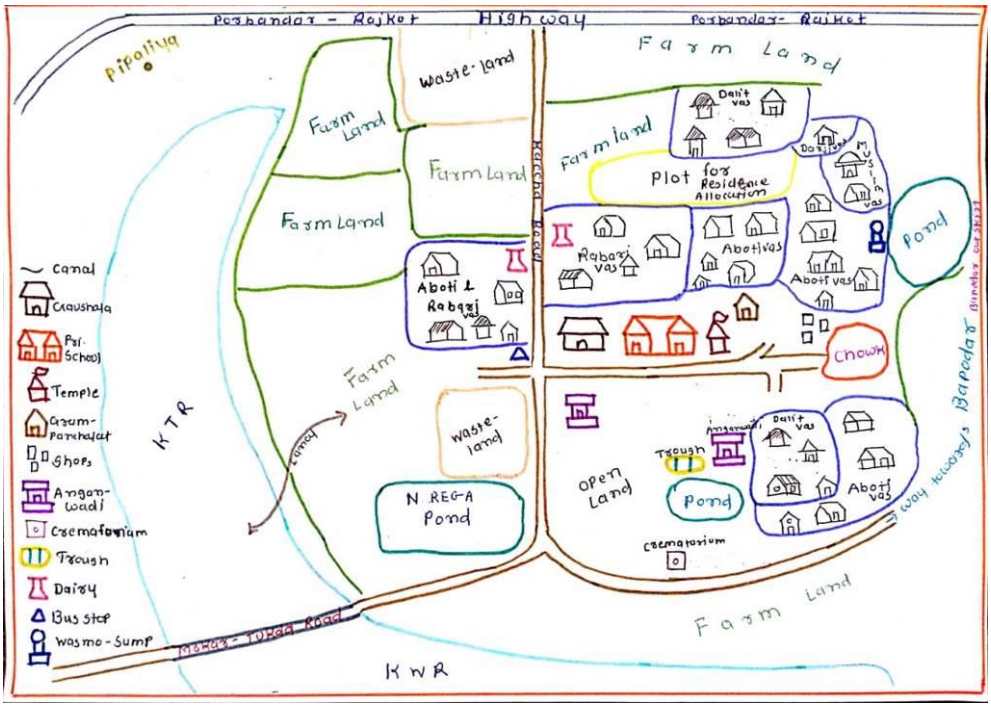
h. Resource Management Conflicts and Management
   1. Inter departmental conflicts (boundary and functions)
   2. Land demarcation (settlement etc)
   3. Operational (use of wetland for different purposes)
   4. Inter community conflicts
   5. Perspectives of different stakeholders on how wetlands can be better managed

