

Integrating Livelihoods Approach into Conservation Strategy

A scoping study in the National Chambal Sanctuary



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Executive Summary

In conservation initiatives such as the establishment of protected areas (PAs) and in the process of threatened species or landscape protection, communities in and around such areas often get marginalized. Their conventional livelihood sources undergo the threat of being declared illegal. In situations where no alternatives are provided, the ecosystem comes under increasing pressure from illegal activities. Communities, who are the potential custodians of nature, resort to further exploitation due to their poor socio-economic conditions and lack of alternatives.

Development Alternatives (DA) focuses on sustainable livelihood solutions for marginalized communities and has been providing innovative responses to such issues for almost three decades. In this Scoping Study in the National Chambal Sanctuary, DA - supported by Turtle Survival Alliance (TSA) and Gharial Conservation Alliance (GCA) - has integrated an innovative livelihoods approach to complement the conservation process.

The Scoping Study is an important step towards mobilizing support for marginalized communities in any such area. The scoping study of Chambal covers the five pilot villages of *Gopiyakhar*, *Barolli*, *Kheda Ajabsingh*, *Nadgawa* and *Bacchedi* along the Chambal river within Etawah district and the National Chambal Sanctuary Project, Agra in the state of Uttar Pradesh. Besides Kheda Ajabsingh, each of these villages has an ecologically unsustainable livelihood practice(s), which may hinder or delay achieving the results of conservation interventions.

A situational analysis conducted in the five villages revealed poor socio economic conditions and poverty in all the villages with some villages being comparatively worse off. The village of *Gopiyakhar* has the poorest socio-economic condition among the 5 villages. *Bacchedi* village has the best socio-economic status among the pilot villages, but in comparison with an average village in India, it would still be considered a socio-economically poor village.

The primary livelihood in the study area is agriculture; in most households, individuals work on their own land or as agricultural labour. However, cultivable land is scarce and agricultural productivity is low due to the ravined terrain and water scarcity. The water table in the area is reportedly low and in dry months the river, which is inaccessible to the communities is the only source of water. Incomes are supplemented through a variety of activities – the most common being cattle rearing for milk. However, people in the sample villages have reported to be involved in activities that are detrimental to the ecosystem namely fishing, sand collection,

riverside agriculture and wood collection – all of which (either subsistence or on a commercial scale) are not permitted in the sanctuary area.

The villages lack basic infrastructural facilities and there are no local enterprises except for a few rudimentary village shops. There are also no community-based institutions to enable collective action for livelihood improvement or environment protection. The study identified potential sustainable livelihood options that can improve the socio-economic conditions of communities residing within the Protected Area. These were based on the local resource base and skill sets available within the communities.

A majority of community members selected artificial jewellery as one of the livelihoods they would like to take up from a selection of a few easily acquirable skill options that included skills like paper bag making, handicrafts from rope, and others that were mentioned by participants during a multistakeholder community level workshop. As a confidence building exercise, the option was demonstrated in two of the five villages - *Gopiyakhar* and *Bacchedi* Communities participated in the artificial jewellery trainings with enthusiasm and the number of finished products were appreciable. However, further steps are required in making such livelihood options sustainable through the establishment of market linkages and further training on book keeping, marketing and other aspects required to establish an enterprise.

Other options identified to be taken up in a subsequent phase are food processing - specifically pickle making from fruits of *Capparis decidua* (a shrub that is known for its medicinal properties), compost making, high value horticulture including trees of amla (*Phyllanthus emblica*), ber (*Zizyphus mauritiana Lamk*) and bel (*Aegle mermelos*), cultivation of medicinal plants like neem (*Azadirachta indica*) and *Aloe vera*, growing of leguminous fodder and grasses to support larger cattle stocks and value addition to rope and mats - *durries* that are already being made in the village of Gopiyakhar. In parallel to the livelihood interventions, communities need to be engaged through awareness activities to ensure aspects of sustainability and bio-resource conservation.

This is first of its kind of efforts jointly taken up since the creation of this freshwater. To ensure continuous economic development and ecological security in the area DA and TSA are now working towards the establishment of a resource centre for conservation-linked livelihoods. The centre will provide a space to explain linkages between conservation and livelihoods and consolidate and scale up such efforts in the area area to improve the participatory conservation of threatened aquatic species.

A woman makes rope with a locally developed machine called the 'Girri' in the village of Gopiyakhar in the National Chambal Sanctuary



Table of Contents

1. Introduction and Background	1
1.1. Objectives	3
1.2. Selection Criteria	3
1.3. The Sustainable Livelihoods Approach	5
2. Situational Analysis	6
2.1. Methodology	6
2.2. Socio-Economic Profile	7
2.3. Livelihood Profile	13
2.4. Natural Resource Base and Potential Threats to Ecosystem	15
2.5. Infrastructural Capital	17
2.6. Institutional Systems	19
2.7. Government Schemes	20
3. Summary of Project Progression	22
3.1. Selection of Villages	22
3.2. Livelihood Pilot	24
4. Key Findings	27
5. Way Forward	30

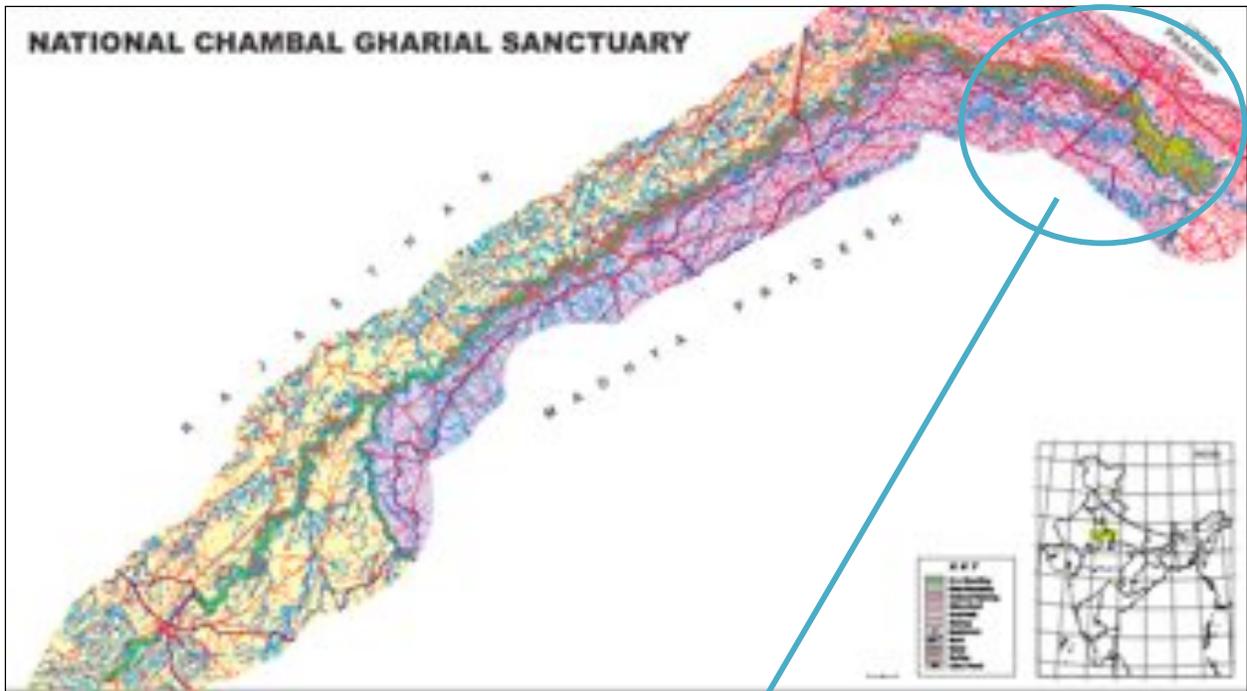
List of Tables

Table 1 Detail of Sample Villages	4
Table 3 Number of Households surveyed in sample villages	6
Table 4 HH with highest and lowest annual income	11

