Effective Practices of Natural Resource Management in Rajasthan- A Study by Rajmeru

Report Prepared By:
Neelu Choudhary

Supported By:

RAJMERU

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Acknowledgement

The Survey for collection of Effective Practices of Natural Resource Management was conducted under the aegis of the RAJMERU, Rajasthan, many thanks to the management of Rajmeru for providing me the opportunity to undertake this study.

I express my deep sense of appreciation to Secretary Rajmeru Sanstha, Jaipur and Mr. Dinesh Chandra Vyas for their guidance, support, and personal interest. The administrative and financial staff of Rajmeru including Ms. Ganga Sharma and Ms. Vartika Pant made it possible through their substantial support for logistic arrangements for the fieldwork. Their contribution is appreciated and acknowledged with thanks.

I would like to thank all the respondents for their invaluable cooperation. Mr. Amit Kumar, Kumarappa Institute of Gram Swaraj (Jaipur); Mr. R.L. Verma, Nirmaan Sansthan (Jaipur); Mr. R.C. Saini, Mahila Evam Paryavaran Vikas Sansthan (Tonk); Mr. Ram Kishore Prajapat, Gramouthan Sansthan (Ajmer); Mr. Shivji Ram & Mr. Bharat, Shiv Shiksha Samiti (Jaipur); Mr. Jagdish Meena & Mrs. Beena Sharma, Rajasthan Yuva Sangam Sansthan (Jhalawar); Mr. P.K. Dutta, AFPRO; Mr. Mohan Dangi, Prayatna Sansthan, (Udaipur); Mr. C.P. Choubisa, APNA Sansthan (Udaipur); Mr. Abhay S. Jhala, Ankur Sansthan (Udaipur); Dr. Jagdish, SPDW (Udaipur); Mr. Deepak Sharma, Freelancer (Udaipur); Mr. G.L.Mehra, IDEA Sansthan (Jodhpur); Mr. Ganesh Purohit, Jagran Jan Vikas Sansthan, (Udaipur).

Last but not the least; many thanks all those community members who shared their experiences and invaluable knowledge.

Principal Investigator
Neelu Choudhary

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Index

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

EFFECTIVE PRACTICES OF NATURAL RESOURCE MANAGEMENT

Chapter 1 - Introduction

1.1 Background –

Sustainable use of natural resources is very crucial to the development of a country. India is endowed with diverse natural resources. Among these agriculture, land and water are the most important natural resources. Sufficient food for domestic consumption can be produced if these resources are wisely and effectively used. Strong socio and economic development can also be achieved if through sustainable use of natural resources. However, these natural resources are commonly not used effectively. To reverse the natural resource degradation the government and developmental organizations are aggressively engaged in soil and water conservation, climate change adaptation and related activities. Rajasthan is an important mineral resource area of the country having almost complete monopoly in the mining of nonferrous minerals like Zinc, Gold, Silver and having large reserves of ferrous minerals such as Iron-ore and Manganese; Non-ferrous minerals like Copper ore and Lead; nonmetallic minerals such as Dolomite, Calcite, Emerald, Felspar, Garnet, Mica, Rock Phosphate, Magnetite and building stones like Marble, Lime stone etc.

Agriculture and animal husbandry form the mainstay of the state's economy, representing 44.79 percent of the state's revenue in 1994-95, as against only 31.74 percent of the country as a whole. There are two agricultural seasons –Kharif and Rabi, of which Kharif season particularly depend on the quantum of rain as well as its proper distribution over a reasonable time span and its intensity. Surface water resources are scarce as there are no perennial rivers traversing the southeastern region of the state. There are four major sources of irrigation, viz., canals, tanks, wells and tube-wells.

1.2 The State of Rajasthan-

The state of Rajasthan is situated in the northwestern part of the Indian Union (23° 30' and 30° 11' North latitude and 60° 29' and 78° 17' East longitude) and is the second largest state in terms of area (3,42,239 sq. km). It shares its geographical boundaries with the states of Punjab (in the north), Haryana (in the north-east), Uttar Pradesh (in the east), Madhya Pradesh (in the south-east) and Gujarat (in the south-west). It also has a long international border with Pakistan in the west and northwest.

The Tropic of Cancer passes across the southern point of the state in the Banswara district. The capital city of Rajasthan is Jaipur. Rajasthan experiences extreme climate or weather and consists of four distinct seasons- Pre-monsoon, Monsoon, Post-monsoon and winter. The average temperature in winter ranges from 8° to 28° C (46° to 82° F) and in summer the average temperature range from 25° to 46° C (77° to 115° F) making the region parched and draught-prone.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

1.3 Natural Resources of Rajasthan

The extensive topography includes rocky terrain, rolling sand dunes, wetlands, barren tracts or land filled with thorny scrubs, river-drained plains, plateaus, ravines and wooded regions. A massive portion of the state of Rajasthan (about 70% of total landmass) is desiccated and encloses the biggest Indian desert- the Thar Desert known as the 'Maru-kantar'. This desert region embraces the districts of Jaisalmer, Barmer, Bikaner and Jodhpur. The oldest chain of fold mountains the Aravali Range spearheads the state into two geographical zones. The Mount Abu is the only hill station of the state, which houses the loftiest summit of the Aravali ranges- Guru Shikhar Peak.

The soil and vegetation of Rajasthan alters with its wide-ranging topography of the state and the availability of water. Rajasthan soils are mostly sandy, saline, alkaline and chalky (calcareous), Clay, loamy and black lava and so on. Only 9.36% of the total geographical region lies under forest vegetation. The State has a variety of soils that support cultivation of a diverse range of crops such as wheat, rapeseed, mustard, soy bean, millet, maize and cotton.

The flora and fauna are particularly endemic to the arid regions and are specially adapted biologically to survive in the dry, waterless regions of the "Desert State of India". There is a very rich habitat to wide spectrum of wild-life including avifauna comprising Tigers, Leopards, Wolves, Black Bucks, Chinkaras, Desert Fox, Great Indian Bustard, Migratory common Cranes, Ducks, Coots, Pelicans etc. in its lush green forests.

1.4 Crises

The poor households depend relatively more than the others on the natural resource endowment that they can access. The state all through remained a significant resource area of the country. It used to have rich forest area having timber, fuelwood, fodder, minor forest products and above all, a very rich 'gene bank' with variety of vegetation and animal species, profusely available in the region. Unfortunately, the situation has changed significantly during last four decades and depletion of its resource base is causing concern to even one. In a state where the majority of the population relies directly on the natural resource base to meet its daily needs, widespread environmental degradation poses an immense threat to livelihoods. Some of the driving forces, which are responsible for environmental degradation in Rajasthan, include-

- Increased demand for resources;
- Limited Water & Energy Resources
- Changing land-use patterns
- Increased pollution load on air, water and land.
- Increasing densities of population (growth, mobility, distribution & structure)
- Rapid urbanisation;
- Migration to urban areas;
- Increased and concentrated generation of pollution and wastes;
- National and International Policies, Liberalisation and privatisation of economy
- State Policies & Programmes

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

The most important factor that is going to govern the future trend of development is the availability of electricity and water. The state is rich in minerals, however except for the low quality lignite found in Barmer, state is totally devoid conventional sources of energy i.e. coal and hydro-electricity. While coal for thermal plants has to be hauled all the way from the eastern states, Rajasthan has to depend on Central Grid to reduce the gap between the supply and demand. Similarly, the State has very limited water resources as can be assessed from the fact that though constitutes 10.4% of country's area it is bestowed with 1.16% of water resources only. Likewise, groundwater resources are only 1.70% of the total groundwater resources of the country. Whatever water resources there are, these are being over exploited. According to the latest Report "Dynamic Groundwater Resources of Rajasthan" prepared by GWD, the overall stage of groundwater development (exploitation of ground water) in March 2004 stood at about 125%. As there is increasing trend of ground water utilization, situation is expected to get worse with every passing year. Water table is going down in many parts and with it, water quality is also deteriorating. Excess of dissolved salts, chlorides, fluorides and nitrates has rendered the water unfit for human consumption at many places. Today all the 32 districts of Rajasthan are endemic to fluorosis, a crippling irreversible disease (teeth and bone deformities) caused by excess of fluorides in drinking water affecting children in particular.

With growing urbanization, requirement of water for drinking purposes is going up very fast. New dams and reservoirs are being constructed primarily to meet drinking water needs of urban areas as well as small towns and enrooted villages. It has been made mandatory by the State Government the 30% of water in irrigation canals shall be used for drinking water. This has already resulted in agitation by the farmers, and such incidents are likely to increase with time. Industrial progress is also being stalled because of shortage of water.

