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Putting the issues together...

A Case Study Analysis on Conservation-Livelihoods Linkages in Khata Corridor, Bardia, Nepal

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Study, analysis and presentation by:
Tara Prasad Gnyawali
Senior Livelihoods Expert
Email: tara.gnyawali@wwfnepal.org

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"The people of Khata Corridor who depend on its natural resources for their livelihoods are largely poor. The composition of this community is heterogeneous; the community members' livelihoods priorities, strategies and approaches towards asset accumulation are, in effect, also different. In this context, the dynamics of wellbeing are diverse and one action, hence, will not bring about drastic and immediate changes.

There has been a reduction in the forest encroachment levels, especially by subsistence users, and they have been found to coexist in harmony with nature and wildlife. The engagement and participation of such users in corridor conservation also indicates that though a majority of them are deprived in terms of monetary assets, they are capable of leading and responding appropriately to challenges to conservation and biodiversity. This means that low incomes and social deprivation are not necessarily a predominant threat to conservation, although they definitely pose a challenge at the individual level. "

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WWF for a living planet®

Anil Manandhar
Country Representative
PO Box: 7660
Baluwatar
Kathmandu Nepal

Tel: + 4434820, 4434970

Direct: 4430736
Fax: + 00-977-14438458
www.wwfnepal.org

Foreword

Khata Corridor is a critically important biological corridor where WWF Nepal through its Terai Arc Landscape (TAL) Program aims to sustain the corridor's ecological and biological services with appropriate interventions and active participation and stewardship of the local community. WWF Nepal through TAL–CBRP has been working in Khata for the last decade. Our organization has invested in a valuable and critical biological corridor where its program is specially designed to protect the forest and habitat with significant contribution and stewardship of the program by the local community. We aim to review these results to ensure that a wider audience can benefit from and have access to TAL-CBRP initiatives, especially where biodiversity conservation and securing livelihood simultaneously is the agenda. Among its various projects that address biodiversity issues with underlying anthropogenic issues, the Khata Corridor is a critically important area for WWF Nepal.

Khata serves as the transit habitat for various species such as tigers and elephants from Katarniaghat Wildlife Sanctuary in India to Bardia National Park in Nepal. At the same time, WWF understands the complexity of livelihood issues, and ensures that there is local investment and support towards safeguarding the corridor – as outlined in the TAL Strategic Plan Document 2004-2014. It was felt that a more incisive case study be carried out focusing on the local context and issues and observed changes from an insider's perspective over a ten-year period starting 2001 when it began. This would allow more pace to be gathered for further interventions while also understanding prevalent issues and preparing areas for further joint interventions.

I would like to thank the residents of Khata Corridor for their whole-hearted efforts to bring about changes in Khata Corridor, safeguard its resources and maintain the natural capital base without compromising its value. Even during the conflict, the community paid serious attention towards maintaining and sustaining support for WWF and TAL as well as our partners.

I also express special thanks to our valuable donors, networks and international communities for their technical and financial support; WWF US, WWF UK, WWF Finland, Johnson and Johnson Inc. Ford Foundation, McArthur Foundation and WWF International, Social Development for Conservation Global Team and Asia Pacific Region.

I would like to thank the senior livelihood expert who went through a rigorous process to explore issues using diverse tools and methodologies to bring this study to a wider audience. I welcome critical and creative feedback from you to make this document more useful for future generations.

Thank you

Anil Manandhar
Country Representative
November 2011

ACKNOWLEDGEMENT

The Khata Case Study is a milestone document that not only gathers the results of joint efforts in the last decade by WWF Nepal, its partners and the local community towards safeguarding ecological services of the corridor but also sheds further light on issues of sustainable livelihoods, resource management and community wellbeing. The document also collates information on governance practices, social inclusion and representation of marginalized groups in decision making processes.

This case study is a conclusion of the outcomes and the lessons learned from the interventions made in Khata. It is hoped that this study will be successful in sustaining the continued conservation and local stewardship efforts while protecting available resources and promoting equitable governance practices and equal participation in corridor resource management from all segments of society in Khata.

I would like to thank the Khata CFCC, CFUG and members households, CBAPOUs and cooperatives. The contributions of Bardia District Forest Office and FECOFUN Bardiya have also been vital to this case study.

I am grateful to Bhaskar Dev Chaudhari, Maya Yogi, Pratiksha Chaudhary, Krishna Pariyar, Bhadhai Tharu, Durga Bhandari, Rajendra Chaudhary, and women's groups from Madhuban, Dalla, Suryapatuwa, Dadagau, and Tara Tal – all of whom have contributed and supported to bring this document to its present form. I would also like to thank Tilak Dhakal, Prakash Lamsal, Shiva Raj Bhatta, Dr. Ghanshyam Gurung, Santosh Mani Nepal, Bunu Baidhya, Gokarna Jung Thapa and Bijan Gurung, for their contribution in this case study.

I would especially thank Shubash Lohani, for his analytical and creative feedback with in-depth overview. Similarly, I would also thank Akash Shrestha for helping in outlining and designing this report, and also acknowledge the contribution of Amish Raj Mulmi in editing and proof-reading the document.

Lastly, I thank all the interested groups, individuals and WWF colleagues who encouraged me to complete the study. I look forward to receiving your comments, feedback and support to produce a more qualitative document in the coming days.

Tara Prasad Gnyawali
Senior Livelihoods Expert
WWF Nepal Programme
tara.gnyawali@wwfnepal.org

EXECUTIVE SUMMARY

Landscape conservation as an approach began during 2001 and was conceived as a strategy to protect, restore and conserve critical corridors and bottlenecks to maintain biological and ecological connectivity across the landscape in Terai. Due to its diverse biological, anthropogenic and natural pressures and challenges, the corridors and bottlenecks in this landscape converted into critical, owing to pressures from increasing population, inter-geographical migration, land conversion, encroachment, poaching and other illegal activities, economic deprivation and exclusion, weak resource governance, unsustainable harvesting, insecure livelihoods and prevalence of local grievances against wildlife for crops, livestock and property loss.

The Khata Corridor is a critical biological Corridor that connects Bardia National Park (including the Churia foothills) of Nepal to Katarniyaghat Wildlife Sanctuary in India, allowing movement of wild animals across the political border. Nepal has applied different adaptive conservation models including Department of National Parks-managed Protected Areas; Protected Areas jointly protected and managed by the Nepal Army and Department of National Parks; Protected Areas managed by National NGOs; and Protected Areas managed by various local communities. During the course of the programme, the conservation approach has changed from focusing on the species to focusing on the landscape and from “fence and fine” to the participatory.

Conservation and livelihoods interventions are intertwined at the micro level when implemented on the ground. Biogas, as an example, induces multiple benefits but the conservation objective behind it is to reduce the pressure on using fuelwood as a method that allows restoration of Corridor and habitats. Besides, this generates other multiple benefits, which include: motivation for stall feeding, reducing grazing frequency, reducing work load and drudgery from fetching fuelwood, saving time, promoting healthy and hygienic practices, availability of organic slurry use for kitchen gardening, productive livestock management, dairy production, using clean and efficient energy that avoids intra household air pollution and decreases the prevalence of diseases such as Acute Respiratory Infection (ARI) among children and motivation for male in domestic role sharing. At the impact level it contributes through changes to securing clean and efficient in-house energy use, reducing chances of encounter with wildlife, decreases in drop outs from schools, increases intake frequency of vegetables, expands asset holdings, reduces health expenses by lowering chances of airborne ailments such as ARI as well as diarrheal disease

incidences, generating funds for the household's future (as seen in a recent corridor study), and widens the participation and inclusion of women and marginal farmers and their access to loan and services. Therefore, it is often unjust to limit such interventions that generate multiple benefits to communities to core biological objectives. However, the study concluded its findings with critical issue specific observations, with areas that need to be considered especially for future corridor management approach modifications, replications, extension while developing and designing programmes to address more contemporary challenges and external driving forces prevalent in and around the landscape. Key findings from the study are summarized below:

- Deprived communities and their dependency on natural capital stock for subsistence have not been seriously threatening the conservation of corridor resources. Rather, political intervention and protection to illegal encroachers, and often jeopardized community and institutional abilities contribute towards irreparable losses (Approach and Influences).
- The balance between regeneration of natural resources and communities which require natural sources for subsistence can be achieved when key anthropogenic pressures are diversified with appropriate incentives and strategies (e.g. energy efficient bio-gas devices and farming of unpalatable crops on lands that lie on the margins of the Khata Corridor). Compliance of the Community Forest Users' Group (CFUG) rules and regulations through integration of good governance principle and attributes, building institutional capacity are evidences for this.
- Commercial use and marketing, harvesting, and processing of forest and natural resources of critical corridor area should only be integrated as strategic options for livelihood when minimum regeneration capacity of natural capital stock in the critical corridor substantially meets users' community subsistence levels. Commercial use is only recommended when surplus stock of natural capital as agreed by user committee exists and upon technical recommendation and evidence from the respective corridor management institution.
- The social security of biodiversity-dependent communities and families is also indirectly associated with over and unsustainable collection of natural capital stock, i.e., over asset accumulation for future security, since they do not have any other option. Basic education, community health services, community shops, infrastructural services, and micro finance are alternatives that contribute towards diversification and reduction of potential pressure as well as ensure social security.
- Good governance and the integration of social inclusion processes from the micro level (e.g.community forest operation plan) to the macro level policies and strategies secure users' rights and ensure equity and

inclusion in benefit sharing, use, control, and access. Users' rights should not be undermined as well as non-contradictory with national and other sectoral policies since these generate insecurity among users regarding their access to conserved natural capital that they laboured for.

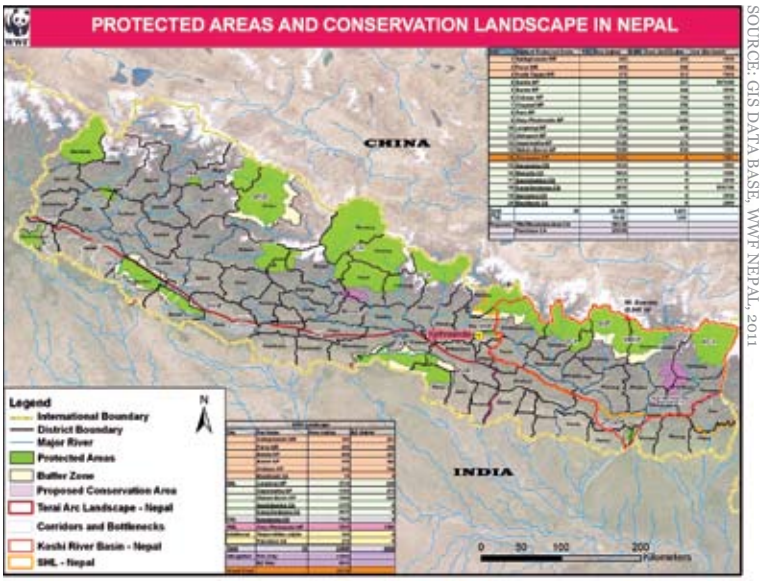
- Improvement of institutional assets and service quality in a transparent way including community and institutional capabilities to generate institutional revenue and leveraged local potential are more effective and relevant than focusing on distribution of benefits, delivery of products and services, and looking at long term efficiency and relevance of institutions and their sustainability.
- Enhanced institutional, community and household capability helps households and communities transform desired resources from one available asset and opportunity to another assets services. Opportunity and services induced during corridor management make conservation along with livelihood more sustainable. Further, it engages users with each other.
- Where institutions do not have substantial products, service and opportunity for immediate distribution, if they are functioning transparently and have more understanding of critical issues in conservation and livelihoods, these communities will be able to secure livelihoods and sustain long term services towards conservation.
- Access, use, control and decision over opportunity, resources and services within corridor by local dependents and subsistence family are more critical, especially those that support building ownership rather than limiting the project's efforts to products and benefit distribution that complement project results.
- Livelihoods and conservation services managed under an institutional umbrella framework in a corridor with shared responsibility is more effective and efficient rather than distribution of such products in isolated forms which allows for grievances among involved service providers and community leaders while lacking in transparency.

INTRODUCTION

The Terai has been heavily deforested and the land when put to agricultural use faces serious problems of soil erosion initiated by the tillage of soil...