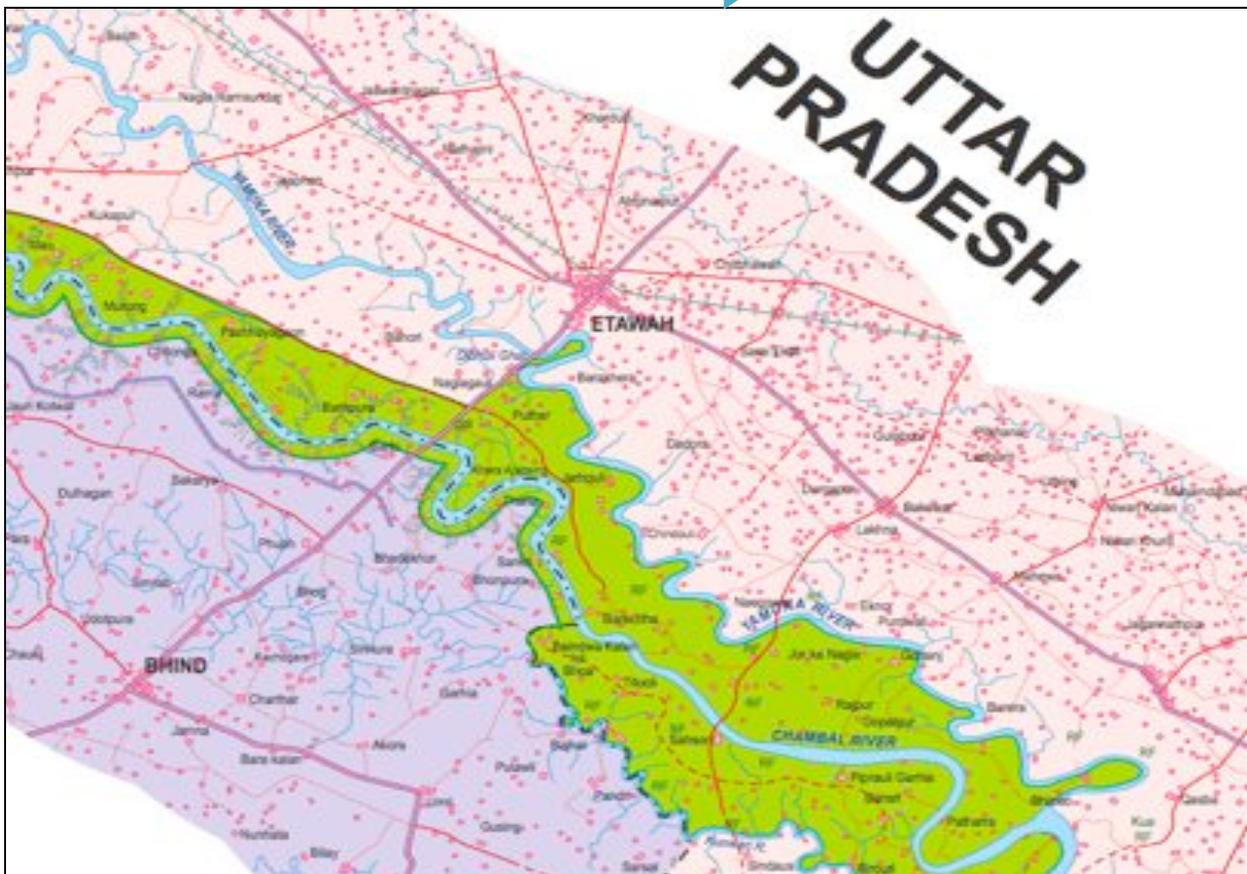
List of Figures

Figure 1 Average family size in sample villages	7
Figure 2 Average land holding in sample villages	7
Figure 3 Composition of housing in sample villages	8
Figure 4 Electricity connection in sample villages	8
Figure 5 Percentage of uneducated members	9
Figure 6 Percentage of HH with no educated members	9
Figure 7 Percentage of HH with atleast one member educated till high school	10
Figure 8 Percentage of HH with atleast one member educated till graduate level	10
Figure 9 Income (Per capita)	11
Figure 10 Use of River Ecosystem by Households	15

1. Introduction and Background



Map Credit: MoEF and NTRIS - CASMACC



The National Chambal Sanctuary (NCS) is a 5,400 km² protected area for the critically endangered Gharial (*Gavialis gangeticus*), rare species of turtles such as the Red Crowned Roofed Turtle (*Batagur kachuga*), the Ganges river dolphin (*Platanista gangetica*) birds like Indian Skimmers (*Ryncops albicolis*) and other terrestrial flora and fauna. Located in North Central India, the sanctuary lies between 25° 13'N-26° 52'N and 76°28'E and is managed by three states Rajasthan, Madhya Pradesh and Uttar Pradesh (see above Map). The Sanctuary is protected under Section 18(1) of the Wildlife Protection Act of 1972.



The sanctuary has a highly ravined topography and the infertile soil and scarcity of water restricts the productivity of agriculture, which is the primary livelihood in the region. To supplement incomes communities have undertaken livelihoods that have increased pressures on the ecosystem. Activities include fishing, sand collection, lopping of wood, and riverside cultivation. A lack of awareness and inability to change current practices result in disturbance and destruction of habitat that is critical for the Gharials, turtles and other endangered species.

As part of the conservation action, it is important to address the needs of local communities by developing ways to conserve biological diversity while enabling them to live productively and sustainably. This study uses a sustainable livelihoods approach to identify and establish sustainable livelihood models that minimise pressures on the ecosystem. The experience of Turtle Survival Alliance (TSA) in the National Chambal Sanctuary has indicated that, it is imperative to address the social aspects for conservation efforts to be effective. This is owing to the close links between the ecosystem and the livelihoods of the local communities.

Development Alternatives and TSA carried out a recce of a few villages in National Chambal Sanctuary in order to understand the environmental settings and explore livelihood options in May 2009. Village socio-economic surveys as well as the findings of this short study were shared at the 'Gharial Pre- Species Recovery Plan (SRP) Meeting' held in Delhi in 2009, and were instrumental in formulating the socio-economic aspects of the SRP.

To help strategise the integration of the livelihood aspect in the conservation strategy, Society for Development Alternatives (DA) in partnership with Turtle Survival Alliance (TSA), Gharial Conservation Alliance (GCA) and Madras Crocodile Bank Trust (MCBT) undertook a detailed scoping study in 5 villages of the NCS. Information, learning's and recommendations of this scoping study are provided in this report.

1.1. Objectives

The objectives of the Scoping study were as follows:

- ❖ To conduct a situational analysis study to map the livelihood-conservation linkages.
- ❖ To evolve livelihoods options through a multi-stakeholders consultation process.
- ❖ To facilitate the initiation of demo-models of alternative livelihoods.
- ❖ To develop a proposal for integrating sustainable livelihoods aspects in conservation strategies and to develop implementation plans inline with the conservation efforts.

1.2. Selection Criteria

5 case study villages namely Gopiyakhar, Nadgawa, Barolli, Kheda Ajabsingh and Bacchedi were selected. The main criteria for selecting villages were as follows:

- ❖ Villages should fall within the limit of National Chambal Sanctuary
- ❖ Distance of village from the river should be within 100 meters
- ❖ Differential livelihood dependence on river ecosystem
- ❖ Nearby Critical stretches of river for aquatic wildlife
- ❖ Enforcement, regulation and management of the area (by the Forest department)

Village Name	Livelihoods	Importance for threatened river reptiles	Other Attributes
Gopiyakhar	Fishing (~ 40% fishermen community)	<ul style="list-style-type: none"> ▪ Less important as far as critical Gharial habitat requirements are concerned¹ ▪ Management wise important – close to the buffer zone, just down to/at Gopiyakhar fishing is allowed, important consideration especially in monsoon season when species stray out of PA limit ▪ Occasional clandestine community / commercial fishing 	<ul style="list-style-type: none"> ▪ Close to Yamuna-Chambal Confluence (5 km down from confluence) ▪ Under buffer zone of PA
Nadgawa	Agriculture (riverbank ² and river side)	<ul style="list-style-type: none"> ▪ Important for Batagur turtle nesting ▪ Critical Important Habitat for Gharials (corridors for adult movement and feeding grounds for juveniles) 	<ul style="list-style-type: none"> ▪ Generally villagers don't use pumps to extract water from river ▪ Use of fertilizers and pesticides in cucurbit crops
Barolli	Sand collection (through camels)	<ul style="list-style-type: none"> ▪ This is a preferred nesting site for Gharials and Turtles ▪ Occasional hunting 	<ul style="list-style-type: none"> ▪ Villagers own camels ▪ Also fulfill domestic demand for the sand in construction ▪ Sand quality found said to be good
Kheda Ajabsingh	Reference village Minimal Impact and activities recorded during the surveys	<ul style="list-style-type: none"> ▪ Critical Area for Gharial (nesting habitat) 	<ul style="list-style-type: none"> ▪ Yadav (a subdivision of Hindu religion) community predominant
Bachhedi	Agriculture and Wood Trafficking to Brick Kilns, glass factories Firozabad	<ul style="list-style-type: none"> ▪ Wood trafficking leads to deforestation thus may lead to the silting of the sandbanks and riverbed 	<ul style="list-style-type: none"> ▪ Soil quality is considered to be good ▪ Extract Green fodder from forests for Goats and other cattle

Table 1 Detail of Sample Villages

1.3. The Sustainable Livelihoods Approach

The success of livelihood initiatives taken in the National Chambal Sanctuary is dependent on the cooperation and interest shown by the riparian communities that work and reside within the PA. Conservation initiatives can be successful only if there is sustainable use of the resources in the sanctuary among communities while at the same time ensuring that their development aspirations are met.