On the other hand, the ruthless deforestation and degeneration of natural pastures, increasing occurrence of erratic rainfall has resulted into excessive surface run-off, soil erosion and soil transportation. Environmental degradation, including biodiversity loss and water quality decline, is a major problem facing the farmers of Rajasthan.

Further, lack of management and institutional capacity, and over exploitation have heavily damaged Rajasthan's natural resource base. The frequent droughts have had an additional negative impact. As a result, the state's vulnerability to natural disasters and food shortages has increased, and additional pressure is put on the state's most important resource base. Many smallholder farmers in vulnerable areas continue to face complex challenges in adoption and adaptation of resource management and conservation strategies.

Not to forget that, sustainable development require a sustainable natural resource base, which is characteristically fragile in most districts of Rajasthan. Efforts to protect the natural resources and its biodiversity have been few and far between. A very small share of the pasturelands and forest area is protected. There remain unattended large tracts of barren lands and wastelands. Such lands can be suitably treated. This would check degradation and generate more resources for the livestock. More number of surface water bodies can help harnessing rainwater, which

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

would also increase the groundwater potential. Institutions that manage the common resources are weak and largely ineffective.

1.5 Rationale for the study

In such a scenario, regional delivery of natural resource management (NRM) is the main mechanism to address such issues. Efforts to augment the natural resource endowment would benefit both the APL and BPL households alike, though initially at least the average benefit of the APL may be higher, as they collect more output from these resources. The Encroachment of forests and pasturelands reflects weaknesses of existing institutions, civil society and absence of community based institutions.

Infect, over the last two decades, a growing consensus has emerged among both the academia and the development institutions on the need to experiment with new ways to work with local communities on efforts to improve the management of natural resources. The conservation/development interface poses new challenges for dealing with a multiplicity of stakeholders and social players operating at different levels and with diverging degrees of power. These dynamics lead to a constant different type of negotiation over the outcomes of conservation and development initiatives. Not only are rural communities facing off with government agencies, business interests, and nongovernmental organizations, but within the communities, themselves there are also significant differences in interests, perspectives, and power. In addition to emphasizing the need for more “bottom-up” or “participatory” approaches to development, many development planners and donor agencies have become increasingly aware of the area-specific nature of environmental degradation.

With this, several efforts are being made at government, organizational and individual levels to improve natural resource management practices. Yet fundamental understandings about the effectiveness and optimal design for regional NRM management are lacking. Natural Resource management is a key determinant of the capacity of regional NRM institutions to make effective decisions and integrate decision-making and action across ‘triple bottom line’ concerns.

At the same time there is enough evidence that “Rural and indigenous people” possess their own knowledge, practices and representations of the natural environment, as well as their own conceptions about how human interactions with nature should be managed. This indigenous knowledge forms the basis for decision making and survival strategies in the rural areas. The survival of this indigenous knowledge as a dynamic and vibrant resource within rural and indigenous communities depends upon its continuing transmission from generation to generation.

With this backdrop, “Studying the Good and Effective Practices” is the most comprehensive look at natural resource management by the people in different areas of rural Rajasthan: their attitudes, current practices, changing human behaviors in order to improve the conservation, sharing of benefits and sustainability based on the range of resources available to a community, decisions concerning their livelihoods and the management of their resources.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

The idea of Effective Practices Study is based on the observation that carefully documented case histories can provide excellent guidelines for policy making and planning new projects. It intends to encourage researchers and policymakers to incorporate indigenous knowledge into their project proposals, feasibility studies, implementation plans and project assessments, and to take indigenous knowledge and practices into account in all activities affecting local communities.

1.5 The objectives of the Study are to:

1. Establish a theoretically robust understanding of Effective Practices on Natural Resource Management and Development in different regions of Rajasthan
2. Review the literature on the benefits of, and concerns about, NRM arrangements and structures in different regions of Rajasthan
3. Develop indicators and guidelines for good Natural Resource Management and Development in different regions of Rajasthan
4. Identify aspects of Natural Resource Management and Development that should be targeted for improvement in different regions of Rajasthan
5. Sharing the status of current practices, indigenous knowledge, innovative/best model and reapplication with different stakeholders like community, government, and individuals working on the issue.

1.6 Study methodology

Overall, the study lays special emphasis on:

- knowledge communities: communities of practice and knowledge discourse; focus on some specific set of work practices, and knowledge networks on creating and sharing more generic knowledge that may have some potential future application and utility
- Knowledge landscapes: maps of relevant knowledge domains and their relative importance.

Of the central place of 'effective practices', the overall guiding question is how and to what extent an effective practice approach could assist to promote NRM approaches in different regions of Rajasthan. Related to that, there are three issues that are more specific or questions that the study tries to address:

a. Thematic or process 'focus' questions: What practices in what processes could or should be the target; What innovative approaches are there for collective participation and decision-making in research on NRM problems and processes
b. Implementation or strategy questions: how could change processes towards better NRM be effectively supported by partner NGOs, Where are new kinds of linkages between farmer-led research initiatives and formal-led ones
c. Organizational questions: depending on the decisions on focus and approach, what – categories or types of- organizations should be involved in the management and sharing of best practices and knowledge.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Framework for development of Effective Practice model for Natural Resource Management

Based on the review of documents of partner and other NGOs active in the field of NRM in the study area, it is clear that a best practice model for NRM should meet the following criteria (see Figure 1):

1. A clear nexus between an organization's legislative requirements, community requirements and the strategic objectives for natural resource management
2. Clearly stated goals (desired outcomes) that are derived directly from the strategic objectives
3. A plan of natural resource management programs and activities at both the organization and the target community level for meeting the strategic objectives within a specified time-frame (both medium term and annual)
4. Performance indicators and targets against which the degree to which goals were achieved can be assessed, at both the organization and community level
5. Natural resource monitoring programs that provide data for the assessment of performance indicators.

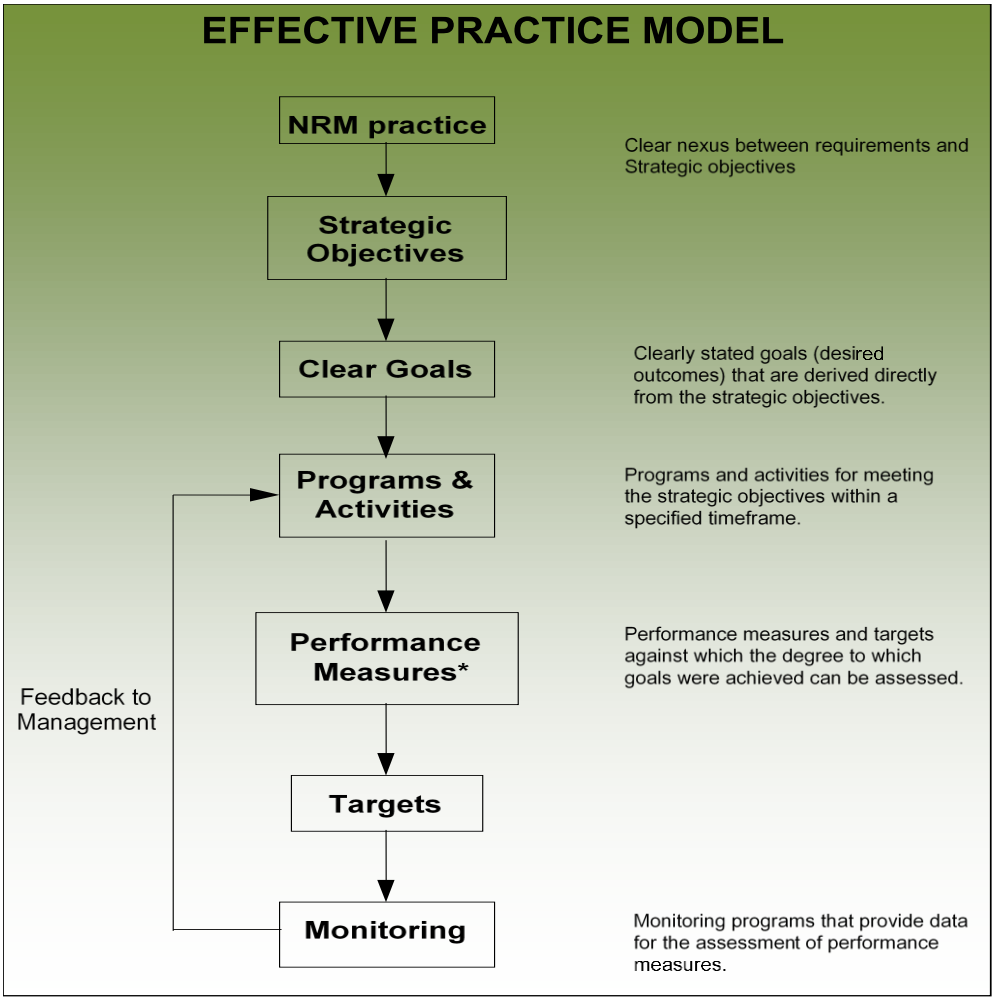


Figure 1. The Effective practice model.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