BACKGROUND

The Terai region of Nepal is possibly one of the most ecologically disturbed areas because of the degradation, soil erosion and loss of forest areas (Pal: 1995). The Churia forest with fragile and eroded structures extends from the southern plains of the Terai to the northern foothills, and comprises three major river processes – Koshi, Gandak and Karnali – from the east with breaks across the landscape. The terrain is sub-Himalayan, where deforestation has taken place at random with consequent soil erosion. The Terai has been heavily deforested and the land when put to agricultural use faces serious problems of soil erosion initiated by the tillage of soil on the loose gravel detritus on which the soil is formed.



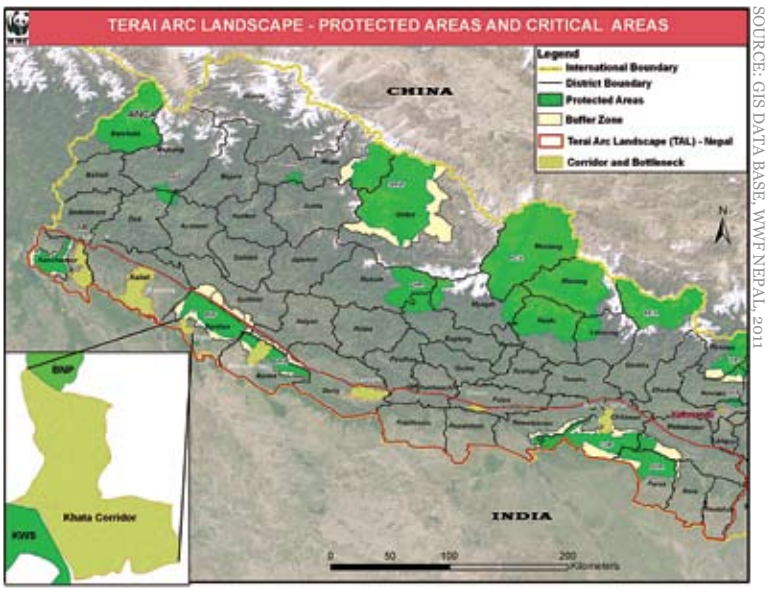
SOURCE: GIS DATA BASE, WWF NEPAL, 2011

The Terai plains are a densely populated zone where concentrations of population have largely been influenced by local advantages of land fertility, wetlands and river site, dense tropical forests, transportation and communication means and other such development facilities and motivating factors. The Terai is a region which encompasses habitats of diverse and key extinct and endangered species and encounters all the constraints of environmental challenges and changes in climate and polity. The land use ration indicates a high percentage of forests, especially in the western and mid-western part of Terai including Churia,

undergoing continued ecological processes and water recharges. Along with deforestation, landslides, soil erosion, flood, water scarcity and environmental health, infectious diseases are the other serious problem in the landscape. In the Terai, with rampant deforestation, soil erosion, and flash floods, the incidence of vector-borne and waterborne diseases are integral to issues of the environment and the human population living in the area. It is also opined that the Terai (Sen: 1995) is the most ecologically unbalanced area in the World and its deplorable situation has been brought to the forefront with an appeal for forest and soil conservation. Of the socio-economic diversities of different ethnic groups and their adaptation and practices of land use and overall lack of development, some typical practices such as slash and burn, kharka-goth (seasonal cattle migration) and land use and poor socio-economic conditions deserve to be mentioned. Most of the landscape is inhabited primarily by Tharu indigenous people and hill and other migrant ethnic groups, with only a minority of culturally discriminated Dalit and Muslims.

TERAI ARC LANDSCAPE (TAL)

Terai Arc Landscape (TAL), a landscape level conservation programme, aims to connect the core areas between important protected areas in the Terai region for the conservation of flagship species such as the Royal Bengal Tiger, Greater One-Horned Rhinoceros, and the Asian Elephant. TAL-Nepal encompasses an area of 23,199 sq. km and is extended from



SOURCE: GIS DATA BASE, WWF NEPAL, 2011

the east to the west covering protected areas, national forests, agricultural land, settlement areas, and water bodies in 14 Terai districts. The landscape ensures the ecological, economic, and socio-cultural integrity of the region by supporting rich biodiversity, forests, soils, and the watershed of the Terai and Churiya hills.

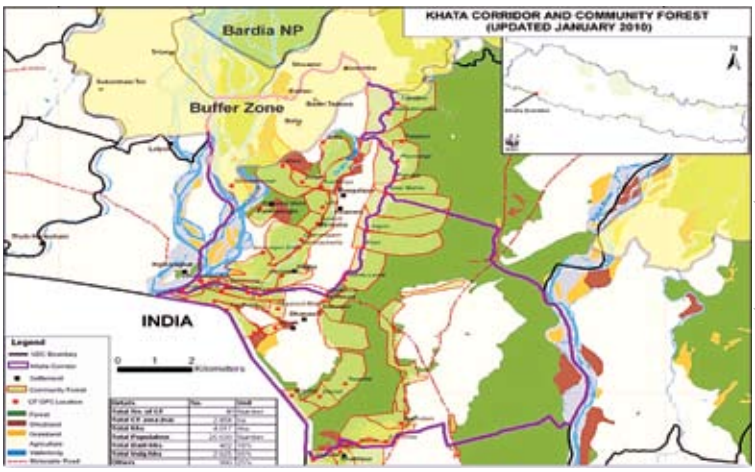
TAL Nepal is a jointly implemented programme by WWF Nepal, the Ministry of Forests and Soil Conservation, Department of National Parks and Wildlife Conservation, and Department of Forests under the Terai Arc Landscape–Nepal Strategic Plan. About 6.7 million people (MOFSC-TAL: 2004) with their 4.5 million heads of cattle depend on the forest, soils and watershed of the Terai for their livelihood. Nearly 60 per cent of the households in TAL carry out livestock farming. A recent mid-term evaluation report on United Nations Millennium Development Goals' (UNDP/MDGs: 2010) progress estimated the poverty level in the Terai as 25.4 per cent. In contrast, another report by different research and development missions estimated severe levels of food insecurity at 63 per cent.

Box 1: WWF Nepal's learning in Landscape Level Conservation in TAL

"Sustainable conservation is not possible until and unless the minimum livelihood needs of the natural resource users of this landscape are met and they feel that their children are socially, economically, culturally and politically secure."

Source: Livelihoods Outcomes Study Report; 2007, WWF Nepal

Besides focusing on species conservation activities, TAL also addresses livelihood issues of the people living in and around the Terai as part of an integral strategy to conservation. A number of conservation-related diverse livelihood issues are prevalent in the Terai; these issues include agricultural expansion, forest fires, overgrazing, and killing of wildlife, poaching and illegal timber trade, non-timber forest products collection and fuelwood use. These issues are prevalent broadly because of poverty, increasing population, lack of income, weak governance, lack of markets, lack of education and awareness, external forces such as climate change, natural disasters, and political instability and insecurity. The programme aims to conserve this landscape so that wildlife and people can live in harmony. The programme can only be sustainable if the pressure on wildlife habitats is tolerable and adequate conservation benefit mechanisms are in place. To achieve these twin goals of biodiversity and livelihood security, multi-pronged approaches have to be applied.



SOURCE: GIS DATA BASE, WWF NEPAL, 2011

KHATA BIOLOGICAL CORRIDOR

Khata Biological Corridor is a significant corridor that bridges Bardia National Park in the Churia foothills of Nepal to Katarniyaghat Wildlife Sanctuary in India. The corridor is highly important for biodiversity especially for movement of flagship species across the border. Under the landscape conservation approach, the landscape conservation programme visions the functionality of corridor continues the present environmental and ecosystem services without creating pressure on its biodiversity.

During the inception of the landscape approach in Nepal, the Khata corridor was one of the last remaining narrow strips of forest used by elephants, tigers and rhinos. In recent times, different threats due to unstable national political conditions, fragile law and order situation, population migration pressure and cross-border trafficking of timber and other wildlife particles have posed a challenge to the corridor. Similarly, land encroachment, land security issues and absent local governance systems have created a vacuum and encouraged illegal activities. The major role of Community Forest Coordination Committee (CFCC) is coordination, implementation, planning and monitoring of the programs reflected through its own annual plan of operation and constitutions norms and based on conservation targets and the TAL strategic plan (2004-2014). The Khata CFCC implements a diverse range of conservation and livelihood activities that sustains efforts on conservation and maintains critical corridor and habitats while generating livelihood opportunities for people living in the area. Besides these, mainstreaming good governance principles with equity and social justice to reach out to different households is also a significant effect of the programme.

STUDY RATIONALE

The rationale of this study is to find out the status of communities living in and around the Khata Corridor; changes in lives and livelihoods due to the programme and other community inputs; changes in direct, indirect and underlying threats identified during the plan's formulation; effectiveness, relevance and efficiency of adopted strategies

Box 2: What do Sustainable Livelihoods mean for WWF?

"Sustainable livelihoods are a holistic approach to conservation which enables people and communities to analyze, decide and act to achieve fair and sustainable management and use of natural resources, and improved individual and community wellbeing".

Source: Peer Review Meeting on Livelihoods and Social Works in LHNI, 2008, Nepal

WWF Nepal with support and collaboration with its prime partner, the Government of Nepal's Ministry of Forest and Soil Conservation (MoFSC), has been implementing a landscape conservation programme in the Terai. At the beginning of the programme in 2001, WWF Nepal organized different studies and interactions with different stakeholders and communities to identify underlying causes, threats and challenges to sustaining the biodiversity richness of the landscape. A comprehensive and strategic plan under the leadership of MoFSC and in collaboration with other institutions, development missions and INGOs, TAL is a 50-year-long vision with the goal of attaining strategic results in periods of 10 years (TAL Strategic Plan 2004-2014). The document's two obvious major goals are to conserve biodiversity and improve livelihoods. The rationale behind the strategy document is to address their inter-linkages, identify underlying threats, and address obstacles to conservation through an appropriate, affordable and viable approach and methodology (See Box:2).

The basic rationale of this study is to find out the status of communities living in and around the Khata Corridor; changes in lives and livelihoods due to the programme and other community inputs; changes in direct, indirect and underlying threats identified during the plan's formulation; effectiveness, relevance and efficiency of adopted strategies addressing those issues and challenges especially those resulting from human activities (See Box 3 & 4); their linkages to biodiversity conservation; livelihood improvement and corridor management; and achieving broader conservation and livelihood impacts. Most identified issues, threats and underlying causes are related to human behavior, a pro-subsistence

Box 3: Identified direct threats in Terai Arc Landscape

- Forest Conversion
- Uncontrolled Grazing in Forest
- Unsustainable Timber Harvesting
- Unsustainable Fuel wood Extraction
- Forest Fire
- Churiya Watershed Degradation
- Wildlife Poaching
- Human Wildlife Conflict

Source: TAL Strategic Plan (2004-2014)

Box 4: Additional cross-cutting issue of environmental degradation and biodiversity loss in Terai Arc Landscape

- Migration and population growth
- Low agricultural productivity
- The struggle for land
- Lack of off-farm livelihoods opportunity
- Inadequate access to and management of forest resources
- Cross border issues

Source: TAL Strategic Plan (2004-2014)

livelihood, ambition towards asset accumulation for future security, improvement of living standards, and power holding capacity which might have direct and indirect linkages.

A decade has passed since WWF Nepal with its partners has implemented the landscape conservation programme with special focus and emphasis on critical corridor and bottleneck restoration programme. One major gap in the programme was that there weren't any site-specific (corridor) or landscape level evaluations and analyses that focused on effective, efficient and relevant corridor management approaches. That is why it is difficult to gauge the changes, particularly in human wellbeing, but some areas could be evaluated with available GIS information and recent study findings. As a study decision, it is quite appropriate to measure linkages, efficiency, relevance, and results that corridor management efforts generate in the Khata Corridor. For this, a Sustainable Livelihoods Approach Framework that was modified according to the WWF Sustainable Livelihoods Strategy has been used as reference to analyse and present the understanding of livelihood and conservation linkages.

Looking at the given explanations, the measurement of impact and results is highly desirable. Forests around the landscapes, especially in bottlenecks and corridors, face problems such as increased timber demand and use pressure from saw mills, distance users and their rising demand from across the border (from India), growing internal markets and urbanization, infrastructure and other physical development, consumption and use behavior, and occupation of forests by landless and political activists.These have been recently observed in some critical sites where local communities use forest resources for domestic and subsistence purposes. The crucial

fact is that these subsistence communities like marginal farmers or wedged-farmers do not harvest resources more than what is required. It is regrettable that the poor and the deprived are placed at the center of threats to biodiversity rather than understanding their magnitudes of contribution towards natural resources. These issues must be focused on while developing models and approaches rather than just viewing people as threats. If seriously reviewed without any prejudice towards class and caste-ethnicities, this model of corridor management is more challenging because of institutional commitments to reduce deprivation and anthropogenic pressures on natural capital stock, ensure users and local rights to use and control appropriate interventions, and building institutional capacity which eventually requires more natural resource transformation within a corridor management framework. In this case, the diversification of livelihood strategies will only be critical in achieving a balance among demand, use, control and supply of conserved resources. A careful understanding is required of whether conservation policies contradict local solutions and practices.