The **sustainable livelihoods approach** is a holistic one adopted in this study to understand the social, economic and ecological resources that are used by communities to make a living. This is necessary in order to increase accessibility to opportunities and alternatives to enhance current livelihoods and make them ecologically and economically sustainable.

Development Alternatives has been working on the creation of large-scale sustainable livelihoods for nearly 30 years. The goal of the organisation is to provide the rural poor with jobs and decent incomes, giving meaning and dignity to life while producing goods and services for the local market while preserving the local environment. In the context of the National Chambal Sanctuary – the aim is to promote the sustainable use and regeneration of natural resources using appropriate management techniques, livelihoods and responsible community institutions.



2. Situational Analysis

2.1. Methodology

A situational analysis provides the context and knowledge for planning any future interventions by identifying and prioritizing the problem situations affecting the target area. The analysis under this scoping study was conducted using the Participatory Livelihoods Assessment Technique (PLAT). PLAT is a participatory methodology for livelihood assessment based on the participatory rural appraisal principals of direct learning from the community, visualization, and flexibility.

Development Alternatives designed a comprehensive matrix for data collection and the team from Turtle Survival Alliance (TSA) mobilized communities from the 5 villages and conducted the surveys. Data was collected on social, economic, environment and livelihood aspects and analysed using MS Excel. Over 80 households were covered in the survey from the 5 sample villages. Focus Group Discussions were also carried out in these villages by the DA-TSA team.

Village	Number of Households surveyed
Gopiyakhar	12
Barolli	14
Nadgawa	18
Kheda Ajabsingh	20
Bacchedi	16
TOTAL	80

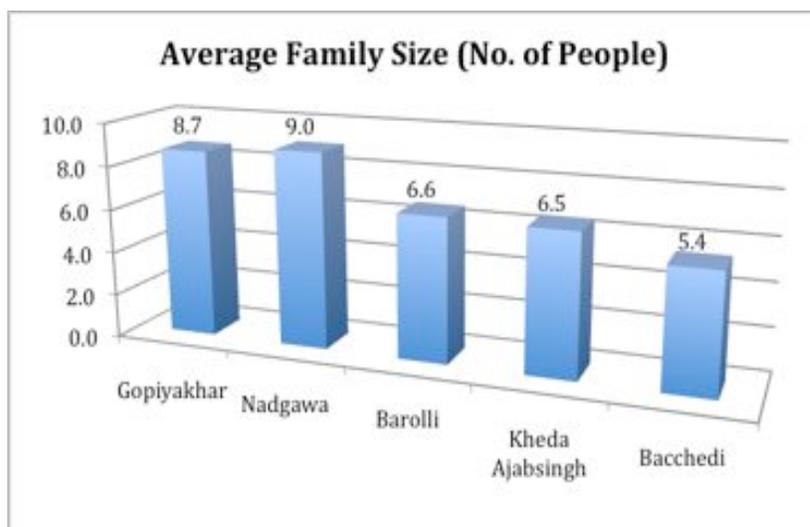
Table 2 Number of Households surveyed in sample villages

The study had certain limitations – In the survey as well as through focus group discussions livelihood activities such as fishing, wood trafficking and sand collection (either commercial or subsistence) were not reported by respondents, since these activities are illegal in the sanctuary area and punishable by fines; However secondary information on such activities were collected from various and reliable sources as well as observed in the villages on different levels during the study period

2.2. Socio-Economic Profile

Average Family Size and Land Holdings

Uttar Pradesh is the most populous state in the country³. The average family size in the 5



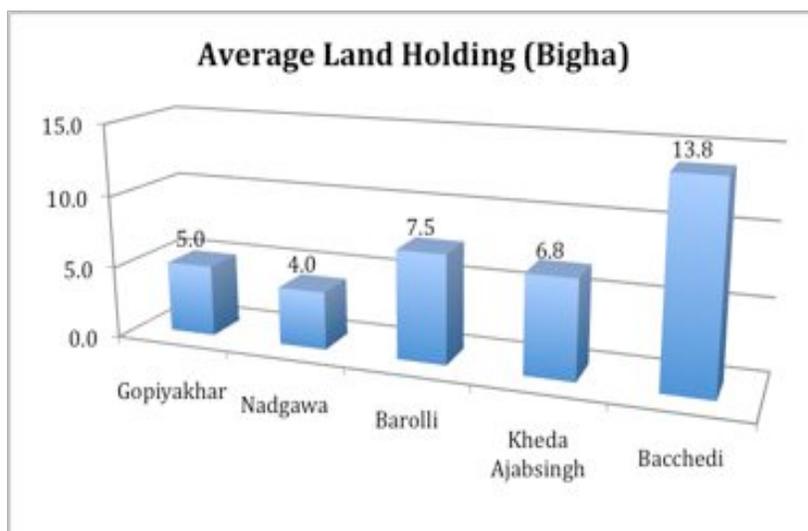
sample villages is significantly above the national average of 5.34 members with the average family size varying between 5 to 9 members (Figure 1). The village of *Nadgawa* and *Gopiyakhar* have the highest number of members to a household – almost 9, whereas the village of *Bacchedi* is closer to the

Figure 1 Average family size in sample villages

national average. The family size also plays a role in determining the average landholding size in the village.

As can be seen from **Figure 2 Average land holding in sample villages**

Figure 2, the villages of *Nadgawa* and *Gopiyakhar* have larger family sizes but have a smaller average landholding size. The village of *Bacchedi* has the largest average landholding size amongst the villages with an average landholding of 13.8 Bighas per family



(Bigha is a unit to measure land in Uttar Pradesh, 1 Bigha = 0.25 Ha so 13.8 Bighas = 3.45 Ha)

Composition of Housing and Access to Electricity

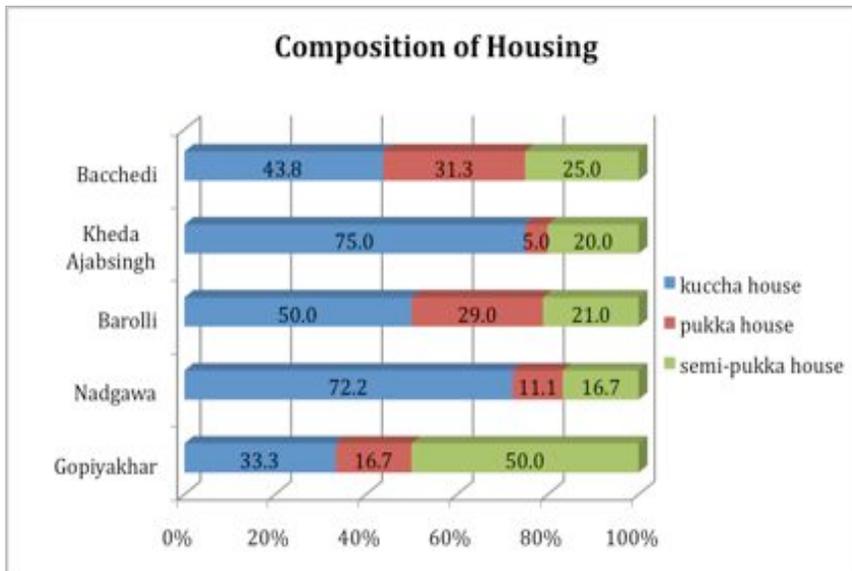


Figure 3 Composition of housing in sample villages

Majority of the houses in the sample villages are either Kuccha or Semi-pukka which means they are predominantly made from mud, cowdung and thatch (locally available grasses and agricultural by-product). This may be an indicator of the poor socio-economic condition of the villages.

The villages of *Barolli* and *Bacchedi* have the maximum pukka (cemented masonry) houses with 30% of houses (Figure 3) being made from bricks and reinforced roofs in these villages.