***Performance measures for Natural Resource Management Best Practices**

- Ecological sustainability
- Improve knowledge about appropriate resources
- Enhanced risk management tools
- Cost benefit
- Ease of implementation
- Incremental and transformative changes
- Community maturity level, capacity built
- Inclusiveness, building broader stakeholder engagement, coordination and convergence
- Addressing state specific issue, integration with regular planning and budgetary process
- Gender equity
- Knowledge sharing
- Benefit sharing mechanism

1.7 Study area

The present study focuses on Jaipur, Jodhpur and Udaipur Divisions of East, West and South Rajasthan. Overall 7 organizations namely Kumarappa Institute of Gram Swaraj (Jaipur); Shiv Shiksha Samiti (Tonk); AFPRO (Udaipur); Prayatna Samiti, (Udaipur); Sahayog Sansthan, (Udaipur); Idea Sansthan (Jodhpur); Sahaj Sansthan (Jodhpur)of these three areas have been studied for the purpose of identification of few best practices in NRM.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Chapter 2- Building Local Institutions for Natural Resources Management

Category of Practice:	**CBNRM**
Title of Best Practice: -	**Strengthening VDCs**
Region:	**Bijalpura Village, Piplu Tehsil, Tonk District**
Organization:	**Shiv Shiksha Samiti, Tonk**

2.1 Context and Genesis

This chapter examines the role of Local Institutions in sustainable development, leading to rural communities capacitated to protect and manage their natural resources by demonstrating the Community Based Natural Resource Management (CBNRM) approach.

Study of this category tries to answer the following questions –

1) How the power relations between all stakeholders involved shape the community based natural resources management approach,
2) To what extent the decision-making and regulation reside with the local resource users and,
3) How much of the benefits of resources management accrue to the local community.

2.2 About the Area

The population of Tonk district as per 2011 census (provisional) is 1421711 and the population of Piplu tehsil is 101259 (2001 census). The district is primarily an agricultural district and the fact file of the district is as follows –

Average annual Rainfall	cms.		61.36
Total Physical area	Hectares	2009	717958
Forest	Hectares	2009	27614
Uncultivable land	Hectares	2009-10	26559
Permanent pasture and other *gochar*	Hectares	2009-10	41776
Unused Cultivable land	Hectares	2009-10	43726
Total cultivated land	Hectares	2009-10	460913

Animal Husbandry is the one of the major sources of livelihood, and regulation of pasturelands is of utmost importance. In the pre-Independence era, villagers managed common lands without external intervention. Natural Resource Management was based on mutual agreement to follow a set of unwritten norms on animal grazing, penalty to encroachers etc. Under this system, there was control over cutting trees, encroaching on common land etc. However, Post Independence, this system collapsed and the pasturelands came under the control of the village Panchayats. The Panchayats usually looked upon the village common lands as a source of income and did little to regulate use of the same. This led to malpractice and degradation of the pasturelands.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Water has high levels of Total Dissolved Soluble (TDS) leading to reduced soil fertility. These area specific problems are coupled with droughts leading to challenges for sustainably managing natural resources. The community has been hit hard by the repercussions of declining agriculture. Against an average rainfall of 600 mm, Tonk gets only 323 mm. When the monsoon does come, it is essential to carry out surface water storage to establish moisture, provide drinking water for animals, domestic use and gravity flow irrigation. Most villages have a large water holding structure, or talab to use either for irrigation or for recharging ground water. Village tube wells with hand pumps and open wells can only function if the recharging structures are in place. Drinking water supplies are fully dependent on ground water, and agriculture relies on it for 80% of its needs, so it must be recharged.

2.3 The Practice –

The case of CBNRM in Bijalpura village cannot be understood without taking cognizance of a RDP project, which began in 2005. The project followed a right based approach, with a broad objective to Strengthen Village Development Committees (VDC) to fight for their rights. Natural resources utilization subsequently became the appropriate land and water-use option for these people. The project made an enormous impact on the local planning and rural development process and bore the following preconditions for successful CBNRM in the years to come:

- A true community based project needs to accommodate the interests of all local resources users within the community in terms of participating in the decision making and benefit sharing.
- Local organizations must have sufficient power to really manage their natural resources and
- They must have the capacity to cope with the potential intra-community conflicts of interests

The above approach was built upon three (3) assumptions:

1. Management responsibility over the local natural resources that is devolved to community level will encourage communities to use these resources up to sustainable levels.
2. The “community” represents the interests of all its members.
3. Communities are keen to accept management responsibility because they see the (long-term) economic benefits of sustainable utilization, and they are willing to invest time and resources in natural resource management.

There are three tiers of practice; at panchayat level, block level and district level. The district level manch interacts with the district level local government committees and forms a bridge between the VDCs and the district administration. For each level of advocacy the active leader representatives from each VDC are empowered through Leadership Trainings, Trainings related to pasture Land Act, Vertical and horizontal grading of the groups and exposure of Manch

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

2.4 Achievements-

Ecological Sustainability - This VDC plays an active role for the maintenance of the natural resource and has laid a set for natural resource-based planning with the sparsely distributed communities on how to manage the water and land resources.

- Social mobilization for enhancing community participation in Eastern Rajasthan Development Project supported by a donor agency.
- Introduction of already proven systems like Chouka system.
- Promote step cropping on hill sides
- A total of 724 hectare area was covered under the water harvesting project in which 10 kms. Medbandi, 1 nadi, 3 checkdams and 7 hectares pasture land was developed through pre-watershed activities.
- Construction of a model watershed has been done near the village in view of livestock and agricultural needs
- Regular village level, State Level and District Level meetings organized for making their plans

The CBNRM process includes a number of steps and the application of various guidelines and regulations.

- The land and water resources are closely monitored and no one is allowed to damage the natural vegetation and water resource.
- The use of water of Devsagar is restricted for animals only, where about 700 cows and buffaloes and 8000 small ruminants come to drink water daily from 12 villages from nearby areas.
- If the water of Devsagar is used for any other purposes for example irrigation then a penalty of 5100 rs. is imposed on the user, for bathing the cattle the penalty is of Rs. 1100/- . The VDC keeps the record of money collected as penalty and uses it for village development.
- Maintenance of Devsagar is the responsibility of VDC
- Responsibility for the maintenance of the system of water distribution is of VDC
- Penalty for hunting wild animals, water animals or birds is Rs. 2100/-
- For the development of the sagar, support must be taken from the panchayat, and local contribution, responsibility of implementation of any developmental activity is on the VDC

Community indicators to predict the monsoons

In Rajasthan profuse flowering of neem and khejari indicate a good monsoon. The timing of flowering indicates early or late monsoons. Aakha Teej is also important for predicting the monsoon season. Chirping of certain birds like khemedi, goghra and lomdi is considered auspicious on this day.

Gender Equity - 50%Female representation in Village Development Committees is nonnegotiable.

Improvement in Knowledge about appropriate resources -

- Sensitization the VDC representatives on climate change, its effects and need for adaptation and risk reduction

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

- VDC representatives made aware of current global and national climate change policies and negotiations
- Capacity Building of the VDC on CBNRM

Wheat being taken out from the double walled chamber

A low-cost Passive-Cool Chamber for Preservation of Food Grains

High temperatures in the desert region, especially during the summer months, affect the keeping quality of food grains. Conventional methods of fod grain storage are costly. A low cost passive system has been developed by the community to preserve the food grains for one year. The storage is a double walled system made up of bakes, bricks and cement, lined up with cow dung. This chamber reduces the temperature inside.