The linkages among conservation in the context of categories of livelihood, asset holdings and use, and availability and use of biodiversity resources and their changes in stock with particular focus on small and marginal farmers, the socio-culturally discriminated and household with lesser assets are the key factors for such analysis. The strengths, intensity and direction of the linkages differ depending on the asset composition of users' communities and the diverse environmental challenges they face living within a defined corridor area (e.g. crop and livestock depredation, siltation, floods, soil fertility and rapid erosion, policy constraints, land and natural capital productivity, environmental diseases, grass and fuel scarcity and contaminated water). Micro-macro linkage of policy and planned strategies adapted to conserve the corridor need to focus on variables that affect market development, community wealth, physical assets and household asset distribution and an economically affordable, technically appropriate, culturally acceptable and locally manageable approach to corridor biodiversity conservation.

The scope of the study is to analyze and reflect the status of linkages of the Khata Corridor looking at diverse aspects of subsistence and dependency on nature. As the study is confined within the Khata Corridor, it does not entirely represent the issues that are defined within the strategic plan and depth of biodiversity science; rather, it depicts human behavior, poverty, environmental linkages, dependency, and trend and effectiveness of inputs generated and invested in by users with support from TAL.

Research Questions: Looking at a decade's investment in this landscape for conservation with focus on site-specific bottlenecks and corridors, the questions that arise are: 1) Whether planned efforts directed towards sustainable development of communities have achieved their goals or not? 2) Are these resources (inputs and strategies) efficient, sufficient and relevant to sustain corridor ecological services? 3) Are these resources contributing to secure community livelihoods and maintain social equity and justice? 4) Are these resources building institutional capabilities for sustainability? 5) Are these efforts and resources contributing towards managing a functional biological corridor without creating any forms of anthropogenic pressures? It would be rational to thus reviewing the components of sustainable development as defined in early practices.

REVIEW OF EARLY PRACTICES AND RESEARCH FINDINGS

Edward Barbier (1987) in his book indicates direct concern with increasing the material living standards of the poor at grassroots level, which can be quantitatively measured in terms of healthcare, sanitation and water supply, and emergency stocks of food and cash and is only indirectly concerned with economic growth at the aggregate, commonly national level. In general terms, the primary objective of sustainable development is reducing absolute poverty of the world's poor through providing lasting and secure livelihoods that minimize resource depletion, environmental degradation, cultural destruction and social instability. This understanding is quite relevant to conservation because basic livelihood issues are integral to determining components of threats to conservation. This conclusion argues that any changes to improvements in wellbeing need to be scaled at a local level than at the national level because the complexity of livelihoods and their linkages to biodiversity conservation might differ in different geographical, ecological and human settings. About sustainability, Brundlant (1986) in his speech mentioned four major conditions for sustainable development: elimination of poverty and deprivation; conservation and enhancement of resource bases; broader concept of development that comprises social and cultural development besides economic growth; and most importantly, unification of economics and ecology in decision making at all levels. Further, the speech concludes by stressing on the understanding of local carrying capacity, ecological services and human consumption as well as access to decisions of local communities on resource management and use. W. Clark and R Munn1 (1986) focused more on challenges in the coming decades and balance management to increase the prospects of ecologically sustainable improvements in human well-being. This statement focused more on understanding of the environment and development of institutions and communities capable of better management.

Looking at recent working contexts and landscape conservation modalities, David Pearce (1988) is more relevant and closer to the current corridor management approach. He identified five major elements that qualify as sustainable development. These were: increase in real per capita income; improvements in health and nutritional status; educational achievements; access to resources and a fairer distribution of income; and increases in basic freedoms. Further, he summarized sustainable development as a constant of the natural capital stock. If we re-define these components according to investment and working context in the corridor, three major categories for sustainability can be outlined: livelihood security (food, water, energy, economic and social safety including health); social equity and good governance in natural resource management; and institutional capability and sustainability which could be measured through positive changes in resources, strategy, vulnerability and coping capacity, cost and role sharing by community in cash and kind, and self-esteemed participation in resource management as well as transparency in social equity and governance in the corridor as a pre-cursor for conservation and livelihoods linkage analysis.

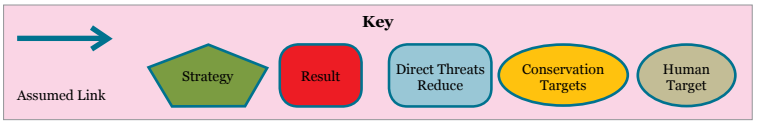
The explanation of the World Commission on Environment and Development (WCED: 1987) on sustainable development is quiet relevant to outcomes of current corridor management efforts. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. It meets present requirements without any compromise and pressure on the future. This explanation stressed more on building existing users' capacity so that they could enjoy their conserved resources, capitalizing and maximizing environmental and development benefits and technological and managerial enhancement of social organizations. Adding to this, David Pearce (1988) stressed on consumption pattern and requirements that should not exceed the regenerative capacity of conserved resources. Furthermore, he suggested maintaining a balance between consumption behavior and amount of natural capital stock with its regenerative capacity. Based on this, institutional efforts need to be guided towards enhancing the capacity of the ecosystem and involving social institutions and community to manage the unsustainable pressures, thus creating a consumption pattern that could comply with regenerative capacity. This complies with an integrated conservation and livelihood approach that corridor management adopts, maintaining a critical approach on CFCC through CFUG, conserving forests and wetlands with inputs, creating nursery plantations and bio-fencing, controlling grazing, plantation and regeneration with improved harvesting techniques. This also reduces energy usage, especially the demand for firewood enabling institutions to install energy efficient technologies such as biogas plants, and allows

for the development of micro credit, skills support, alternative fodder and grass farming. Such interventions contribute towards enhancing institutional capabilities, reduction of pressure on natural capital and conservation for future use.

A study of the linkage between conservation and livelihood (Salafsky et al: 2000) can perhaps best be understood by considering different approaches that have evolved over the past century and reconcile their demands respectively. Nick described three approaches among this spectrum, which can be defined as no linkage – e.g. protected area, indirect linkage – protected area surrounded by buffer zone – and direct linkages between livelihood and conservation -- biodiversity site in overall landscape. According to these criteria, the Khata Biological Corridor can be categorized under the last definition, where direct linkages between conservation and livelihood can tangibly be illustrated. This approach was based on making livelihood dependent on and therefore directly linked to biodiversity. The key feature of this approach involves developing dependent relationships between biodiversity and those who live around the area. Local users and their management committees are given opportunities that directly benefit from the biodiversity, and thus presumably have an incentive to stop external threats to the habitat. Nick further iterated that a well-designed conservation project uses a mix of different strategies and interventions to combat threats at a given site. The strategy and invested interventions in the Khata Biological Corridor can be defined under as this approach. The causal relationship between human behavior and threats to biodiversity are almost similar to this approach which recognizes direct threats to habitat are human actions with the most proximate influences on the biodiversity. Direct threats can be sub-divided to internal threats which are caused by stakeholders living in the corridor and external threats caused by outsiders. Direct threats are causal factors often less visible but significant drivers of threats. This model assumes that all threats are caused by human activities; therefore, a natural fire arising from a lightning strike is not a threat. The TAL programme similarly recognized anthropogenic pressures as root causes of threat to biodiversity with a diverse range of interaction that mostly represent human struggle for subsistence and future security. This Linked Incentive Model focused more on internal capability (community and institutions) managing threats to biodiversity as well as understanding the economic value of biodiversity and its threats by human strife for livelihood. In this model, livelihood must produce sufficient value to the stakeholders to create incentives for them to engage in threat-mitigation activities. This model-linked incentive contributes to other diverse results that add value to conserved biodiversity such as increase in education and awareness, an

understanding of the economic value of biodiversity and environmental resources such as wetlands and their role in sustaining livelihoods and promoting economic substitution as an entrepreneurship model.

Looking at this definition, the efforts and investments made in the management of the Khata Corridor are found to be relatively efficient, effective and appropriate in addressing underlying causes of loss of biodiversity in the corridor (See Box 6 for inputs, intervention and livelihoods approach relevancy). Investment on other aspects of livelihood such as asset enhancement and increasing access and use of community services and sustaining the desire among people towards self-responsibility by regularly engaging with them has helped towards this, as the economic value of biodiversity products is high compared to what they received directly from conserved resources in the short term.



Adapted from Salafsky N. "Biological conservation" 2010.

In his findings about conservation project teams seeking integration of development in their Nick Salafasky (Salafasky N: 2010) concluded with three different options: to have an integrated mix of conservation and development ends; to use development means to the strict service of conservation goals; and to explicitly link conservation ends to broader development goals. Option one seems to be the most likely choice to be practiced, but if conservationists blindly mix conservation and development goals, the former will end up as an end to itself. Option two is probably the safest way for conservationists to spend the resources with which society has entrusted us. If the conservationist needs to develop more support for conservation or address real trade-offs, option three is also a useful alternative. The key is to make our values more explicit. If we maintain our conservation goals and take care to understand how they interact with human needs, we can use development as a means to achieve successful conservation.

The TAL Strategic Plan (MoFSC-TAL:2004) has clearly identified seven direct and root problems that plague conservation: conversion of forests; uncontrolled grazing; unsustainable timber harvesting; unsustainable fuel wood extraction; forest fires; Churiya water-shed degradation; and wildlife poaching and human wildlife conflict. The major cross cutting issues outlined within them are migration, population growth, low

agricultural productivity, the struggle for land, lack of off-farm livelihood opportunities, inadequate access to and management of forest resources, and cross-border issues. Under sustainable development, the strategic plan further detailed the following strategies: i) Enhancing agricultural productivity ii) Enhancing off-farm income generation under which Non-Timber Forest Products (NTFP) marketing and value addition and eco-tourism are major components iii) Improving community access to Services and iv) Reducing the need for resettlement in forests.

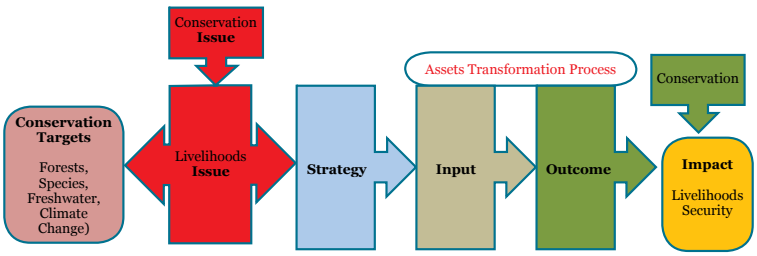
The majority of the population living in the TAL programme is poor and relies on subsistence farming as their main source of livelihood. The average household income in the TAL area is only US$ 100 per annum but this figure hides considerable inequality both within and between districts in the Terai. Multidimensional indicators (Oxford-OPHI: 2010) show that the majority of the population lives in poverty (65 per cent). More than half of TAL households (60 per cent) owned less than one hectare (15 kattha) of land, and a study of seven TAL districts shows that 71 per cent of the population does not grow sufficient food to last throughout the year (NPC, 2001-3). Poverty is higher among indigenous Tharus and the Dalits. With limited off-farm livelihood opportunities the majority of households rely on farming on very small land holdings. Without access to alternative assets and formal sources of credit, many of these households are segregated from supporting institutions and services and are obliged to borrow from local moneylenders – usually at high interest rates. Human development indicators for TAL are below the national average.

