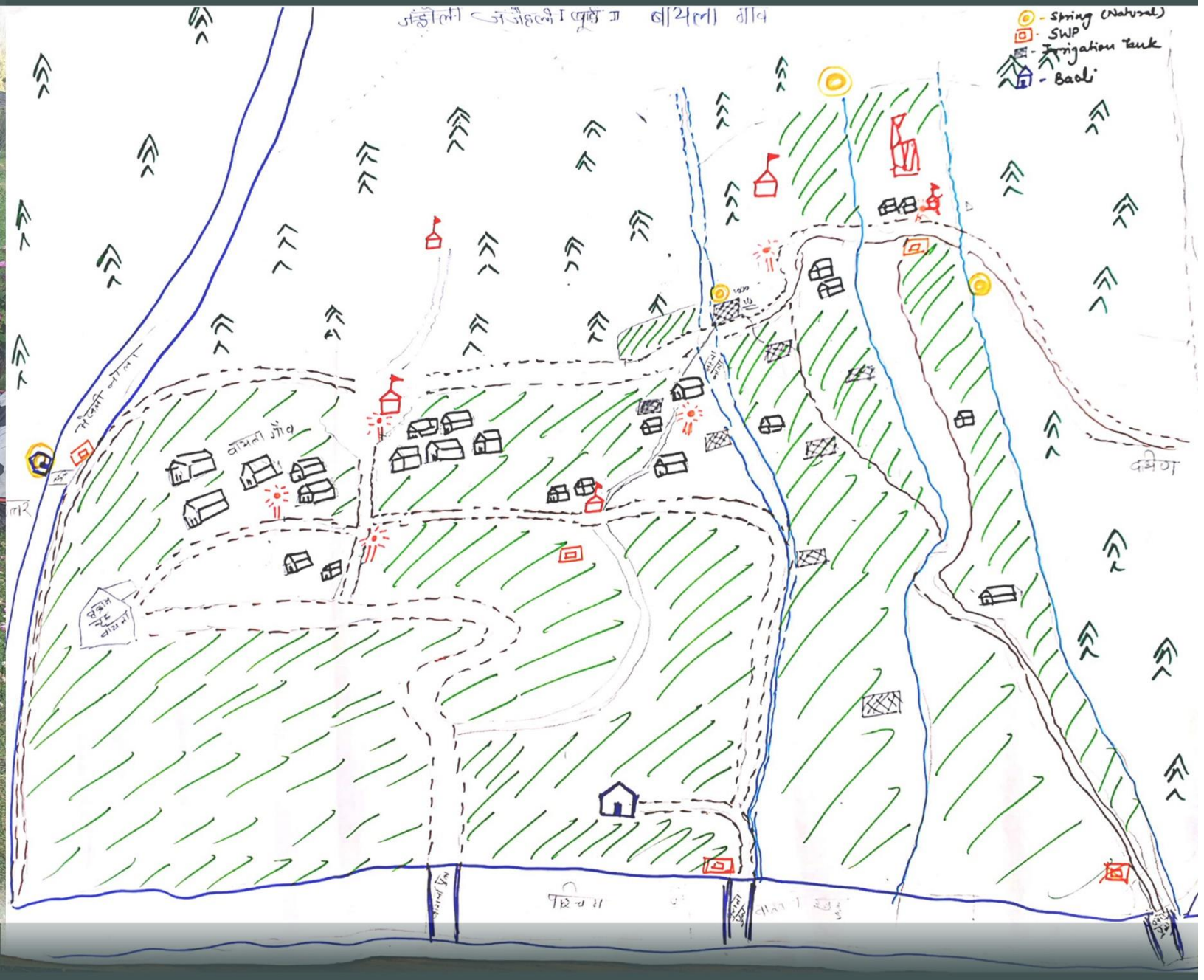
"Eco-Village Development Plan" of Janjehli (Bayla), District Mandi, Himachal Pradesh



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The Study Team

CTRAN Consulting

Eco-Village Development Plan

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INTRODUCTION

"When it comes to the north Indian destination, Shimla is the most favored choice among the tourists. But 200 km north of Himachal Pradesh's capital lies the valley of Janjehli, in the Mandi district. This picturesque place can be as distant as possible from Shimla when it comes to tranquility and peace.

At a height of 2,200m, Janjehli is one of the rather unexplored territories and the terrain has a lot to do with it. Reaching the place can be an arduous job and it is definitely not for the faint-hearted. But once you reach the spot, it's sheer heaven."- India Today, Scaling the mighty hills of Janjheli, August 23, 2015.

"Janjehli valley is a Beautiful Hilly & Green area with full of nature beauty Situated at a height of 2150 meters. This place is about 70km far from Mandi town. Janjehli valley is under Thunag Tehsil of Mandi District and is 13 km from main Thunag area. Near to Janjehli Valley is Bulah, an open, Green ground with lush green meadows and full of natural beauty." – hpmandi.com, Janjehli Valley - A Virtual Paradise On Earth.

The relatively untouched and preserved nature of Janjehli, specifically Bayla village within it, represents both a challenge and an opportunity.

FIGURE 1 JANJEHLI VALLEY

The challenge in this location lies in terms of conservation of the site with regard to the extensive movement of tourists along the road to Shikari Mata.

"Shikari Devi temple is about 18 Kms from Janjehli and connected by a jeepable Forest road. It is situated at an altitude of 3359 Mtr. Thick forests on the way to Shikari peak are amazing. Being the highest peak of Mandi District, it is also called Crown of Mandi. Vast green pastures, captivating sunrise and sunset, panoramic view of snow ranges make this place favorite to nature lovers. The place receives a lot of snow during winters. The place can be approached from Karsog which is just 21 Kms from Shikari Devi." – hpmandi.nic.in, Janjehli - Shikari Devi Temple.

The efforts of conservation of natural surroundings is also required in terms of resilience and adaptation with regard to implications of climate change.

The opportunity of the location can be rationalized with consideration of its currently untapped tourism (eco-tourism) potential of the location with limited rest house and homestays available. Such an opportunity represents potential for the locals to generate additional income to their current cropping and plantation earning and well as create alternate livelihood opportunities for the area.

BACKGROUND

Himachal Pradesh is a mountainous state in Himalayan region. Around 90% of the population resides in rural areas and are dependent on natural resources for agricultural purposes. Global environmental changes are threatening the natural resources, thus pose a great threat to the livelihood of rural population. The Eco Village Concept under the scheme by Department of Environment, Science and Technology, Govt. of Himachal Pradesh aims to develop an environmentally sustainable model village. The programme endeavors to sustain prosperity in villages that is built around sustainable use of the key natural resources of a village, through the adoption of low-impact practices that result in water security, food security and livelihood security for the village communities. These ecofriendly villages will be developed with support of villagers and shall aim to reduce the ecological footprint by as much as 50% of the base assessment from launch of the scheme. It aims to create new means to build climate resilient village communities. It will focus on development of environmentally responsible practices in areas of sustainable agriculture, water management, waste management, energy conservation, management of natural resources, climate change action and livelihoods.

OBJECTIVE

The main objective of this engagement is to assist the local authorities in the identified villages in the following aspects:

(a) Designing the Eco-village Development Plan with concrete activities (as per the notified guidelines) in a participative manner

(b) Support the implementation of the scheme providing guidance on change in vulnerability and other agreed indicators every quarter during the life cycle of the project and document bets practices, barriers, lesson learning and policy briefs based on scientifically obtained micro-level data.

PROJECT LOCATION

TABLE 1 PROJECT LOCATION

State	Himachal Pradesh
District	Mandi
Block	Seraj
Panchayat	Janjehli Panchayat
Village	Janjehli-I (Baila)

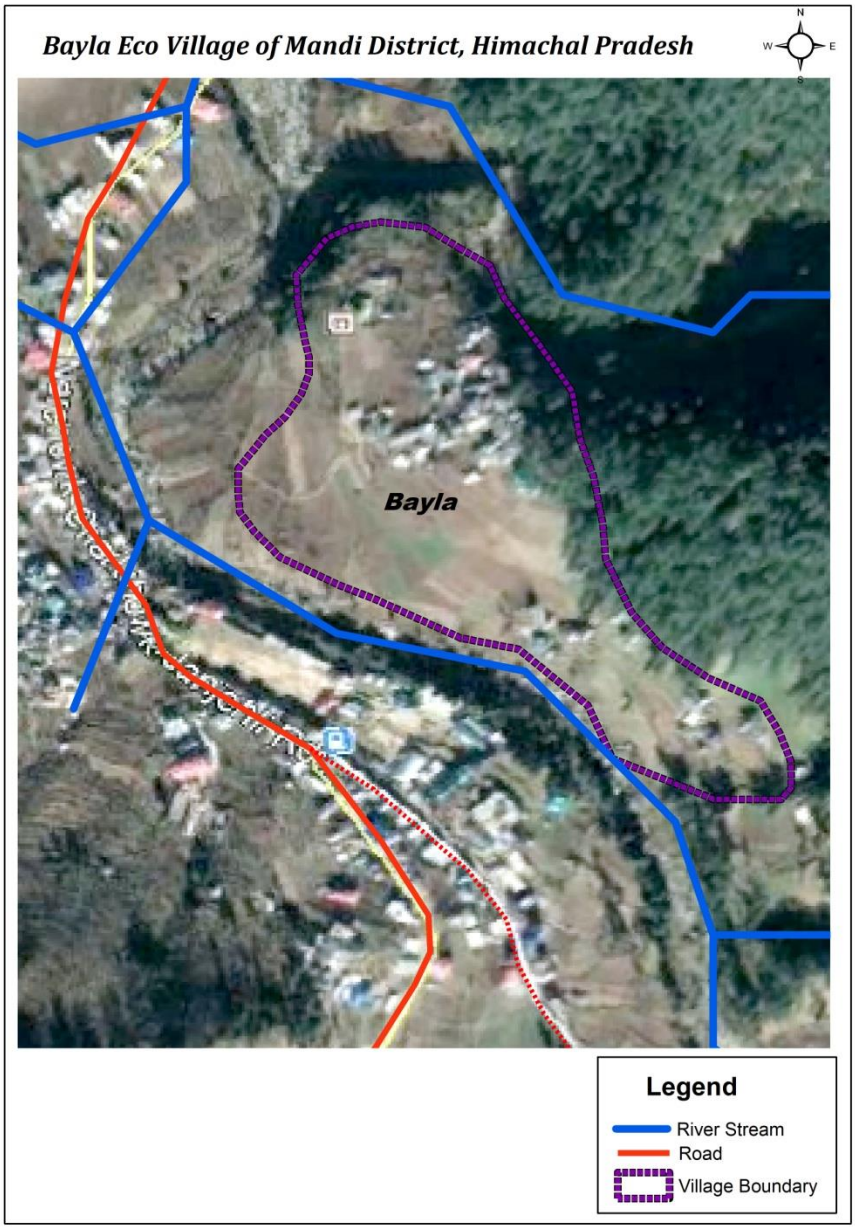


FIGURE 2 LOCATION OF BAYLA ECO VILLAGE IN JANJEHLI PANCHAYAT

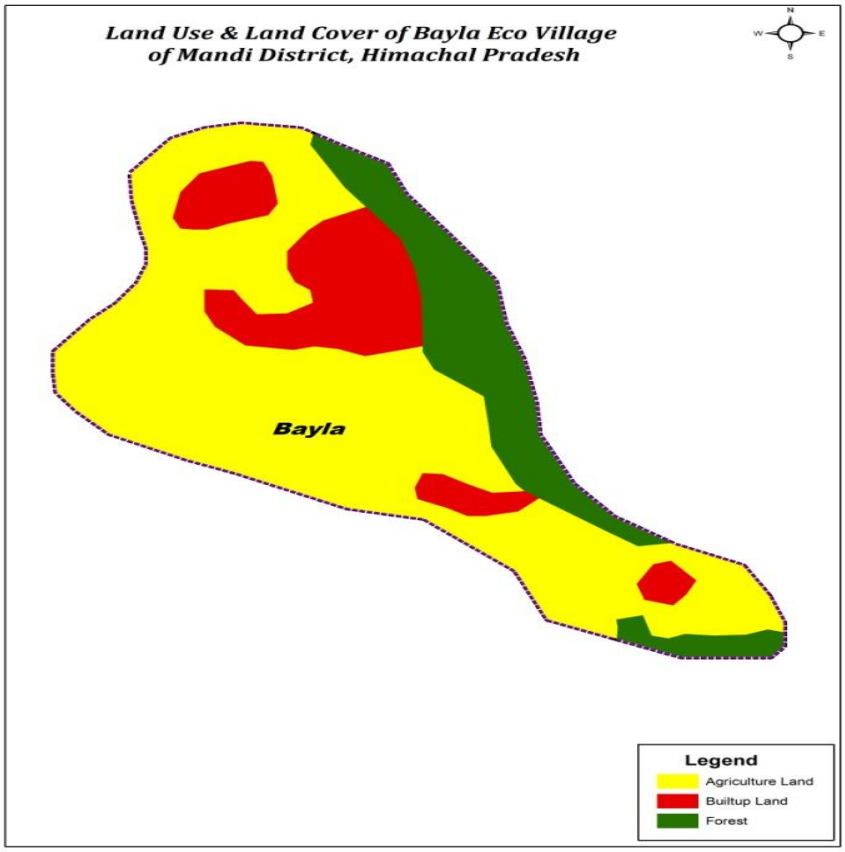


FIGURE 3 LAND USE AND LAND COVER OF BAYLA ECO VILLAGE OF MANDI, HIMACHAL PRADESH

The proposed eco village i.e. Bayla is present on the right banks of the Bekhli Khad which is marked by the road on the opposite site that directly leads to Thunag, Mata Shikari Temple as well as Shimla from Mandi and/or Sundar Nagar.

FIGURE 4 AERIAL VIEW - JANJEHLI

How to reach Janjehli

- Reaching by Bus
    - Mandi – Janjehli (96 Km)
    - Shimla—Janjehli (139 Km)
- Driving from major nearest cities
    - Shimla to Janjehli, the distance is 139 kms
    - Manali to Janjehli, the distance is 166 kms
    - Delhi to Janjehli, the distance is 481 kms
- Reaching by Train
    - *Chandigarh Railway Station (CDG)* is the nearest major railway station. (250 Kms)
- Reaching by Air

- *Chandigarh Airport (IXC)* is the nearest major international airport. (250 Kms)

History

Janjehli panchayat was formed in 1964 as a single panchayat. This single panchayat was later broken up into 7 smaller panchayats. Now currently there 5 villages with 5 wards in panchayats out of which 2 are residential, namely Janjehli and Bekhli (Revenue Villages). Janjehli revenue village has 8 sub villages.

Historical linkage of the village is evident from the presence of Sacred Village Shrine (Narayan Temple) near the sacred groves which were characteristically marked by the presence of the oldest still standing Deodar trees in the near-distant area.

Demography

As per Panchayat records, the village displays a female positive sex ratio with a nearly even breakup of the resident population of 251 individuals for the Bayla village. The individuals resided in a total of 69 households through the village. Male population constitutes 47.8% (120 Nos) of the total population while females constitute 52.2% (131 Nos) of the total population.