Inclusiveness, building broader stakeholder engagement - 4 SHGs have been formed and provided training on record keeping at the same time other CBOs were been created for example – Women Awareness Forum, Water User Committee, Dairy Union and Pastureland Preservation Forum. Moreover in 2000-2001 Bijalpur watershed plan was developed by the VDC, later on effective implementation of the same was done by the VDC with support of CRS

Incremental and transformative changes - In 2005, the nearby VDCs were organized in a manch and linked with the Aajeevika Evam Charagah Bachao Abhiyan. The efforts of the manch are as follows –

- Advocacy at block and district level for preservation of pastureland
- Advocacy for full payment for full work in NREGA
- Village electrification under Rajiv Gandhi Electrification project
- Reconstruction of village school previously built by poor quality material
- Inauguration of AWC in the village
- Prevention of the sale of alcohol within the village
- Efforts to prevent child marriages, 1 child marriage was stopped
- Advocacy for linking Bijalpura with Mandap Baigumpura and Ranoli
- Sites developed under the watershed were linked with NREGA and Hariyalo Rajasthan projects of the Government

- VDC was honoured by Commendation letter from the Chief Minister of Rajasthan State
- VDC was honoured by Dhundhar Ratan Gram vikas Navyuvak mandal, Lapodiya

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Community maturity level achieved - Community members were involved in all steps of planning implementation and monitoring. People suggested the place for stopping water, shared traditional knowledge about the condition of land. Formation and strengthening of CBO's (SHG's and farmer groups) was the entry point in community followed by formation of Village Development Committee's at the hamlet level

2.5 Impacts

- Increase in forest animals and birds
- Increase in water level
- Increase in total irrigated land area
- Increase in average yield per hectare
- The level of fluoride has fallen
- Farmers now take two crops *in a year*

2.6 Replicability

The Community Based Strategy for Rural Development is a participatory approach that is adopted by the government in an attempt to further decentralize planning and development to village level. The strategy is built upon the same principles as CBNRM: to encourage people to take part in rural development, they have to be given incentives and the responsibility to create "their own development" It made the effect on other district also

2.7 Success Factors

- The organization did many works related to land improvement to complement the effort of strengthening the VDC
- Made a strong group of VDC
- Awareness generation of VDC with the help of trainings
- People started understanding and talking about agriculture practices

2.8 Learnings

Resource management practices are not sustainable if they are not profitable. Some practices that are for the good of the environment (or are a 'public good') generate no economic return, yet require time and finance to implement – and may generate a need for ongoing maintenance or impose other costs on management. In such cases, it may be necessary for the public to support the activities if they are to prove viable for a producer to incorporate into ongoing NRM. The community-based approach has been an important component of NRM activity.

To ensure peoples' participation, Village Development Committees can be created to identify problems, prepare plan, implement and maintain the created assets.

The VDCs need to be empowered to execute the NRM programme, resolve problems within the community to fulfil their basic needs and enable government to play a contemporary role. They must consist of the multiple users' committee, such as water users committee (if any storage structures), forest protection committees, fodder development committees, seed distribution

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

committees, self-help groups (women and men) and social-cultural committees. This is often justified for identifying sectoral interest groups and for efficient management of the resources.

Sustainability will not only be assured through the continued availability of financial resources, but also through the continued and increased commitment of government to CBNRM.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Chapter 3 – Enhancing Adaptive Capacity to Climate Change

Category of Practice:	**Coping Strategies to Climate Change**
Title of Best Practice:	**Water bank and Agro met Labs**
Region:	**Kundai Village, Bhinder (Vallabhnagar) Block, Udaipur District**
Organization:	**AFPRO, Sahayog Sansthan and Prayatna Samiti, Udaipur**

3.1a Context and Genesis

Recognizing that global change and in particular global warming has and will have serious impacts on biophysical environment and the socio-economic conditions and livelihoods of people in semi arid regions of the state where land productivity is already extremely poor and agriculture is in the back seat. At the same time, livestock production is almost negligible and there are minimal sources of employment. Climate change will also affects species composition and diversity, habitats and the occurrence of rare and endangered species as well as invasive species in the area, thus jeopardizing the conservation the environment.

Coping with climate risks is an important factor in shaping indigenous biodiversity may succumb to new global forces. Participatory research/ management could turn people's callous/ negative attributes to positive attitudes towards protected areas.

This chapter examines the role of Local Institutions in sustainable development, leading to rural communities capacitated to protect and manage their natural resources.

Study of this category tries to answer the following questions –

1) To what extent the water use efficiency can be increased through interventions for better water management
2) How can Community's access to weather monitoring and prediction data combined with community managed water resource systems can lead to greater water use efficiencies and improved adaptive capacities?

3.2a About the area

Udaipur is one of seventeen drought-prone districts in Rajasthan. Average rainfall is 625 mm, and although very variable, there is a 75% probability that rainfall will be at least 500mm. It receives slightly more rainfall than the state average. Udaipur is less urbanised (17% in 1993) than Rajasthan state as a whole (21% or higher), but apparently more densely populated. Forest area share is significantly higher than for the state as a whole, net sown area share less and irrigated area share higher. Land holdings are smaller than the state average, and value of agricultural output per unit area significantly higher. The percentage of people employed in agriculture is slightly higher than the state average. These data tend to imply that the district is

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

agriculturally relatively advantaged vis a vis a large part of the state- particularly if population density is higher or similar to the state average.

There are about 107 – 110 wells in Kundai village out of which only 64 were in operation when the project was initiated. Ground water availability is very limited; the water level is generally 8 – 10 meters below the ground level which decreases drastically during the summer season resulting in acute shortage of drinking water for human beings as well as animals.

Agriculture is mainly rainfed and the total irrigated arable land is 10%, unirrigated arrable land is 16%, private uncultivable land is 27%, cultivable wasteland is 24% and pastureland reserved for cattle is 23%.

Maize is the main kharif crop followed by gawar and urad.

3.3a The Practice –

The project on enhancing adaptive capacities to climate change in particular recognizes the value of traditional systems to sustain agricultural activities in the face of frequent drought. The programme design was built upon the traditional coping strategies of the communities and adapted traditional technologies such as small water harvesting structures and community based harren management systems as an entry point.

The interventions covered three broad categories of approaches, aiming at

a) increasing the amount of water available (e.g. reducing run-off through water harvesting structures);
b) improving water management in order to increase the water use efficiency (e.g. increasing water distribution capacity); and
c) reducing agricultural water demand.

In Dhudh Talai hamlet of Kundai village an improved irrigation system in the form of **"Water Bank"** was introduced with the objective to increase the cultivable land of 12 families and thereby cover entire area especially up lands under irrigation, save energy and time for irrigating fields, conserve water and maintain good storage of groundwater in the well. The hamlet well is situated at a low lying point in the valley, before the intervention farmers were using plastic pipes to irrigate fields close to the well, hence a big portion of land remained unirrigated. Intervention included Community Mobilization, formation of CIGs, creation of awareness to CC at all levels including school children, Capacity building on prediction of weather and weather related matters, SWC measures, Agricultural practices, crop planning, water management, Pasture dev & Livestock Management etc., Installation of Mini Agro-met observatory labs in the project village,

The 'Dhudh Talai' water harvesting structure in Kundai was constructed about 40-50 years ago for the purpose of storing water for village cattle and for recharging the wells located downstream of the structure. The structure was damaged by heavy rainy spells and flash floods in 2006, leading to reduced water storage capacity due to leaks in the dry stone masonry wall. Moreover, farmers noted that the structure was lacking an adequate spillway for excess water.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Development of common and joint private pasture lands, Breed improvement in Goats – SIROHI, Sloppy Land treatment, Lining of irrigation channels including 'Haren', Construction of Improved chullahs, rennovation of the existing open well and installation of two water reserviors (one at a higher altitude).

Water bank in Kundai Village

The beneficiaries of the Dhudh Talai water harvesting structure held a meeting in the month of May 2007 and approved the plans for the renovation of the structure. They agreed to contribute 20 per cent of the total cost in the form of labour. They approached the Gram Panchayat of Kundai village to seek permission for the initiative.

3.4a Process:

A series of meetings with the farmers were organized wherein concept of proposed water bank was discussed and their suggestions were considered. The plan of action was prepared jointly and accordingly following steps were taken:

- Topographic Survey – A topographic contour map of the area was prepared with 1 meter contour interval depicting elevation of different land holdings and reduced level of well was marked.
- Land use map of Dhudh Talai has been prepared on the basis of land record data from revenue department and field mapping of different land units. Production data of different crops in Kharif and Rabi have been compiled for the year 2006-07.
- Base line survey of 12 house holds of Dhudh Talai has been done in the year 2006.
- The yield test and short duration pumping test was carried out in the open dug well of Dhudh Talai to ensure availability of groundwater in different season.