THE DAMAGED POLICE STATION DURING THE MAOIST ARMED CONFLICT, AT KHATA CORRIDOR © TARA P GNYAWALI, WWF NEPAL

METHODOLOGY

The conceptual framework illustrates the linkage among the factors that contribute to livelihood as well as conservation with the expectations that communities and institutions involved can develop asset transformation capabilities

CONCEPTUAL FRAMEWORK (LOGICAL LINKAGE)



Adapted from: Livelihoods and Good Governance Change Monitoring Manual, 2010, WWF Nepal

Reviewing and looking at the critically analyzed conclusions mentioned above, a conceptual framework for a study developed for the Khata Corridor analyzing effectiveness, efficiency and relevance of landscape conservation approach. The present conceptual model is different from the aforementioned concept and theory in the sense that this focuses more on users and institutional capabilities in transforming available resources to meet desired outcomes together with conservation without creating any pressures on corridor resources. This study has been conceptualized on the framework that illustrates the linkage among the factors that contribute to livelihood as well as conservation with the expectations that communities and institutions involved can develop asset transformation capabilities and are able to adapt and manage the constraints that limit them. The interventions in the Khata Corridor were designed based on identified biological and livelihood issues (TAL Strategic Plan: 2004-2014) with focus on local institutions' functional role to take ownership, implement, monitor and benefit from natural resources and induced opportunities. The interventions are implemented in an integrated way that aims to target two major conservation targets – forests and species -- though some interventions also contribute to freshwater resources as well as the agenda on climate change adaptation. All livelihood-related major interventions (See Box:6) are designed as strategies to achieve and benefit the community and reduce the pressure on the corridor's biodiversity from frequent and excessive use. In between, some interventions under conservation and livelihood change their form due to asset transformation by enhancing community and natural resource management groups'

capacities and capabilities to another form that had previously been counted as hardly of any economic value of ecological services and biodiversity resources (LGCM: 2010 & Findings Summary Figure 13). For example, collection of fodder from a corridor forest, loans obtained to buy a milking buffalo and installation of biogas plants transform a household and enables it to deliver dairy products, bio-manure, and clean-energy cumulatively resulting in rise in incomes, improvements in domestic nutrition, reduces the incidence of airborne and waterborne diseases, and acquiring required assets and services which eventually secures livelihood, reduces household vulnerability and pressures on biodiversity (TAL-Midterm Evaluation Report: 2006 & Livelihoods Outcome Study: 2007). For inter linkage see summary figure 13 at the end where a large majority of farmers are experiencing year the round grass deficiency (LGCM: 2010)from their own sources, access cooperatives for credit facilities (52 per cent) and bio-gas contributed to regular saving (47 per cent). A house capable of transforming (process, generate, change and value addition of product and services from one assets to another form) assets is often invisible to the program staff and consultants who are scared to observe linkages in tangible form. These are due to of lacking in capturing the changes with in-depth understanding between conservation and livelihoods; reporting against cumulative progress, lacking in periodical monitoring of changes in livelihoods and conservation at CFCC level (See WWF Nepal Midterm Evaluation Report for TAL: 2006 & Annual Technical Report 2007 to 2010 including PHE Annual Report 2008 to 2009). The rationale behind recording comparative changes among user households follows this. The changes that one must record are: What are the strategies that have been locally adopted? What are the strategies that a household and a community have adopted? What are the livelihood and biodiversity issues that the programme and the community have jointly identified? And finally, what are the impact areas that the project and the community would like to bring under a range of shared inputs (interventions) that enable asset transformation, increase access and improve decision-making capabilities together with biological priority? The study and analysis has to emphasize on defining and finding the logical linkage and whether putting biological and livelihood issues in one basket brings desired changes as well as broader impacts. One of the benefits of understanding the framework and linkages is that it allows the analysis of the strategy and forecasts whether the project and programme are efficient, effective and relevant in addressing existing biological threats and livelihood issues. Similarly, this also helps one understand whether adopted existing community-strategies for improvement in livelihood are creating more negative impacts, whether there are tangible and visible linkages, and whether these are not directly associated with the threats to biodiversity, especially species habitats in the Khata Corridor.

The outcomes in this study were measured looking at broader areas of change especially in the community's and household's wellbeing through their asset holdings and use status, adopted strategy to see the existing pressures to and trends of biodiversity, vulnerability to see whether existing inputs, and community and household capabilities and capacities are appropriate, and addressing the capacity-recovering capability from unexpected shocks as well as future trends (e.g. increase in prey-base contributes towards increases in crop-raiding instances). All these map whether existing models that put livelihood and conservation issues into one basket are bringing positive changes and impacts. The study also focused on defining the linkage between corridor resources and opportunities that contributed towards community livelihood and reducing the dependency of the respective community on corridor resources. With these, the programme inputs also seek to transform and build capability and enable the access and benefits from the corridor's resources equitably among the communities, thus generating entrepreneurship skills and allowing for financial support to establish enterprises and enhancing human capital.

WWF Nepal's Sustainable Livelihoods Strategy Framework (2011, modified in own working context) has, from the project-formulation stage, defined and understood the complexities of livelihood that are intertwined with conservation threats (TAL Strategic Plan: 2004-2014). During the identification of root causes to conservation threats, drivers of broader challenges -- invisible or indirect -- have been identified and their tangible and intangible impacts on conservation targets have been studied. The second stage was to find out major entry points, and an appropriate strategy that tactically addresses both issues and supports identified interventions was implemented. The third stage was to develop a broader scale of interventions that affect conservation and livelihood. The fourth stage was to monitor the outcomes -- e.g. changes in the particular biodiversity site or landscape and their scales and magnitudes, possibly in tangible forms (forest coverage, houses with roofs and children dropout rates). These changes will not only be project-induced but also because of changes in lives dependent on the biodiversity rather than the project. This will guide whether the wellbeing of the community has been enhanced (Assets), whether the pressure on biodiversity has reduced (Dependency trends and use pressures), whether natural resource management-related Community Based Organizations (CBOs) institutional capability has been enhanced and contributes towards sustainability (Sustainability and Capability), whether the attributes and process of good governance and social inclusion have been integrated (Social inclusion and equality) and whether prevalent vulnerability trends have changed or not

(Vulnerability, issues and shocks). These five areas are crucial to manage issues, and incorporate and integrate them adaptively and periodically. At the end, the impact will be measured in terms of three major areas: first, whether the livelihood of deprived and disadvantaged families have been primarily secured; second, whether institutional governance and the social equity process is effectively functioning and in place; and third, whether the involved institutions are capable and sustainable of leading the conservation efforts by themselves in the long run in the landscape in question. Though project experiences strongly advocate that all interventions not be directly linked, some interventions were made as a trade-off to scale down and mitigate possible threats rather than enhancing biological value. For example, skills training for young barber and in the use of computers to rural youth are aimed at their engagement against poaching and further equipping them with start-up capital from CFCC revolving funds. Furthermore, the rationale behind such intervention is to engage and enable local youths towards enterprising that will discourage them to be part of illegal activities. This is an indication that if the magnitude of issues is critical and serious, the institution should find local adaptive strategies which may not require a linkage in tangible and illustrative forms.

STUDY AREA

The case study was conducted in the Khata Corridor in Bardia, Nepal. All VDCs, community and settlements, CFUGs, cooperatives and other associated apex institutions and groups have been consulted during the study process. The findings reflect the status of the communities living

WETLANDS. A SOURCE OF NUTRITION AND FOOD FOR POOR AND INDIGENOUS COMMUNITY© TARA P GNYAWALI, WWF NEPAL

in this corridor. The Khata Community Forest Coordination Committee (CFCC) was formed almost a decade back which comprised almost 34 CFUGs including 3,245 user households, with an estimated population of 22,000 in four VDCs. The corridor is connected with the buffer zone of Bardia National Park in the north-east. The Karnali River passes through the corridor, and the river is a critical habitat of the Gangetic Dolphin.

The aim of this study is to understand and explore the efficiency, effectiveness, relevance, local acceptance and grievances, impacts and their linkages under the critical biological corridor management approach within the landscape conservation program in the TAL. The TAL program visions establishing functional connectivity and sustaining ecological services which benefit biodiversity as well as the communities not only within Nepal but also across the border. This study analyses integrated livelihood and development interventions based on community preferences and their contribution to biodiversity and livelihood. This study further provides tangible evidence from the ground, putting together identified conservation and livelihood issues and analyses whether a more effective and relevant approach is needed to maintain the biological corridor and ecological services with active community stewardship.

SAMPLE AND SAMPLING PROCESS

The communities, households and service-providing institutions, groups, and committee have been sampled for this study. Cluster sampling of specific sites and random selection of samples were the two major techniques that were applied. Key informant and group interviews were also conducted in selected clusters. Care was taken while selecting key informant interviews and cluster selections keeping in mind the socio-political and cultural sensitivities and human-wildlife conflict. Confidentiality of sample households and respondents were given a high priority. The sample selection was done in the presence of the CFCC making the process more transparent and proportional in its inclusion of cultural groups, ethnicities and minorities in the corridor.

All member household of CFUGs under the Khata CFCC have been taken as the universe in the study. A total of 3,245 households which are members of the 34 CFUGs including a cooperative were taken to be the study universe. The sample has been proportional based on the density of households within each CFUG with consultation and representation of CFUG and CFCC members and also from trained Local Resource Persons (LRPs). Prior to selection, a list of CFUGs with their households' identity number was prepared and then 20 per cent of households from each CFUG were randomly selected. Besides these, focus groups participants, ethnic group representatives and key persons have also been consulted for qualitative information collection.

According to the selection of the sample, 63 per cent of total sampled households were from the indigenous communities, 24 per cent from ethnic/caste groups, 11 percent from Dalit/discriminated groups, and the remaining 2 per cent from other non-specific groups including minorities. The nature of sample includes more of the migrants from the hills with the local indigenous Tharu population dominating.

TOOLS, TECHNIQUES AND NATURE OF DATA

The study applied mixed techniques and tools while biodiversity and biological information were adopted from different sources such as the GIS-database, satellite mapping and conclusions of different scientific researches.

Looking at the nature and type of information required, a qualitative and quantitative information collection methodology was administered. Attempts were made to understand the community's perceptions, observations, practices and behavior through qualitative methods whereas a structured survey questionnaire was applied to collect information on assets, institutional revenue, pressures, trends, empowerment, participation, and basic introductory knowledge at household and institutional levels. The used tools are illustrated in the Box: 5

Box 5: Tools and Techniques

- Focus Group Discussions (FGD)
- Participatory Observation/ Transect Walks
- Key Informant Interviews
- Mobility Maps and Seasonal Calendar
- Photographic Monitoring
- Ethnographic Tools
- Structured survey questionnaire
- Good governance Assessment (GGA)

The information was collected through institutions, household survey and group discussions and past records. Quantitative information was collected from two sources household and institutional surveys. Institutional information detailed the budget trends, expenses and investment history, institutional priority, and issues. Other qualitative information was collected through participatory rural appraisals (PRA), Good Governance Assessment (GGA) and relevant ethnographic tools (pile sorting, free listing, cultural value of natural resources and perception mappings. A wider consultation and interaction with Khata CFCC members, CFUG members, cooperatives and user representative members was also organized. Though the study focused more on whether the impact and changes as well as linkages of the investments made in the Khata Corridor Management have brought positive changes in livelihood and contributed towards sustaining ecological services without anthropogenic pressure in the corridor. The case study is framed within

the Sustainable Livelihoods Framework elements, making it easier to link, synergize and compare with other components of the framework such as livelihood strategies, assets, vulnerabilities, policies and institutional processes and corridor management outcomes. Besides this, keeping in view the recent socio-political and economic trends and newly emergent contemporary issues such as resource conflicts, governance, use, access, control and decision making process and resource sharing mechanism, the equity and empowerment processes were all assessed through good governance assessment tools. These captured trends in environmental health and compliance of health and environmental services. Ethnographic assessment tools were used to find out underlying perceptions, preferences, priorities and behavior against wild species, conflicts, asset-loss and attitudes towards program activities.

A pair-wise preference ranking was used to identify priorities and effective inputs which were conducted with local user communities' thoughts on long term sustainability of interventions and inputs. An integrated conceptual framework was developed based on livelihood assets and measuring effectiveness, efficiency, relevance and sustainability of interventions bringing positive impacts to biodiversity and livelihoods. The obtained information was later triangulated with key informant interviews.

A cross checking with key informants and resource persons from the locality was done to verify these findings further. The structure and nature of the questionnaire and the discussion topic guidelines were designed based on research topic and priority. All the collected data and information was compiled and edited directly in the field, minimizing repetition, quality and validity, and was later processed with SPSS software. Local terminologies have also been verified with key persons.

STUDY FINDINGS

These instances indicate that integrating twin aspects -- livelihood and conservation -- contributes towards supporting underlying causes of threats to conservation in the corridor and landscape.