Annexure 3: Social and Resource Maps, GWC and KBS

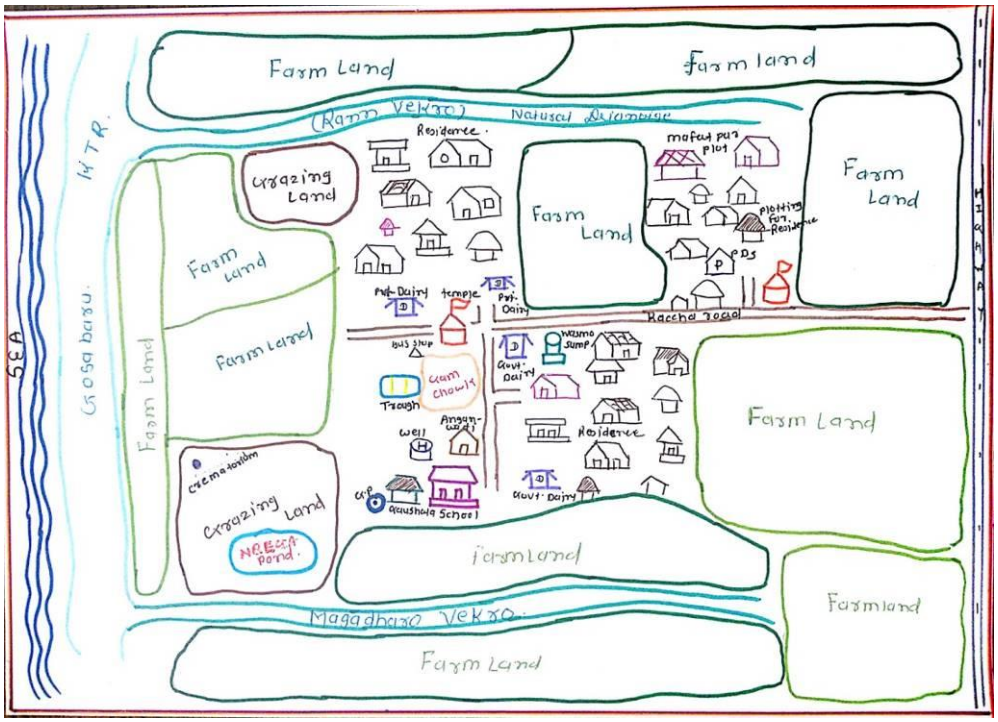
Resource Map: Padardi, GWC



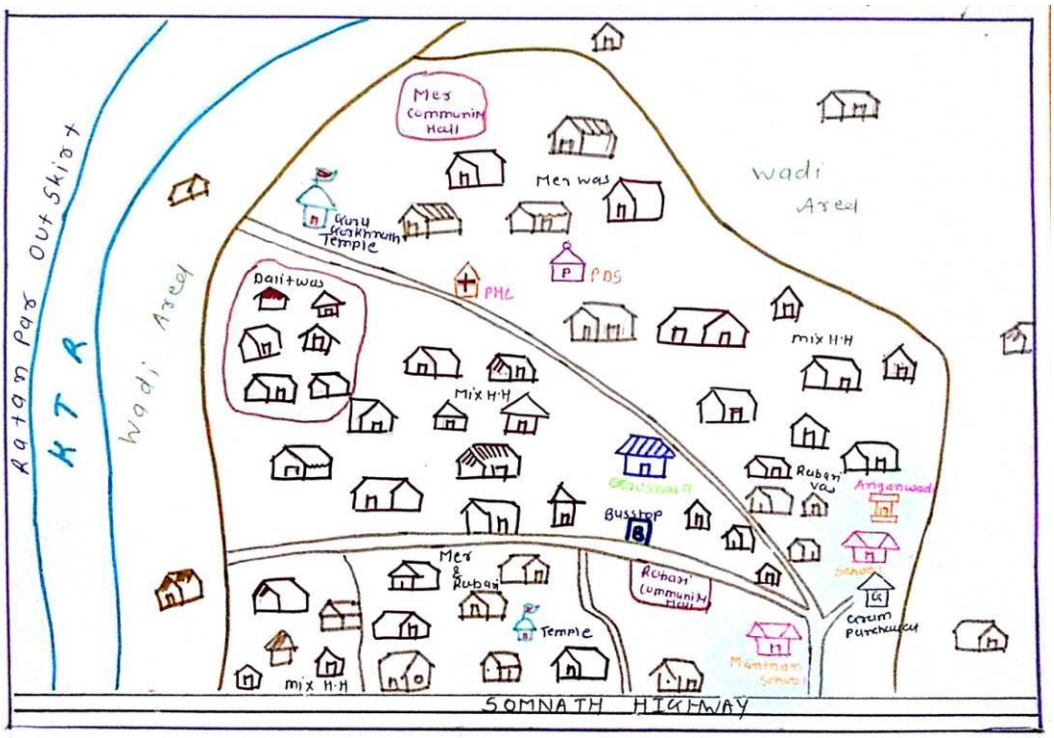
Resource and Social Map: Virpur Vanana, GWC