Village meeting

- The renovation of well has been done with the participation of the stakeholders and only cement was provided form project grant for this job.

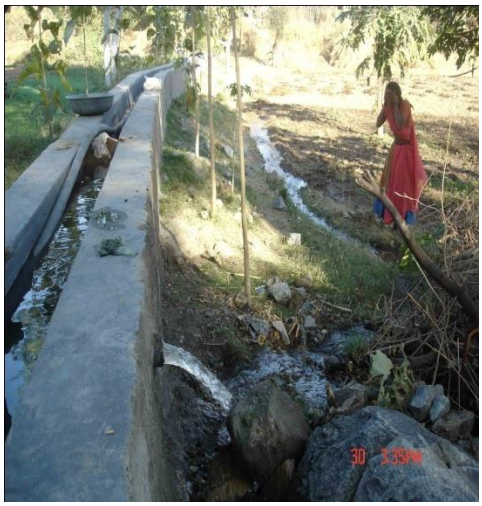
A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

- The engineering design of the water storage tanks and lay out of pipes has been shared with the farmers of Dhudh Talai and all the stake holders were present on site at the time of marking lay out of pipes and sites of construction of water storage tanks.

3.5a Unique features of the project design

- **Composite irrigation system:** with all the components at fixed location and well placed.
- **Simple operation:** opening valves of the underground pipes immediately provides water flow for irrigating fields.
- **Time saving:** there is no need to transport pipes up to the fields for irrigation fixing and breaking pipes not required.
- **Energy saving:** Only one 5 HP electric motor is operating in place of 3 Diesel pumping sets and gravity flow for irrigating fields, thus pumping hours are reduced
- **Total irrigation area coverage:** The water reservoirs at higher levels cover entire area for irrigation including up lands, which were not covered earlier.
- **Low maintenance:** The pipes are buried underground therefore least affected by weathering and are not subjected to frequent breaking and cracking as there is no frequent transportation from one place to another. There is no risk of theft of pipes.
- **Efficient water management:** The irrigation water is properly controlled and reaches every part of the field through natural gradient of the field. In event of less water availability in the well, the water storages can be filled up during rise of water table and by the time irrigation is applied through reservoirs the well is allowed for recuperation, as a result fast depletion in water level is checked.
- **Water conservation:** There is no wastage of water during conveyance from well to the storage tanks and fields.
- **Water Storage security for critical time:** The irrigation is not totally dependent upon lifting devices, in case of electricity cut off the reservoirs would supply irrigation water. The reservoirs are secondary water storages in addition to well water.
- **Crop diversification and land use:** Farmers have grown seasonal vegetables and used that piece of land wherein regular crops were not grown due to limited extension and location. In the uncultivable hilly pasture land mango and lemon trees have been grown.
- **Organized and proficient water user group:** The operation and maintenance of water bank has developed a good understanding amongst different members and they have emerged as a wise group who takes decisions for optimum use of the available water resources and farming decisions.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017



Lining of Irrigation Channel and Renovation of well – Kundai

3.6a Achievements

Ecological Sustainability - Through the installation of the water bank, the area under irrigation in Dhudh Talai was increased by 6 bighas. Out of the 12 households of Dhudh Talai, 10 households benefitted from the intervention, with a largely equitable distribution of additional irrigated land amongst the families.

The enhanced capacity of the well can now sustain the drinking water needs of the community throughout the year and the irrigation requirements of the total land under irrigation. A minimum of 8 irrigations were done during Kharif and Rabi of 2008-09. The facility has even allowed for the cultivation of vegetables and green fodder for animals after the harvesting of the Rabi crops.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

The benefits from the improved irrigation infrastructure became evident in the Kharif season after the completion of the works. Through the newly installed water bank and irrigation facility the entire maize crop could be saved during drought.

Improvement in Knowledge about appropriate resources -

- Sensitization of the community representatives on climate change, its effects and need for adaptation and risk reduction
- Capacity Building of the community members and water user groups
- Creation of awareness at all levels including school children,
- Capacity building on prediction of weather and weather related matters

AGRO MET LABS

Crop-weather and pest –weather relationship at Kundai village has shown significant positive relationship of the yield with cumulative moisture use. As rainy period is shorter in Udaipur region, there is demand for the development of a weather prediction model to get maximum yield as this information can be utilized for crop planning under rainfed conditions. If there is no rain, farmers will not sow If the rain arrives too late for the usual crop sometimes another short duration crop or variety is sown, but also in some cases people just let the season pass.

Inclusiveness, building broader stakeholder engagement - Many farmers from nearby villages have visited Dhudh Talai and observed with keen interest the water bank infra structure, they feel that it is very well suited to this area and they should also have such a improved irrigation system in their fields also. It is therefore important to build capacity of other farmers for developing the infra structure with their participation and financial assistance from banks or other financial institutions.

Community maturity level achieved - Community members were involved in all steps of planning implementation and monitoring. People suggested the place for stopping water, shared traditional knowledge about the condition of land. Formation and strengthening of water user group was the entry point in community.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

The farmers of Dhudh Talai are very efficiently using the water bank irrigation infra structure for irrigating their crops. Although low rain fall during this year has resulted in insufficient groundwater availability even then agriculture production has been satisfactory. There has been a good understanding amongst farmers for operating and maintaining the infra structure.

The community reported that earlier conflicts used to come up occasionally over water use and water distribution across the households. External mediators had to be called to resolve the conflicts. Ever since the installation of the water bank and the improvement of water availability, no major conflicts have occurred as the community had not faced a situation of water scarcity.

3.7a Impact-

- Increase in water level
- Increase in total irrigated land area
- Increase in average yield per hectare
- Equipped with scientific know how the farmers now make optimum use of their land and other resources.
- Farmers are now more aware about the modern techniques of farming through Farmer Clubs constituted in the village.
- The groundwater level has increased making water available for drinking and irrigation throughout the year, with villagers now taking three crops are some of the other notable achievements of this project.

3.8a Replicability

- The infra structure of water bank can easily be replicated at number of villages where undulating cultivable land remains un irrigated due to inadequate irrigation infra structure.

Water bank of **Ambatalai in Girwa block of Udaipur** is another example of the success of the above approach. The water bank concept was introduced to Ambatalai village by **Prayatna Samiti**, Udaipur Under the SGP project of UNDP. This intervention was on an extremely small scale benefitting just three families. The cost of the infrastructure was barely Rs. 20000/-. The families are taking crops of organic vegetables and fruit trees.

3.9a Success Factors

- Intensive field study about topography, land use and sustainable water source.
- The important technical in puts for assessing storage of groundwater, designing the reservoirs and laying pipe lines etc. were provided by Hydro-geologist and Engineer.
- Investment and farmers participation is necessary for rising the infra structure.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

3.10a Learnings

The sustainability of local institutions depends on the ability to address community needs, capacity to take decisions regarding the programme planning and implementation through joint efforts, maintaining accountability and transparency, and availability of sufficient funds. The projects in study are more concerned with arresting and reversing on-going environmental degradation.

Community-based activities that involve mobilizing the community for management (for instance irrigation) provide direct immediate benefit to all the landowners, indirectly through employment for the landless, and towards Integrated Resource Management.

Category of Practice:	**Coping Strategies to Climate Change**
Title of Best Practice:	**Silvipasture development of Common Lands**
Region:	**Sagatdi Village, Bambora panchayat samiti, Udaipur**
Organization:	**Prayatna Samiti, Udaipur**

3.1b Context and Genesis

The poorer rural livestock keepers in Rajasthan tend to be small or landless farmers who do not have sufficient land to grow forage crops. For them common lands such as village grazing lands and state owned forests are the most important source of forage for their goats and other livestock but during the last few decades a large proportion of village grazing lands have become degraded. As a result, Pasturelands have now become a major focus of attention for development of Rajasthan.

This chapter examines the role of Community coping strategies in sustainable development, leading to rural communities capacitated to protect and manage their natural resources.

Study of this category tries to answer the following questions –

1. What impacts the common land development initiatives can have on livestock feeding systems and the type and number of livestock that the people keep?
2. To what extent are the small ruminant owners affected by the enclosure of common lands?