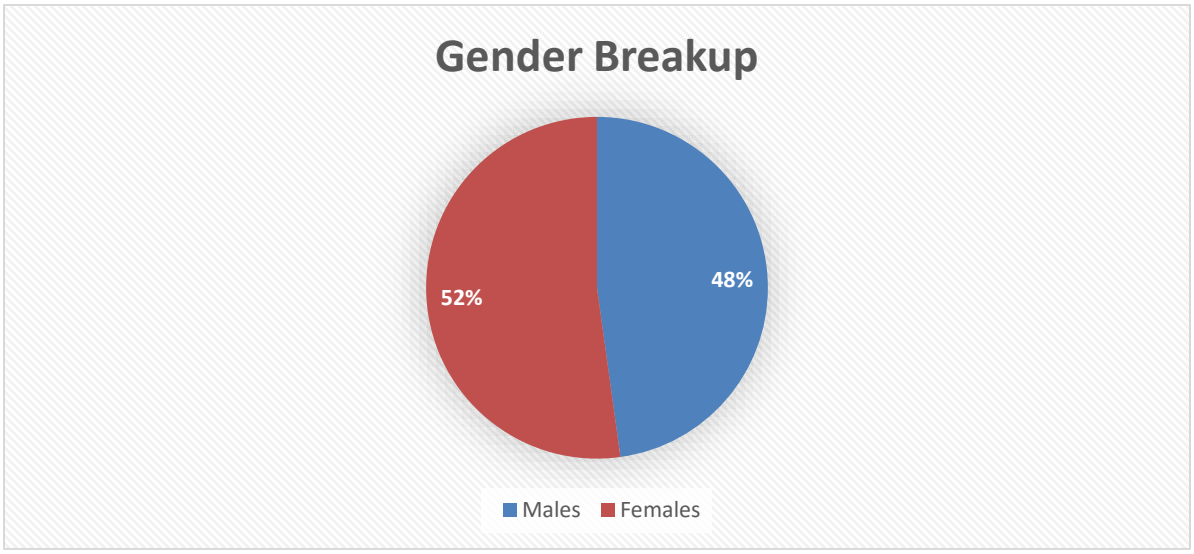


FIGURE 5 GENDER BREAKUP OF POPULATION IN BAYLA VILLAGE

Social Composition

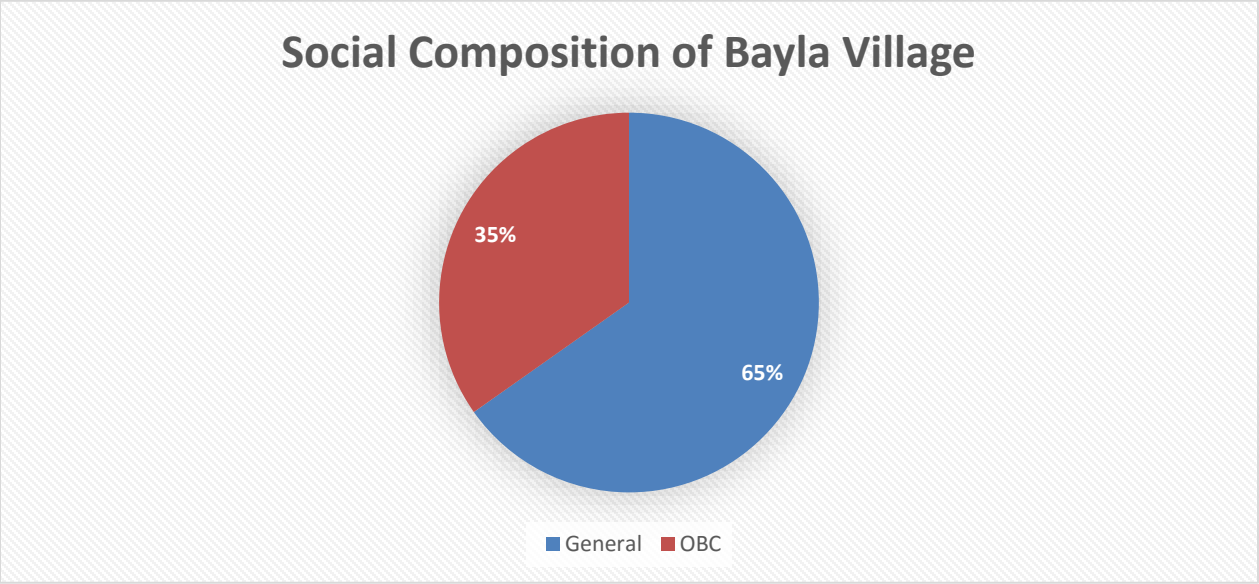


FIGURE 6 SOCIAL COMPOSITION OF BAYLA VILLAGE

Off the 69 Households present overall in the village, (45 households out of 69 households) 65% of the total belongs to the General caste. Whereas, the remaining 24 households i.e. 35% of the total households belongs to Other Backward Castes (OBCs).

There are 19 households or 27.53% of the total 69 households belonging to families living under the poverty line (BPL). Out of these, 12 or 79% belong to families from general castes whereas the remaining 7 or 21% belong to OBC families.

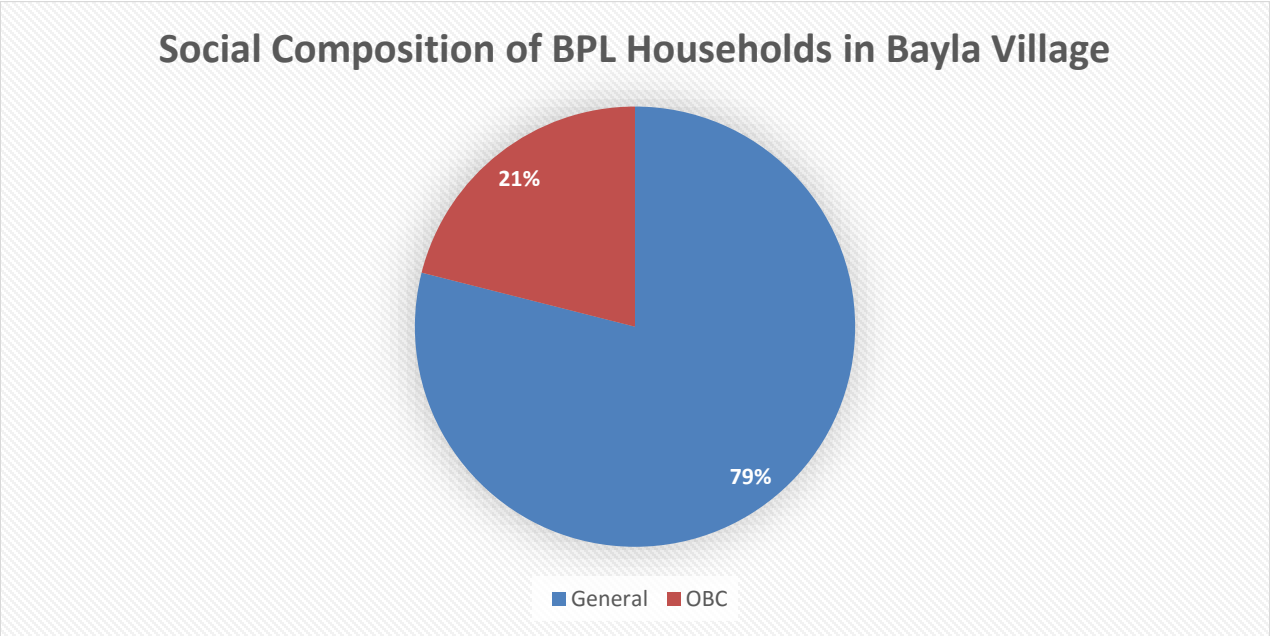


FIGURE 7 SOCIAL COMPOSITION OF BPL HOUSEHOLDS IN BAYLA VILLAGE

Approach for the given Tasks

Task I

- **Develop Eco-village Development Plan for one identified village—Village *Janjehli* in Mandi district**

The Eco-Village Development Plan aims to regenerate the natural environments, preserve cultural heritage, increase social resilience and improve livelihoods. An eco-village development plan is a function of the ambition of the stakeholders and accordingly rigor, resources and regulation (voluntary and mandatory) are determined.

Formation of an Eco village development plan initiated with a baseline study in the selected village for identification of existing legal and regulatory frameworks, outlining initiatives government could take for an enabling environment. Community interaction initiated the participation of community and other stakeholders.

Bio-physical parameters estimated (precipitation and temperature) from the state stations at the block scale or estimated from the IMD GRID for 63 years (up to 2013).

- Future climate projections (modelled output) upto mid-century under relevant scenario
- Risk and return periods (based on the risk/multi-hazard maps) if not available recall method
- Forest cover from relevant Grids (current and future)
- Biodiversity register from the village if available
- Baseline emission from the village

Tools used: Multivariate analysis and Participatory Vulnerability analysis at the village scale, PRA tools, FGD.

- *Community level resource mapping and vulnerability assessment using participatory tools like PRA, FGD etc. to understand the baseline climatic trends and its impact on the life and livelihood of communities and natural resources in the two villages*

Development of Plan is facilitated by allowing local stakeholders to identify assets, needs and leverage points for the community.

- Key informant interview on past experience and impact (past, near term, future) using picto-gram, story board techniques
- Using the modeled output (block scale) for village level interpolation.
- Socio-economic impact (future projection for a longer term may not be feasible at the village scale)
- A future vision of the community for their eco-village (movement from current to a desirable future)

Tools: Modelled output, force field analysis technique, future search visioning technique with community

- *Identification of the current and potential impacts of climate change and resource depletion on the ongoing activities and the life and livelihood of the communities in the selected village through corroboration of scientific and community level findings*

Along with the secondary level data findings and stakeholder consultation at district, block and village level helped in understanding current impacts on the natural resources and livelihoods of the communities in selected villages.

- Transect walk through the village for identification of existing natural resources and their depletion.
- FGD with old villagers for understanding the impact
- Stakeholder Consultation
  - *Developing a list of strategies to addresses environmental, climate change and resource depletion related challenges in line with the guidelines for Eco-village Scheme notified by the State Government available Review of the current government development programmes/ schemes that are ongoing in the identified district with focus on addressing identified challenges related to climate change, resources depletion and other environmental issues.*

The guidelines highlight environmental issues in rural areas of Himachal Pradesh. Sector wise tools and strategies proposed are:

Climate stressor on sectors	Tools used to Observed/Modelled impact outputs	Strategy/Activity	Available resources
Water	From baseline survey	Spring-shed rejuvenation	Financial resources (current and projected) Skills/capacity Research available (if that can be used)
Climate change	From V&A study, SAPCC	Adaptation Plan Contingency Plan	Analysis of status of funding, linkages under missions
Forest and Biodiversity	From state of forest inventory, biodiversity register	Participatory forest management	Linkages with flagship schemes, national missions, external aided projects
Agriculture	Agri-vulnerability, trend analysis, market analysis, livelihood analysis, cropping system	Diversification of crops or varieties based on the stressed, cropping system change Farmer Field Schools	Linkages with schemes Own budget
Waste Management	Waste and emission analysis Livestock profile	ODF village Source segregation plans Vermiculture	Swachh Bharat Budgets from state and flagship schemes

	PRA to pinpoint	Voluntary compliance to regulation on polythene	
Energy	Energy profile analysis Ex-ante baseline and ex-post analysis for emission reduction	Integration of solar energy in streetlight, water heating, crop preservation, water purification	Convergence fund (HIMURJA)

- *Stakeholder consultation and prioritization of programmes/ schemes and strategies implemented based on identified criteria vis-à-vis climate change, resources depletion and other environmental issues.*
- *Coordination with DEST on leveraging funds available for Eco-Village Scheme as well as coordination and liasioning with state line departments and local government institutions to identify entry points for convergence with various other projects/ schemes*
- *Mapping and selection of the potential actors who involved at the district, block and panchayat level*

Presence of social networks like water user groups, SHG groups, JFM groups, Farmer Interests Groups, ANM/ASHA, Para teachers, etc. have been analysed. Assessment of their efficiency and effectiveness is key to sustainability of the eco-village.

PRA techniques like spider diagram, influence chart, etc

Tools: Stakeholder Analysis

Preparing a detailed plan of action in the form of Eco-village Development Plan (one for each village) including convergence with other schemes/ programmes with clear indicators on the future environmental/ adaptation benefit to implement the prioritized strategies including M&E plan, implementation mechanism, steering structure and budget for the proposed Plan.

List of prioritized actions were proposed under Eco village development plan with list of schemes for convergence. It is based on gap assessment and analysis taking in accounts the baseline status of all components.

The approach for the project will be:

- Baseline study
- Concurrent monitoring and reporting with the submission of quarterly monitoring reports. This will include both technical and financial aspects
- Special impact studies and success-stories in social media
- End-line assessment after one year of implementation support

- A participatory monitoring guidebook to systematical track the project with the counterparts as part of our knowledge transfer initiative

Task II

Technical support for implementation of Eco-village Development Plan at village Janjehli in Mandi district as per plan of action.

Orientation workshop with identified government departments and other relevant institutions before initiating the implementation and creating awareness about the Eco-village Development Plan and identified activities

The eco-development plan formulated for Janjehli was consulted at the district level in a workshop with line department officials and PRI members.

Departments like agriculture, horticulture, animal resource development, rural development, health, forest and environment, I&PH and DEST were consulted and participated in the workshop.

The key issues will be discussed and roles of different stakeholders will be clearly defined and time schedule and milestones to be refined and agreed upon.

Coordinating and implementing activities over a period of 5 years as per the plan of action. The detailed project information with activities that need to be implemented by mobilising funds from existing government schemes.

Plan of action for Jhanjehli village is based on:

- Identifying climate vulnerability of the identified village
- Participatory vulnerability assessment to recalibrate local indicators
- Community response on vulnerability
- Identification of modern and indigenous sustainable options in the identified sectors
- Budgeting of climate proofing investment
- Convergence of identified activities in existing schemes

Monitoring and Evaluation will be done based on the agreed M&E framework.

Facilitate training workshops for district, block and Panchayat level officials on eco-village development plan

The following categories of capacity building activities will be undertaken

- Climate change awareness
- Awareness on solid waste management
- Training on organic agriculture/ natural farming

FIGURE 8 COMMUNITY PARTICIPATION- RESOURCE MAPPING

- Training on book-keeping and financial management
- Specific sectoral training

Resource mapping

The resource mapping exercise was conducted on May 22nd 2019. This was carried out post the briefing about the required legend for the resource map of the village. The villagers present, comprising mainly of Land-owning individuals from the village, were informed about the required indicators to be displayed on the map. This was followed by a community exercise to inter-discuss, interact and to devise a map of the resources of the village which was accurate to the perception of the villages and accepted by all present.

Transect Walks were carried out regularly during the entire duration of the stay from 20th May 2019 to 28th May 2019 at Janjehli panchayat. This allowed for successful confidence building amongst villages and hence allowed for continual assessment of village conditions and situation.

Focus Group discussion was conducted on various levels with the presence of multiple different groups and stakeholders such as the 3 (three) Mahila Mandals and the SHG's (Self Help Groups) present in the village, the land owners, amongst others.