INPUTS AND PROCESS

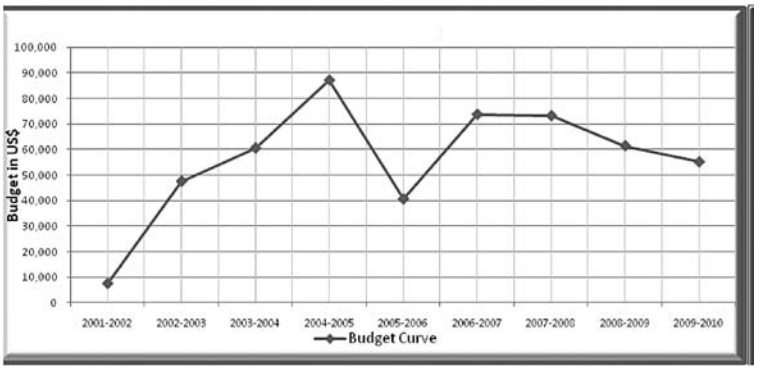
The Khata CFCC has been receiving grants regularly from WWF/TAL under the CBRP program since 2001 (See figure 1). Beside this, Khata CFCC has also generated revenues (for its management and investment for conservation and livelihoods) from its membership fees, cooperatives and interest from revolving funds, rewards and donation from different sources, individual visitors and its own enterprise earnings where it has invested as a shareholder (e.g. Forest, Agro and NTFP based Enterprises).

The Khata CFCC has invested not only grants received from WWF-TAL but also locally generated funds, and has leveraged volunteer work through consistent stewardship, mobilizing youths, school teachers and clubs, students and interested groups. Installation of distillation plants, promotion of cultivation of unpalatable crops and high value crops, grievance mitigation and counseling against violent wildlife depredations, moral and institutional support to vulnerable families, management of a large users' groups to access micro-credit schemes, repayment and reducing defaulter clients, and promotion of community

Box 6: Major Inputs in Khata Corridor Management

- Income generation activities
- Cooperatives and saving credit
- Fund mobilization (Wild life relief, IGA & endowment)
- Institutional capacity strengthening
- Social mobilization and empowerment
- Enhancing and improving community services
- Capacity building and skills trainings
- Education, extension and awareness
- Human wildlife conflict mitigation/prevention
- Population, health and environment (PHE)
- Community based biodiversity monitoring
- Community based anti-poaching operations
- Dolphin conservation and awareness
- Good governance and social inclusion integration
- Community forest and habitat conservation
- Clean and energy efficient technology promotion
- Technical/financial supports (grants, donation)
- Community leverages (equal to 25 to 75%)
- Health sanitation and safe drinking water
- Leadership and advocacy skill
- Green enterprises and marketing
- Awareness and exchange visit/sharing
- Livestock and grazing management
- Herders education

Figure 1: Trends of Financial Support to Khata CFCC (2001-2010)



Source: Khata CFCC, 2010

services with repair and maintenance of small and required infrastructure are the major roles that the CFCC has played. Similarly, institutional capacity building of executive members of CFUGs, marketing and social mobilization, gender and social empowerment, promotion of reproductive health especially among eligible couples and children, awareness campaign on conservation, skill and capacity building trainings, monitoring and use of valuable information, and guiding and promotion of various donors are other significant roles that the CFCC plays in the program. Dolphin conservation in the Karnali, Aurahi River bank protections, controlling encroachment and illegal trade across the border, coordination and relationship building with the government, non-government organizations and civil society are some crucial intangible attributes that add value to conservation efforts of the CFCC. List of major inputs and financial support trends are given in box: 6 and figure:1 respectively.

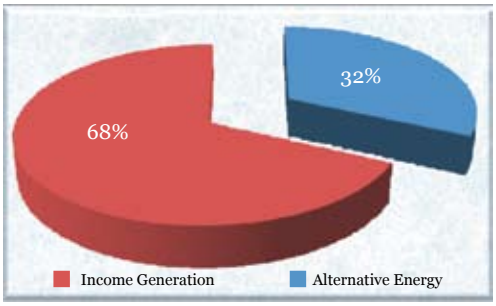
The financial support from WWF/TAL to Khata CFCC followed a fluctuating trend. For the first five years, the level of support is in a growing trend whereas it has significantly gone down during 2005/6 due to the completion of the SNV fund to TAL-CBRP. However, when triangulated, the support trend is actually sound given that the average support amount is US$ 50628.40 per year which is more or less equal to the support level of the initial five years. The Khata CFCC received US$ 50628.40 (as annual average) as grant from WWF/TAL during 2001-2010 excluding other technical, donations and individual supports in cash and kind.

OUTCOMES AND IMPACTS

Institutional Capability and Sustainability

- **Effective and functional coordination committee:** This CFCC is responsible for access to community services, policy and price supports, interest earned on institutional loans to its users members @ 8 per cent

Figure 2: Use of Revolving funds(%)



Source: Khata Case Study, 2010

Figure 3: Distribution of Revolving fund use by their Sub-sector (%)

Source: Khata Case Study, 2010

interest is a form of indirect support since 25-75 per cent of the total interest earnings are again used for community welfare, subsidized loan to deprived familes, education and health activities, social schemes and community and conservation activities through CFUGs and users groups, relief and revolving funds mobilization, and transparency in received and leveraged funds administration whereas the remaining amount usually used for CFCC and its enterprise, management and monitoring purposes. The financial support from the TAL programme to the Khata CFCC alone is estimated at Rs. 36.45 million (US$ 506284) in cash besides technical and institutional support from programme staff and logistics between fiscal period 2001/02 and 2009/10. Similarly, the CFCC has generated community saving funds of about Rs. 6.3 million (US$ 87500) from which economically marginalized communities have benefited from its subsidized and minimum interest fees. The Khata CFCC has also leveraged non-cash and material support (labour support) from the community of around Rs. 11 million (US$ 152778) during the fiscal year 2010 only (Khata CFCC Annual Report: 2010), a significant indication of local community participation in implementation and management of financial and technical support. The leveraged labour has mostly been used in trench building, special patrolling, road maintenance, repair and maintenance of community infrastructures and physical assets, fencing state and community forests, maintaining the fire-line and waterholes in corridor forests, safeguarding against illegal activities and curbing wildlife crime, maintaining forest inventory and weeding, rivers and check-dams, controlling grazing, establishing commercial nurseries, promoting micro-irrigation, and organizing campaigns and events, sending delegation for meetings, and monitoring the biodiversity and conservation efforts. The CFCC manages 34 CFUGs, 34 community-based anti-poaching operation groups, and more than 700 community conservation leaders and volunteers, allowing for effective coordination

Box 7: Cooperative Changed Our Life: Pratima Khadka, Shiva CFUG, Khata

Pratima Khadka, 28, is a resident of Dalla village in Khata Corridor and depends on the corridor's natural resources for her livelihood. She has two sons and is a beneficiary of a pro-poor conservation program run by WWF Nepal through the TAL-CBR project. According to Pratima, her role, over the years, has seen a dramatic change from being a housewife to becoming more engaged in income generation and community resource management, thanks to the project.

Pratima had enrolled her two children in a government school earlier. She is now able to afford a better education for her children in a private boarding school after becoming a member of a local cooperative and receiving benefits from the welfare schemes of the CFCC and cooperative. Pratima was also a victim of wildlife crop depredation earlier; she has now diversified her household strategy from being solely dependent on farming to investing in other schemes such as NTFP farming by accessing subsidized loans and capacity building opportunities from the Khata CFCC. The cooperative's subsidized loans at 12 per cent and 8 per cent interest rates for income generation activities and alternative energy practices respectively are lower than any private cooperative's rates (which are between 18-22 per cent) in urban and other areas. Her monthly savings in the local cooperative have also gone up from US$ 0.35 to 1.39 indicating a shift towards a surplus household income.

Pratima is also an active member of the Shiva Community Forest User Group, Dalla-4, a critical habitat for the One Horned Rhinoceros, and is actively involved in habitat protection and conservation activities. She states that there have been rapid increases in the number of wild boars, elephants, tigers and deer in the community forest.

Pratima strongly believes that livestock and crop insurance schemes can go a long way in securing the livelihoods of deprived farmers as such schemes cope them from unexpected damage and casualties caused by wildlife.

SOURCE: BASED ON KEY INFORMANT INTERVIEW, KHATA CASE STUDY, 2010

with government line agencies and private entrepreneurs as well as civic society and concerned park administration.

- **Effective and functional cooperative service:** A functional cooperative under the management of Khata CFCC has been serving corridor forest and resource users. The cooperative has given out micro loans, preferably for efficient alternative energy technologies

(32 per cent) such as biogas plants, solar-tuki purchases, and also for income generation, enterprise and entrepreneurship, meeting domestic requirements (short term loans), cash crops and commercial farming, livestock and animal purchase (68 per cent), and emergency health requirements. Similarly, it has also introduced different schemes serving women, marginal farmers and children without any direct collateral, and initiated deposits for small amounts. The cooperative currently holds and mobilizes funds estimated at about Rs. 6.3 million (US$ 87500). The cooperative has also declared a subsidized interest rate compared to other commercial and government supported financial institutions. Almost 25 to 75 per cent of interest earnings are reimbursed to community forest and saving credit groups.

The Khata CFCC manages a functional cooperative that comprises beneficiary households (52 per cent of total households in the corridor are regular members) which are engaged regularly in saving credit schemes. The cooperative manages its clients efficiently with regular supervision and monitoring of loaned funds, reducing pressure on threatened livelihood activities. The findings show very few or no defaults against loan repayments, proving the community has increased its saving and repayment capacity, and their trust in the cooperative adds value to the whole corridor management process and efforts. The CFCC through the cooperative has launched different welfare and pro-poor schemes like children's savings, women's savings, and subsidized loans for income generation activities. Similarly, additional revenue from loans has been re-invested in the installation of 78 bio-gas plants and 53 solar tukis for households without assets. This is an additionally generated opportunity that benefits the excluded part of community who were not prioritized in the early subsidized loans schemes. A major proportion of loans are given towards the cultivation of alternative and high value cash crops which also contributes towards decreased wildlife depredation and increases the coping capacity against wild animal presence. The CFCCs have generated and accumulated US$ 2569.44 only from interests against defused fund capital which are again used for social benefits e.g. for child scholarship and education material support, emergency and disaster supports, and loans in special cases. The study found that 60 per cent of households have increased their savings amount from an average of Rs. 25 (US$ 0.35) to Rs. 1,000 (US$ 13.89) per month based on their surplus amount and saving capability. This amount varies according to household status and sources of income over the last two years. This is an indication of change in the community's saving capacity towards achieving a surplus household economy. Though direct cash income has not risen on a significant

level, a change in accumulation and use of domestic and institutional assets, appliances and access to modern services and opportunities are visible and tangible evidence of this change. The Khata CFCC annually makes its financial transactions transparent to all users and a public auditor by organizing public hearings and public auditing processes. The community has also benefitted from the cooperative towards supporting their children's higher education. The findings indicate that 6 per cent of loans have been given out for education. These instances indicate that integrating twin aspects -- livelihood and conservation -- contributes towards supporting underlying causes of threats to conservation in the corridor and landscape. A significant attribute is its review process for lending where the cooperative with support from the CFCC executive committee regularly monitors its debtors. This cooperative is different than other commercial cooperatives that look towards a wide spread of interest rates between loans and deposits. The cooperative's first priority is lending to bio-gas units and other alternative energy devices including efficient energy use technologies, then towards livelihood diversification but the proposals for loans are reviewed by the CFCC committee who do an environmental audit on whether the proposed loan is conservation friendly and ensures it will not create pressures on corridor biodiversity. The significance of the cooperative is lending without any tangible collateral thus reaching out to a large majority of corridor resource-dependent and assets deprived communities. A majority of the loan holders are women or households led by women and women entrepreneurs, Dalits, and marginal farmers without any physical assets. No report against a defaulter has been reported indicating that lending to women is a safer investment and reduces the pressure from the community on the corridor's resources. This is a very creative move from the Khata CFCC which reaches out to the marginalized and excluded segment of the community enabling significant benefits from programme-induced opportunities.