3.2b About the area

Sagatdi is one of the Village in Girwa Mandal in Udaipur District in Rajasthan State. It is located at about 25 km distance from its Mandal Main Town Girwa. It is 41.6 km far from its District Main City Udaipur. Male Population is 1903, Female Population is 1866 and the total Population: 3769. The forest belongs to the northern tropical dry deciduous forest. The livestock population is about 800 goats and 200 buffaloes

The major forest produce is timber and fuel but the timber production has now come to a halt. NTFPs are now the major produce from the forest, chief among them being tendu leaves, tendu

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

fruit, aonla, honey, custard apple, grasses, etc. the average land holding is less than two hectares. The common pool pastures and grazing areas are suffering from a severe decline due to excessive population burden, legal land privatization, illegal encroachments, government distribution of CPRs to individuals under various schemes to benefit the poor, etc.

3.3b The Practice

Silvi pasture Development was undertaken by the inhabitants of Sagatdi village in 1995 with the broad view to prevent encroachment and to obtain additional fodder for their animals at the time of scarcity. The approach taken has involved enclosure of the area and exclusion of all the ruminants in the protected area. This kind of work was a new experience for the local people and was initiated with extremely limited budget. The major hurdle was that the people from surrounding village had encroached the pasture with their animals and severly degraded it. Hence the immediate standard technological package was to construct a boundary wall, plant trees and sow grasses in the protected area.

The site for protected silvi pasture area was selected by the local men, their main concern was to stop the open grazing of neighbouring villagers' animals. Thus the main criterion was to choose an area adjacent to the village boundary. About 35 ha. of land were selected for protected pasture land development. Pasture committee members were selected from all sections of the society.

3.3b Physical structures

The villagers constructed a stone wall along the boundary of the site to keep out people from neighbouring villages and identified the natural flow of water to construct stone bunds in the dry stream to retain the water.

3.4b Planting of trees

The priority was fodder tree rather than timber and fuel. Only traditional grass and a few fodder trees were available on the common land. The organization selected primarily native species of trees for plantation.

3.5b Protection System

The villagers have employed a chowkidar who is paid @ of 5kgs. per crop of grass per family, i.e. a total of 850 kg per year. The gram sabha decides the size of penalty to be applied to offenders. Forage is normally only obtained from the enclosed area through cut-and-carry, and has to be stall fed.

3.6b Achievements

<u>Ecological Sustainability</u>

The most direct and visible benefit of protection and development work is increased biomass production. During the initial years the main biomass product was grass and dry wood. But over all these years, stock of woody biomass has also increased and now NTFPs such as fruits, gums, and lopping of tree fodder are being harvested.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

As silvi-pasture is regenerating it is also attracting certain species of animals which were either absent or very few previously.

The stone bunds have minimized soil erosion from the protected land and the runoff of rain water has slowed down, thereby recharging ground water in the area. As a result crop production on agricultural lands near the pasture land has increased by 20 – 25%.

Transformative changes

The pattern of livestock ownership has changed. The number of small ruminants has increased. The additional fodder availability for large animals is to the tune of two month's supply, contributing about 15 – 20% of the fodder. The forage is being stored for use in times of scarcity, it means that the owner no longer has to purchase forage at those times.

Community Maturity level achieved

People have become aware of their rights and of the procedures, and they have become more confident in interacting with outside agencies. The committee has full control on socio-political affairs of the village and is functioning very effectively. They were able to confront moves by the Nandivela village to encroach their land.

3.7b Impacts

- Local Capacity developed for conflict management
- Environmental protection
- Increase in the supply of fodder for animals
- Improved animal health
- Improved production from livestock
- Improved biodiversity
- Increase in ground water level
- Increase in average yield per hectare
- Villagers are now more aware about their land rights.

3.8b Learning

Pastureland development on common lands can be highly political. Villagers may hve their own agendas that may differ from that of the development agency. Development agencies should be aware of the political context in which they are operating.

Since Small ruminants are owned primarily by poorer groups they should not be overlooked in the process of planning for PSPA development. When developing the management plan for the forest, these communities should be free to choose grazing as an objective if they want to. This would have implication on management, for example planting fodder trees, as there are evidences that forest departments generally prefer non fodder trees.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Chapter 4 –Indigenous technological knowledge related to survival and subsistence

Category of Practice:	**Promotion of conservation and use local medicinal plants**
Title of Best Practice:	**Conservation of local biodiversity and promotion of Traditional Medicine knowledge for health security**
Region:	**Jhadol, Udaipur, Rajasthan**
Organization:	**Jagran Jan Vikas Sansthan, Udaipur**

4.1 Context and Genesis

South Rajasthan's Natural Forests are home to thousands of medicinal plants that form the primary source of health care for a large proportion of population of the area, particularly the rural poor. However, efforts aimed at equitable use of these resources are largely ineffective and harvesting remains uncontrolled. However, Local knowledge systems have been found to contribute to sustainability in diverse fields such as biodiversity conservation and maintenance of ecosystems services, tropical ecological and biocultural restoration, sustainable water management, genetic resource conservation and management of other natural resources. Local knowledge has also been found useful for ecosystem restoration and often has ingredients of adaptive management.

This chapter examines the role of traditional knowledge for sustainability of natural resources including forests, water, and agro-ecosystems across landscape continuum spanning from households through farms, village, commons and wilderness.

Study of this category tries to answer the following questions –

1. To what extent can the conservation and utilization technique of medicinal plants promote self reliance of resource poor people to meet their primary health needs?

4.2 About the area

The project was initiated in the seven networking states viz. Rajasthan, Bihar, Jharkhand, Himachal Pradesh, Uttranchal, Madhya Pradesh and Gujarat. Present document is drawn on the experiences of JJVS in 7 blocks of Udaipur district in Rajasthan state.

The area is inhabited by poor tribal and other backward communities living in forest fringes. These communities eke out their living through a combination of several marginal activities, which includes traditional agriculture, cutting and selling fuel wood, casual wage labor, and collection of non-timber forest produces. Although the area receives medium rainfall but due to its erratic nature income from farming is very uncertain. These uncertainties discourage people to go for intensive land husbandry rather they fall back upon forest to meet any deficit/emergencies they face. This is at the core of poorly developed farming system and prime reason for degradation of natural resources in the villages.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

These communities are deprived of their basic rights to sustenance and are victims of human exploitation by forward community social groups. There are practically no sources of livelihood. Because livestock productivity is poor, residents depend on subsistence farming. As in other blocks, migration is widespread, but migrants return to their villages for cultivation since the region still retains some of its natural cover. Road access to the interiors is very poor, and roads become partially or completely dysfunctional during the monsoons.

Marked features of the project area-

- Lack of employment opportunities is the major factor responsible for the abject poverty.
- Poverty has resulted in poor education, poor health status and low self esteem.
- On one hand poor education and poor health system is producing malnourished children, uneducated youth, weak and overburdened women and worn out men living in contempt.
- While on the other hand, lack of employment opportunities has built a hidden consent for migration as well as child migration.
- Agriculture is the major source of income but due to obsolete agricultural practices and land deterioration coupled with lack of irrigation facility agricultural produce is just sufficient for subsistence
- Livestock is an important source of livelihood in semi-arid regions but due to shortage of fodder animal produce and animal rearing is hindered, hence migration is a natural escape.
- The children are the worst sufferers due to such failing economic and social conditions as well as lack of information about the child rights.
- Secondary status of women and gender inequality are common features.
- Poor health status marked with non availability and poor access to health services, financial problems resulting in inadequate treatment at home, lack of awareness and malnutrition.
- There is an acute shortage of safe drinking water and lack of irrigation facility.
- Awareness about government programs is very limited; hence they do not get full benefits of such programs.

4.3 The Practice –

To conserve the medicinal plant diversity in ex-situ of the area Primary health Care (PHC) gardens were developed at the farmland owned by Gunis or village health workers. The size of the herbal garden was 50x50 ft. The small size was planned due to scarcity of water in most of the blocks and the high temperature conditions. The emphasis was laid on the development of threatened species. With the aid of this program fresh crude herbs were made available to Gunis and they no more had to depend on the market shops. This herbal garden became model for these villagers and also have a scope of being utilized for the cultivation of vegetables and fruits as well. These gardens would be developed on commonplace and would require to be utilized as community resources under supervision of one community worker. On each plant detail

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

specification relating to its name, and uses was specified so that people are able to know the important information about the same.