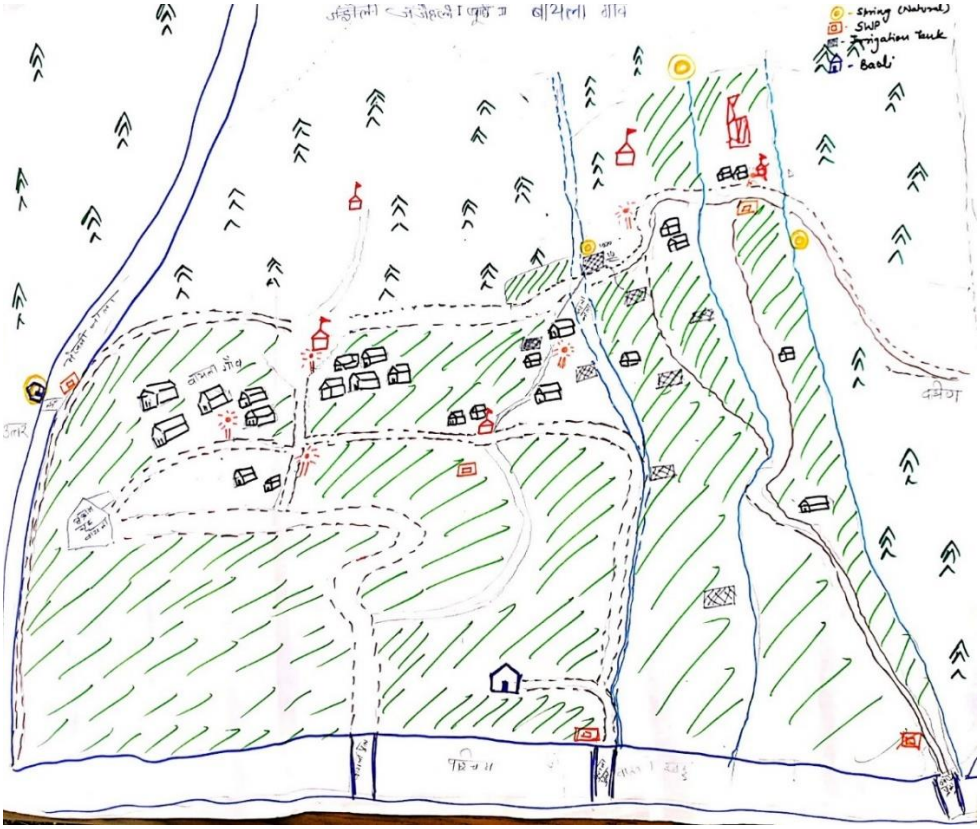


FIGURE 9 COMMUNITY GENERATED RESOURCE MAP OF BAYLA VILLAGE

Land Use

TABLE 2 LAND USE IN BAYLA

621 Hectares under panchayat	
Bayla and TherniMohal Forest Land	208.46 hectares
Agricultural land	200 bigha (16.6 hectares)
Orchard	6.6 hectares
Crop Land	10 hectares
Residential land	1.5 hectares
Grazing land	1 hectare

SOURCE : PATWARI, JANJEHLI PANCHAYAT. REVENUE DATA

Agricultural land, comprising of orchards (6.6 hectares) as well as crop land (10 hectares) makes up a total agricultural land area of 16.6 hectares in Bayla village. The rest land holdings can be broken up into residential land, of 1.5 hectares and grazing land of 1 hectare.

CLIMATE CHANGE IMPACT

Himalayan ecosystems are highly vulnerable due to the stress caused by forest land conversion, forest degradation, habitat fragmentation, overgrazing, fuel wood collection, forest fires, infrastructure development, mining, and other related challenges. The effect of these current stressors will be most likely exacerbated due present and future climatic changes.

The environment has a limited carrying capacity so there is a need to make our villages sustainable, ecologically sound & environment friendly so it becomes imperative that we address the environmental issues. These considerations are of prime importance as nature can sustain a negative impact up to a level & sensitive systems are not so resilient to cope up with changes in physical and natural environment therefore reviewing relevant impacts of eco village development proposals prior to major decisions taken and commitments being made, to account environmental values in their decisions as there may be impact on people and other social components. Similarly, there can be direct or indirect impact on flora, fauna, water resources, land use etc. Therefore, a sustainable and climate adapted village will have more resilience to overcome the future challenges associated with climate change.

Climate Change Trends in District Mandi

Climate

Mandi features a subtropical highland climate under the Koppen climate classification. The climate of Mandi is composite having hot summers and cold winters. Mandi generally experiences rainfalls during end of summer season.

Mandi falls in the lower most climatic zone of the Himalayas. These regions enjoys a Wet-sub temperate climate of the foot hills (450-900m) as against the Dry-cold alpine climate with snow fall at higher altitudes (2400- 4800mts). Temperatures typically range from 6.7 °C (44.06 °F) to 39.6 °C (103.28 °F) over the course of a year. The average temperature during summer is between 18.9 °C (66.02 °F) and 39.6 °C (103.28 °F) and between 6.7 °C (44.06 °F) and 26.2 °C (79.16 °F) in winter. Monthly precipitation varies between 25.4 mm (1 in) in November to 228.6 mm (9 in) in August. It is typically around 58.3 mm (2.29 in) per month during winter and spring and around 101.6 mm (4 in) in June as the monsoon approaches. The average total annual precipitation is 832 mm (32.76 in).

Climate Change Vulnerability of Project Area

According to Himachal Pradesh climate change state action plan Various factors show that Himachal Pradesh possesses a high degree of vulnerability to climatic variations, which will affect millions of poor rural people. Some of the identified key aspects of Himachal Pradesh have been elaborated using parameters such as adaptive capacity, exposure and sensitivity that contribute to its net vulnerability to climate change in the State.

From global level assessments of vulnerability on the basis of database for the period 1960-1990 carried out by K. O'Brien et al. / Global Environmental Change 14 (2004) 303–313 following spatial representations of adaptive capacity, sensitivity and exposure have been observed.

District-level mapping of adaptive capacity of Himachal Pradesh at global level measured as a composite of biophysical, social, and technological indicators (1960-1990) shows lowest adaptive capacity for Chamba and Kullu whereas higher adaptive capacity of Kangra, Hamirpur, Una, Solan and Sirmour districts

District-level mapping of Climate Sensitivity Index (CSI) for India based on observed climate data (1961–1990) and based on results from the HadRM2 model is shown in the and as per estimate, sensitivity is lowest for Lahaul&Spiti and low in Chamba, Shimla, Kullu and Kinnaur regions.

Districts in the country that rank highest under climate change vulnerability and globalization vulnerability are considered to be double exposed.

District-level Mapping of Climate Change Vulnerability (Exposure)

District-level Mapping of Globalization Vulnerability

District-level Mapping of Adaptive Capacity at Global l in Himachal Pradesh

District-level Mapping of Climate Sensitivity Index (CSI)

CLIMATE CHANGE PROJECTIONS

The HPSSAPCC 2012 contains extensive sections about past, current and projected climate change trends Upgupta et al (2015) carried out climate change projections for Himachal Pradesh under Representative Concentration Pathways RCP4.5 and RCP8.5 scenarios for the period 2021–2050 (2030s) and 2071–2100 (2080s) which are briefly presented below.

In the midterm (2030s), most districts in Himachal Pradesh are projected to experience a warming of 2–3 ºC. However, in the long term (2080s), the mean warming under RCP4.5 is in the range of 3 to 4 ºC, and under RCP8.5, the warming increases to 4–5 ºC

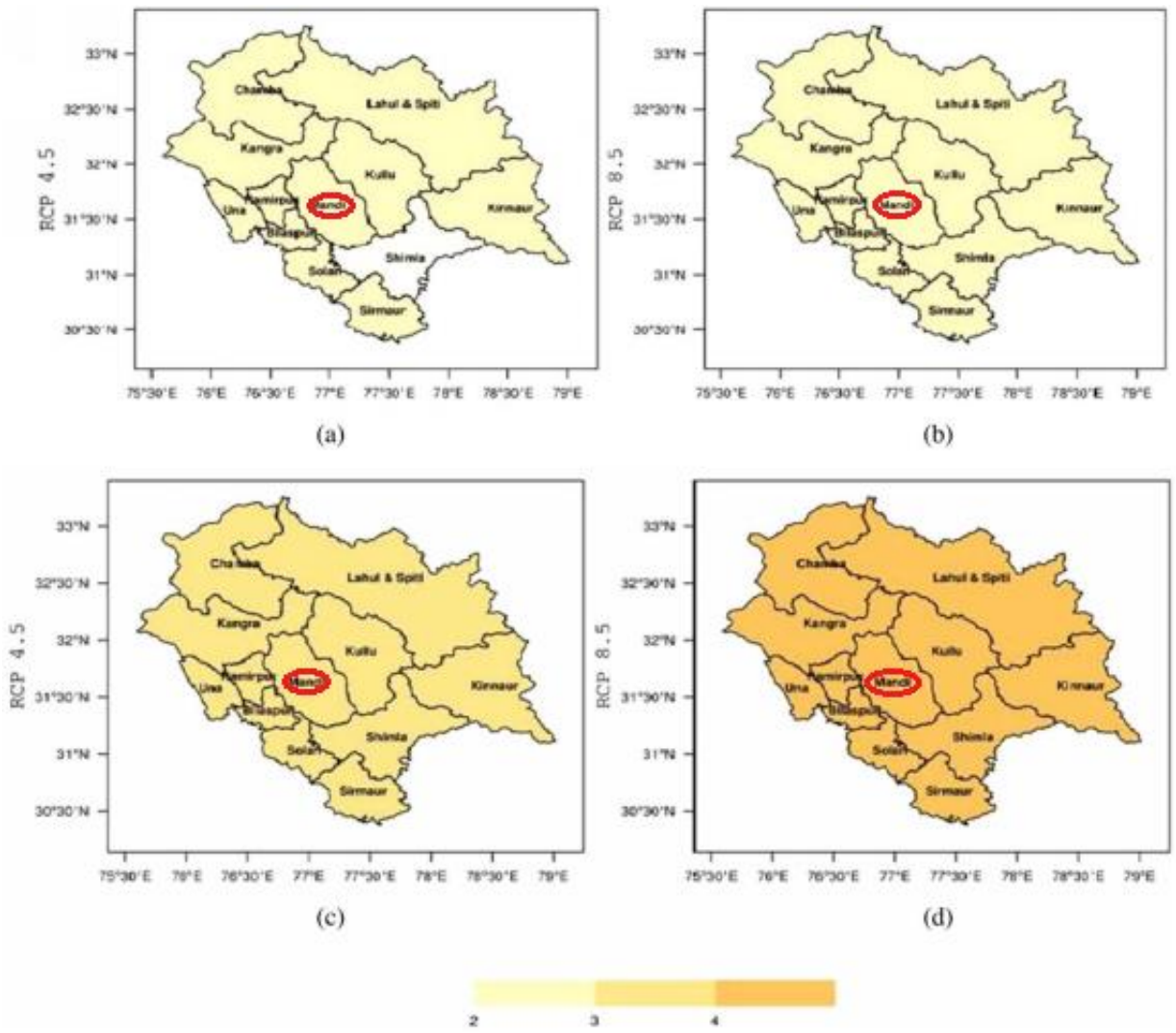


FIGURE 10 District-wise projected warming of temperature: (a) for 2030s under RCP4.5, (b) for 2030s under RCP8.5, (c) for 2080s under RCP4.5, (d) for 2080s under RCP8.5.

Precipitation is projected to increase by 4–8% under RCP8.5 for most districts in the midterm. The percentage increase in precipitation could be over 16% for all districts, except, Shimla, Mandi, Solan and Una districts by 2080s.

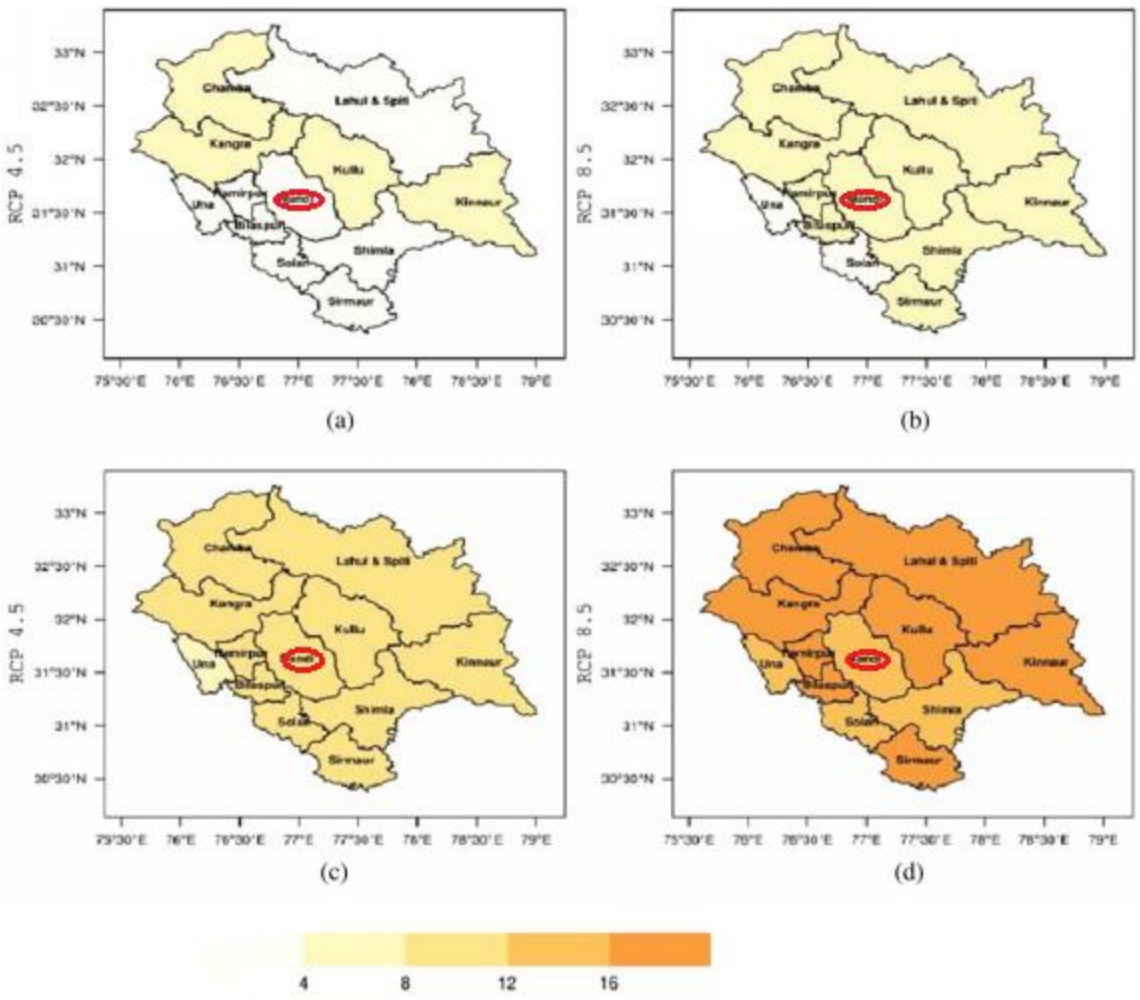


FIGURE 11District-wise projected changes in precipitation: (a) for 2030s under RCP4.5, (b) for 2030s under RCP8.5, (c) for 2080s under RCP4.5, (d) for 2080s under RCP8.5.