Another crucial indicator of socio-economic development is the availability of electricity in the villages. As can be seen from Figure 4 the households covered in

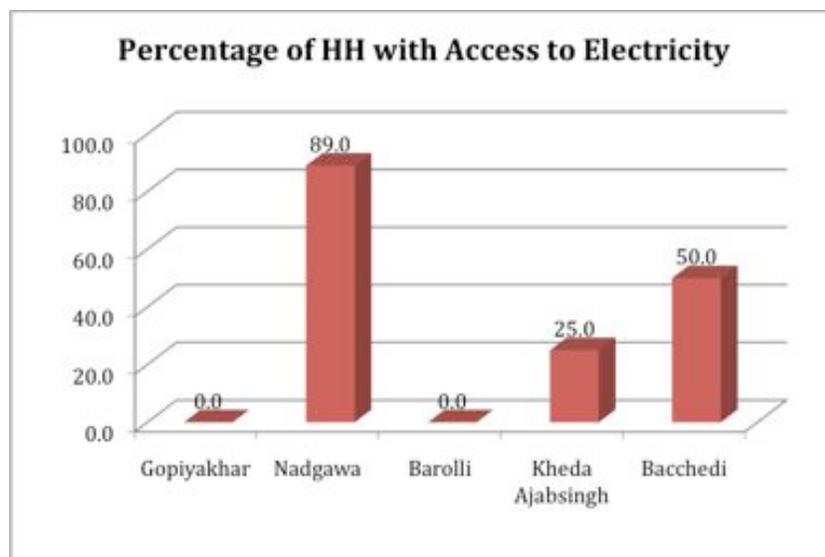


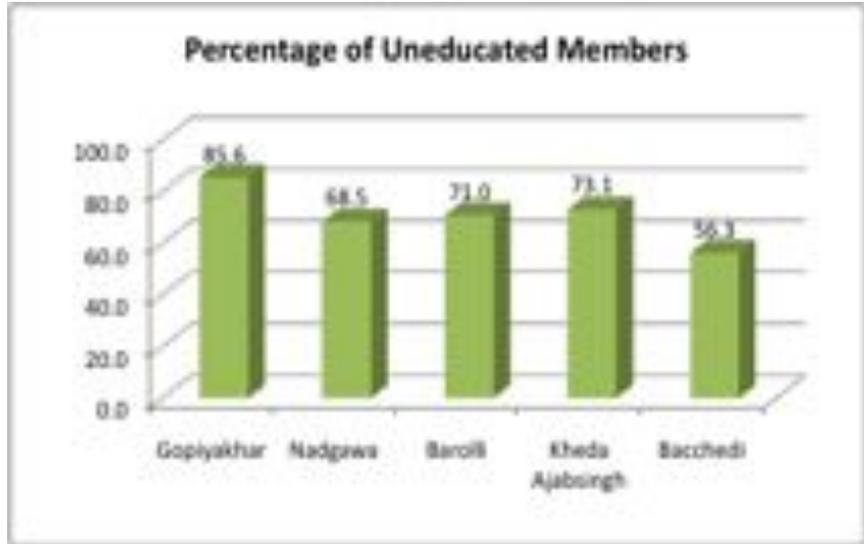
Figure 4 Electricity connection in sample villages

the survey, two of the five villages –*Gopiyakhar* and *Barolli* had no electricity connection and only 25% of villagers in the village of *Kheda Ajabsingh* had a connection. Only the village of *Nadgawa* had decent access to electricity with 83% of respondents having an electricity connection, followed by *Bacchedi* where 50% respondents had access to electricity. Access

to and availability of electricity can have a significant bearing on available livelihood choices and ability of communities to acquire education and other professional skills.

Education

In India, free and compulsory education to children in the age group of 6-14 years has been a fundamental right since the year 2002⁵. The number of children, especially number of girls who go to school in India is increasing due to various schemes,



however currently a huge section of the adult population in rural India remains uneducated.

All the sample villages have primary schools in the vicinity – however these have been recently established. A high number of members from the sample survey were uneducated as can be seen from figure 5. Education levels in the village of *Gopiyakhar* are considerably poorer than the other villages with 85.6% members in the sample being uneducated (figure 5).

Additionally, 42% of households in *Gopiyakhar* do not have even one educated member (Figure 6) and only 33% of households had a member who was educated till high school level (Figure 7).

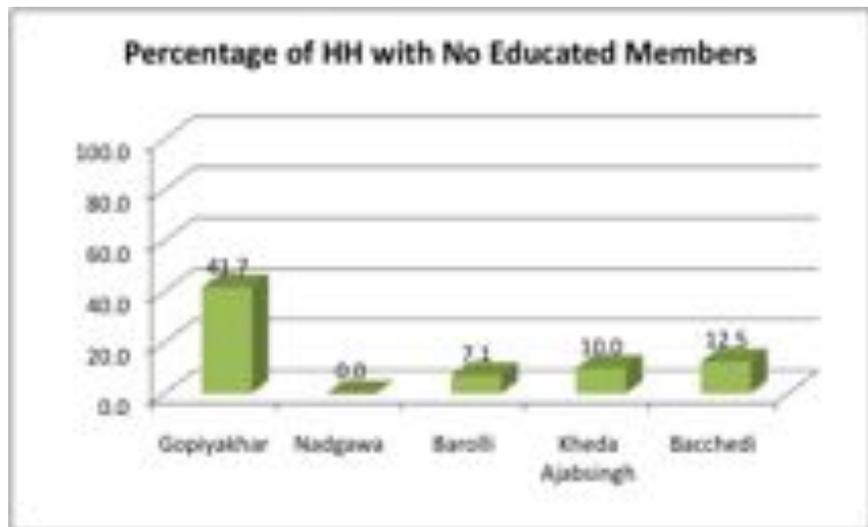


Figure 6 Percentage of HH with no educated members

In the other villages the

percentage of households without any educated members is considerably lower, infact all households surveyed in the village of *Nadgawa* had atleast one member who was educated (Figure 6).

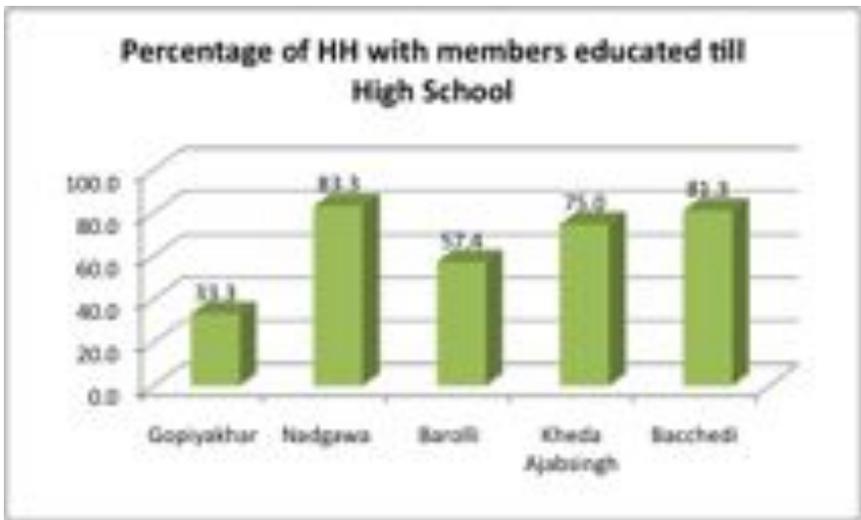


Figure 7 Percentage of HH with atleast one member educated till high school

Gopiyakhar, *Barolli* and *Kheda Ajabsingh* there were no households with a member educated up to a graduate level (Figure 8).The village of *Bacchedi* had 31% of households with a member who had graduated from college and *Barolli* had 14%.

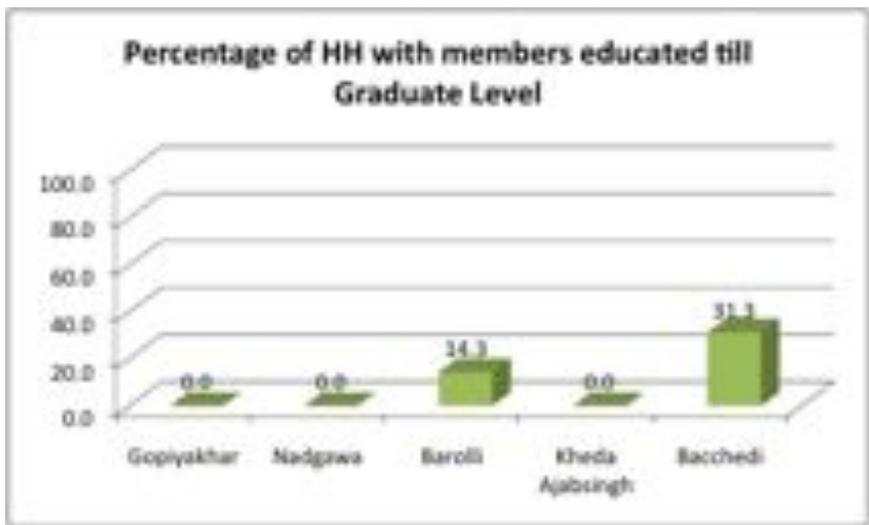


Figure 8 Percentage of HH with atleast one member educated till graduate level

Another important criteria of socio-

economic status is the number of women who are educated. Surveys revealed extreme gender inequality in education. The percentage of females educated was abysmal with the average number of females who are educated in all villages being approximately 7%. *Bacchedi* had the most number of educated females at 15% followed by *Nadgawa* at 9%. In

Most households in all the villages except *Gopiyakhar* had members who had attended high school. However, the percentage of households who had members who then went on to college is considerably lower. In the three villages of

the other villages, the number of educated females is negligible with only 1.9% females being educated in *Gopiyakhar*, 4.3% in *Barolli* and 5.4% in *Kheda Ajabsingh*.