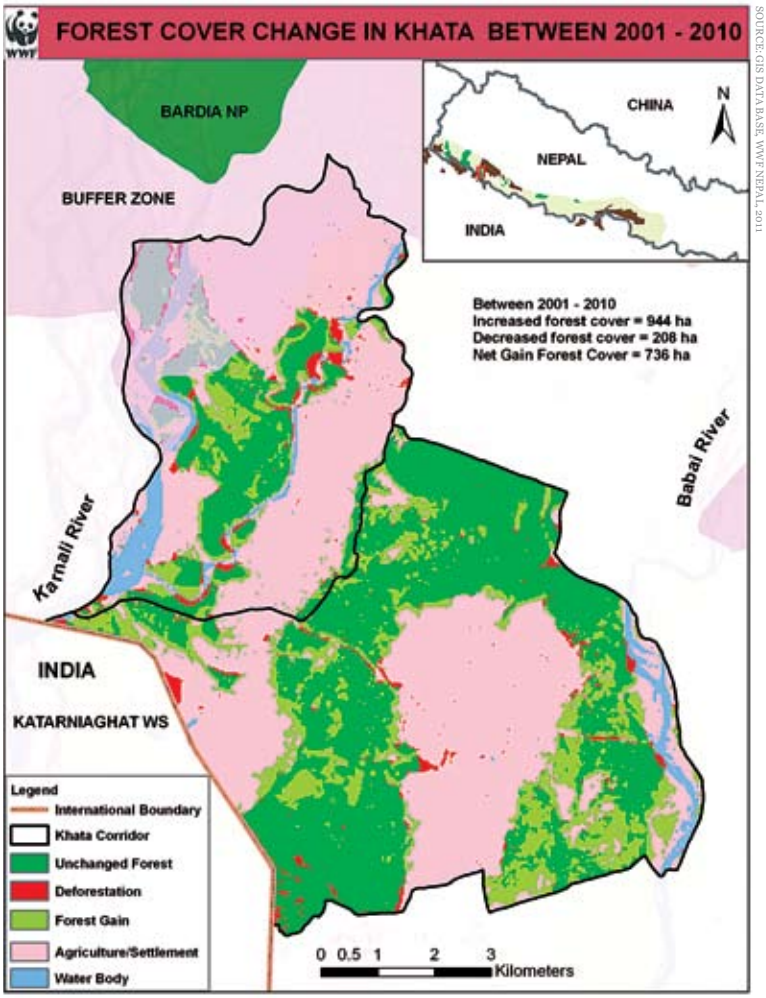
- **Self-participation in corridor conservation:** The community's motivation for participating in and understanding the complexities in the linkages between conservation and livelihood is spurred by their ability to capitalize on resources as well as opportunities derived from livelihood-improving conservation activities -- trenches, electro-fencing, biodiversity monitoring, bio-fencing, encroachment control and habitat protection. This is emphasized by the community contributions leveraged in Rs. 11 million (US$ 152778) in FY 2009/10 in compared with the annual financial support from WWF –TAL (See figure 1) of US$ 55071, this leveraged amount is a perfect example of local ownership, role and cost sharing as well as trust on CFCC and

CFUGs including their role to conservation and livelihoods. The local leverage is calculated on the basis of the value of local contributions and converted into number of days and number of persons involved in a project activity. The value of local contributions included forest user membership fee, number of people paid for voluntary works for conservation activities (such as plantation, trenching, fire line, rescue, waterhole and green link trek, harvesting, biodiversity monitoring, inventory and voluntary support during researchers scientist, forest and wildlife patrolling, local materials and accommodations in field site, coordination and negotiation meetings, planning and CFCC board meetings, monitoring at site and cash and kind support from individuals and guests).

- **Enhanced understanding of corridor management issues:** Most of the CFCC, CFUGs members and corridor resource users understood the analysis, illustrated conservation purposes and economic values of the program and its integrated approach to corridor management with its tangible and non-tangible benefits and opportunity. One of the major strengths of the program that they felt was its continued presence even during the intense conflict period. No serious cases of poaching and encroachment were observed during the recent political instability period and the resulting frequent changes in local bureaucracy as well as lack in groundwork and community consultation prior to making political declarations. The political leadership's inability to instill confidence in the local community in providing services and legal authority has critically affected the local community. Participants raised several critically relevant issues that need to be incorporated and integrated in the corridor management plan. Users agreed on an approach of putting issues in one basket as an appropriate corridor management strategy where conservation and livelihood issues are interdependent and interlinked with each other. Institutional learning has indicated that people's basic livelihood issues

Table 1: Distribution of Land use Pattern in Khata Corridor

Description	Area (ha)	%
Govt. Forest	1227	14.9
Community Forest	2857	34.6
Agri-land	3167	38.3
Grass Land	211	2.6
Water Body/sand	640	7.7
Others	159	1.9
Total	**8261**	**100.0**



SOURCE: GIS DATA BASE, WWF NEPAL, 2011

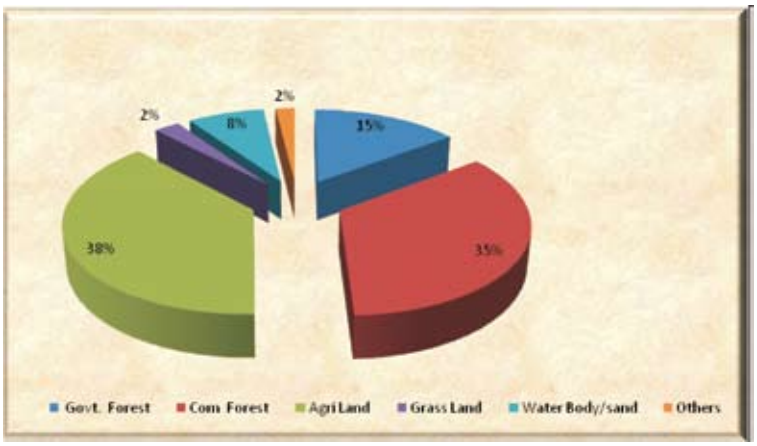
TIGER TRAPPED IN CAMERA AT KHATA © WWF NEPAL, 2009

RHINO IN SHIVA COMMUNITY FOREST, KHATA © TILAK DHAKAL/ TAL-CBRP, NEPAL, 2010

cannot be separated from a program especially where conservation threats are mostly rooted in the subsistence strategy of people. The summary of strengths that users concluded are given in box:8.

- **Contribution to safeguarding corridor forest and habitat:** Khata CFCC has been coordinating and managing 8261 ha of land of which 2857 ha (34.6 per cent) of forests are under the management of the community. A majority of the CFUGs inside and around the corridor safeguard 1227 ha (14.9 per cent) of government-owned forests (See table: 1, figure: 4). Khata CFCC also coordinates and builds capacity among the CFUGs, outsourcing the resource pool and linking them with each other. The CFCC coordinates between the Indian authorities and the Nepali authorities including with local service providing agencies such as District and Range Forest Offices. Up to now, the Khata CFCC has facilitated in providing legal ownership of 68 per cent of the total forest land in the corridor to the community through which they are receiving numerous benefits, opportunities and services. The CFCC's major roles are institutional coordination and leadership with partners and district forest and range offices to support handing over of corridor forests to the community with legal ownership including required documents such as forest operation plan, constitution and annual work plan. CFCCs also play a key role in linking district forest office, range office and CFUG to solve human wildlife conflict, illegal activities and poaching, institutional capacity on biodiversity monitoring and mobilization of CBAPOUs. It also monitors the compliance of rules and regulations mandated for CFUGs and communities mentioned in the constitution of the CFUGs and community forest policy in Khata Corridor.

Figure 4: Distribution of Land use Pattern in Khata Corridor



GIS unit/WWF Nepal, 2011

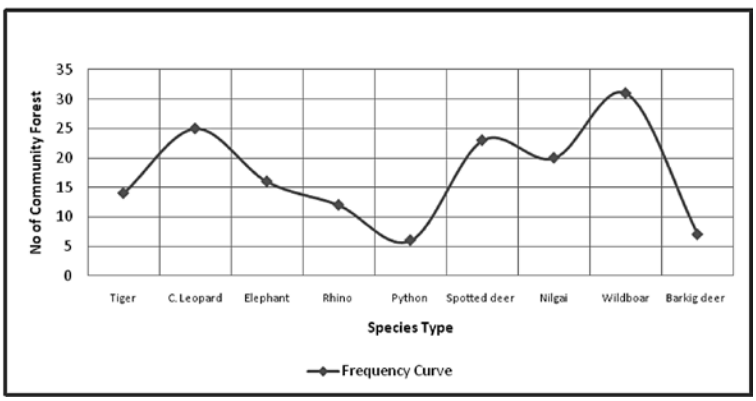
- **Sustained youths engagement in community-based anti-poaching operations (CBAPOs):** The Khata CFCC also coordinates among 34 community-based anti-poaching operation groups and engages local youths against poaching and illegal activities. These groups did not stop their operations even during the conflict. They safeguarded critical forest habitat and threatened species. They also safeguard the mobility of rhinos and other species including tigers and elephants while curbing illegal and unsustainable collection of timber and forest products. CBAPO members regularly report to the CFCC with monthly meetings that are updates on local issues and initiating a response action for the issues. During the discussion and interaction with CBAPO members, they mentioned that patrolling without any legal identity and equipment is often difficult. The Khata CFCC has no legal right to punish transgressors at their level, and CBAPO programmes are limited to collection of traps, watching mega species movement, control of prey species poaching and illegal and over-collection of forest products. The CFCC has invested towards making a more effective CBAPO by retaining the youth and engaging them in skills and entrepreneurship training, providing them preferential micro-credit support, equipment and start-up logistics material support, and support through enterprise and learning centre. But these are often inadequate in meeting the basics aspiration for those who have been regularly involved in the CBAPO.

- **Contribution to address human-wildlife conflict:** By its nature of being a connectivity corridor, Khata is a critical transit for wildlife and human movement across the border to India, which is linked by human settlements, a road across the Karnali River, and a wildlife corridor from Bardiya National Park to Katarniaghat Wildlife Sanctuary across the border. Regular use of the corridor by wildlife increases the frequency and chances of affecting the community's assets negatively (human casualty, crop, livestock depredation etc (See figure: 5). Such incidences are however often beyond the community's control and the institutional management. Community efforts and CFCC resources alone are not enough to reduce this. During the last decade, there have been two human casualties and other injuries reported to the Khata CFCC. No official reports against crop-raiding have been recorded though the community has mentioned it has increased significantly (43.4 per cent) compared to previous years. Rapid corridor encroachment increases the frequency of such incidences. But other factors also impact human-wildlife conflict, whether it be decrease in forest and habitats that pressures wild animals to move towards human settlements, increases in wild animal populations, or encroachment of corridor forests by migrants and freed Kamaiyas during the last few years. However, corridor resource users have benefited from human-wildlife conflict

mitigation measures and opportunities, which include bio-fencing, electro-fencing, trenches, watchtowers, alternative and unpalatable crop farming in marginal lands, hybrid livestock management, easy access to wildlife relief funds, education and knowledge on wildlife behavior, on-the-spot herder education, stall promotion, community health clinics and camps, improving infrastructural services, cooperatives, gravelling of access roads, health and hygiene promotion especially among groups vulnerable to wildlife, capacity building, green enterprises and entrepreneurship promotion, restoration and management of corridor forest, patrolling and observation of key and prey species movement, biodiversity monitoring and inventory profiling, water hole management in community and corridor forests, controlled grazing, support through improved cooking stoves and biogas -- reducing chances of unexpected encounters with wild animal during fuel wood collection, fodder fetching, and grazing in corridor and buffer-zone forest and connected land areas. Some key biological significances like footprints of tiger movement (see camera-trapped picture), numbers of rhinos and other such mega species in the community forests (see Rhino picture in Waterhole), frequent sighting of deer groups and blue bulls, and wild animal movement including those of wild boars and leopards are sufficient to qualify as tangible evidences of changes in the biological significance of the corridor (See figure 5). Significantly, no local resident has been found to be involved or been reported in retaliation killing and illegal logging/smuggling in this corridor, despite the rise in crop and livestock depredation (43.4 & 13.9 per cent).

Figure 5 indicates that there is wildlife presence in a number of community forests. Groups discussions with affected groups also illustrate that livestock depredation by leopards has increased while

Figure 5: Sighting of Wildlife Presence in Community Forest (2009)



Source: Khata Case Study, 2010

the crops are mainly depredated by wild boars, blue bulls and spotted deer. The curve also indicates the richness of species diversity in the community forest with at least 20 per cent of community forests housing various species excluding pythons. It is, however, very difficult to claim the active presence of tigers, rhino and elephants in these community forests because there is only one camera-trapped evidence of tiger taken in 2009, sighting of a tigress with a cub during 2010 by the CFCC chairperson and sighting of only five rhinos in Shiva CFUG. The community has internalized the importance of conservation and accepted that co-existence of wildlife and humans in harmony with nature can be achieved.