The Energy and Resources Institute (TERI) in collaboration with the Global Green Growth Institute (GGGI) used a high-resolution dynamical model to simulate a baseline run from 1970–2000 and for near future (2030s: 2020–50) to arrive at future climate variability over the study domain area (CRGGS 2015). Main conclusions are:

- The spatial distribution of precipitation in the near future will change relative to the baseline period.
- The precipitation change for monsoon months will be in the range of –8 and 12 per cent. This change for winter months of December to February shows a much larger variation from less than –10 per cent to over 30 per cent in some areas.
- The whole State shows a positive change for summer rainfall in the range of 5 per cent and 30 per cent. Post-monsoon season also shows a variation in the changes of

precipitation percentage in the range of less than –15 per cent in some areas to more than 30 per cent in others.

- There will not be much changes in the occurrences of extreme rain events during the summer monsoon season in the near future from the baseline period. Extreme rain events are expected to increase for the State in the long run.
- The temporal distribution of rainfall will be different.
- Annual mean temperature is projected to increase by 1.3–1.9°C for 2021–50 relative to 1971–2000.
- Mean Annual Maximum temperature (Tmax) over the State is projected to increase by 1.1–1.9°C. The Mean Annual Minimum Temperature (Tmin) also is projected to increase over the study domain area in the range 1.5–1.9°C.

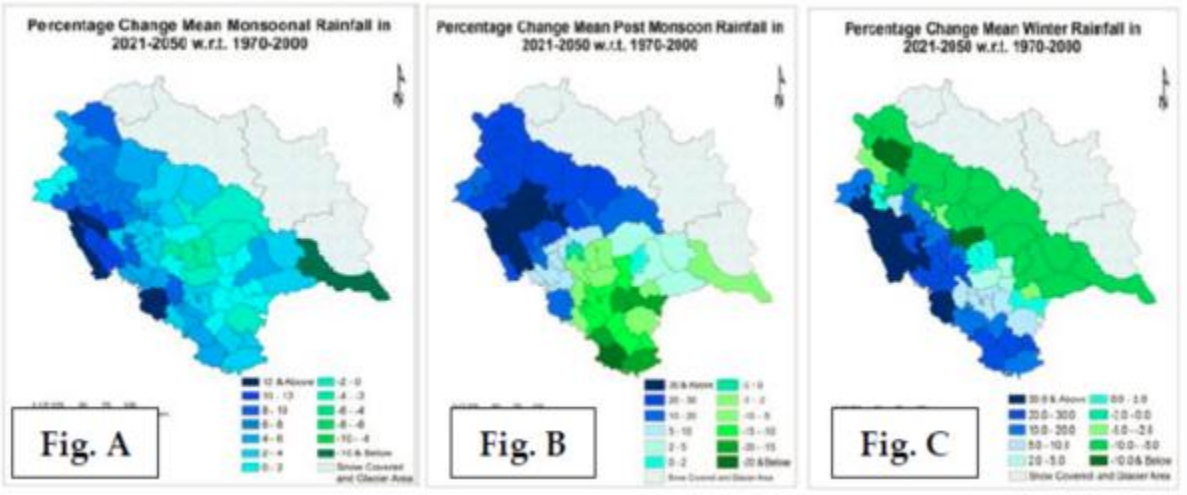


FIGURE 12 Precipitation projections for near future (2021-50) for different seasons

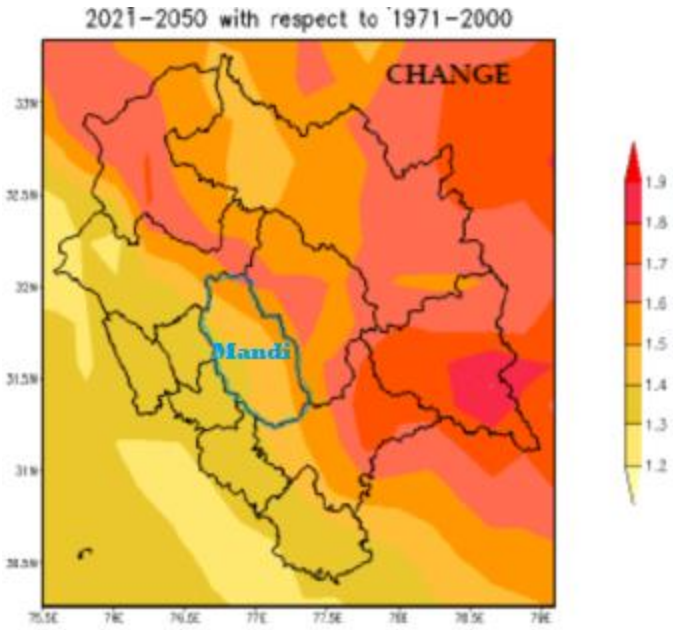


FIGURE 13Forecasted increases in annual mean temperature in the short-term (2021-50) for Himachal Pradesh

AS per Himachal Pradesh Climate change Action plan (HPCCAP) the overall climate change variations are set to arrive in following manner:

Temperature

- The annual temperatures are set to rise.
- The rise in temperature with respect to 1970s shows a range between 1.5 C to 2.8 C.
- Temperatures are also showing a rising trend in all seasons.

Precipitation

- The mean annual rainfall likely to vary between 1250±225.2 and 1550±175.2 mm in Himachal Pradesh.
- The rate of increase is more in North-western parts of the State i.e. areas of district Kangra,Chamba, Kullu, Una are likely to receive rainfall with increased intensity.
- The High Hill areas like Kinnaur, Lahul&Spiti and some parts of Chamba and Kullu districts may also experience rainfall in place of snowfall with increased temperature.
- There may be staggering decrease in snowfall patterns in mid-hills temperate wet agro climatic zone.
- An increase in rainfall in the pre-monsoon and post-monsoon months with increasing incidence of storms in Himachal Pradesh.

Extreme Events

- Change in rainfall patterns with increased variability in future some regions (Southeastern parts) may be experiencing less rainfall Drought like conditions may prevail in given projections.
- Projected increase in temperature, rainfall, rainfall variations and intensities in the State may lead to accelerated summer flows leading to situations like floods/flash floods in North-western parts of the State.
- Health risks are also associated indirectly with extreme events in sub montane, low hills, and sub humid agro climatic zones of the State.

CLIMATE CHANGES OBSERVED IN JANJEHLI

According to Himachal Pradesh state action plan, the State climate variables are showing changes in trends:

- Change in trend of rainfall.
- Change in trend of snowfall.
- Change (shift) in cropping pattern and vegetation species.
- Change (shift) in apple contour.

The above trends which have been established on scientific data base are also supported by concerns raised by the community in Bayla eco-village. Below is the detailed perception of villagers with regard to climate change impacts.

Climate changes observed	• Increase in temperatures • Rainfall is now more intense and erratic, previously rains were less intensive, but it rained longer, i.e. for a number of consecutive days (i.e. rains were easier to predict) • Winters are drier as compared to the past • Reduced snowfall
Impact on soil and water	• Water scarcity due to drying of streams and springs • Heavy downpours do not allow percolation of water into the ground leading to water scarcity • Severe runoff of rainwater across the slopes • Soil erosion, loss of topsoil and exposure of rocks due to intense rain • Increased number and severity of landslides
Impact on agricultural crops	• Decrease in agricultural production as no timely rains and scarcity of water in summers • Change in cropping patterns due to change in rainfall patterns • Change in rain pattern is impacting them badly, high rains at the time of sowing or immediately after sowing leads to washing away of seeds and damage to the fields; also rains at the time of harvest destroy their crops. • Increased infestation by weeds • Abandonment of agricultural fields since cultivation of crops (e.g. paddy rice, brown rice) is not economically anymore due to drought / erratic rainfall
Impact on forests	• With climate heating up and prolonged dry spells between the rains, trees with shallow roots are dying as water table has gone down and not much moisture available for them to survive during summer months
Impact on health	• Increase in diseases as previously there were less mosquitoes and flies
Pests	• The pest infestation and agricultural related diseases are on rise
Direct impacts on livelihoods (apart from agriculture)	• Landslides and heavy floods damaging houses, roads and property • No timely rains impacting agriculture

TABLE 3Perception of villagers with regard to climate change impacts.

BASELINE ASSESSMENT

WATER RESOURCES

Due to climate change the rains have become erratic, the intensity of rains has increased leading to low percolation of water which can have a severe impact on water security, availability & increase in occurrence of extreme events like flash floods.

With climate change leading to rising temperatures, rise in rainfall intensity and a marked decline in winter rain/ Snow, the problem of dying springs is being increasingly felt across the Indian Himalayan Region, NITI Aayog constituted group of experts have submitted report titled 'Inventory and Revival of Springs in the Himalayas for Water Security' it has mentioned that nearly 30% of springs crucial to water security of people are drying and 50% have reported reduced discharge in Himalayan region.

FIGURE 14 WATER RESOURCES OF BAYLA VILLAGE

In Bayla eco village two major Streams passing through, the streams are perennial and three minor streams of which two are seasonal and one perennial.

TABLE 4 BASELINE INDICATORS OF SPRING SHED DEVELOPMENT

Strategy	Protect, celebrate, and appropriately utilize water
Indicators	(Siri &Thirani) have dried down and now have become seasonal other streams (MatlaNalla)

TABLE 5 VULNERABILITY IMPACT MATRIX OF WATER SECTOR

Climate change hazard	Climate change impact	Determinants of vulnerability	Possible Adaptation options
Increased aridity from temperature increase	•Drying up of water sources •Decrease in water levels in ground water •Lowered ground water levels lead to reduction in vegetation cover •Impacts on agriculture	•Impact on agricultural based livelihood source •Loss of biodiversity •Impact on forest cover and biodiversity •Competition for surface water for agriculture •Loss of livelihood	•Shifting to low water-based agriculture •Change in crop diversity •Shifting to modern agricultural practices like drip irrigation.
Increased rain intensity	•Low water percolation • •High runoff •Soil erosion •Increased flash floods	•Drying of Springs leading to water scarcity •Drying of streams leading to low water availability for agriculture •Loss of fertile top soil •Low income	Soil & water conservation Water harvesting Ground water recharge
Decreased winter rains & snow	•Low water availability in summers	•Impact on agriculture summers	Rain water harvesting
Increased frequency of flash floods	•Loss of assets & life	•Loss of agricultural land •Erosion •Damage to property	Basic engineering measures and structures combined Flood resistant crops during monsoon season
Decreased water availability in Springs	Loss of perennial sources of water Loss of potable water	•Competition for surface water for domestic consumption	•Spring restoration •Springshed management •Stream Preservation & restoration

Decreased water flow in river	Low water availability for irrigation and other human use	•Competition for surface water for agriculture consumption	Watershed management Rain water harvesting,

IMPACT ON STREAMS

As per villagers two streams which used to be perennial in past (Siri &Thirani) have dried down and now have become seasonal other streams (MatlaNalla) have decreased flow in comparison to the past.

As Heavy intense downpours do not allow percolation of water into the ground leading to low recharge which in turn leads to drying down of natural sources leading to water scarcity. Except for year 2019, the snowfall has been showing a decreasing trend for last many years which can also have a direct bearing on the summer water output.

TABLE 6 PRESENT STATUS OF MAJOR WATER RESOURCES

S.no	Streams	Numbers	Status
1	Major streams	2	Bakhli (Perennial) Bakheli(Perennial)
2	Minor streams	3	MatlaNalla (perennial) Siri Nalla (seasonal) TheraniNalla(Seasonal)

IMPACT ON SPRINGS (BAWDI)-

The spring discharge is reported to be declining as per community; it is on the expected lines as across Himachal overall discharge from springs is on decline.

Two spring has already dried down while others have reduced output in comparison to past. The springs need to be monitored and regular flow needs to measure and data collected, so that comprehensive spring restoration plan is made.

TABLE 7 IMPACT ON NATURAL SPRINGS OF BAYLA VILLAGE

S.no	Springs	Numbers	Status
1	Dried	2	No water availability for last many years
2	Perennial	2	perennial but with decreased output

FIGURE 15PERENNIAL SPRINGS IN BAYLA VILLAGE

It is important to note that one spring which had dried out has been transformed to serve as storage tank by cementing it from every side with concrete so that no leakage of stored water takes place, and thereby making it impossible to revive it in its present condition, so it also becomes necessary that awareness is created so that no other spring is covered with concrete or altered anyway or any other construction taken in the vicinity it may permanently dry out the spring.

FIGURE 16 DRIED SPRING USED AS STORAGE TANK

AGRICULTURE-

Himachal Pradesh is highly vulnerable to climate change. Climate change also poses additional challenges as higher temperatures increase the need for water, irrigation and the risk of warm stress on crops. Changing weather patterns and rising temperatures will leave the farmers of

<table>
<tr><td>Strategy</td><td>Ensure food security, nutrition and organic food chain</td></tr>
<tr><td>Indicators</td><td>

Current cropping system (to be available with VLW)
Off Season climate favoring vegetables like Peas, potatoes, Cauliflower, Cabbage, Broccoli, Wheat, Maize
Chemical fertilizer and pesticide use (crop wise recommended and current use) per ha basis for each crop
<table>
<tr><td>Crop</td><td>Chemical/Pesticide applied in each season</td></tr>
<tr><td>Apple</td><td>7.5 litre/ bigha</td></tr>
<tr><td>Peas</td><td>2.5 litre/bigha</td></tr>
<tr><td>Potato</td><td>0.5 litre/ bigha</td></tr>
<tr><td>Cauliflower/Cabbage/Broccoli</td><td>2.5 litre/bigha</td></tr>
</table>
Use of vermi-compost (no of pits or no of HH using now)
65 Households have vermin compost in village, only 5 Households are using it.
Organic crop production in ha (crop wise)
25 bigha organic crop production is currently practiced by farmers.
Productivity (kg/ha) crop wise
<table>
<tr><td>Crop</td><td>Productivity</td></tr>
<tr><td>Peas</td><td>3 quintal/bigha</td></tr>
<tr><td>Potato</td><td>5 quintal/bigha</td></tr>
<tr><td>Cauliflower</td><td>7 quintal/bigha</td></tr>
<tr><td>Wheat</td><td>1 to 2 quintal/ bigha</td></tr>
</table>
No of irrigation required/crop
Perennial stream is not tapped for irrigation purposes in the village. Irrigation Infrastructure like community tanks, irrigation channels are required in the village.
Processing and value addition (current practice)
Harvesting is done manually. No mushroom cultivation, apiculture is practiced. Floriculture can be promoted
Farm waste handling
Not practiced

</td></tr>
</table>

the State vulnerable to crop losses on one hand and excessive precipitation also destroy the crops on other hand. Climate change will also negatively affect the water resources with increased water scarcity in hill stations. The increase in water demands will increase the vulnerability in the State.