Income

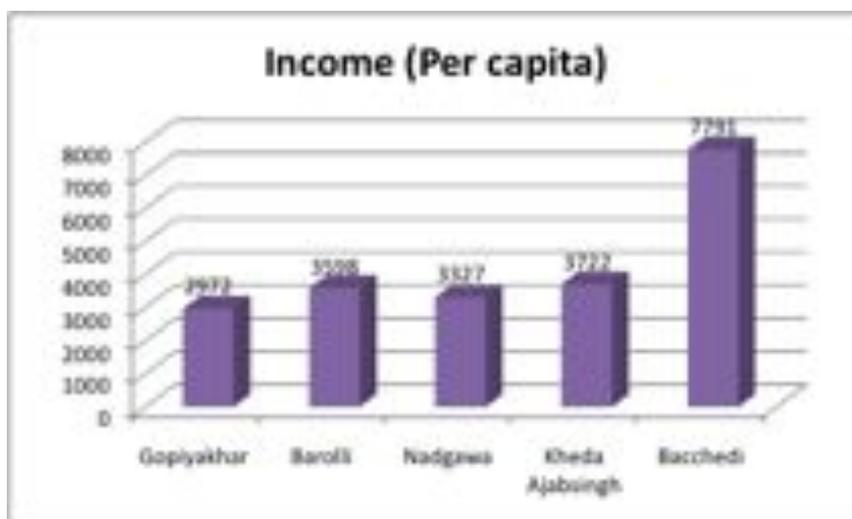


Figure 9 Income (Per capita)

The per capita income of India in the year 2010-2011 was projected at Indian Rupees (Rs) 54,527⁶. The per capita income for the sample villages was calculated by dividing the sum of all incomes of households by the number of people in the households. The per capita incomes in

this survey are only indicative and there is a possibility this indicator could be skewed due to the presence of extremes in the sample size.

Table 3 HH with highest and lowest annual income

Village	Highest Annual Income	Lowest Annual Income
Gopiyakhar	Rs 45000	Rs 3000
Barolli	Rs 35000	Rs 11000
Nadgawa	Rs 164000	Rs 8000
Kheda Ajabsingh	Rs 39000	Rs 6000
Bacchedi	Rs 100000	Rs 8000

The state of Uttar Pradesh (UP) has the second lowest per capita income in the country at Rs 26,051⁷. The sample villages have a considerably lower per capita income even compared with the average of UP. The per capita income figures are represented in Figure 9 and the amount ranges from Rs 2972 in the village of Gopiyakhar to Rs 7791 in the village of Bacchedi. The villages of Barolli, Nadgawa and Kheda Ajabsingh have similar per capita

incomes at Rs 3598, Rs 3372 and Rs 3722 respectively. Table 3 has been prepared to show that some of the highest annual incomes in the villages are considerably high, however because of the large family sizes the average figures are considerably lowered. For instance, in Nadgawa, the HH that earns Rs 164000 also has 16 members and thus the average income is only 10,250.

Thus, from the above analysis of the sample villages, it can be seen that the villages are in a socio-economically backward position as compared to the rest of Uttar Pradesh, which has a lower socio-economic status as compared to most states in the country⁸.

Among the sample villages, according to the socio economic indicators Gopiyakhar clearly has the poorest status with the lowest per capita income, very poor rates of education and a lack of access to electricity. Bachhedi has the best status with considerably higher per capita income, better status interms of education with the most number of graduates and educated females and least percentage of uneducated people. People in this village also have higher landholdings and access to electricity. Followed by Bachhedi, Nadgawa scores well on important indicators namely number of females educated, 100% access to electricity and highest percentage of households with a member educated till high school.



2.3. Livelihood Profile

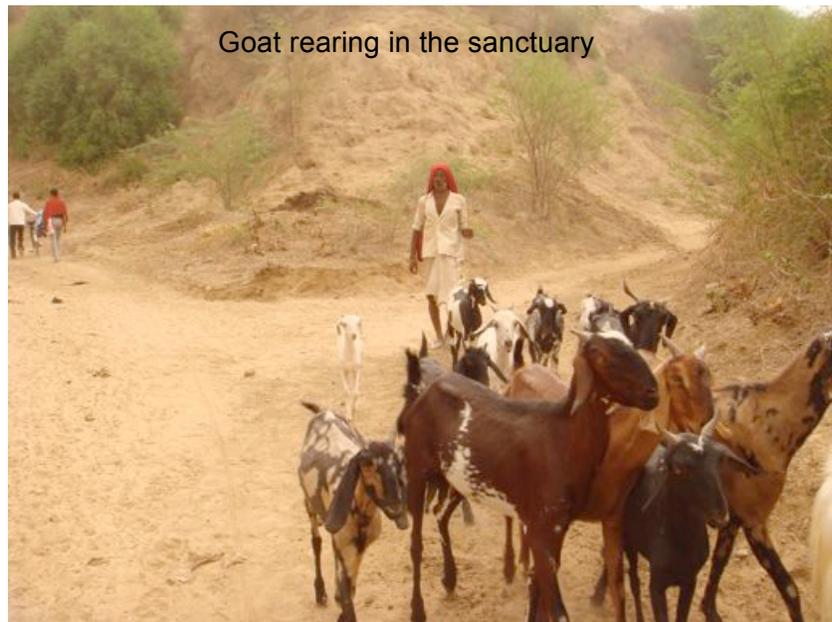
Agriculture and livestock rearing are primary occupations in the area. Other livelihoods undertaken to sustain and supplement incomes include fishing, sand collection and riparian agriculture. Below are some details about these livelihoods in the area:

❖ **Agriculture:** Agriculture is a difficult and relatively unproductive occupation in the region owing to the infertile soil and the unavailability of sufficient water for irrigation purposes. Agriculture is therefore mostly subsistent in nature, with very little of the produce being marketed locally. The main crops grown are wheat, grams, pearl millet, pigeon pea and to a lesser extent mustard. Most households reported the use of fertilizers such as urea and diammonium phosphate (DAP) and pesticides for agriculture, which adversely affect the river ecosystem.

❖ **Riparian agriculture:** River bank and island cultivation of cucurbits is done in the months from January through June. Such cultivation is considerably labour intensive as it involves watering several times a day due to the low water retention capacity of the sandy substrate. Cucumbers, watermelon, muskmelon, pumpkin and other vegetables are grown on the riverbank.

❖ **Fishing:** Any form of fishing in the sanctuary area is not allowed, however clandestine fishing is practiced occasionally. For instance, among the sample villages there are reports of clandestine fishing in Gopiyakhar. Fishing practices can cause pressures on the river fauna including the gharial and turtle populations. River reptiles can get snagged in the nylon set nets and drown. Turtles are sometimes inadvertently caught as by catch.

❖ **Cattle rearing:** In most villages, cattle rearing for milk is a



major livelihood. In few villages cattle is reared for meat. The milk yield is mostly sold locally. The *Capra hircus*, locally known as the *Jamnapari* breed of goat known for its

superior quality has been traditionally reared in the region but is gradually getting replaced by other (mostly hybrid) breeds; however overall goat rearing is more predominant as compared with poultry, cows, buffaloes and camels probably due to the favourable climate and demand of goatery products.

❖ **Sand-collection:** In the area, sand collection from the riverbank is being carried out and caters mostly to the local population's construction requirements. However, relatively few people in each village take this up as a livelihood as it involves considerable capital expense for sourcing camels used as pack animals for carrying the collected sand. Among the respondents in the sample villages, no one reported sand collection as a livelihood. Though subsistence sand collection may have limited impact on ecosystem but when done on known nesting grounds for good quality sand, it can directly impact the threatened oviparous species and their nesting upto a great extent.

A sustainable livelihood observed in the village of Gopiyakhar was traditional rope making from 'Kush' or 'Daab' (*Sacchurm species*) of grass grown locally. Currently one bundle of rope takes one day to make using a locally developed machine called the 'Ghirri' and can fetch Rs 50 for a bundle; however it is not sold but used by the households themselves. Another livelihood in the same village was 'durrie' making. It was also observed that pickle from the fruits of the medicinal and indigenous shrub Khair (*Capparis decidua*) locally known however it is not produced for commercial purposes.

The number of illegal activities to meet livelihood requirements is comparatively to a minimum in the village of Kheda Ajabsingh. While some sand collection has been reported from the village it is substantial and there is no fishing because it is a village with a 'high-caste' community. Fishing is considered an occupation for low castes and this is why it is not practiced in the village, Gopiyakhar on the other hand has a high 'Other Backward Classes'⁹ (OBC - a term of Government of India for the betterment and up-gradation of certain section of the society, which had been deprived in the past) population with 100% of respondents falling in this category and instances of clandestine fishing in this village are high.

Several respondents have job cards issued to the Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS) and work as wage labour with a rate of Rs 120/day for an average of 90 -100 days a year. Increasing populations of youth from the sample villages have been migrating to towns and cities for work because of a lack of livelihood options available in the village. Several households have members who move to big towns such as Delhi, Haryana and other places for a few months every year.