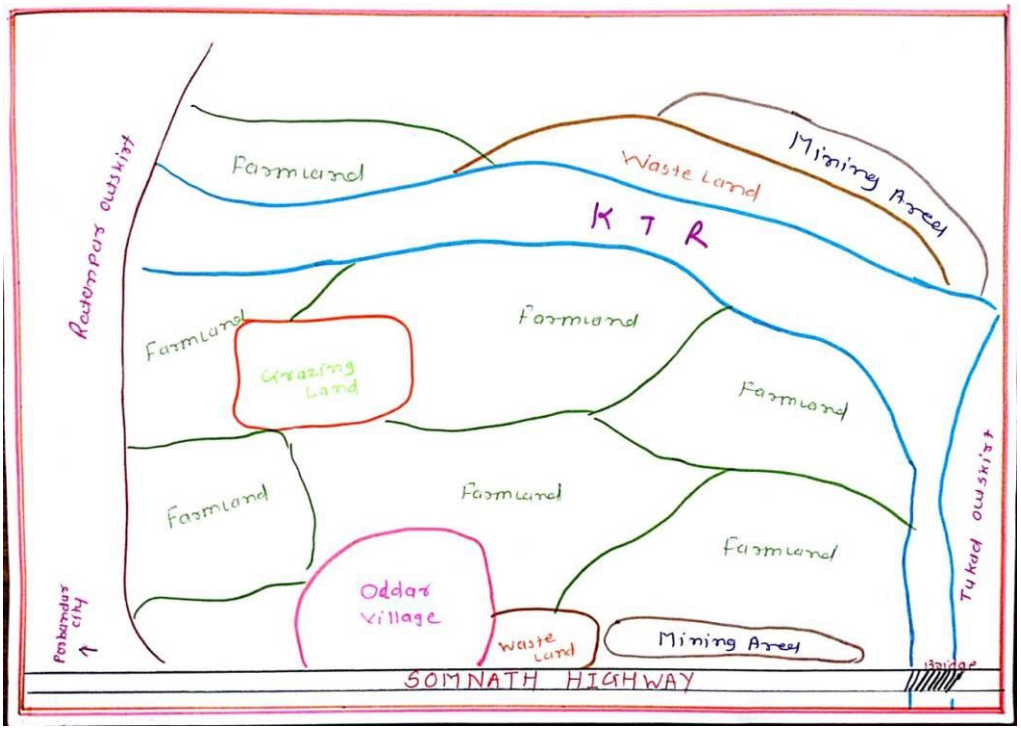
Social and Resource Map: Mokar, GWC



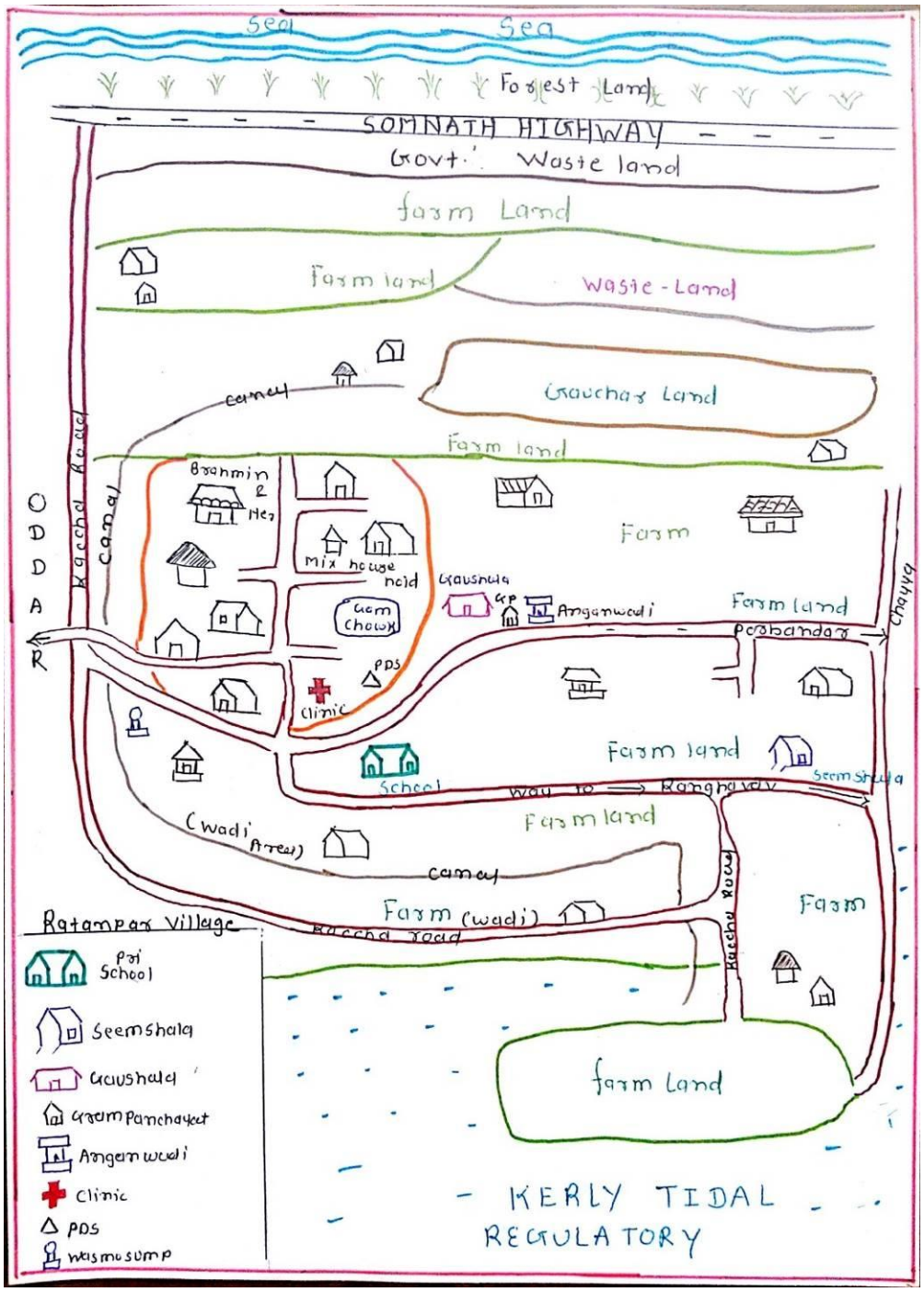
Social and Resource Map: Pipaliya, GWC



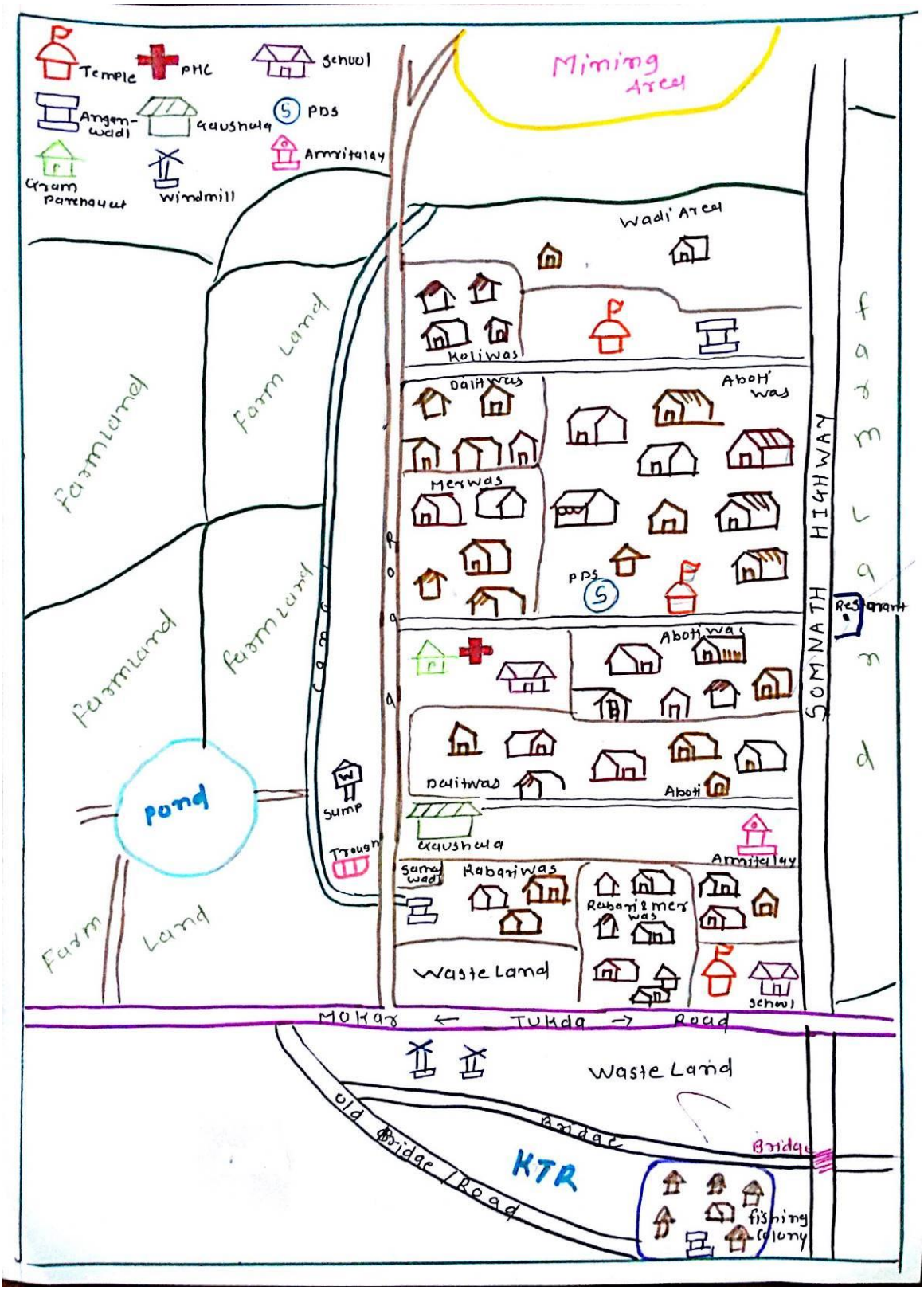
Social Map: Oddar, GWC



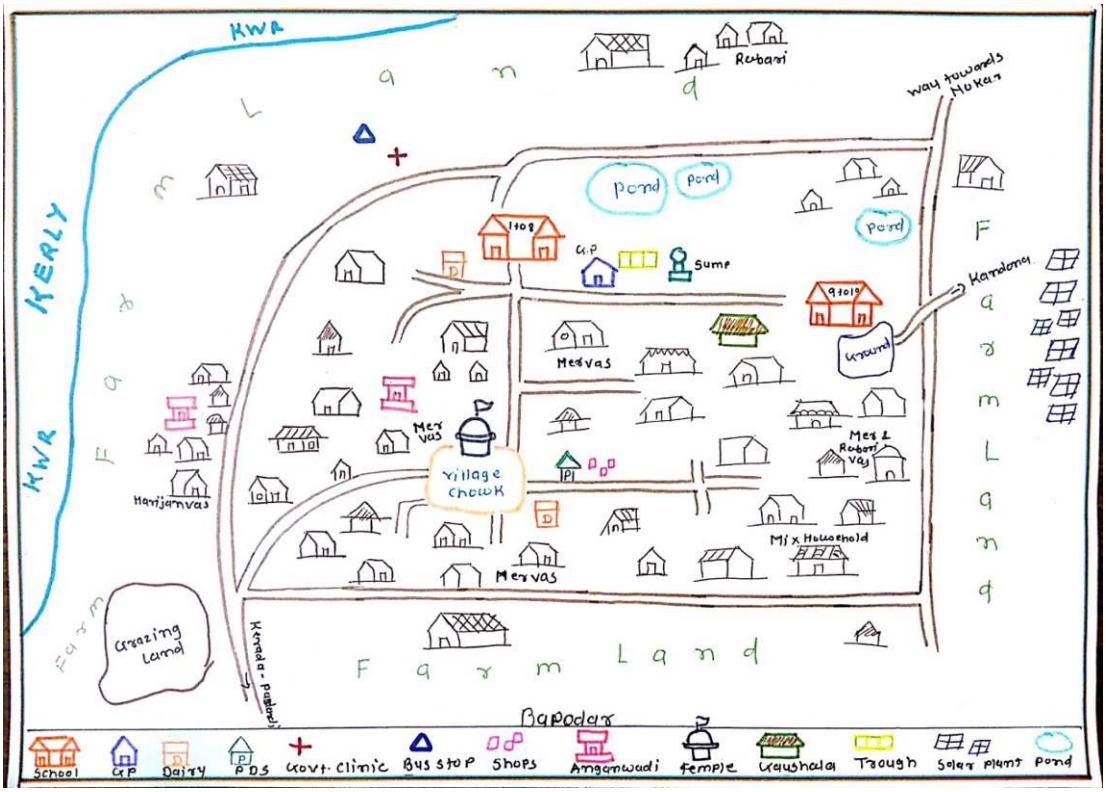
Resource Map: Oddar, GWC



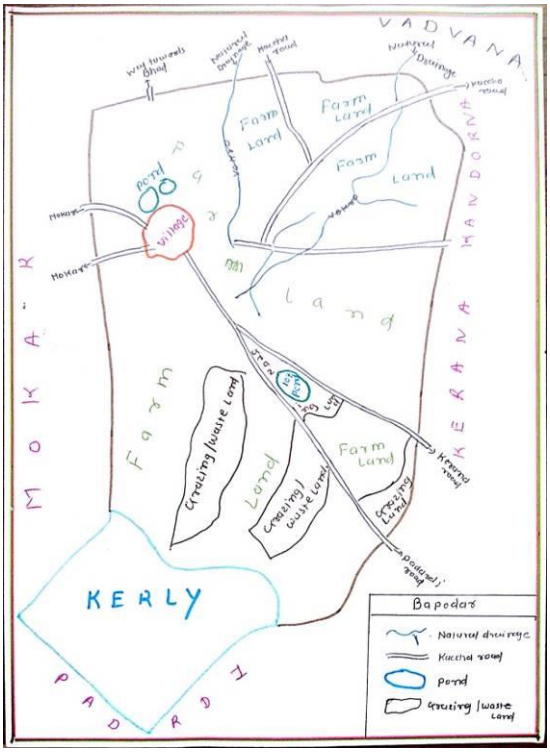
Resource Map: Ratanpar, GWC



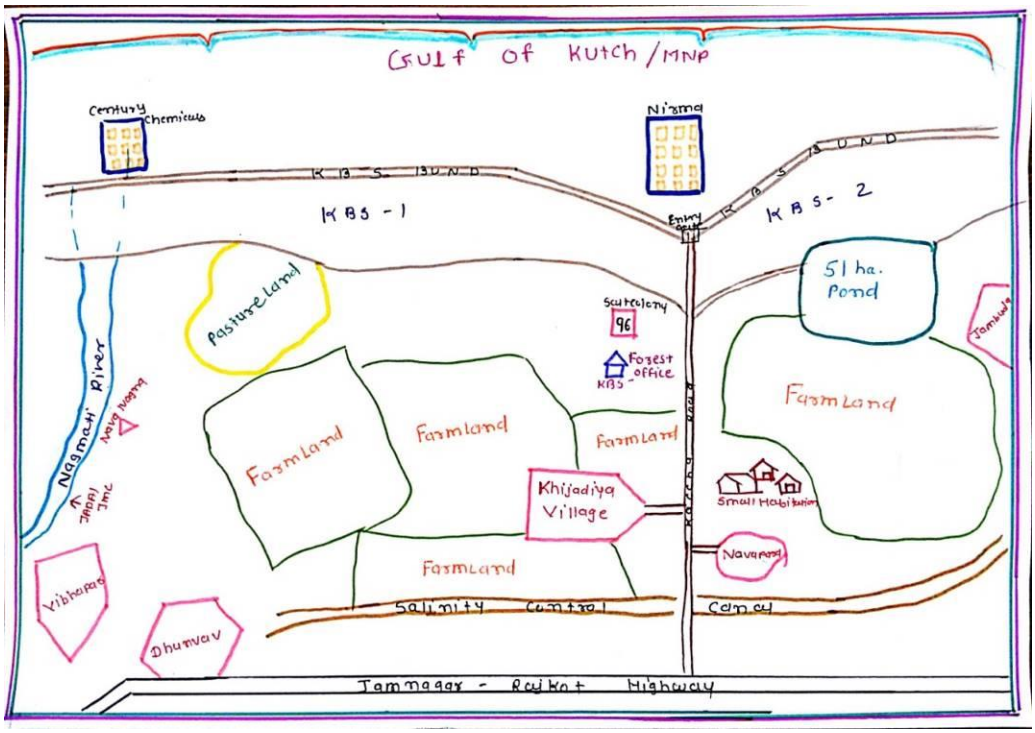
Social and Resource Map: Tukda, GWC



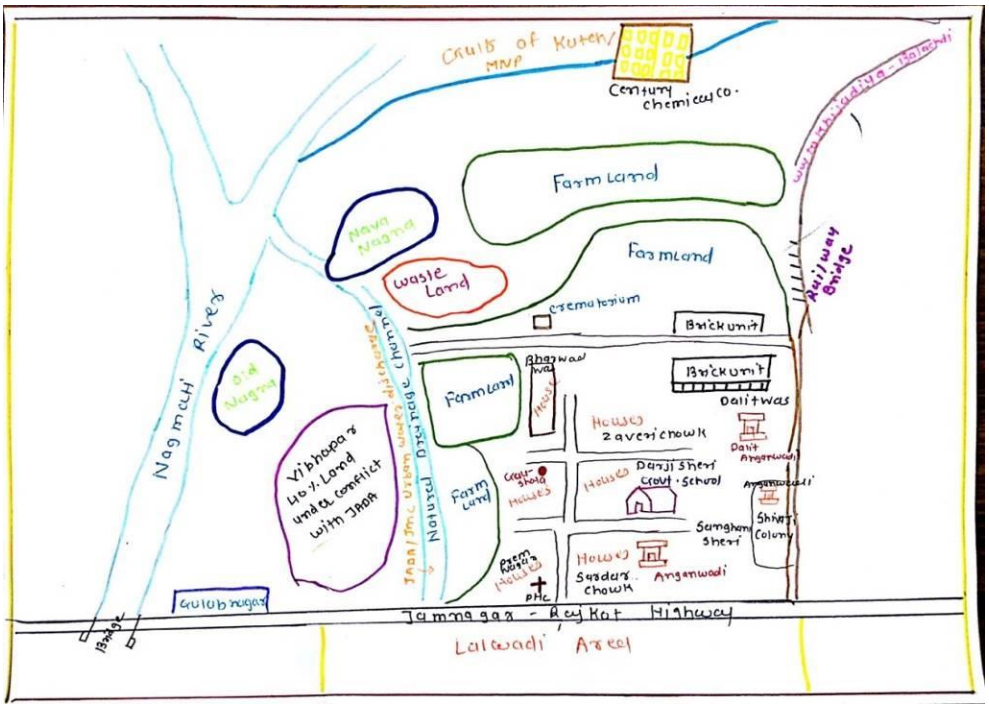
Social Map: Bapodar, GWC



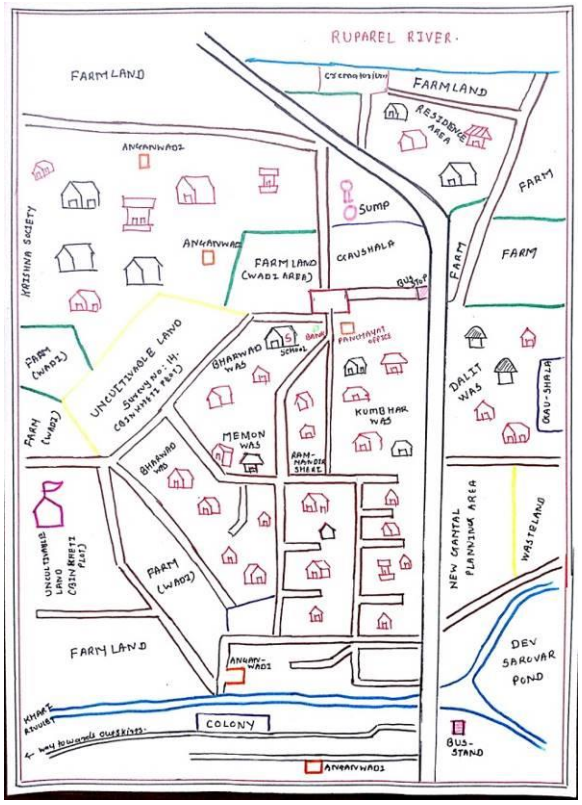
Resource Map: Bapodar, GWC



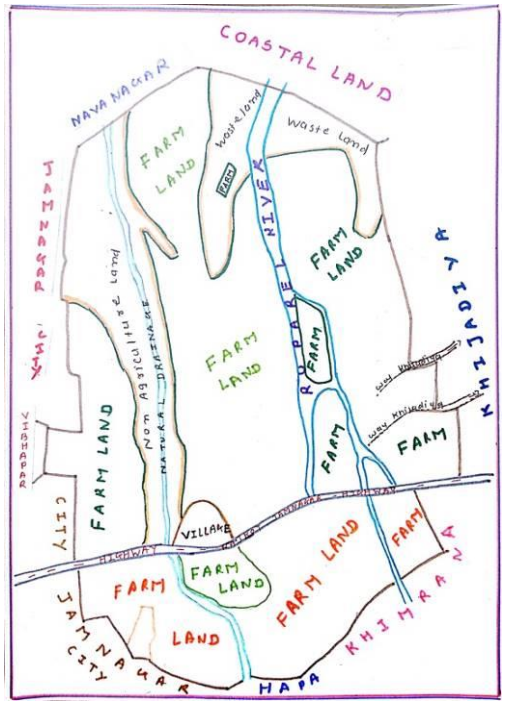
Resource Map: Khijadiya, KBS



Social and Resource Map: Vibhapar, KBS



Social Map: Dhunvav, KBS



Resource Map: Dhunvav, KBS