TABLE 8 BASELINE INDICATORS OF SUSTAINABLE AGRICULTURE

FIGURE 17 LOW LYING AGRICULTURAL AREA OF BAYLA VILLAGE DEPICTED IN LIGHT GREEN COLOR WHICH CAN BE IRRIGATED BY STREAM

TABLE 9 CLIMATE CHANGE IMPACT MATRIX- AGRICULTURE

Climate change hazard	Climate change impact	Determinants of vulnerability	Possible Adaptation options
Increased aridity from temperature increase	Scorching /wilting of crops	• Low crop yield •Crop failure •Impact on agricultural based livelihood source	Shifting to modern agricultural practices like drip irrigation. •Shifting to low

			waterbased agriculture Change in crop diversity
Increased rain intensity	Flash floods	Loss of fertile top soil Resulting in crop loss/ damage/ low crop yield •Loss of agricultural land	Soil & water conservation Water harvesting Ground water recharge
Decreased winter rains & snow	Water scarcity / droughts	Decrease in Apple production Low availability of water in summers Decrease in farm produce	Rainwater harvesting Watershed management
Changing rainfall pattern & distribution	Unseasonal rains and dry seasons in between the seasons. Late onset and early cessation of rainfall	Effects cropping calendar Lowers crop yield Late harvesting/ Droughts	Change in crop diversity Change in cropping calendar
Increased frequency of flash floods	Large scale destruction	Loss of crop Loss of farm assets Damage to property erosion	Basic engineering measures and structures combined Flood resistant crops during monsoon season

As per Himachal Pradesh state action plan for climate change, with increasing temperatures, it is anticipated that there may be an all-round decrease in horticultural- agricultural production in the region in long-term, and the line of production may shift to higher altitudes.

The Apple production in the Himachal Pradesh region has decreased between 1982 and 2005 as the increase in maximum temperature has led to a reduction in total chilling hours in the region-a decline of more than 9.1 units per year in last 23 years has taken place (Fig. 29). Temperature Humidity Index (THI) is projected to rise in many parts of State during March–September with a maximum rise during April–July in 2030s with respect to 1970s will lead to discomfort of the livestock productivity and therefore will have negative impact on livestock productivity.

TABLE 10 EXISTING STRUCTURES AT VILLAGE LEVEL

S.No	Existing Structures	Numbers
1	Roof top rainwater harvesting structures	2
2	Vermi-compost pits	65
3	Community Irrigation Tanks	6

SOIL EROSION (Agricultural land) & LANDSLIDES –

Landslides

Intense rain the phenomenon associated with climate change have increased risk in terms of number and severity of landslides.
Also, construction of roads in this area has led to landslides and erosion, at few places the road construction has made the agricultural fields and orchids vulnerable and it can have a catastrophic impact on them and may jeopardize the livelihood of some community members.

The topography of the Eco village is such that it will be prone to landslides at various locations; the landslides are caused by the poorly consolidated rock formation, the slope angles and the erosive forces of the surface run-off during the monsoon period or rainy period. In addition, the disturbance of slopes by roads and buildings, undercutting the loose materials, is the main cause of the phenomenon.

Soil Erosion

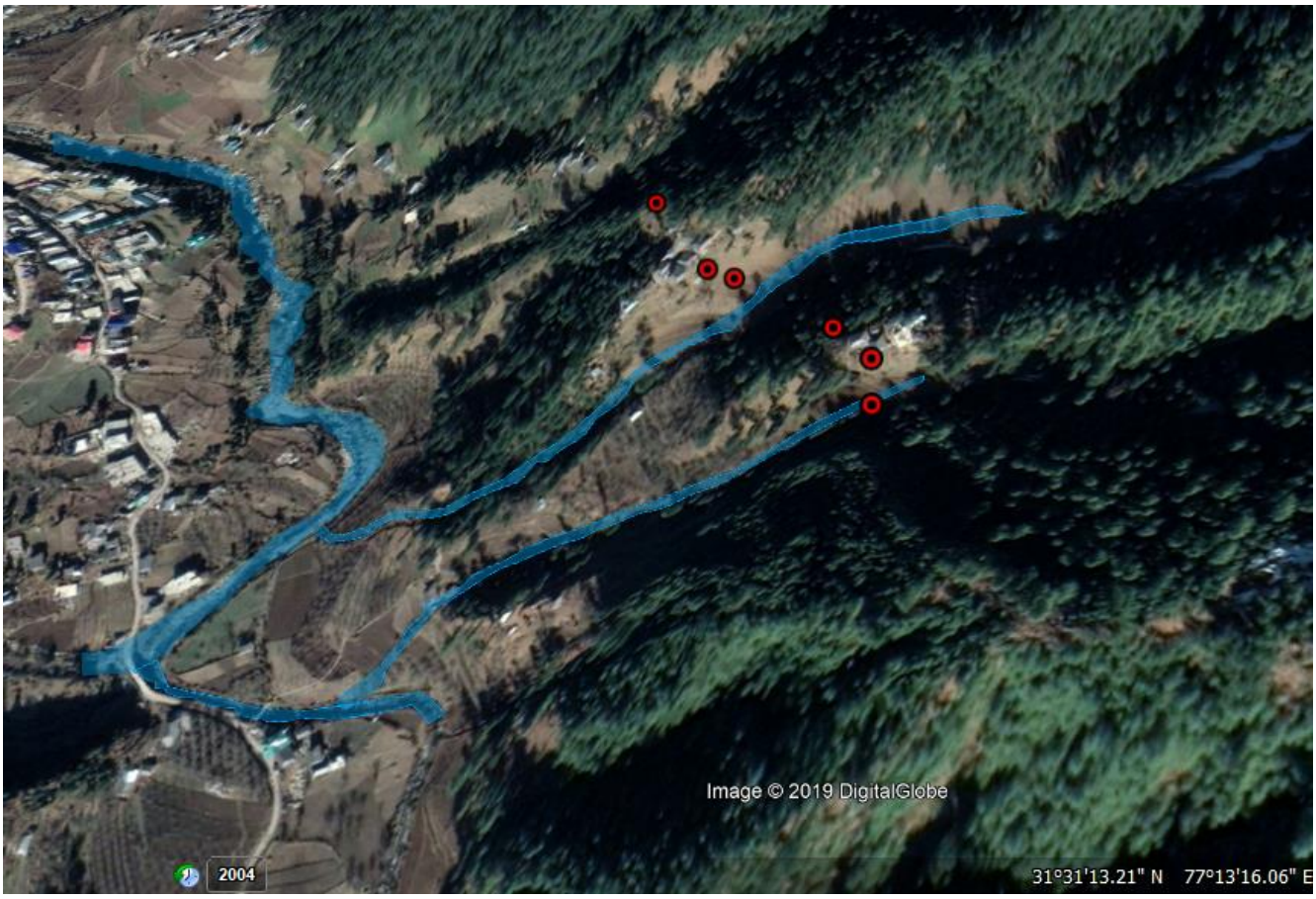
Janjehli has uneven terrain therefore risk of erosion is very high Runoff will produce a highly variable discharge in terms of volume and quality.

Severe runoff of rainwater across the slopes due to intense rains, also construction of new

roads on mountainous slopes has made it vulnerable to Soil erosion, loss of top soil and exposure of rocks.

FIGURE 18 SLIDING AREAS IN AGRICULTURAL LAND OF BAYLA VILLAGE

IDENTIFIED SOIL EROSION SITES / SLIDING AREAS



These are the marked areas where possible soil erosion in the form of land sliding can occur due to precipitation among other natural causes. This holds relevance as the areas marked are located near or around agricultural land and/or natural springs. Therefore, any erosion of land around these locations either means a decrease in agricultural productivity or the damage of an existing natural spring.

FOREST-

The immediate repercussions of climate change on the forests are visible in the form of shifting of tree line to higher altitudes and movement of pine species to higher altitudes. Most of the people in Bayla village depend directly or indirectly on forests for their livelihood and use

significant quantity of forest goods and services like non-wood forest products, fodder, timber etc.

TABLE 11 BASELINE INDICATORS OF FOREST PRODUCE MANAGEMENT

Strategy	**Maximize biodiversity to support the ecosystem**
Indicators	• Bio-diversity register to get (green: abundant blue: declining red: extinct species) No Biodiversity register is maintained in Panchayat • Plantation in ha No plantation in peripheral forest land in Bayla

Expected impact of climate change on forests in Western Himalaya

According to the HPSSAPCC, the following impacts of Climate Change on forests can be expected:

- Change in distribution of floral species & forest areas
- Change in forest productivity
- Shift in treeline
- Threatened species will be highly exposed
- Forest productivity may increase initially by higher atmospheric CO2 levels but with adverse impacts in the long term
- Decrease in snowfall may result in greater mortality of species
- Occurrence of forest fire may increase
- Change in climate conditions in subtropical regions will favour expansion of certain species upwards
- Spread of diseases
- Reduced water yields of forests
- Reduced biodiversity and ecotourism values

The climate change driven vulnerability of forests depends on the extent and rate with which the climate change occurs, the implication of non-climatic stressors, and the adaptation responses through forest management.

Upgupta et al. (2015) assessed forest ecosystem vulnerability to climate change across Himachal Pradesh and identified the priority districts for vulnerability reduction under 'current climate' and 'future climate' scenarios. Vulnerability of forests under 'current climate' scenario

was assessed by adopting indicator-based approach, while the vulnerability under 'future climate' scenario was assessed using climate and vegetation impact models.

As can be seen below the district Mandi falls under very high current vulnerability class.

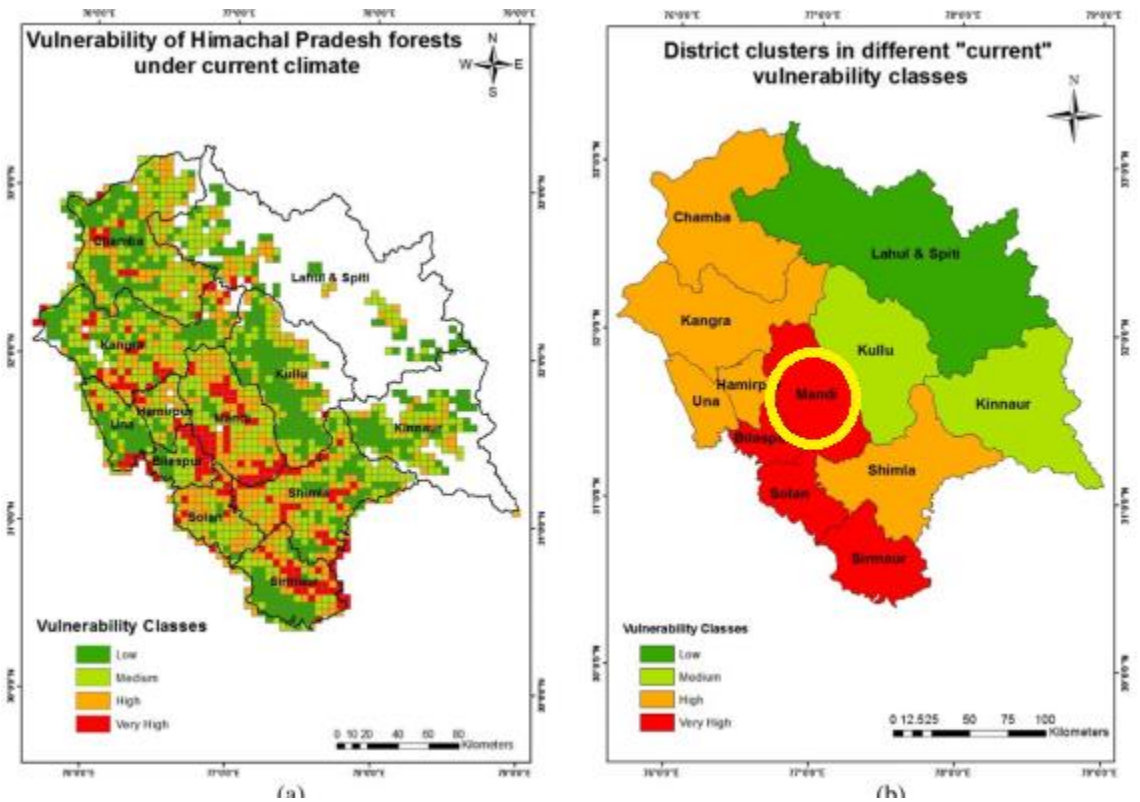


FIGURE 19 VULNERABILITY OF FORESTS IN HIMACHAL PRADESH SOURCE: UPGUPTA (2015)

The Byla village is surrounded by lush green forests , but the stress on forest was quit visible and as seen in pictures below, the timber wood was found scattered in large quantities across the village it reflects how much the villagers are dependent on forest for timber. The forests are the frontline resource to counter climate change and if the forests get altered it impacts the whole ecosystem and will also impact the adaptive capacity of community negatively.

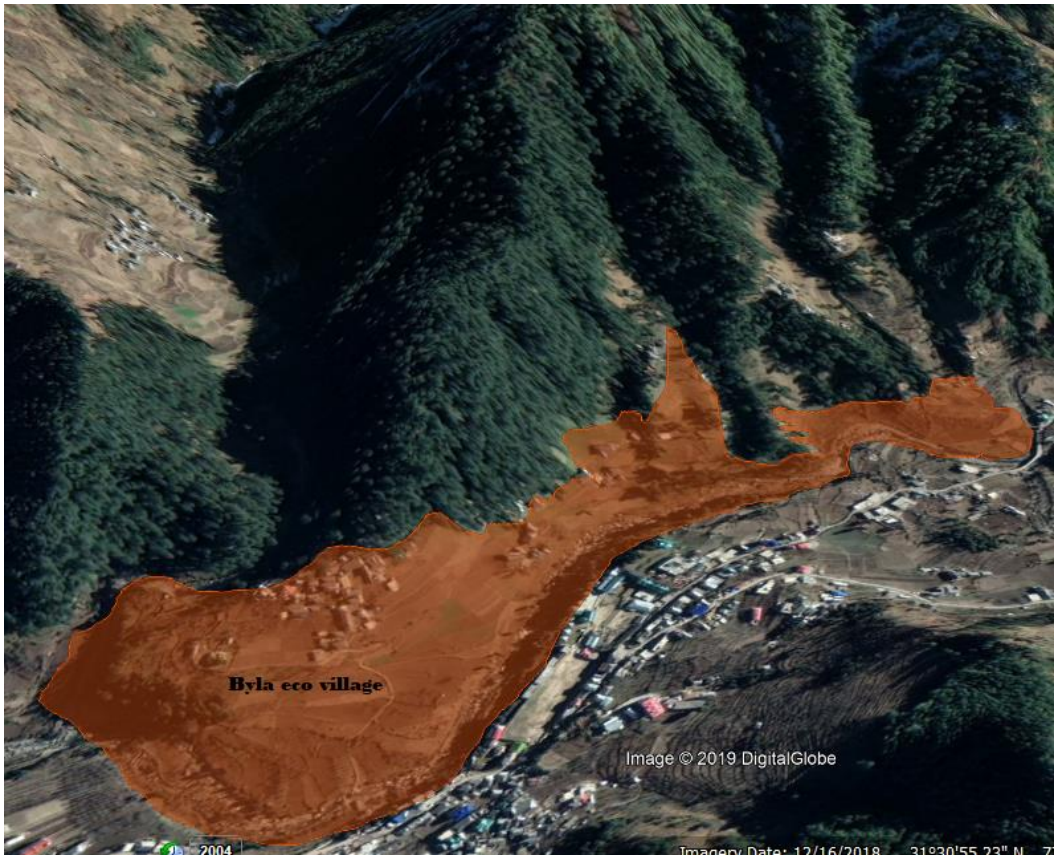


FIGURE 20 FOREST AREA AROUND BYLA ECO VILLAGE

FIGURE 21 LARGE AMOUNT OF TIMBER WOOD SCATTERED ACROSS VILLAGE

Fire Hazard

Research shows that changes in climate, particularly early snowmelt due to warming in the spring and summer, have led to hot and dry conditions leading to longer wildfire season which in turn increases the chances of fire incidences. Also, forest fire contributes to global warming in two ways firstly forest fires add to release of carbon in atmosphere, secondly impacting sequestration of carbon as damaged forest would otherwise had removed CO2 from the air.