2.4. Natural Resource Base and Potential Threats to Ecosystem

The most important natural resource in the region is the Chambal River. Before it received, sanctuary status in 1979 in the state of Uttar Pradesh, the river provided water for agricultural and domestic purposes and its piscian fauna provided a source of livelihood for the fishing communities; the river bank also provides land for riparian agriculture and sand for construction purposes. After ceation of the PA, several of these activities were banned and

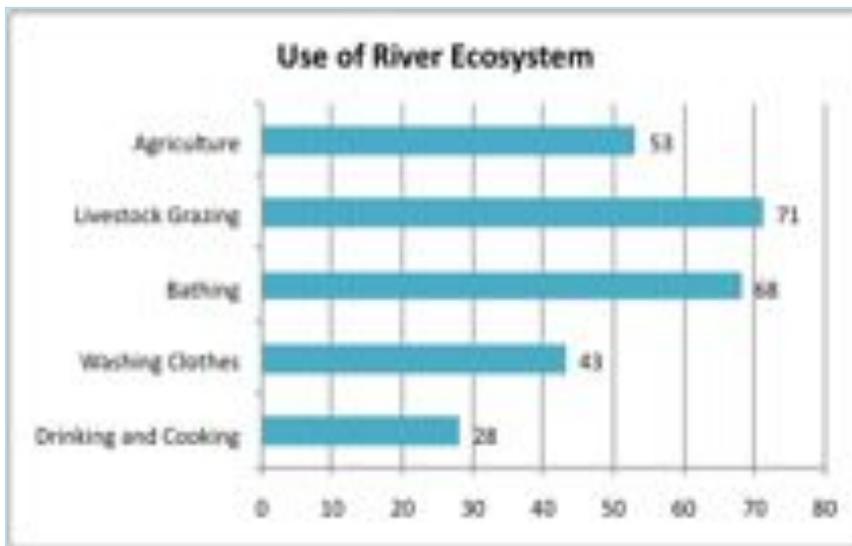


Figure 10 Use of River Ecosystem by Households

Figure 12 depicts the use of the river ecosystem by number of households in the sample villages. Out of 80 households surveyed, 71 households admitted to using the river ecosystem for livestock grazing and 68 HH use it for bathing. The river is also used for agriculture, washing clothes and for drinking and cooking to a lesser extent. The river bank is suitable for cultivation of cucurbits during the months of January to June. The water table is reportedly very low making it difficult to extract ground water for irrigation purposes and the extraction of river water for irrigation is not permitted. Moreover, the ground water is hard with significant levels of salts and minerals, and so, river water is mostly preferred for drinking purpose. The forest cover in the area, particularly in the buffer zone mostly consists of scrub forest and is dominated by an exotic species, mexican mesquite, *Prosopis juliflora*. This species is harvested and sold for use as fuel in brick kilns and other small industries.

The sanctuary has a unique landscape and the associated biodiversity may be considered to be a significant natural resource in the region, and one that provides several important

carried out illicitly now. Unlike most rivers in India, the water quality is good; however as per the qualitative observations of respondents as well as researchers working in the area, it seems to be deteriorating in recent years.

ecosystem services. Some of the perceived potential threats to the ecosystem are listed below:

❖ **Dependence on the river ecosystem**

There is a high degree of direct dependence on the river ecosystem for domestic and livelihood purposes. The survey in the sample villages revealed that on an average almost 90% respondents used the river ecosystem to graze livestock and 85% used it for bathing. About 65% of the respondents also used the river ecosystem for agriculture, in terms of water for their crops and riparian agriculture and livestock grazing. This high dependence on the river ecosystem has several detrimental consequences that are mentioned below.

❖ **Poaching and wildlife trafficking**

Poaching of crocodiles has not been reported. However, turtle and bird poaching by organized armed groups is known to occur occasionally in the area¹⁰.

Turtles and gharials often get caught in the fishing nets and are subsequently killed by the fishermen, mostly to avoid the effort and time that would be required in rescuing and releasing them back into the river. Unlike the gharials, the killed turtles are usually either discarded or processed to take out “calipee”d (outer cartilaginous rim derived from soft-shell turtles). The nylon gill nets that have found favour over the traditional fishing nets pose increased threats to the animals as it leads to more frequent inadvertent accidents with gharials and turtles.

Batagur turtle eggs are sometimes poached by villagers for consumption; especially during large community gatherings. Eggs unearthed during sand-mining are discarded and perish.

❖ **Habitat destruction**

Sand collection increases stress on gharial and turtle populations as the sand banks preferred by the animals as basking and egg laying sites are preferentially mined owing to the relatively superior quality of the sand found there.

The sanctuary vegetation, mostly the *Prosopis juliflora* growing on the bank and buffer zone, is regularly and illegally harvested for use as fuel in households and small industries.

❖ **Habitat disturbance**

As the cultivation season overlaps almost exactly with the breeding season of the gharial and turtles the sand banks used for cultivation are also the sites preferred by gharials and turtles for laying eggs and basking, habitat disturbance is a major problem.

Associated activities like bathing of cattle in the river impose considerable stress on the riverine fauna including the gharials. The village communities frequent the river regularly for conducting all day to day activities such as washing, bathing, drawing water and sand collection may contribute to continuous disturbances for the riverine fauna.

❖ **Impairment of river water quality**

The application of chemical fertilizers and pesticides during riverbank cultivation may contribute to the pollution of the river. Effluent discharge from industries and sewage discharge in the Yamuna upstream to its confluence with the Chambal leads to significant levels of pollution in the buffer zone and part of extreme lower Chambal. The animals washed downstream by the monsoon flow to locations near the confluence may thus be exposed to higher levels of pollution (Rainwater and Singh, 2009; Singh et al, 2011).

Washing and bathing by the village communities in the river with chemical cleaning agents also contribute to riverine pollution. For the past few years limited water discharge was observed from dams situated in upper section of the river and this may worsen the situation in terms of accumulation of silt, toxics and waste products along certain sections. This may change the habitat attributes of the riverine fauna.

Low water itself can cause direct negative impacts on nest and nesting ground by allowing local residents and predators to access through the main channel.

2.5. Infrastructural Capital

In keeping with the poor socio-economic status of the study villages, the status of infrastructure capital available was also observed to be lacking in most contexts. As was seen from Figure 3, most of the houses in the village are kuccha or semi pukka (earthen or semi masonry). In the context of this study and future livelihood related interventions that may be introduced in the region, a significant aspect would be the availability of market for whatever products may be generated through the alternative livelihoods. Easy access to markets that are located at not too great distances from the village will help in the establishment of market

linkages. On the other hand, some products may be ideally suited for sale locally within the villages.

Within the sample villages, *Bacchedi* is the only village with a school that is within the village. In the villages of *Gopiyakhar* the only valued infrastructure that exists is a hand pump. The village of *Nadgawa* has a health centre. In terms of livelihoods, infrastructure is severely lacking – the kind of infrastructure that could add value to livelihoods in the villages include oil expelling units, milk chilling units, broilers, infrastructure that can accommodate small businesses such as tailoring units, bakery, *dhabas* (roadside restaurant) etc.



2.6. Institutional Systems

The questionnaire survey in the study villages included questions on the existence in the study villages of any community institutions such as self help groups or common interest groups as such groups often provide a suitable starting point for the initiation of livelihood oriented training or mobilization activities. However, the survey revealed that the concept of such community institutions is fairly unknown amongst the people in the study villages. Even in the few instances where common interest groups had been formed, such as for savings or for running dairy operations on a cooperative basis (in Barolli), the experience had been less than favourable and the groups had naturally disintegrated. Not a single women group was reported in any of the study villages.

Apart from Turtle Survival Alliance, there is one other NGO that works on pollution control activities and awareness generation among communities in the area called Peace Foundation. An increase in the number of Civil Society Organisations and Community Based Organisations may be crucial in the area for capacity building among the communities.



2.7. Government Schemes

Any alternative livelihood generating intervention targeted at disengaging people in the region from existing livelihoods having negative impact on the Chambal riverine ecosystem would have to be on scale to achieve its desired impact in terms of reduced anthropogenic pressures on the ecosystem. While pilot interventions may be undertaken for demonstrations purposes, for livelihood interventions on such a scale it would be necessary to avail of government schemes and programmes aimed at generating livelihoods or promoting enterprises.

The **Department of Horticulture** in Etawah has a **Food Preservation Unit** that gives trainings on a seasonal basis on **Food processing** – The trainings range from 7 and 15 days to 100 days. The trainings include makings of jams, pickles, dehydrated fruit as well as bakery and cookery. The cost of the trainings is Rs 35 per head. The trainings take place between the months of April and August and are usually advertised in the newspaper. Since, very few members of the community read newspapers, a mechanism to pass on such information is important.