The entire effort was complemented with relevant trainings from time to time, exposures, awareness generation and networking activities. The project activities were implemented in seven networking states of previous phase of programme. The Project was centrally coordinated from JJVS headquarter, Udaipur which monitor activities in project states which are having networking partners of NGOs that monitor activities in their respective states. Local village institutions like Gram Panchayat, Gram Sabhas are actively involved for issues related to recognitions of biodiversity and related traditional medicines knowledge as well as its carriers i.e. Gunis.

The following activities were taken for the Conservation of Local Biodiversity and Promotion of TM Knowledge for Health Security during the project period: -

- ❖ Orientation workshop of Networking Partners & Project Staff
- ❖ Grassroots Recognitions and Scientific Assessment of TMK (Traditional Medicines Knowledge) of Gunis
- ❖ Community Health Knowledge Registers
- ❖ Primary Health Care (PHC) Gardens
- ❖ Awareness Camps
- ❖ Jari – Buti Seed Bank and Nursery
- ❖ Village level Training
- ❖ Guni Swasthya Mela
- ❖ Rashtriya Guni Sammelans
- ❖ Documentation
- ❖ Review Meetings

4.4 Achievements

This integrated approach included helping the people to discover their own unexplored capabilities and realize the potentials of their own underutilized resources. Simultaneously it built their awareness about the local environment and its linkages with sustainable livelihoods. In this context the Herbal garden model of integrated development represented a unique opportunity for tribal community to get greater control over their own development and management of their natural resources particularly medicinal plants.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Ecological Sustainability

The project components addressed capability building of local communities, which ensured the participation of each family in the programme. Gradually these groups were taken through intensive training and exposure on improved NRM practices and environmental regeneration. The approach ultimately led to increased medicinal plants production, processing, value addition, Packaging, augmenting food supply, fodder, fuel, timber and medicines. It as well ensured improvement of local environment through better water resource development and biomass production.

S.No.	Name of State	No. of seedlings raised	Species grown	Seeds collected
1.	Himachal Pradesh	39000	*Vilola odorata, Neelkanthi, Kachur, Justicia adhatoda Ocimum sanctum Aloe barabadensis Asparagus racemosus Kalonchoe pinata, Kuth, Terminalia chebula Terminalia belerica Phyllanthes emblica Cymbopogon martinii Spilanthes acmella Stevia, Tinospora codifolia*	*Solanum xanthocarpum, Barberis aristata Berginia ciliata Boerrhavia diffusa Centella asiatica Mentha piperata Ricinus communis*
2.	Uttaranchal	38200		
3.	Bihar	30500	*Ocimum sanctum Kalanchoe pinnata Justicia adhatoda, Phyllanthus emblica, Andrographis paniculata, Abrus precatorius Tinospora cordifolia Tribulus terrestris Boerhavia diffusa Abutilon indicum Cassia fistula Citrus aurantifolia Wrightia tinctoria Asparagus recemosus Enicostema hyssopifolium Bombax ceiba*	*Terminalia belerica Terminalia chebula Ocimum sanctum Mimosa pudica Gymnema sylvestre Abutilon indicum Abrus precatorius Celastrus paniculata*
4.	Jharkhand	33000		
5.	Rajasthan	39000		
6.	Madhya Pradesh	25000		
7.	Gujarat	25000		
		229700		

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

2 lakhs 29 thousand & **700** hundred seedlings were raised in decentralized **15** nurseries of **7 states** during entire project period. These seedlings of most of the herbaceous species have been distributed for plantation in PHC gardens. The species grown in nurseries were based on scientific assessment of documented traditional medicines knowledge. The collected seeds of plants will be used to direct sowing in gardens.

Ease of implementation

The first and the foremost benefit is the access to these healers will become easier for Tribal people in remote areas of the target villages. In all the three sub-districts, the availability of the modern doctors is very low. Each sub centers serves 3600 individuals on an average, and is usually staffed with one nurse. A primary health center serves 48,000 individuals and has average of 5.8 medical personnel appointed, including 1.5 doctors; where the availability of traditional healers is near about 1:1200. In this regard the cost of the medicines, treatment and the opportunity cost for accessing the treatment in the modern treatment is severely high as compared to the TM, in which the healers is mostly available within few kilometers area, cost of medicine and fees is very low and the time is also saved, thus the opportunity cost to avail the treatment reduces.

Incremental and transformative changes

Modern medicine is known to have serious limitations in terms of multiple side effects, drug resistance, monitory requirement and availability of the technical expertise, etc. in comparison to the traditional medicines that are developed from herbs and have no harmful consequences.

The project provides nutritional substitutes during their health camps and will train the health worker during the training. These substitutes will be utilized to fight against the deficiency of several nutrients among the women and children.

Socio-economic condition

Good health will increase efficiency and efficacy of an individual and hence precipitating into increased participation in economically productive activities. And moreover additional cost incurred into availing modern medicines and treatment will reduce. Another important aspect is that the socio-economic condition of the traditional healers will improve.

The social benefits anticipated from the project are

- Reduced migration
- Improved social status
- Improved health and living conditions
- Empowerment of women
- Learning to be self reliant

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Improved knowledge about appropriate resources

The project has created awareness among the community, among women on the accessibility and availability of the local resources and local knowledge, i.e. TM. The project has prime focus on dissemination of information of various disease and preventive measures to overcome these diseases. Awareness generation against the supernatural beliefs has particularly formed a secure hold on the health of Tribal community especially among the Tribals.

This project has promoted the conservation practice of herbs and henceforth the local tradition of our cultural medicinal heritage can be conserved and promoted for the societal betterment.

Replicability and sustainability

This societal promotion of TM can be replicated in many other villages. There are various other intangible outputs and outcomes of the project which motivate replication and are responsible for sustainability-

- Capacity building of number of women as health worker in villages for managing health problems at the village level.
- Systematic documentation of the remedies and the process.
- Sharing of experiences with support agencies and NGOs.
- Replication of the programme in other villages.
- Status of primary health care will be improved. It can be measured with set identified indicators and could be evaluated after the project terminates

4.5 Impact –

- Cultivation of medicinal plants in forest villages.
- Capacity building in cultivation, processing and value addition for selected medicinal crops.
- Land productivity enhancement.
- Employment and income generation for tribal peoples.
- Effective utilization of available land, water and manpower resources of selected tribal families through participatory approach.
- Implementation of environmentally friendly income generating activities.
- Development though peoples organizations.
- Active participation by women in development process and their empowerment
- Productive mutilation of wasteland and marginal lands which is the priority of the country
- Increased area under fruit crops which is a thrust area
- Increased forest area and decreased deforestation
- Conservation of natural resource like soil and water
- Creation of self employment for tribal mass
- Generation of employment opportunities for land less
- Increased production of fruits and other forest produces
- Increased production of food grains due to adoption of better agronomic practices
- Increased GDP

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

4.6 Learnings -

Adequate attention needs to be given to address the following concerns:

- Awareness among different stakeholders on their roles to conserve environmental resources and enable access to good health;
- Unsustainable harvesting and exploitation of biological resources and inadequate focus on resource mapping, threat assessment, conservation or sustainable use;
- Recognition of knowledge and practices of native healers or traditional health practitioners in health care delivery, and mechanisms of protection of knowledge on medicinal resources and practices held by healers and communities;
- Mechanisms for assuring standards on quality, safety and efficacy of such health services and products;
- Understanding by relevant stakeholders of the intricacies of traditional knowledge and methodologies for their assessment suitable for resource-poor contexts;
- Policy and financing mechanisms for strengthening community health through effective use of local resources and capacities—including biological resources and related traditional knowledge and practices.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Chapter 5 – Community Based Monitoring System of Basic Services

Category of Practice:	**Benefit Sharing**
Title of Best Practice:	**Community based water distribution mechanisms**
Region:	**Okatiya Bera Village in Balotra Block of Barmer District**
Organization:	**IDEA (Institute of Development Education and Awareness)**

5.1 Context and Genesis

In many parts of rural India the dalit and adiwasi populations are unjustly discriminated against and denied access to many government sponsored programs that could greatly improve their lives. In such a scenario the CBMS is being implemented by Idea NGO in Balotra block of Barmer district. The CBM approach seeks to provide the Gram Panchayat and local communities with a participative and evidence-based information system on access to Basic Minimum Services for needs based policy formulation and monitoring. It contributes to the reduction of inequalities in access to basic minimum services by providing disaggregated information on levels and distributions of health and access to health care and other services for different sections of the population. The CBMS involves systematic and regular gathering of baseline information at the community level, with a particular emphasis on vulnerable households.