Annexure 4: Schedule of Community Consultations & Meetings

S. No.	Dates of Visit	Purpose	Places Visited
1.	October 27-29, 2015	Preliminary Visit for fact finding	1. Khijadiya Bird Sanctuary, Jamnagar, Village Khijadiya, Forest department, Interpretation Centre 2. Gosabara Wetland Complex, Porbandar, Forest department, Mokar village, Tukda Gosa Village
2.	December 2-4, 2015	Orientation Meeting and Field Visit for finalisation of methodology	1. GEER Foundation, Gandhinagar 2. Khijadiya Bird Sanctuary, Jamnagar, Gosabara Wetland Complex, Porbandar, Forest department
3.	December 8-12, 2015	Data Collection	1. Khijadiya Bird Sanctuary, Jamnagar, Villages in Jamnagar: Jambuda, Khijadiya, Dhunvav, Vibhapar 2. Gosabara Wetland Complex, Porbandar; Villages in Porbandar: Mokar, Tukda Gosa, Ratanpar, Oddar
4.	January 19-23, 2016	Data Collection	1. Villages in Porbandar: Pipaliya, Virpur Vanana, Padardi, Bapodar, Tukda Gosa 2. Department of Statistics, District *Panchayat*, Porbandar, Irrigation Department, Salinity Control Department
5.	February 25-March 1, 2016	Data Collection	1. Villages in Porbandar: Ratanpar, Oddar, Padardi, Bapodar, Mokar 2. Gosabara Wetland Complex
6.	March 6-7, 2016	Review Meeting	3. Forest department, Jamnagar
7.	April 11-16, 2016	Data Collection	1. Porbandar: Departments of Agriculture, Irrigation, Statistics, Fisheries, Livestock, DRDA, Cooperative Farming, Doodh Sahkari Mandali 2. Visits to 4 project villages in Jamnagar: Departments of Agriculture, Irrigation, Statistics, Salinity Control, Livestock, DRDA 3. Visits to project villages in Porbandar