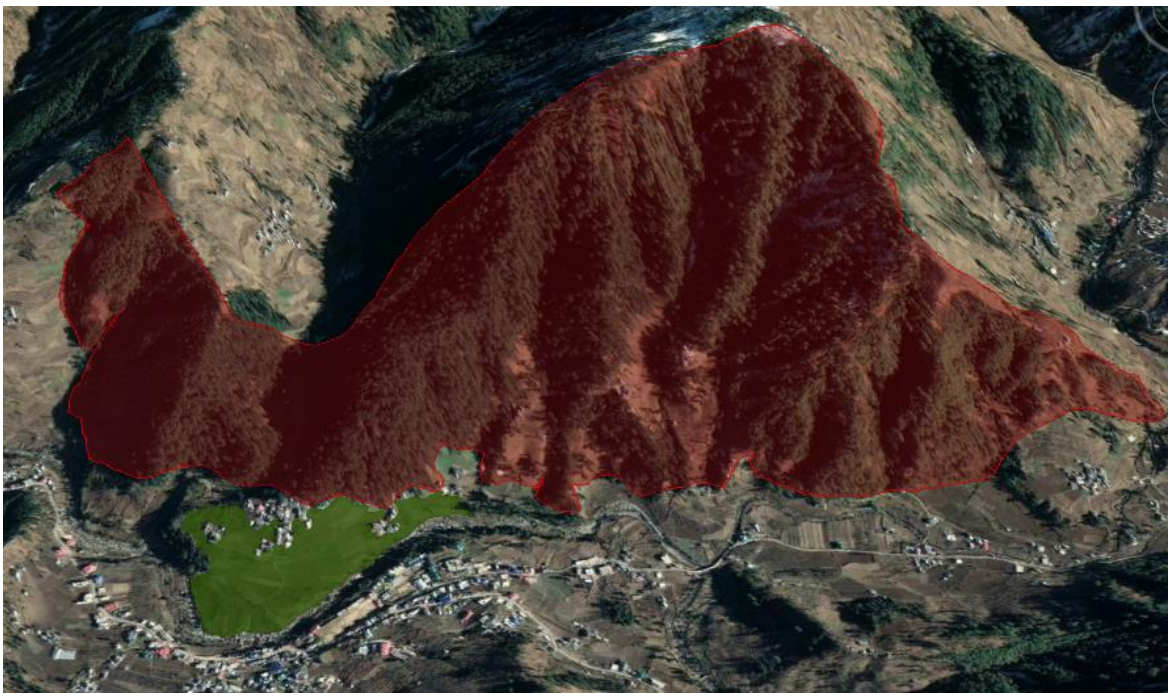


FIGURE 22 THE AREA SUSCEPTIBLE TO FIRE MARKED IN RED

ECO TOURISM

The unique location advantage of Janjehli can be realised if viewed from the perspective of a possible or untapped tourist destination. The otherwise untouched site of the village (Bayla) is only glaced at by tourists in varying modes of transport while travelling on road along BakhliKhad next to the village. The tourists either travel through personal vehicles, hired cabs and busses, both of which are available in Janjehli as well. The tourists, with numbers up-to 1500 vehicles per day during peak seasontravel along the narrow road to reach the Shikari Devi Wildlife and the Shikari Devi Temple. There are also connecting roads present to Shimla and Thunag that are often used by locals for connectivity.

Therefore, all the tourists visiting Janjehli only as an intermediate stop can be retained in the protected and mostly unaltered surroundings of Janjehli. The derived benefits of setting up Janjehli as a successful tourism centre are the following: -

- Alternate livelihood
- Better management of resources

- Better infrastructure
- Better market opportunities
- Recognition
- Discovery and protection of potential tourist sites
- Higher income

Given the overall advantage of Tourism interventions and set up within the village through direct as well as indirect effects of the inflow of visitors in the village, Tourism seems like a viable option for the village as well as the villagers. The village stands to face less and less deteriorating affects of development in the form of deviation from the original or the current state of being into a state that is unnatural or artificial in terms of replication of urban centres.

The authenticity of the place can be retained through eco-centric tourism initiatives that focus on maintaining the natural structure of the area as well as contain and restrain the mild or severe deviations that might happen to the nature. Such form of tourism is called Eco-Tourism and is characterised by its inclination towards environment centric development of tourist sites and tourism attraction. The overall benefits for a new site to invest into eco-tourism rather than opting for commercial tourism are huge and not only is the benefit to environment and maintenance of the surrounding a derivative, but also, a higher price can be commanded as well as access to a new and fast growing eco-tourist market be generated for the area which would help retain the core competencies of the area. For example, in the case of Janjehli which may develop base camping establishments as well as services for the numerous treks, both short and long, that originate from and around the site to nearby locations. The Benefits of eco-tourism as compared to conventional tourism are: -

- Retention of the Natural advantage of the location in terms of avoidance of degradation.
- Preservation of the nearby and linked natural ecosystems
- Access to unique eco-tourism market
- Less or no deviation of the normal way of life of local residents
- Lesser intervention cost
- Lesser alteration of existing surroundings.

Current Status

Currently only one household in the Bayla village is operating as a home stay to provide accommodation to tourists. The only other alternative to that is the forest rest house.

There is a lack of any developed tourist site in the village with absence of tourist centric initiatives such as sign and information boards, marked pathway a well as the absence of an established camping site.

RENEWABLE SOURCES OF ENERGY

TABLE 12 BASELINE INDICATOR OF RENEWABLE ENERGY STATUS IN BAYLA VILLAGE

Strategy	**Develop non-fossil energy alternative**
Indicators	• Presence/absence of solar street lights: 6 Solar Street Lights at present • Households using LED bulbs (share of conventional/LED) Privately owned LEDs • Use of Solar Water heaters (no of HH) No Solar Water Heater installed • Use of solar lights (in community halls/schools/public buildings) No • Use of solar lights private buildings (HH) No • Use of bio-gas (HH) Not used • Solar fencing Not used

One way is to reduce carbon footprints is by use solar energy, by this way we mitigate fossil fuel electricity production and replace it with clean, environment friendly renewable energy Bayla Village will use solar street lights to lighten up the village road and also one government building will be used set up solar electricity unit. This initiative will not only lead us to cleaner energy source though small but significant intervention to help overcome climate change in future.

WASTE MANAGEMENT

The major source of waste water includes the grey water from kitchens, bathrooms & water from toilets and also from the nearby market. To maintain the surrounding environment & to reduce the demand of potable water by providing secondary and tertiary treated water, it is important to ensure treatment of the wastewater generated from the village and nearby areas, There is no provision for channelization of waste water generated in the village and at one place the sewage pipeline outlet directly empties itself in the river, untreated sewage is the single most important source of pollution of the Bakhali stream which in turn pollutes the whole stream. There are certain areas were dumping of waste was seen near the stream

Due to climate change water scarcity will be an issue so it becomes imperative upon us that we keep our resources clean and sustainable.

FIGURE 23 SEWAGE PIPELINE DIRECTLY DRAINS INTO RIVER STREAM

As it can be seen above, a drain from the main market across the river and road from Bayla and adjacent to the main entrance of the village, empties directly into the river. Thereby, the site acts as a point for waste disposal and entire environment in the surroundings is polluted by either residential, organic or plastic waste.

Municipal Solid Waste-

Municipal solid waste management is an essential for sustainable Eco-village development. Its components are segregation, storage, collection, relocation, and finallydisposal of solid waste to so as to minimize adverse impact on environment.

TABLE 13 BASELINE INDICATORS OF WASTE MANAGEMENT IN BAYLA VILLAGE

Strategy	**Sustainable waste management, cleanliness and reduction in plastic waste**
Indicators	• Composition of domestic household waste: (i) Plastic waste (including single use plastics and hard plastic) which are openly disposed (ii) Kitchen and Agricultural waste are openly composted directly in fields. • Current level of segregation (at house-level) of solid and liquid waste, degradable and non-degradable waste: Segregation Tank constructed, not practiced currently • Vermi-compost use (no of HH) 65 Households have vermin compost in village, only 5 Households are using it • Disposal of waste No waste disposal, No waste water treatment is done. Waste water pollutes the stream

	• Open defecation (extent) IHL are constructed in all households with 2 community Toilets • Percentage use of sanitary napkins: 90% • Use of sanitary napkins (its disposal) : Disposed in landfills

WATER MANAGEMENT AND IRRIGATION

Water Management is one of the important components of climate change adaptation strategy. The main challenge of water management in agriculture is to improve water use efficiency and its sustainability.

Efficient irrigation systems and water management practices can help in overcoming the impactsin anscenario of limited water availability due to climate change. To achieve the goal of water security, water-use efficiency may not be the only tool required to achieve water security, other adjustments & improvements in watershed are needed to so a comprehensive long-term plan and execution is required.
In Byla village following water sources are presently used for irrigation-

Surface water- water mostly from Bakhli and Bakhli streams is water is uplifted directly by nearby fields downstream for irrigation. Another source Matla stream is used by fields on uplands for irrigation.

Artificial water tanks - some artificial water tanks have been built to channelize the Matla stream water to fields.

TABLE 14 BASELINE INDICATOR OF WATER MANAGEMENT AND IRRIGATION

Strategy	**Ensure water security and water use efficiency**
Indicators	• No of roof top rainwater harvesting structures 2 Households • Other water resources (for irrigation and drinking water) Drinking Water Sources: 2 Baolis, IPH taps Household Water Sources: 2 Streams (Matla, Therani) and 2 bigger rivers (Bakhla, Bekhli) • Create a dashboard (a) Functional (b) partially derelict (c) fully derelict • If possible estimate water availability per capita (for drinking, for livestock, for irrigation, for enterprise) • Identify low water requiring crops/varieties (grown in ha, not grown): No such crops are grown • Identify small ruminant and poultry (reared and nos, not reared): No

COMMUNITY INSTITUTIONS AND CAPACITY

Community level participation and active involvement is necessary for both the successful establishment as well as the maintenance of the numerous eco-village specific activities and interventions. This is necessary as the uptake of activities and in order for them to yield a productive advantage, a behavioral change might be required. This form of change can only be enabled after the complete or proper sharing of knowledge. Therefore, through building of capacities of various village institutions such as committees, it becomes possible for village locals to demand and receive better benefits and profits.

TABLE 15 BASELINE INDICATORS OF CAPACITY BUILDING

<table>
<tr><td>Strategy</td><td>Develop capacity of community institutions to sustain the eco-village</td></tr>
<tr><td>Indicators</td><td>

SHG (nos and their self-rating or based on observation rate them as
green: account up to date, interest earned, at least 3 years, regular meeting registered
blue: infrequent meeting, some on lending, not up to date accounts
red: for name sake exist

<table>
<tr><td>SHG</td><td>Rating</td></tr>
<tr><td>Khushi</td><td>Blue</td></tr>
<tr><td>MaaJalpa</td><td>Green (max. activities undertaken)</td></tr>
<tr><td>Aajivika</td><td>Blue</td></tr>
</table>

JFM groups (no and status): No
FIGs (no and status): No

</td></tr>
</table>

PROBLEM/ BARRIER ANALYSIS

Component	Problems	Possible causes			
		Low participation	Low awareness	No technology	No Finances
Spring shed Management	Lack of protection intervention Landslides and Soil erosion in spring periphery	✓	✓	✗	✗

Sustainable Agriculture	Lack of knowledge of benefits of Organic/Natural/Zero-budgeting	✓	✓	✓	✗
Water Management and Irrigation	Lack of Irrigation infrastructure Water storage structures, Water lift	✓	✓	✓	✓
Renewable Energy	Lack of knowledge of benefits and scope	✓	✓	✓	✓
Solid Waste Management / Cleanliness	Lack of concern (collection) and end term measure (final disposal)	✓	✓	✓	✓
Forest Produce Management and Eco Services	Lack of knowledge of Threats (due to overconsumption – Fuel wood, Forest fires), No Eco-tourism sites	✓	✓	✗	✗
Capacity Building	Lack of In-situ trainings	✓	✓	✗	✗

GOALS

S.No.	Activity	Indicator	Baseline	Target
1	Trenching	Reduced soil erosion through constructed trenches	Absent	Rejuvenation of existing Springs
2	Plantations	Increased green cover within village	In Village absent	In village plantations to assist soil and water conservation
3	Check Dam and loose boulder implementation	Collection and retention of stream water	Absent	Water conservation and availability for irrigation
4	Loose Boulder and Crate Wall	Top Soil Retention	Absent	Water conservation and availability for Irrigation
5.1	Organic farming training	Improved productivity through organic	On-going In-Village	Motivation of farmers

		farming	training camp absent	to take up and eventual 100% organic farming in village
5.2	Individual testing of Organic Farming	Increased adoption of organic farming	On-going through Village SHG	
5.3	Individual testing of Organic Farming	Increased adoption of organic farming	Market linkage absent	
6	Solar Fencing	Agreement and adoption for all cluster farm lands	Absent	Retained agricultural productivity
7	Rooftop Rain Water Harvesting	Storage of rain water	Present in only 2 households	Water Conservation
8	Irrigation Tank	Construction of Multiple farm feed tank	Large collection tank absent	Solar power fed irrigation pump to feed water availability for gravity assisted community irrigation
9	Solar Plant on Forest Rest House	Generation of solar power	Absent	Shift to renewable source of energy
10	Solar Street Light placement	Implementation of Village solar lights	Absent	Selection and placement of points for Solar lights for maximum shared community benefit
11	Solar water heater	Increased implementation	Benefits unrealized	Reduction of fuel wood usage in households
12	Plantations	Increased green cover	In village absent	In village plantations to assist soil and water conservation
13	Fireline Management	Reduced asset loss due to forest fires	Existing sites mapped and maintained by forest department	Protection of village property from accidental and mismanaged fires.
14	Existing Village Site Development (Sitting area, fountains)	Increased visitor footfall within village	Absent	Increased tourism potential of existing sites
15	New Camping Site Development (tree house)	New visitor and tourist engagement	Absent	Creation of new recreation tourist sites

16	Awareness activities	Placement of sign boards and information signs	Absent	Generated environmental awareness and Village information display through sign bards and displays
17	Entry gate	Demarcation of village entry point	Absent	Distinction and labeling of eco-village site and significance
18	Landslide prevention	Creation of landslide prevention structures	Absent	Prevention of soil runoff/errosion and protection of village pathways through crate walls and wire mesh interventions.
19	Sewage Treatment Plant	Management of liquid waste and bio waste	Absent	Cleaning of proximate liquid waste discharge at village entry point.
20	Waste incineration unit	Management of Plastic waste and sanitary waste	Absent	End point solution for plastic and inorganic waste generated in village and by tourism
21	Demonstration of Vermi Compost and Poly house (2 Phases)	Increased adoption by Villagers	Infrastructure mostly present, use majorly absent	Utilization of existing vermi compost pits for conversion of residential organic waste
22	Training on Micro irrigation	Increased adoption by Villagers	In village use Absent	Water conservation and increased crop productivity through advanced irrigation techniques
23	SHG/ Mahila Mandal Training (In Village and Exposure Visit)	Improved productivity through responsibility knowledge and delegation	3 Self Help Groups present	Training of local SHG groups for organic farming among other value addition activities
24	Exposure Visit (2 Phases)	Improved recognition of benefits as well as training	Ongoing on limited scale and reach	Training for organic farming

PLAN OF ACTIVITIES

SPRING RESTORATION

As per Niti Aayog report, any programme attempting to develop this natural resource must broadly involve the following sets of activities:

- Assessment of the hydrogeological controls on the springs (at micro level).
- Recharge potential of the spring through spring shed development measures (at micro level).
- Embedding the micro-level perspective in the macro-picture of the water resources in a region.
- Maintenance and protection of springs.
- Effective monitoring of the spring discharge and water quality during planning, implementation and impact assessment stages.
- Active participation of the community at all stages including during the stage of knowledge generation.