The **Department of Agriculture** has a scheme for soil testing and a subsidy for establishing **Vermicomposting Pits**. A regular pit with the dimension of 30m x 8m costs Rs 60000 and the department provides a subsidy of Rs 30000. The establishment of vermicompost pits is a crucial intervention for manure management as well as to reduce the amount of chemical fertilizers that are currently used in the sample villages. Currently, there is no vermicomposting being practiced in any of the sample villages.

Some of the government schemes that hold promise are **Swarnjayanti Gram Swarozgar Yojna** (SGSY) and **Ambedkar Vishesh Rojgar Yojna** (AVRY). While the nature of agri-based activities and enterprises that are supported under SGSY is eminently suitable for the region as they are primarily agriculture based economies, the relatively modern and diverse enterprises and trainings supported under AVRY would possibly find a better connect with the youth, very few of whom are interested in continuing with the less profitable agricultural livelihoods.



3. Summary of Project Progression

3.1. Selection of Villages

Based on the situational analysis and response from the communities, two villages out of five were shortlisted to initiate demo livelihood models. The villages shortlisted for demonstration of livelihood models were *Gopiyakhar* and *Bacchedi* and a summary of reason for selecting these villages are provided below:

Gopiyakhar

The village of *Gopiyakhar* is the most socio-economically backward village among the sample villages with the lowest per capita income, dismal rates of education and a lack of access to electricity. However, it is also the only village among the sample villages where the community possesses some traditional skill – that of rope making and durrie making. Currently one bundle of rope takes one day to make using a locally developed machine called the ‘Ghirri’ and can fetch Rs 50 for a bundle. The rope that is made in the village is not commercially sold, it is used within the village to make ‘*khatias*’ (wooden cots) and stools. This skill has the potential to be further developed. *Gopiyakhar* is also the only village where fishing is a dominant livelihood, in terms of conservation it lies close to the Yamuna Chambal confluence and during the monsoon months Gharials as well as other aquatic animals move out of the sanctuary limit and are often found in the Yamuna river on the banks of which this village is located. During discussions with forest department and other government officials, the need for interventions in *Gopiyakhar* to reduce illegal fishing was reiterated and thus, this village was considered a priority.

Bacchedi

The village of *Bacchedi* was selected predominantly because of the interest shown by the community to take up alternative livelihoods. The level of infrastructure and socio economic status in this village is better than the other villages and the set up of any enterprises is most likely to succeed in this village mainly because of the better status of education among its people, especially the women. The village of *Bacchedi* has been notorious for deforestation and wood trafficking within the PA for the use of local brick kilns and glass factories. Natural resource based livelihood models such as kitchen gardens, agroforestry as well as awareness generation need to be taken up to demonstrate the value of ecosystem services in order to reduce instances of wood trafficking.

Kheda Ajabsingh was chosen for the survey as a reference village because of fewer conservation challenges – there is no illegal fishing or sand collection that takes place in the village. The village of *Nadgawa* and *Barolli* are however crucial villages in the context of conservation, since they are located in critical Gharial and turtle habitat and sand collection and riverbed agriculture that is practiced in these villages disturbs the populations and activities of threatened aquatic species. Additionally, in *Nadgawa*, the use of chemical fertilizers may impair the water quality in the said section in long term.

Unfortunately, the response from the community in *Nadgawa* was unfavorable and they seem to view any conservation initiatives as a threat. The team from DA and TSA received an unenthusiastic response from the community so the village was dropped for testing of pilot livelihood interventions.



3.2. Livelihood Pilot

Livelihood Opportunities Shortlisted

The economy in the project area is predominantly agrarian, however the lack of water available for irrigation makes agriculture less productive and other activities are taken up by riparian communities to supplement incomes. These as mentioned in the report are usually illicit activities such as fishing, sand collection and selling of *Prosopis juliflora* wood. Dependence on these livelihoods, especially in the sanctuary area causes livelihood insecurity for the communities and has deleterious effects on the riverine ecosystems and associate wildlife and riparian forests. .

Some of the potential livelihood options that came up during stakeholder consultations were goat rearing, poultry farming, pisci-culture, food processing, kitchen gardening, high value horticulture, cultivation of medicinal plants, growing leguminous fodder and grasses to support larger cattle population, compost making, paper bag making, jewellery making, rope and durrie making. Some of these activities are capital intensive and could not be included in the scope of the pilot – these include goat rearing, fish farming (pisci-culture) and poultry units. Based on consultations with local government institutions (Chapter 3.7), it was found that there are few support systems for livelihoods apart from the usual government schemes of MNREGS and SGSY. There is some support from the Department of Horticulture for Vermicomposting and for food preservation.

Based on the marginalised socio-economic status of the villages, the most important factor for the pilot demonstration of livelihood activities was considered to enable immediate income generation and reduction of dependence on natural resources. Thus, four simple cost effective livelihood options were selected – artificial jewellery making, paper bag making, refining rope products and food processing.



Durrie made from rags in Gopiyakhar Village

Multistakeholder Workshops

A team from TSA and Development Alternatives (DA) carried out a series of multi-stakeholder meetings and workshops from the 3rd to 6th of January, 2012 in order to freeze the pilot livelihoods that could be undertaken to demonstrate alternatives to the community and increase their confidence to undertake alternatives.

The livelihood options that emerged for *Gopiyakhar* from the workshop were – handicrafts from rope, artificial jewellery making and paper bag making. Of these most interest was displayed at the workshop in Handicrafts from Rope and artificial jewellery making. During the workshop, members from *Gopiyakhar* displayed some of the products they had made and designed from rope such as *khatias* (cot made up from wood and rope), stools and toys and mats made from rags.



Participatory Livelihoods Assessment Technique (PLAT)

In the workshop at *Bacheddi*, respondents were most interested in artificial jewellery and paper bag making. Some of the other trainings they requested were pickle making and ‘agarbatti’ or incense stick making.

In addition to the livelihood options that can be used to increase incomes, DA and TSA envisage that certain activities that can have an immediate impact and demonstrate reduced dependence on the riverine and forest ecosystem

such as Kitchen Gardens should be taken up. In this regard, during the workshop – the participants were asked the benefits of a kitchen garden and they responded with the following benefits – ‘Saves Water’, ‘Saves money’, ‘Makes healthy vegetables available’.

Volunteers who would like to set up a kitchen garden registered their names for assistance in establishing a kitchen garden.

To facilitate the livelihood processes and take the initiative to the next stage, a series of meetings were also undertaken with the Department of Agriculture, Department of Horticulture, Food Processing division (Department of Horticulture), District Industries Commissioner (DIC), Forest Department and TARA Livelihood Academy.

Through the DIC a meeting was organised with a local NGO – *Jan Kalyan Sewa Sansthan* who is working in collaboration with the textile department to organise trainings in artificial jewellery making. Links with the organisation were strengthened and local trainers were sourced from the organisation to take the training forward.

The rope from Gopiyakhar was found to be of poor quality for making handicrafts and thus no trainers were ready to work to impart that skill to the villagers. Thus, artificial jewellery was selected as a livelihood option for both villages. Depending on the kind of raw materials used and designs put in place, artificial jewellery is being made and displayed at certain locations and green shops for sale along with the message. However sustained local and urban market for such products still need to be established in next phase of the project.

Community Response and Commitment

In both the villages of Gopiyakhar and Bachhedi, the response improved as the project progressed, with the village mobilizing to participate in the focus group discussions, and stakeholder workshops. 20 volunteers from both villages signed up for the trainings and there was interest displayed from neighboring villages to undertake similar activities. The response of women to training in artificial jewellery making as compared to men was far better. Since this was the case, a time and location most convenient to women was selected for the trainings that were carried out for ten days.



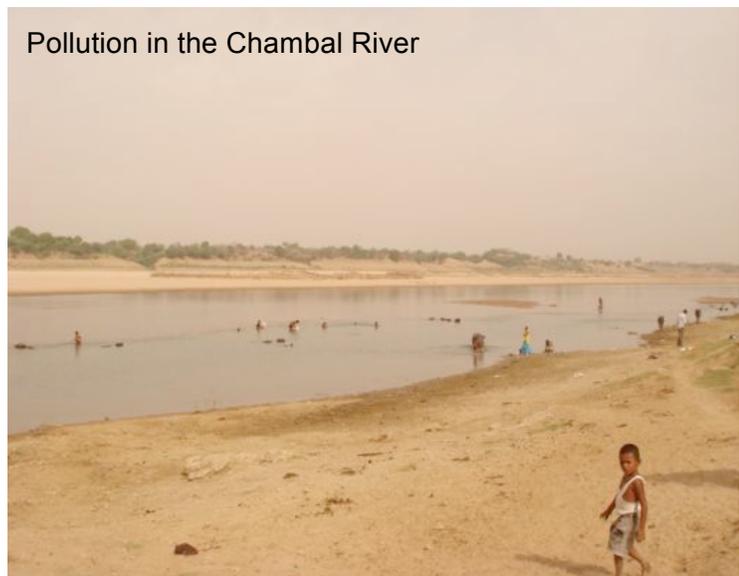
4. Key Findings

Socio-Economic Status

The five sample villages of *Gopiyakhar*, *Nadgawa*, *Barolli*, *Kheda Ajabsingh* and *Bacchedi*, are socio-economically marginalised considering the indicators of education, income, infrastructure, housing composition and access to electricity (except Nadgawa). Among the sample villages, according to the socio-economic indicators Gopiyakhar clearly has the poorest status with the lowest per capita income, dismal rates of education and a lack of access to electricity. Bachhedi has the best status with considerably higher per capita income, better status in terms of education with the most number of graduates and educated females and least percentage of uneducated people. People in this village also have higher landholdings and access to electricity.