Research Team

Binoy Acharya
Geeta Sharma
Kirit Parmar
Yatri Baxi
Mohammad Zahir Shaikh
Kanan Dave
Shailesh Rathod
Jayant Layek
Bhavesh Songara
Kumar Abhishek

About the Study

Amongst the baseline studies that were carried out as a part the CMPA project, a socio-economic assessment was carried out by UNNATI, at two wetland sites in Gujarat viz. Gosabara Wetland Complex (GWC), Porbandar and Khijadiya Wildlife Sanctuary Jamnagar. It underscores the importance of engaging with people through processes where they themselves share, analyse and decide on the actions that are necessary for maintaining ecological balance and sustenance of their livelihood and well-being. The socio-economic baseline assessment, while sought to assess the current situation for developing an integrated wetland management plan, also sought to develop, in the process, an understanding among the communities dependent on the wetlands about its 'wise use'.

The CMPA Project

The Project "Conservation and Sustainable Management of Coastal and Marine Protected Areas" (CMPA) is a project of the Indo-German technical cooperation. It is funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and implemented by the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India, and the *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH* on behalf of BMUB.

Established to support the achievement of the Aichi targets of the Convention on Biological Diversity, the Project's overall goal is to contribute to conservation and sustainable use of biodiversity in selected areas along the coast of India. Taking into consideration the economic importance of the coastal zone for large segments of the population, the Project's approach is people-centered, thus ensuring the support for conservation by those depending on coastal ecosystems.

CMPA Technical Report Series

30

Socio-economic Baseline Assessment at Gosabara Wetland Complex and Khijadiya Wildlife Sanctuary, Gujarat

June 2016

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

Indo-German Biodiversity Programme
Conservation and Sustainable Management of Coastal and Marine Protected Areas