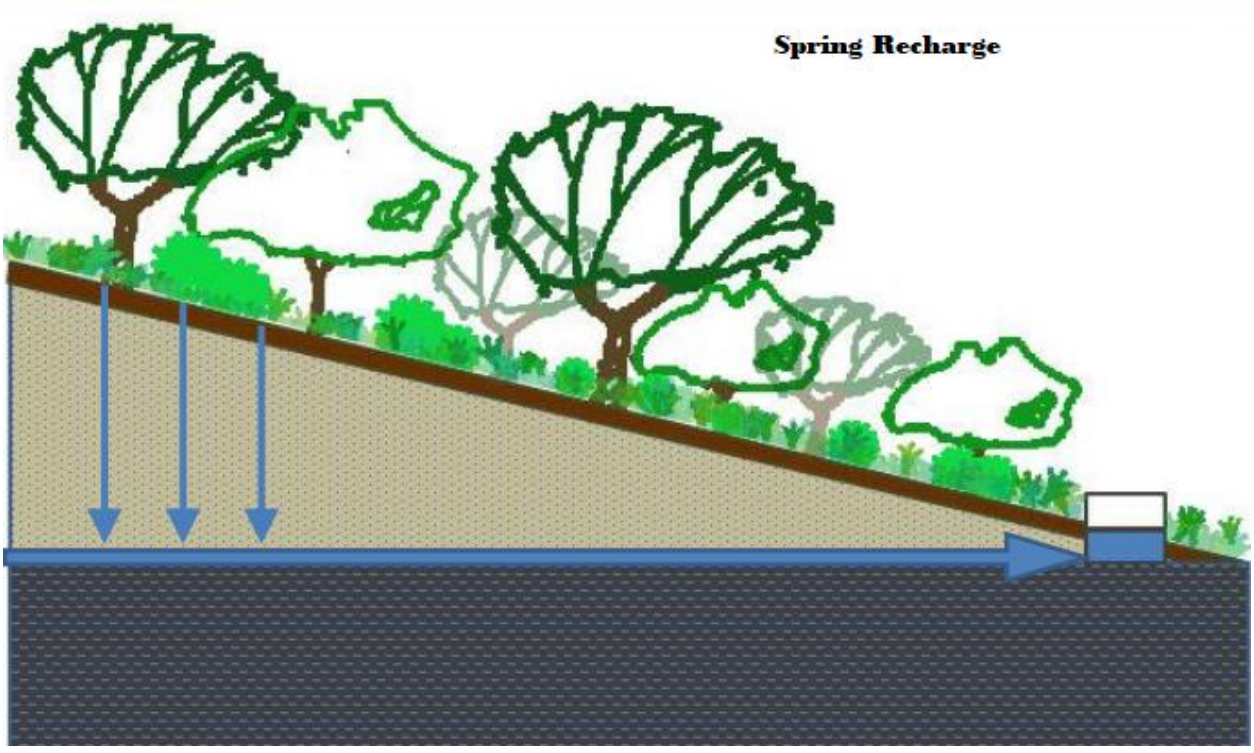


FIGURE 24 SPRING RECHARGE

The NITI Aayog Report of Working Group on Revival of Springs in the Himalayas for Water Security recommendations include mapping of springs, implementing revival of springs & capacity building.

Mapping Springs

- Mapping to include detailed hydrological, geo-tectonic, morphological, meteorological, land use and demographic details. š
- Follow a selective methodology – based on current approaches including the 8-step methodology and more recent protocol of approaches. Application of isotopes to identify origin/source of springs can be an important tool. Hot-spot analysis to identify vulnerable springs must also be included.

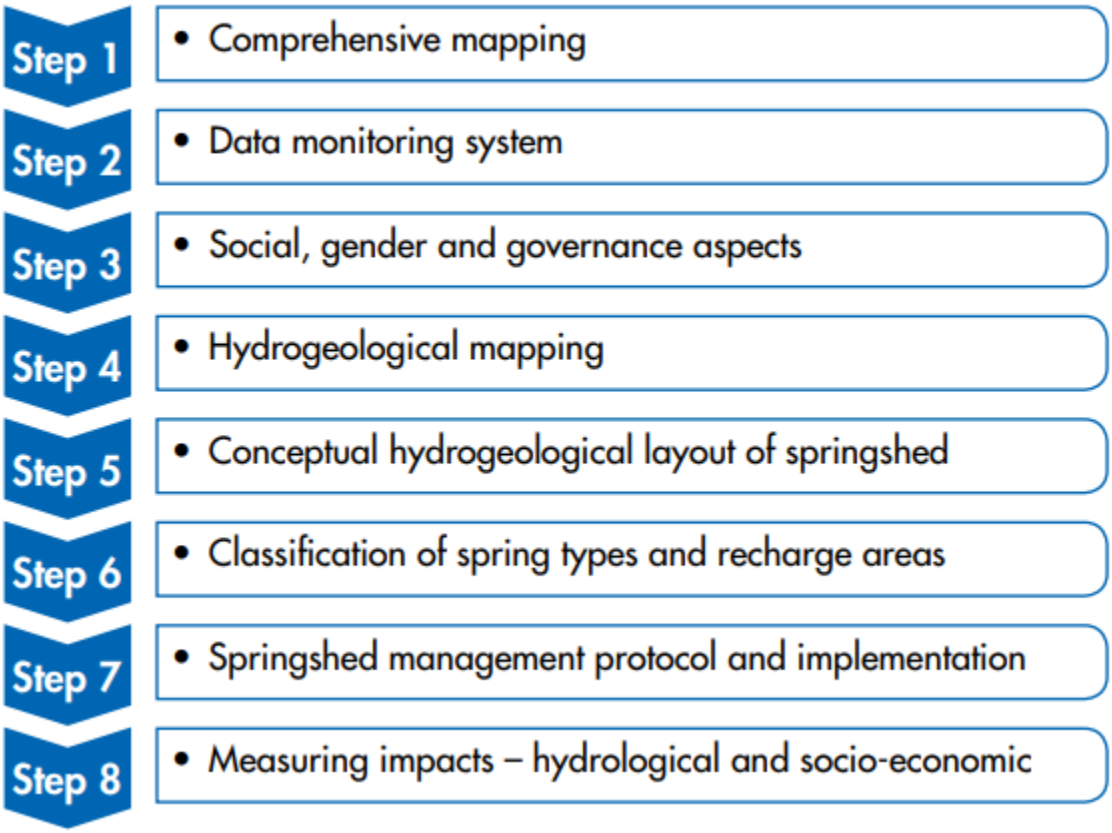


FIGURE 25 -EIGHT STEP METHODOLOGY FOR SPRING SHED MANAGEMENT - SOURCE: (NITI AAYOG)

Implementing Revival of Springs

Reviving springs and sustaining them requires a combination of scientific knowledge (hydro-geology) and community ownership of the resource

Basic engineering measures and structures combined with vegetative measures and management are need for revival. Identification of local level management practices/traditional

knowledge (and practices) for springs is needed to strengthen the plans for spring shed management.

Dhara Vikas a government programme has created a significant impact by recharging lakes and successfully reviving springs in north east and achievements have been recognized by Niti Aayog and many independent experts.

Trenches for groundwater recharge will be needed to be dug scientifically in adherence to geo-hydrological requirements which will be best judged by the hydrologist.

Before starting any work,a training handbook on Dhara Vikas training manual should be consulted for groundwater recharge

ACTIVITY PLANFOR SPRING REJUVENATION-

Sl.No.	Spring rejuvenation			
	Activity	**Location**	**Beneficiaries**	**Outcomes**
1	Trenching	1.Theraini Nala	Whole Ward	Rejuvenation of existing springs
2	Plantations	Across Village	Whole Ward	In village plantations to assist soil and water conservation
3	Check Dam and loose boulder implementation	Matla Nallah	Whole Ward	Soil Retention

SOIL EROSION AND LANDSLIDES

FLOODS & FLASH FLOODS

The village periphery is transected by a stream (Bhekhali khad) it stands out as a natural boundry on the right side demarcating it from the rest of the area, and smaller stream viz. Bakhli khad& other three much smaller streams namely Matla (perennial), Siri(seasonal) and Thirani (seasonal) discharge water and merge into Bhekhali Stream at different points downwards, on its right side of the Bhekhali are agricultural fields, the bhekhali khad is the main source of irrigation for lower elevation agricultural fields and there is a very thin line of elevation barrier difference between the agricultural fields and the river Bhekhali which makes the Agricultural fields vulnerable to flash floods.

FIGURE 26 THE AREA AGRICULTURAL FIELDS AT LOWER ELEVATION SUSCEPTIBLE TO FLOODS

As lower elevated area of the village is near the river, the area maybe susceptible to flash floods and floods which can lead to considerable damage to land and property.

FIGURE 27 SOIL EROSION ON

No-construction zone near the seasonal river bed

No building construction should be allowed near the seasonal riverbed area as it will lead to serious environmental consequences.

Precautions and suitable engineering measures should be taken to prevent flooding of the area due to stream passing close to fields

Mitigation Measures Flooding, soil erosion & landslides-

(A) Flooding

Strengthening of Embankment / bunds near the river streams through loose boulders and vegetation.

(B) Soil erosion & Landslides-

Structural measures need to be taken to strengthen the land slide prone areas to avoid landslide hazard and possible impacts of hazard

The structural measures include, but are not limited to drainage, erosion protection, channeling, vegetation, anchoring systems and retaining structures and slope stabilization techniques. The best suited possible method needs to be applied based on the site specific needs so that it can withstand the impacts and forces of landslides.

ACTIVITY PLAN FOR LANDSLIDE MANAGEMENT

TABLE 16 LANDSLIDE MANAGEMENT AND PREVENTION

Landslide management and prevention				
Sl.No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
	Retention walls	**sliding areas**	**Whole Ward**	**Prevention of soil runoff/erosion**
1	Landslide prevention	1. Before check dam 2. Along agricultural land and pathways	Whole Ward	Prevention of soil runoff/erosion and protection of village pathways through crate walls and wire mesh interventions.

SUSTAINABLE AGRICULTURE

Adaptation measures –

The aim should be to go for low input cost organic farming

- Promoting the diversification of crops based on the ability, adaptability to changing climate patterns.
- Vermi- composting
- promoting soil management practices that contribute to productivity
- Improving water efficiency through better management practices like drip irrigation to reduce vulnerability to variable conditions and water scarcity.
- Using drought-resistant and flood resistant varieties based on the season pattern
- Modifying crop rotations to include cover crops that help build resilience to climate change and climate variability

- Promoting the use of weather monitoring systems and trends analysis to reduce the risks associated to climate variability.

  Activities completed- already Construction of vermin composting pits has been done

Adaptation/ mitigation Measures for water management and irrigation-

As climate change leads to erratic rainfall and change in rainfall pattern therefore based on the area, type of crop & the suitability water conserving methods of irrigation should be promoted-

Sprinkler irrigation- is a method of irrigation in which water sprinkled through the air in rain like drops.

Drip irrigation system- A micro-irrigation method, the discharge rate of the emitters is low so this irrigation method can be used on all soil types.

Construction of water Tanks for storage and distribution - water tanks at technically identified appropriate place and elevation needs to be built so that water from those tanks water can be used for irrigation and micro-irrigation.

Activities to be undertaken –There will be lot of uncertainties due to climate change with regard to agriculture so overall adaptation / mitigation plan is to decrease the input cost. Below is the activity plan for the activities which incur cost that will be undertaken during the project life span

ACTIVITY PLAN OF SUSTAINABLE AGRICULTURE AND WATER MANAGEMENT

TABLE 17 SUSTAINABLE AGRICULTURE AND HORTICULTURE

Sustainable Agriculture and Horticulture				
Sl.No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Organic farming training	Across Village	Whole Ward	Motivation of farmers for take-up and eventual 100% organic farming in village
2	Individual testing of Organic Farming	Across Village	50	
3	Solar Fencing	Across Village	Whole Ward	Retained agriculture productivity
4	Rooftop Rain Water Harvesting	Across Village	Potential Households	Water Conservation

FOREST MANAGEMENT AND ECO SERVICES

Mitigation measures

1. **Planting of climate change-adapted, multipurpose species on open forest land**

The purpose of planting of climate change-adapted, multipurpose species on open forest land is to restore the ecosystem functions of the forest, increase the climate resilience and sequester carbon.

A mix of climate change-adapted and multipurpose species as prescribed in the Forest Management Plan will be planted, with the aim to re-establish a mixed natural forest. During tree selection, locally-adapted indigenous and deciduous trees will be preferred as they can better cope with increased temperatures and extended dry spells.

As an initial climate change safeguard, it is suggested to plant tree species up to 200 m above their present distribution (elevation line). The planting of conifers shall be limited to higher elevations which are too cool and wet for broadleaved species.

2. **Enrichment planting**

The purpose of enrichment planting of climate change-adapted, multipurpose species is to restore the ecosystem functions of the forests and increase the climate resilience. This will be achieved by planting in canopy gaps where there is insufficient tree cover and/or natural regeneration. Enrichment planting should be strictly limited to canopy gaps without sufficient natural regeneration.

3. **Planting of vegetation alongside ravines (Nallah)**

On both sides of a ravine (dry creek), plants like Ban etc. should be planted along each side of the ravine. Existing vegetation should not be cleared as the roots of the vegetation helps to retain the soil.

The purpose of planting vegetation along ravines is to prevent soil erosion and gully development, which causes the loss of top soil and uprooting of trees. To be effective, it may have to be combined with physical soil and watershed measures.

Planting of vegetation along ravines will help to cope with anticipated climate change impacts, especially heavier, erratic rainfalls and flash floods which may even cause human casualties and destroy infrastructure such as houses and roads.

This measure has multiple environmental benefits, such as soil and water conservation, water retention, and biodiversity conservation,

4. Planting of fodder & fruit trees

The main purpose of planting fodder trees in and around the village is to make sufficient quantity available of feedstock for animals at village level and also reduce the grazing pressure on forest, thereby contributing to natural forest rehabilitation and carbon enhancement. Plantation of 20% Fruit trees as per norms will help wild animals to get food and to check human animal conflict; this will increase the climate resilience of the forest as well.

The environmental benefits mainly consist of reducing the grazing pressure on neighboring natural forests. If native trees (such as oaks, wild olive) and grasses are planted, the biodiversity will also increase.