Box 8: Major Impacts Area

- Household and institutional assets increased
- Resource and use pressure (dependency) diversified
- Household saving increased
- Institutional capability increased (HWC, Coping)
- Governance and social inclusion ensured
- Compliance of local policy and regulation increased
- Users' capability increased
- Corridor management capacity enhanced
- Contribution to local economy and market (seasonal and partial employment)
- Self esteemed participation increased
- Youth and local volunteer mobilized
- Functional corridor maintained/sustained
- Presence/observation of tigers and rhinos
- Populations of blue bulls, pythons, wild boars, and deer increased
- Quality of community forests improved
- CBAPOU functionalized
- Regular biodiversity monitoring in practice
- Local support to conservation education and awareness increased
- Cost sharing and labor contribution to corridor increased
- Local trans-boundary relationship enhanced
- Household income increased
- Access and use of institutional loan increased
- Functional cooperative in place
- Access and use of PHE services increased
- Good governance principle integrated
- Program compliance and ownership increased
- Pro-poor conservation approach to corridor developed and tested

SOURCE: KHATA CASE STUDY, 2010

- **Strengthened institutional profile and role:** The Khata CFCC has recently posted Rs 6.3 million as a start-up revolving capital fund and has three full time local staff now. About 52 per cent of local residents have benefited from diverse schemes. The Khata CFCC has mobilized diverse natural resource management groups, invested in green enterprises that induce local employment opportunities – both seasonal and partial, trained locals, promoted alternative energy use and promotion, and worked on an inclusive basis that includes women and other marginalized communities. It has periodically updated and revised its operations, updated its presentation and negotiation skills, implemented a wide range of human-wildlife conflict response mitigation measures and strategies, and has been involved in institutional coordination and strategic relations with local and cross border authorities. These are proven evidences for a strengthened institutional capability as well as a pre-cursor of institutional

sustainability in the Khata CFCC. Its organizing and representative capacity of a large range of activities, capability of responding to queries during public auditing and hearings, implementing its policy partners' responses, sharing information with civil society, motivating community volunteer labour for infrastructure and institutional renovation, and its ability to engage the community in repair and maintenance of institutional assets are all signs of a healthy institutional capacity and sustainability. It contributes to strengthening the government health system through its mobilization of PHE staff and services in clinic centre. Institutional revenues through regular user fees, service fees, and incentive from installed enterprises are its major sources for funds. All these aim at building users' and partners' trust in the CFCC and its efforts in maintaining balance between conservation and livelihood.

Governance and Social Inclusion

- **Impact on governance and social inclusion:** The representation of poor, vulnerable and socio-culturally excluded and discriminated groups (women, indigenous groups, Madhesis, Dalits, small farmers and minorities) in the institutional process in a transparent manner is indicative of the inclusion of issues of marginalization within a programme (See figures 6, 7 & 8). This includes these groups' influence in CFUGs and other resource managing opportunities, their access to forest and other resources, the opportunities to get their opinions heard, and provision of their access to basic services and government infrastructural services. Such inclusive processes contribute towards reducing human poverty that is induced by exclusion from the mainstream discourse. A proper corridor management plan has to then obviously ensure equal participation of such groups in its programme, annual plans, and its actions. The data given in figure 6 indicated their is lacking

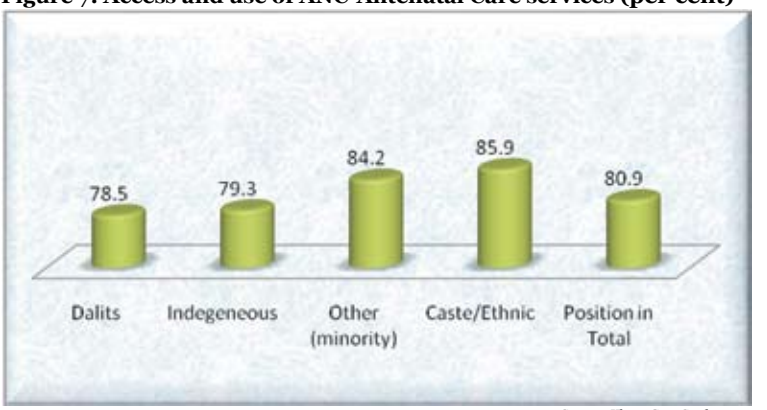
Figure 6: Good Governance Principle Integration and Practice in CFUGs

Source: Khata Case Study, 2010

in complains of community forest rules and regulations. During the focused group discussion, it is discussed that the Freed Kamaiya and Sukumbasi (a group of bonded labour and landless people) and some political activists didn't committed rules commenced by CFCC and CFUGs. The political protection to timber smugglers, poachers and land encroachers have impacted negatively as well as violent community forest rules and regulation.

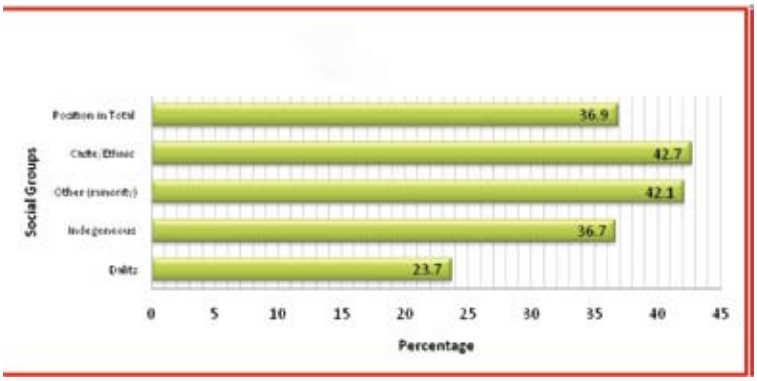
- **Increased equity in access to resources and opportunities:** Opportunities generated by the program not only improve local wellbeing but also contributes to an increase in the access and participation of marginalized and socio-culturally groups in the corridor resource management process. The study findings indicate that a large population of Dalits and indigenous communities including hill migrants are among the socio-culturally discriminated communities. Local demography shows Tharus, Dalits and hill migrants are predominant inhabitants in the corridor. As with other communities, the implementation of the Khata Corridor Management Plan has had similar impacts on the marginalized and socio-culturally discriminated groups, providing key evidence of the groups' acceptance and compliance towards the corridor management approach. The disparity among Dalits and other caste groups and even within homogenous groups is comparatively lesser in Khata than the national disparity, as well as the inequality in other similar districts. This is why there have been no serious instances of violence between the communities as well as retaliatory action against local wildlife and the program. This is despite the increase in local wildlife population as well as an increase in the number of migrants and internally displaced persons when compared with the beginning of the programme in 2001 (See figure: 6,7 & 8 and comparison summary is given in figure 13 at the end of this chapter).

Figure 7: Access and use of ANC-Antenatal Care services (per cent)



Source: Khata Case Study, 2010

Figure 8: Distribution of Benefited household from IGAs Skill Training



Source: Khata Case Study, 2010

The Khata Corridor's demography is quite homogenous in terms of resource use, with an equal spread among all communities. Almost all of them are members of natural resource management groups, CFUGs, cooperatives and saving groups. Disadvantaged groups (Dalits, marginalized Janajatee, small farmers including minorities) are encouraged to increase their participation in management positions and the executive committee. Nearly 13 per cent of all households in Khata Corridor have access to safe and improved (pakka) houses or toilets with the highest proportion among caste/ethnic groups (23 per cent) followed by indigenous households (10.2 per cent) and Dalit households (6.5 per cent), and 5.3 per cent among other minority-households. Here the pakka[3] structure means a structure made out of RCC and brick cement (NLSS Survey: 2003/04). This also indicates a decrease in their dependency on regular timber and thatch for roofs. Similarly, the access to English boarding schools is an indicator towards the household's capability of use of opportunities by transforming its derived assets. A total of 7.6 per cent of local households send their children to boarding schools, with 7.5 per cent of Tharu households, 3.2 per cent of Dalit households, and 10.3 per cent among caste groups. Technical and skill-based training is also a significant direct intervention whereas 36.9 per cent of the local community has obtained a diverse range of skills and knowledge training, and in turn capacity building opportunities.

Livelihoods Assets (Wellbeing)

One of the major challenges in the management of the Khata corridor is raising the wellbeing of corridor resource-dependents, which is most

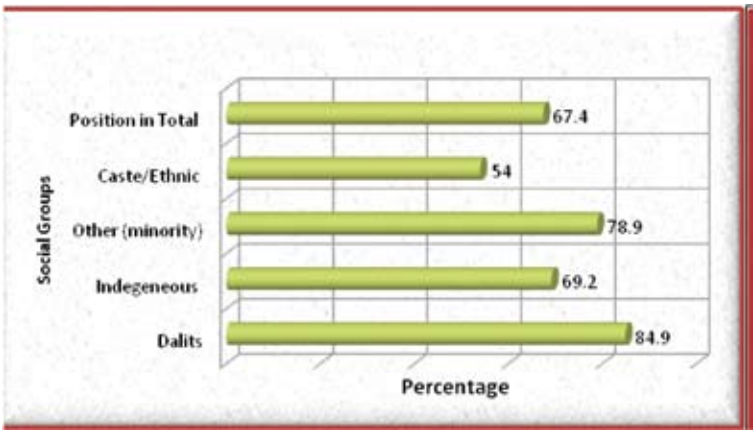
Box 9: Livelihoods Resources and Opportunities (Wellbeing)

Livelihoods Assets and Opportunities	Unit	%
Improved and Safe (Pakki) house	HH	12
Improved and Safe (Pakki) toilets	HH	13
Improved drinking water source	HH	84.6
Less than 0.5 ha cultivable land holdings	HH	31
Irrigable lands holdings (of holdings)	HH	50
All eligible members in family are literate	HH	2
Children in English medium school	HH	8
Year the round grass sufficiency	HH	2
Big cattle holding/raring (Cow, Buffalow)	HH	74
Small cattle holding/raring (Goat, Sheep)	HH	66
Commercial vegetable garden	HH	4
Kitchen garden (staple)	HH	96
Bio-gas (functional and use)	HH	16.6
Entrepreneurships/IGA skills obtained	HH	37
Member to more than two CBOs/groups	HH	60
Antenatal care (immunization-TT)	HH	68
Antenatal care (check-up 4 times)	HH	64
Benefitting from revolving funds use (cooperative)	HH	83

crucial to mobilizing a heterogeneous community living in and sharing the resources of the corridor's wildlife. The CFCC has faced several challenges due to its demographic and economic diversity beside other conservation issues prevalent in the corridor. The wellbeing status of user households has been sourced from their institutional records that they have maintained with regular updates. The study concludes and analyses the level of wellbeing among the users by taking these into consideration: 1) access, control and use over resources 2) education and literacy, 3) leadership roles and political powers including membership to other civil society institutions, 4) households assets, 5) representation of women and their contribution to economic activities, 6) use of communication appliances, 7) engaging with markets and services, 8) livestock and productive cattle, 9) prevalence of diseases, and 10) access to community resources. Similarly, this study also makes an effort in finding out total institutional assets and looks at institutional capability, management structures, institutional revenue sources, transparency and governance, social inclusion, revision of management plans, management of locally generated resources, mobilization of community and cost sharing, and volunteering in conservation actions.

Since the composition of the dependent community in the corridor is heterogeneous, livelihood priorities, strategies and approaches towards asset accumulation also differs. Marginal farmers are dependent on agriculture, working as wage laborers or as tenants. It is more challenging bringing them into the conservation mainstream as their livelihoods

Figure 9: Distribution of HHs by their land holding Size (<0.5 ha)



Source: Khata Case Study, 2010

are based on subsistence. The figure illustrated (See figure: 9 & Box:9) indicates that there are still a large number of assets deprived (Marginal landholding) families in this corridor compared to others. It is very critical to bring tangible change in their wellbeing. However, individual achievements like food sufficiency, representation of women, access to toilets and changes in house structure type, and legal access have increased (see above conclusion). The dynamics of wellbeing are, therefore, diverse and one action does not bring about drastic and immediate changes. However, there is a positive change on the encroachment levels, especially by subsistence users which can be evidence with diversification of subsistence and dependancy (See figure: 8 & 9) for fuel wood, foder, grass collection and grazing as well as not involved in advocacy of corridor land encroachment. Their engagement and participation in the programme also indicates that though a majority of them are deprived in terms of monetary assets, they are capable of leading and responding appropriately to challenges to conservation and biodiversity. This means that low incomes and social deprivation is not a predominant threat to conservation, although it definitely poses a challenge at the individual level. As shown in the findings (See figure:13 & Box:11), depredation of livestock and crops is still significantly high. Even material attributes have not raised significantly, yet the tolerance of wildlife remains high, proving that poverty is not necessarily a detriment to conservation program.