Ecosystem Assessment

In the sanctuary, the ravined topography, infertile soil and lack of water restrict the productivity of agriculture and other related livelihoods and increase the dependence of communities on the riverine ecosystem for activities such as fishing, sand collection, and riverbed ariculture. These are having a negative impact on the river ecosystem that



Pollution in the Chambal River

is the habitat of endangered Gharials as well as various rare turtle and bird species.

The forest cover in the area, particularly in the buffer zone mostly consists of scrub forest and is dominated by *Prosopis juliflora*. This species is regularly harvested and sold for use as fuel – however this is illegal in the sanctuary area.

Some of the grass species (*Sacchurm species*) commonly locally known as 'Daab' are used for making ropes. A medicinal plant locally known as 'Eak' used for stomach ailments and *Capparis decidua* a medicinal shrub whose fruits are used to make pickle is among the natural vegetation of the area.

Livelihoods

In the pilot villages agriculture and livestock rearing are the predominant livelihoods and fishing, sand mining, lopping and selling of wood also occur occasionally. Except for the village of *Bacchedi*, land holdings in the other villages are few, and the villagers work as hired labourers on other agriculture farms or under labour for the NREGS.

Apart from the village of *Gopiyakhar* where locals make rope from a local variety of grass (*Sacchurm*) species and durries from cloth rags, no other traditional skills were revealed during the survey.

Livelihood Opportunities

With the right kind of capital investment combined with awareness generation and capacity building there are certain livelihood activities that could prove lucrative and can be scaled up – one of them is goat rearing. Goat meat and other products – *milk, cheese etc.* fetches a good price all over the country. In the region the number of goats held by a household and milk production can be increased with the provision of good quality fodder and leguminous grasses. To reduce ecological pressures on the ecosystem caused by open grazing, and congregation of cattle along the sandbank especially during spring, cattle especially goats can be stall-fed. All the villages were keen on increasing their number of goats; additionally this will also ensure the conservation of an indigenous goat species the – *Jamunapari*.

Thus, another area of intervention that could create livelihoods is the planting of indigenous leguminous fodder and grass species. High value horticulture and agro forestry models permissible in the sanctuary area are also an option. Trees of amla (*Phyllanthus emblica*), ber (*Zizyphus mauritiana Lamk*) and bel (*Aegle mermelos*), cultivation of medicinal plants like neem (*Azadirachta indica*) and *Aloe vera*.

There are a variety of medicinal plants that can be productized and ensure *in-situ* conservation of these species. The fruit of the medicinal shrub *Capparis decidua* can be used to make pickle at a commercial



scale. This pickle is already made locally in households and with training in food processing and quality control – it can provide a good source of income and a sustainable livelihood option. To reduce the use of chemical fertilizers and improve agriculture productivity, the production of farmyard manure – NADEP Compost and Vermicompost could be a livelihood option because of the abundant availability of manure that is currently not being managed.

Pisci-culture that does not disturb Gharial habitat was another capital-intensive livelihood option that could prove lucrative, the scope of pond construction could be considered through the MNREGS scheme.

Artificial jewellery is one opportunity that has been put in place and has the potential to be scaled up because it can be marketed locally as well as in niche markets in cities.

Challenges

There is a set of challenges in the region that exist and need to be overcome for the successful scale up of interventions to improve livelihood security. The primary challenge in the area is the marginalised socio-economic status due to minimal literacy, limited access to electricity and poor institutional development. There are no community-based institutions such as self help groups. The NGO's that do exist require significant capacity building and more funding to upscale their initiatives in the area – In the absence of these, several villagers are unaware of their rights, entitlements etc. that could improve their socio-economic status. Etawah is the closest district headquarters to the intervention villages. The government support systems in Etawah are comparatively frail and the PA villages and their inhabitants do not receive any special attention or incentives from the government against culling of their rights.

There is also a need to develop supply chains for products and services that can be offered by the communities in the area. Currently, there is no central point where products can accumulate from the scattered villages in order to access bigger markets such as Gwalior, Kanpur, Agra and Delhi.

Finally, it needs to be ensured that any livelihood interventions in the sanctuary do not have a negative ecological impact in the short or long term. For instance, there should be no increase in the amount of solid waste, pollution etc. in the region. Additionally, no local natural resources should be over exploited – in fact the challenge is to enable the regeneration of the resource base and conservation of ecological diversity while ensuring livelihood security and diversification.

5. Way Forward

The team from Development Alternatives (DA) and Turtle Survival Alliance (TSA) has been building links in five pilot villages to initiate a long-term collaboration to strengthen the sustainability of livelihoods and improve the socio-economic status of the communities, while ensuring that the riverine ecosystem is protected. The first step was building confidence and enabling income generation while reducing dependence on the ecosystem. This was done through a pilot demonstration of artificial jewellery making.

Additionally, based on multistakeholder workshops and in consultation with livelihood experts few sustainable livelihood options have been identified for communities in the area. These as mentioned in the report include pickle making, compost making, high value horticulture, cultivation of medicinal plants, growing of leguminous fodder and grasses to support larger cattle population (especially goats) *and* value addition to rope and *durries* that are already being made in the village of *Gopiyakhar*.

To ensure the successful uptake of these livelihoods a systematic approach is required. Successful demonstration of these livelihoods combined with awareness generation on the importance of reducing pressures on the ecosystem is essential. Additionally, market linkages need to be strengthened and supply chains developed to ensure sustainability and economic viability. To achieve these goals, DA and TSA envisage the establishment of a resource centre for conservation-linked livelihoods. Such a resource centre would not only provide a space for demonstration, but also act as a collection point for products and services being provided by riparian communities in the National Chambal Sanctuary and thus act as a crucial point in the supply chain.

The process has been initiated with a centre in the village of Gharihita that has been set up by TSA, that is working towards increasing awareness among the youth and communities on the value of the riverine ecosystem and importance of its conservation. The centre can now be used to increase awareness on conservation – livelihood linkages, demonstration of sustainable livelihoods and facilitate improved access to government schemes for related activities.



Development Alternatives (DA) has been providing sustainable livelihood eco solutions for thirty years. Ever since its inception in 1982, DA has acted as a research and action organisation, designing and delivering eco-solutions for the poor and the marginalised.

With a deep understanding of the rural market and a strong presence in the Indian heartland, its existence has been a credible and visible one – nationally and internationally – in addressing poverty challenges in a climate-sensitive environment. A pioneer in sustainable development and the first social enterprise in India, DA realised the necessity of establishing several associated organisations working toward distinct goals that converge on the unified ambition of regenerating the environment and creating large-scale sustainable livelihoods. www.devalt.org



The Turtle Survival Alliance (TSA) was formed in 2001 as an World Conservation Union (IUCN) partnership for sustainable captive management of freshwater turtles and tortoises. TSA mission is transforming passion for turtles into effective conservation action through a global network of living collections and recovery programs.

Today, the TSA is an action-oriented global partnership work around the world, focusing on species that are ranked Critically Endangered by the IUCN Red List, or that are at a high risk of extinction. For maximum impact and effectiveness the TSA develops programs in turtle diversity hotspots around the world. In India, TSA has been operating on a number of turtle and sympatric species conservation, research and community outreach projects in partnership with MCBT and other various reputed government and non-government institution along various ecological locations since 2004. www.turtlesurvival.org, www.turtlesurvival.in



The Gharial Conservation Alliance (GCA) is an international network of individuals in a variety of disciplines, who are dedicated to saving gharials from extinction and ensuring the establishment of sustainable wild populations. Conservation efforts of the GCA range from scientific population surveys, captive breeding and wild restocking programs, to education, awareness, and government lobbying. Several international zoos have become major players in gharial conservation through

public education, awareness activities, and fundraising campaigns.

The GCA seeks to determine the status of the gharial (*Gavialis gangeticus*) throughout its range, identify the threats to the species, and to establish conservation programs to ensure the gharial's survival into the future. Currently GCA functions as a project of reputed Madras Crocodile Bank Trust/Centre for Herpetology and steers a very important Gharial Telemetry Project to know more about the ecology of the species along lower Chambal. www.gharialconservation.org, madrascrocodilebank.org