5.2 About the Area

Barmer district lies between 24°58′ - 26°32′ N and 70°5′ – 72°52′. The total area of Barmer district is 28,114 km². The longest river in the district is the Luni. It is 480 km in length and drains into the Gulf of Kutch passing through Jalore. Barmer district consists of Barmer, Baytu, Shiv, Chauhatan, Gudamalani and Balotra Tehsils. In 2004-05, about 1.12 percent of the area had forest cover, 7.2 percent constituted pasture land, 25.13 percent was fallow land and 51.63 percent was cultivated crop land. The remainder was either not available for cultivation or cultivable wasteland.

The characteristic features of the climate of the district are its dryness, extremes of temperature and the fitful and erratic nature of rainfall. In summers the temperature soars to 48°C and in winters, it drops to 5°C. Primarily Barmer district is a desert where average rainfall in a year is 277 mm. Throughout the summer season, the heat is intense and scorching winds prevail. Even during monsoon, the air is dry in between the fitful spells of rain. The district is prone to droughts. The rainfall pattern among the regions is very much uncertain. Therefore, kharif cropping is too much uncertain in all the regions. Potable water in the district comes mainly from rain water harvested in large tanks. Wells, tube wells and hand pumps are also in use. The seasonal rivers, Luni and Jojree and the Narmada canal also flow through this district. However the water from the rivers is not potable.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Okatiya Bera is a dalit dominated village where people live in dispersed dhanis or homesteads. The village is located on the border of the district hence is extremely deprived of basic facilities. The traditional sources of water are bera, nadi and tankas. Normally there is no water in the nadis and the water of beras have Chloride[5900.00 mg/l],Calcium[604.00 mg/l],Magnesium[225.60 mg/l],TDS[13720.00 mg/l],Hardness[2450.00 mg/l].

Village Okatiya is commonly known as kala thal (The black Land), and has a history of discrimination with dalit people specifically for water. In past, there were several cases of molestation of young girls and women of the area who had to walk down 7-8 kms. daily to fetch drinking water. Traditionally the Dalit women were not allowed to touch the water source, and had to wait till the upper class women were done with the filling of water for their household purpose.

5.3 The practice

Water access for dalit communities during drought period through community based water distribution mechanisms covering dalit families.

This innovation was developed in response to the exploitative process of accessing potable water that the dalits have been suffering in western Rajasthan. The project recognized that access to water for dalits was an issue not only on account of unavailability of water and caste discrimination but more critically due to a lack of systems for carrying the water to the homestead and storing it.

A detailed feasibility and cost benefit analysis of the entire operation was undertaken. A Tanka was constructed in the **Meghwalon ki Dhani** under disaster management program of the Government of Rajasthan, when the area faced a severe drought in 2000. In the benefitting village a committee was formed comprising of 11 members, the majority was of women. Responsibilities of this committee included-

- water distribution and recovery of dues as well as resolving conflicts
- Maintenance of tractor and keeping checks on the driver
- Cluster level committee was also formed and responsibilities outlined included operational aspects as well as proper functioning of the tanker. The committee had the responsibilities of cluster level coordination of tanker.

Committee members were given leadership training 4 times in a period of two years. In which 4 female members were also given training to monitor the work of ANM, Proceedings of MDM, and Tanka construction. They were also given training on how to test water quality; a kit for the same was given to them which have equipments for testing the Ph, Turbidity, hardness, fluoride and chlorine content in water. At present one member of the community monthly checks the turbidity level and Ph level of drinking water of all the families of the dhani.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

5.4 Achievements -

Improvement in Knowledge about appropriate resources

Rajasthan is one of the most water scarce states of India. Not only is water availability stressed, access to water is a severely affected by caste dynamics. The dalits have limited sources to access water from and many of these sources are managed by the upper caste. In situations of droughts/dry spells, access is further limited as availability of water is reduced. In addition, water prices go up, further limiting access by the poor. The project devised a supply system specifically targeted at the dalits.

The project made available, a visibly valuable asset to the dalit community which not only built their self-image, it has also amply demonstrated the value of coming together for leveraging resources. Access to such an asset was reported to be a majorly empowering process also impacting the dynamic between the traditionally powerful and the powerless!

Inclusiveness, building broader stakeholder engagement

Saving of time spent on procuring water -During the field visits, the evaluation team learnt that while there was a reduction of waiting period by about 3-4 hours daily before a family could get water, at the same time, it also saved them from walking 7 -8 kms. daily. The time saved has reportedly translated to additional workdays under MGNREGA as well as less stress in completing household chores.

5.5 Impacts

- Dalits got access to water
- Asset creation by a traditional marginalized and highly vulnerable group of people
- Quality of life has improved
- Enhanced participation of women in their own development programmes
- Enrollment of children in schools has increased
- Improvement in health status of the people due to availability of safe drinking water
- Reduction in the rate of migration due to availability of water for animals
- Animal health has improved and Production from livestock has increased

5.6 Learnings –

The parallel system created for supplying water to dalits was perceived by mainstream water supplies as a challenge to age –old structures that controlled access to water as well as pricing.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

The new system setup by the project altered the power dynamics reducing the dependency of the dalits on upper caste families for meeting one of their most fundamental needs-water.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Chapter 6 - Conclusion

It is beyond the scope of this document to recommend specific strategies, curricula, materials, and leadership techniques that result in changes in specific outcomes. As all the organizations point out, achieving desired outcomes is influenced by community characteristics, learning capabilities, previous knowledge and experience, and other variables unique to local NRM programs. A NRM program that is effective in changing environmental attitudes or developing environmental action skills with one type of group in one location may or may not be effective with different groups or in different locations.

Our understanding of the generalizability of programs to groups and settings is extremely limited, the principles and findings made above can help guide us in the direction of achieving effective and efficient programs.

Overall, this study has reviewed the challenges that diverse stakeholders face and the effective ways in which they are tackling the long-standing problem of land degradation and sustainable management of ecosystems. The findings of the study suggest that resource poor communities, especially in marginal and rainfed regions, continue to face complex challenges in adopting and adapting alternative NRM innovations for mitigating this problem. In an effort to address this challenge, the approach to soil and water conservation itself has evolved over several phases.

The need for community participation and innovation is justified by the fact that most soil and water management problems tend to be site specific. This calls for the need to provide organizations with a set of flexible options to fit specific niches depending on perceived constraints rather than wholesome recommendations that promote a single technological and institutional package in all areas.

The review also indicates that adoption and adaptation of NRM innovations is constrained by failure to link conservation with livelihoods, extreme poverty and imperfect factor markets, inadequate property rights systems, and weak organizational and institutional arrangements at different levels. The best way to ensure adoption of innovations for sustainable NRM is to develop them iteratively, in collaboration with the target group. This can be done through linking formal research with indigenous innovation processes of local resource users and communities. Effective NRM interventions are characterized by a process of joint innovation that ensures community experimentation and adaptation of new technologies and management practices and careful consideration of market, policy and institutional factors that condition and shape natural resource conservation decisions.

The review and analyses provides the following key insights and lessons:

(a) Future land and water conservation projects should be flexible enough to respond to land users' innovations and inputs;
(b) Natural Resource management interventions should favor approaches that provide a number of different technologies and management practices, which

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

individual resource users can choose, test, adapt and adopt or discard as they see fit;

(c) Resource-poor farmers are unlikely to adopt interventions that do not provide short-term economic gains;

(d) Adoption of good & effective practices requires a conducive institutional and policy environment;

(e) Integrated interventions require community participation and collective action to coordinate and regulate resource use and investment decisions.

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017

Abbreviations

AFPRO – Action for Food Production
APL – Above Poverty Line
AWC – Aanganwadi Center
BPL – Below Poverty Line
CBM – Community Based Management
CBNRM- Community Based Natural Resource Management
CPR – Common Pool Resources
GWD- Ground Water Department
NREGA – National Rural Employment Guarantee Act
NRM- Natural Resource Managment
NTFP- Non- Timber Forest Produce
SGP – Small Grants Programme
SHG- Self Help Groups
SPDW - Society for Promotion of Wastelands Development.
SWC – Soil Water Conservation
UNDP – United Nations Development Programme
VDC – Village Development Committee
VLSP- Village based Livestock Service Provider

A10 Flat No. S1 Primerose Apartment, Budh Vihar-II, Ramnagariya, Jagatpura, Jaipur (Rajasthan) 302017