ACTIVITY PLAN FOR FOREST MANAGEMENT

TABLE 18 FOREST MANAGEMENT ACTIVATES

Forest management				
Sl.No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Plantations	Across Village	Whole Ward	In village plantations to assist soil and water conservation
2	Fireline Management	Village perimeter	Whole Ward	Protection of village property from accidental and mismanaged fires.
3	Awareness activities	Across Village	Whole Ward	Generated environmental awareness and Village information display through sign bards and displays

5. Demand-side Measures to reduce pressure on Forests

Devices that help reduce the dependence of communities on forests for fuelwood.

- Promotion of fuel-efficient stoves
- Promotion of alternative renewable energies (solar heaters and solar geysers) as timber wood is in high demand and it is a major

Mitigation measures (Fire Hazards)

- Prevention of human-caused fires through community education and environmental awareness
- Fireline Construction: A fireline cuts off the supply of fuels, the objective of fire wall is to remove or reduce the flammable materials available on ground that allow the fire to build up in intensity or continue to spread.
- Setting up of fire management committee for early warning and mitigation

PLAN OF ACTION ON ECO TOURISM

TABLE 19 ECO TOURISM SERVICES

Eco Tourism Services				
S.No	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Existing Village Site Development (Sitting area, fountains)	1.Sacred groves 2.Narayan Temple	Whole Ward	Increased tourism potential of existing sites
2	New Camping Site Development (tree house)	1.Matla Nala2.SeriNala	Whole Ward	Creation of new recreation tourist sites
3	Awareness activities	1.Matla Nala2.SeriNala	Whole Ward	Generated environmental awareness and Village information display through sign bards and displays
4	Entry gate	Before bridge on main village entrance	Whole Ward	Distinction and labeling of eco-village site and significance

ADOPTION OF RENEWABLE ENERGY

ACTIVITY PLAN ON RENEWABLE ENERGY:

TABLE 20 RENEWABLE ENERGY ACTIVITIES

Renewable Energy				
Sl.No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Solar Plant on Forest Rest House		Whole Panchayat	
2	Solar Street Light placement	Across Village	Whole Ward	Selection and placement of points for Solar lights for maximum shared community benefit.
3	Solar Water Heater	Across Village	Whole Ward	Shift from traditional fuel wood dependence for heating purpose

WASTE MANGEMENT

Waste water Mitigation Measures to be Undertaken

A major focus of the strategy in Byla eco-village is to create a circular process which involves re-use, rather than disposal. This process has four key stages from source to eventual return to the environment:

- managing wastewater at source (including water conservation and recycling)
- collection and treatment
- re-use of treated wastewater and sludge
- Re-entry of treated waste into an ecosystem.

Waste water treatment plant will be setup to treat waste water generated from the eco village.

PLAN OF ACTIVITIES ON SEWAGE WASTE MANAGEMENT AND CLEANLINESS

TABLE 21SEWAGE WASTE MANAGEMENT AND CLEANLINESS

Sewage Waste Management and Cleanliness				
Sl.No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Sewage Treatment Plant	Waste outflow point at bridge on village entrance	Whole Ward	Cleaning of proximate liquid waste discharge at village entry point.

This type of waste is generated from houses, shops etc. It is mostly non-hazardous solid waste that requires collection and processing or disposal it consists of decomposable food waste, dry material such as glass, paper, cloth, or wood etc.

Following major categories of waste will be generally generated in Eco village-

- **Biodegradable Waste:** Food and kitchen waste, green waste (vegetables, flowers, leaves, fruits) and paper.
- **Recyclable Material:** Paper, glass, bottles, cans, metals, certain plastics, etc.
- **Biomedical waste:** This includes used menstrual clothes, sanitary napkins, disposable diapers, bandages and any material that is contaminated with blood or other body fluids

TABLE 22MUNICIPAL SOLID WASTE MANAGEMENT THROUGH

Municipal Solid Waste Management Through Incineration				
Sl. No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Waste Recycling units		Whole Ward	End point management of Single use plastic waste, Medical waste and sanitary waste

Municipal solid waste management - Plan

A key issue to consider when planning primary and secondary collections in the village is the question of final disposal. While all measures will be undertaken to recycle or compost recoverable materials, there will be residual wastes for which there are no markets. The question is where this residual waste should be directed. It is vital that waste collection programs do not simply shift the residual waste problem from one location to the next.

- Bio-degradable waste can be managed in the eco village itself through Bio-Composting or vermi- composting pits the structures of which have been already made .
- Recyclable waste after segregation should be sent for recycling
- Biomedical waste needs to be incinerated

CAPACITY BUILDING INTERVENTIONS

The following capacity building Interventions have been proposed for the village Janjehli: -

CAPACITY BUILDING INTERVENTIONS				
Sl.No.	**Activity**	**Location**	**Beneficiaries**	**Outcomes**
1	Demonstration of Vermi Compost and Poly house (Phase I)	Across Village	Whole Ward	Utilizating of existing vermi compost pits for conversion of residential organic waste
2	Demonstration of Vermi Compost and Poly house (Phase II)	Across Village	Whole Ward	Utilizating of existing vermi compost pits for conversion of residential organic waste
3	Training on Micro irrigation	Across Village	Whole Ward	Water conservation and increased crop productivity through advanced irrigation techniques
4	SHG/Mahila Mandal Training (Phase I)	Across Village	Whole Ward	Training of local SHG groups for organic farming among other value addition activities
5	SHG/Mahila Mandal Training (Phase II)	Across Village	Whole Ward	Training of local SHG groups for organic farming among other value addition activities

TABLE 23 CAPACITY BUILDING INTERVENTIONS

6	Exposure Visit (Phase I)	Across Village	Whole Ward	Training for organic farming
7	Exposure Visit (Phase II)	Across Village	Whole Ward	Training for organic farming

PLAN OF ACTIVITIES ON CAPACITY BUILDING

As it can be noted from the above table, the activities to enable and introduce organic farming and new and improved skill for agriculture need to be introduced and taken up at an individual level. Therefore, for it to be successfully introduced, which would imply a maximum uptake, generation of people's interest through demonstration of practice and identification of benefits is required. This can be achieved through Phase-wise implementation of various demonstration exercises within the village, training camps and initiative for the select groups as well as through exposure visit to visualize already successful interventions and hence motivate and guide villagers for implementation. The exposure visit is to be carried out in two Phases to ensure prompt and complete realization of benefits and uptake of organic farming by all villagers, similar to other demonstration and training exercises.

Funding of Proposed Activities

S. No.	Activity	Cost	Scheme/ Associated Department	Cost (reference)
1	Trenching on Theraini Nala	20,000	MGNREGA	
2	Plantations (Ground Utility)	40,000	Forest Department	25 x 1000 (per hectare) Maintainance 1st - 30%, 2nd - 20%, 3rd - 10%)
3	Check Dam and loose boulder implementation	1,20,000	Eco-village Scheme	Small - 90,000(6x15) Large loose Boulder - 30,000
4	Loose Boulder and Crate Wall	2,00,000	Eco-village Scheme	10 loose boulders for 20,000
5	Organic Farming			Zero Budget Farming Training
5.1	Organic farming training		Department of Agriculture	Zero Budget Farming Training
5.2	Individual testing of Organic Farming		Department of Agriculture	Zero Budget Farming Training
6	Solar Fencing	40,00,000	Department of Agriculture	1 panel - 1500m, 3 panel for village
7	Rooftop Rain Water Harvesting	14,00,000	Panchayat	1 Lac per house

8	Irrigation Tank	2,50,000	Soil Water Conservation Department	
9	Solar Plant on Forest Rest House	6,00,000	DEST Fund	
10	Solar Street Light placement	3,87,000	Eco-village scheme	
11	Solar water heater	40,000	HIMURJA	2 Units for demonstration at village commons
12	Plantations (Beautification)	50,000	Eco-village Scheme	30 x 1000 (per hectare) Maintainance 1st - 30%, 2nd - 20%, 3rd - 10%)
13	Fireline Management		Department of Forest	
14	Existing Village Site Development (Sitting area, fountains)	89,000	Department of Forest/ Eco tourism Eco-village Scheme	5 benches: 10,000 each, 5 stools: 3000 each
15	New Camping Site Development (tree house)		Eco-village Scheme	
16	Awareness activities	36,000	Panchayat	
17	Entry gate	2,00,000	Panchayat	
18	Landslide prevention	2,50,000		
19	Sewage Treatment Plant	8,00,000	IPH	
20	Waste incineration unit	3,00,000	Block Office	
21	Demonstration of Vermi Compost and poly house (Phase I)	34,500	Department of Agriculture	250 - perday cost per farmer, 2 -days of training required, 69 - number of farming households
22	Demonstration of Vermi Compost and poly house (Phase II)	34,500	Department of Agriculture	250 - perday cost per farmer, 2 -days of training required, 69 - number of farming households
23	Training on Micro irrigation	34,500	Department of Horticulture	
24	SHG/Mahila Mandal Training (In Village)	25,000	Panchayat / Eco village scheme	

25	SHG/Mahila Mandal Training (Exposure Visit)	55,000	Panchhayat / Eco village Scheme	
26	Exposure visit (Phase I)	4,14,000	Dept. of Agriculture	1200 for interstate, 700 within-state
27	Exposure visit (Phase II)	4,14,000	Dept. of Agriculture	1200 for interstate, 700 within-state
	Total	**97,93,500**		

Implementation Schedule

		Year of Implementation				
S.No	**Activity**	**Y1**	**Y2**	**Y3**	**Y4**	**Y5**
Spring rejuvenation						
1	Trenching on Theraini Nala					
2	Plantations (Ground Utility)					
3	Check Dam and loose boulder implementation					
4	Loose Boulder and Crate Wall					
Sustainable Agriculture and Horticulture						
5	Organic Farming					
5.1	Organic farming training					
5.2	Individual testing of Organic Farming (25 HHs)					
5.3	Individual testing of Organic Farming (25 HHs)					
6	Solar Fencing					
Water Management and Irrigation						
7	Rooftop Rain Water Harvesting					
8	Irrigation Tank					

Renewable Energy						
9	Solar Plant on Forest Rest House					
10	Solar Street Light placement					
11	Solar water heater					
Forest management and Eco services						
12	Plantations (Beautification)					
13	Fireline Management					
14	Existing Village Site Development (Sitting area, fountains)					
15	New Camping Site Development (tree house)					
16	Awareness activities					
17	Entry gate					
18	Landslide prevention					
Solid Waste Management and Cleanliness						
19	Sewage Treatment Plant					
20	Waste incineration unit					
Capacity building Interventions						
21	Demonstration of Vermi Compost and poly house					
22	Demonstration of Vermi Compost and poly house					
23	Training on Micro irrigation					
24	SHG/Mahila Mandal Training (In Village)					

25	SHG/Mahila Mandal Training (Exposure Visit)					
26	Exposure visit					
27	Exposure Visit					

ANNEXURE
Baseline Questionnaire

Baseline survey Questionnaire

General							
1	Village:			2	Ward No./Locality:		
3	Respondent's Name:			4	Father/ Husband's / Wife's Name:		
5	Gender:	1. Male		2.Female			
6	Social Category:	1. SC	2. ST	3. OBC	4. Muslim	4. General	5. Other (specify)
7	Education:	1. Illiterate	2. Primary /UP	3.High School/ Inter		4.Graduate & above	5.Technical/Trade
Natural Water Source Availability and Management							
1.	Main Source of Drinking Water in Household?						
2.	Do you have access to water from natural resource/ spring?	1.Yes		2.No			
3.	Is there any depletion in the natural water resource in last five years?						
4.	If yes, in which season do you face depletion?						
5.	How do you use water from natural resource/spring?						
6.	Do you practice rainwater harvesting?	Yes		No			
7.	Do you treat waste water?	Yes		No			
8.	If yes, what do you practice for waste water management?						
9.	Do you practice water conservation in your household?						
10.	Do you wish to secure water for use in your household?						
Agriculture							
1. Type of Cropping System		1.Sole	2.Inter	3.Mixed		4.Periphery plantation	5.Others
2.Are you growing Short		1. Yes	2. No	If yes what crops do you grow?			

2. Is there any climate change impact observed in last ten years?	Yes	No
If yes, What Climate Change Impact you have observed? (*Multiple response possible*)		

		Urea					
	C. Micronutrient:		D. Bio fertilizer:				
	E. Application method:	1. Broadcasting	2. Behind plough	3. At root zone	4. Fertigation	5. Other(specify)	
9. Integrated Pest management:	1. Chemical pesticide	2. Organic pesticide	3.Beneficial organism	4. Mechanical control	5.Cultural practice		

Capacity Building

1. Do you receive any training from schemes like MIHD (Horticulture), ATMA, PMKSY, NAM (Agriculture),IPH?			
Yes	Yes		
If yes, what are the subjects of training you receive?			
2. Do you have MGNREGA job card?	1. Yes		2. No
3. Days of employment you receive under scheme?		4. Amount you receive per day?	
5. Is there formation of any Water Committee under govt. schemes?	1. Yes		2. No
6. Do you know about Farmer's Committee under NABARD scheme?	1. Yes		2. No
7. Is anyone member of Farmer Club by NABARD?	1. Yes		2. No
8. If yes, How do you get benefitted?			
9. Do you wish to be part of Farmer's Committee	1. Yes		2. No
10. Is there any functional watershed committee in village?			
If yes, how many			
11. How many women members part of this committee?			
12. Do you know about Indira Awas Yojna (IAY)?	1. Yes		2. No
13 Have you received any benefit from housing schemes like Indira Awas Yojna? If Yes Specify	1. Yes		2. No
14. Do you know about Mukhyamantri Adarsh Gram Yojna? (MAGY)	1. Yes		2. No
15. Have you received any benefit from housing schemes like Mukhyamantri Adarsh Gram Yojna? If Yes Specify	1. Yes		2. No
16. Do you know about Mukhyamantri Khet Sanrakshan Yojna? (MKSY)	1. Yes		2. No
17. Have you received any benefit from housing schemes like Mukhyamantri Khet Sanrakshan Yojna? If Yes Specify	1. Yes		2. No
18. Have you received any demonstration on new crops other from govt.	1. Yes		2. No
19. Have you observed any works under SBM in your locality?	1. Yes		2. No
20. Is there any existing village water & sanitation committee?	1. Yes		2. No

4

21. Is anyone member of water & sanitation committee in your house? If yes, describe	1. Yes	2. No
Training Need Assessment		
If yes, please specify and no. of family members attended		
1.Do you get training on drought management due to climate change	1. Yes	2. No
2. Do you ever get any training to adopt climate smart agriculture practices	1.Yes	2. No
3. Receive Benefits from Agro Advisory	1. Yes	2. No
4. Receive training on farm Level efficient irrigation technologies	1. Yes	2. No
5. Participation in awareness building on water management	1. Yes	2. No
6. Training on Sensitization programme on climate change	1. Yes	2. No
7. Do you face any problem in animal husbandry during water stress Situation.	1.Yes	2. No
8. Adaptive capacity building Training programmes Attended		

Pictures of FGDs and Transect Walk

FGD with Farmers in Bayla Village

FGD with Mahila Mandal and SHGs in Bayla Village

Activity Planning in Affected areas

Transect Walk through Village

FIGURE 28 PICTURES OF FGDS AND TRANSECT WALK