The status of asset holdings and their appropriate transformation and use (See box: 9) indicate that a majority of households still do not possess assets or possessions such as fertile land holdings, safe and improved toilets, literacy, productive and economically valued cattle and year-round grass for the livestock, commercial and all-year-long kitchen garden, food sufficiency,

communication appliances, or transportation facilities. Nevertheless, a few changes in asset could be observed. These include increase in access to and use of clean drinking water (tube-well with de-arsenic filter) facilities, increase in savings, increase in access to and use of community services, new enterprise skills, improved capacity to use English medium schools, acquired positions in management committees and groups, increase in access to and use of reproductive, child and primary health care and antenatal care, increase in involvement with cooperative, increase in deposits and entrepreneurship levels, and increase in access to and use of cooperative and relief loans. These enable households to diversify their dependency and transform their capabilities from one asset to another, eventually enhancing domestic and community capability in the long run. A large majority of corridor residents (70 per cent) have been raising big[1] (74 per cent) or small[2] cattle (66 per cent) respectively. Despite such a large proportion of cattle holding, no cases of illegal grazing in community or corridor forests or conflicts due to this have been reported so far. This is also an indication of institutional management capability, compliance to locally generated rules and regulations, and changing perception and acceptance of programme presence in an area where only 2 per cent of households have all-year-long grass sufficiency from their own sources and the rest are completely dependent on corridor sources.

Besides, critical areas of intervention that have seen the direct participation of locals in conservation efforts in the community forests (34.6 per cent of total corridor land) include the setting up of nurseries, construction of trenches and watchtowers, distribution of relief funds, imparting technical skills and knowledge on biodiversity and corridor management, building inter-country relationship at local levels, monitoring of biodiversity by CBAPO youths and community forest guards, and institutional integration with district forest and Bardiya national park officials. One of the key achievements of the Khata Corridor Plan has been the participation of and engagement with local people.

Livelihood Strategy (Dependency, pressure and trends)

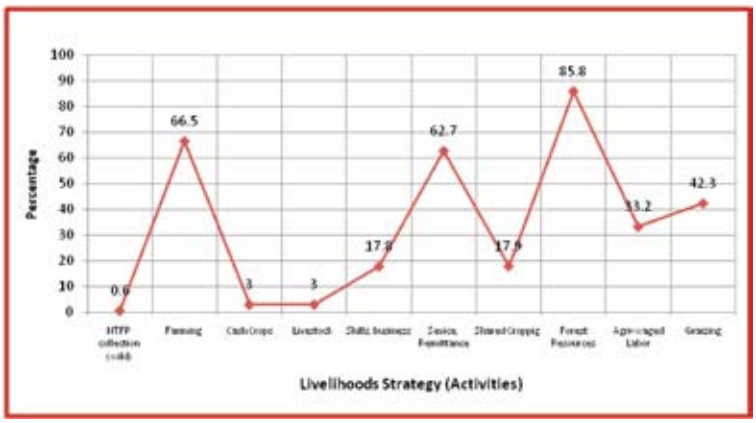
Livelihood strategies within a community on one hand indicate consumption patterns and use of and access to resources while on the other hand they also reflect the dependency of the community on the available resources. This makes it imperative that any project that looks to conserve bio-resources must also take into account the awareness and understanding of the community using those resources and implement

[1] *Buffalo, Cow and Bull*
[2] *Goat and Sheep*

preventive and mitigation measures in critical areas. A periodical review of livelihood strategies of a community also enables one to understand what the current threats to biodiversity are and how those threats are a result of community strategies, while also projecting how long existing resources will last at the rates of current consumption by the community. This requires estimation of natural capital stock, local demography and trends in consumption.

The Khata CFCC, with support from TAL programme, has implemented a diverse range of interventions that look to diversity livelihood options so that the pressure on corridor habitat and biodiversity is reduced. Though a few interventions may appear as if they are irrelevant to conservation, these indirectly contribute towards reducing the pressure on corridor resources. Instances of such interventions include promoting literacy, health care services, and social security. These interventions also indicate towards changes in lives, demand trends, resource requirements, and

Figure 10: Distribution of HHs Major Subsistence Activities



Source: Khata Case Study, 2010

highlight potential conflict areas during resource accumulation. The project can thus integrate issues and plan for the future by using the data collected from these interventions.

Most people living in the Khata Corridor pursue one or more of the following livelihood strategies: NTFP collection, cultivation and marketing of high-value or medicinal plants, traditional farming, livestock raring, farm-based enterprises, services or remittance-based activities, shared agriculture, and waged labour. All of these are connected directly or indirectly with natural resources. Any changes in these strategies will provide the scenario for pressures on natural capital stock through consumption and use. The various livelihood strategies adopted by the community are given in figure: 9.

A majority of households (85.6 per cent) depend upon forests and collection of forest products in the corridor, followed by traditional farming (66.5 per cent). Likewise, a significant proportion (62.7 per cent) of households depends upon jobs, services and remittances as the main source of livelihood. Other sources of livelihood include livestock farming (42.3 per cent) followed by agricultural labor (33.2 per cent).

These figures reveal that a majority of the community is dependent on natural resources for their livelihood. These activities also complement other activities such as use of timber by carpenters. There is thus a need to diversify livelihood options for the people living in the corridor, as nearly every product they use comes from the forest or is a natural resource. Besides, the state of the ecology and ecosystem is dependent on the consumption patterns of those living in the corridor, with significant pressures being generated on the natural capital stock through such direct and indirect activities. This is why it is important for a conservation programme to find out whether a community's livelihood options are appropriately diversified and whether the pressures on forests have reduced or stabilized. Until one can understand the trends in community livelihood strategies, it is difficult to recommend appropriate interventions. All the aforementioned livelihood options require the use of corridor forests either directly or indirectly. Besides, other long term impacts such as encroachment of forest land through political backing, conflict between locals and migrants about land, political influence local district and forest offices, and illegal practices such as logging and sand mining in Karnali tributary (Geruwa Bhangalo) need to be taken into account too.

All these have challenged the community's institutional role in sustaining and regulating the corridor as well as its ecological processes. At the end, the question of livelihood can be addressed by appropriate local and site-specific interventions; contradictorily, a broader strategy is needed to address these long term impacts by influencing the policy framework with commitment from the state and political parties. In concluding, understanding and analyzing the dependence of people on local resources is significant for local level conservation especially where a large number of people are dependent on natural resources for subsistence.

Recent figures indicate that the decision-making processes in private and community forests often undermine those who are most vulnerable and directly rely on forest resources for day-to-day subsistence, which increases the pressure on biodiversity with increased usage. Better-off communities are more interested in high economic value forest products such as timber and medicinal species. Small land holdings (31 per cent) force marginal farmers to increase their usage of natural resources – this is also impacted by the large percentage of livestock holdings (74 and 66 per cent of big and

small cattle) families hold in the area. Minutes of their meetings indicate most users preferred a limited use of resources particularly for fodder collection and grazing, although permission for weekly and fortnightly fuelwood collection is in practice among the groups. While on one hand these decisions reveal the contributions towards effective regulation and compliance with laws thus avoiding unnecessary use of resources, the decisions also make marginal households potentially more vulnerable.

Box 10: Issues in Khata Corridor management

- Prevalence of livestock and crop disease
- Food deficiency and low productivity
- Imbalance in asset availability and holdings
- Weak purchasing and asset accumulation capacity
- Increasing crop/livestock depredation
- Illegal encroachment (forest, riverbank, public land)
- Diseases (e.g. vector-borne, water-borne, air- borne and skin)
- Landlessness, land security and tenureship
- Traditional fuel consumption (carbon-emissions)
- Policy and effective law enforcement and power delegation to CFCC
- Health issues (malnutrition, reproductive health, service quality, infant and infectious disease)
- Lack of access to improved community services, resources and opportunity
- Increasing Illegal logging and timber trade
- Unemployment, under-employment, disguise employment, seasonal employment
- Seasonal/youth migration and their retention
- Soil erosion, siltation and river bank erosion

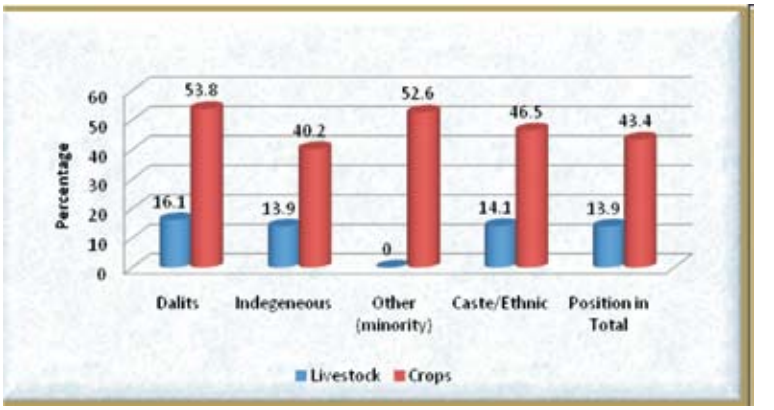
Source: Khata Case Study, 2010

A blanket policy in the name of conservation is often unjust to the deprived and asset-less groups. The policy not only limits access and use comprehensively but also negatively contributes towards alienation of the community and limiting them from encouraging ownership of productive livestock, which in the long term will have an impact on biogas programmes etc. In the corridor, only 16.6 per cent of households have functional biogas plants, comparatively lower than the proportion of other household appliances. In concluding, any corridor-resource conservation attempt should ensure rational use and access to resources.

Vulnerabilities (Issues/trends)

Various development indicators that reveal the quality of life are crucial to sustain the interest of households, communities and institutions towards conservation in the long run. These indicators include food sufficiency, health and hygiene, representative capacity, crop and livestock depredation, sanitation issues and drinking water facilities, access to

Figure 11: Distribution of Wildlife affected Households



Source: Khata Case Study, 2010

education, use of pesticides and fertilizers, and pre- and antenatal care and health care facilities. Until a conservation strategy does not understand the vulnerabilities present at the local level and their magnitudes and trends, the desired conservation goal will not be achieved. These vulnerabilities must be considered while designing local level programmes. For example, if frequency and pressure of crop depredation is higher in winters, interventions should focus on appropriate measures during winter. This will make the programme more relevant and will enable the local managing capacity. Current corridor management approaches including

Box 11: Livelihoods Vulnerability (issues/trends/shocks/stress)

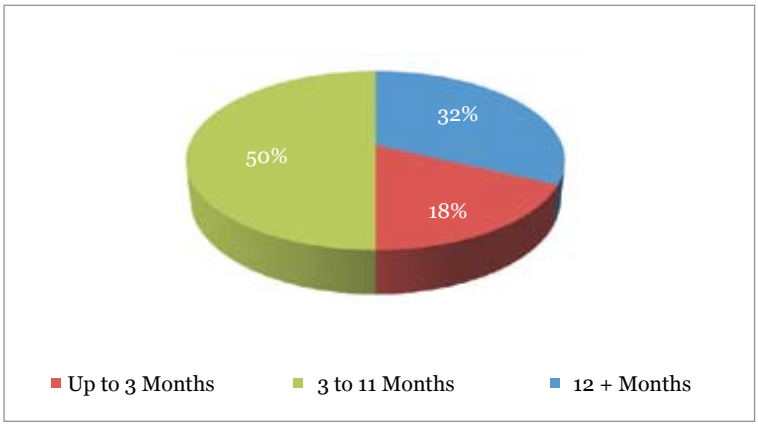
Descriptions	HH	%
Year the round food deficiency	HH	67.5
Affected from livestock depredation	HH	14
Affected from crops depredation	HH	43.4
Shocked from under five year children death	HH	0.3
Shocked from vector born related disease death	HH	7.2
Affected from vector born related disease	HH	14
Chemical fertilizer users	HH	69
Traditional fuel users (wood, Littre, agri-residue)	HH	94
Children (school aged) have not been enrolled at school	HH	3
Heavy dependent on wetlands (food and substance)	HH	49
Pesticides/Insecticides users	HH	41
Have not any type of own toilets in use (free wandering)	HH	3.5
Loan obtained to cope (disaster/conflict/asset loss)	HH	2
Adopted unpalatable crops farming (HWC)	HH	4
Paid in forced and undesired forms of labor works	HH	3

the LGCM-Livelihoods and Good Governance Change Monitoring Process (2010), Sustainable Livelihoods Strategy-2011, WWF Nepal's Conservation Strategic Plan 2012-2016, and the TAL Strategic Plan 2004-2014 have integrated these issues into their annual and periodical work plans by addressing particular underlying threats and issues in conservation targets.

The study found that some critical issues based on seasons have a heavy impact at the local level. Vulnerabilities and household and institutional capabilities are correlated. An increase in issues also creates uncertainty among households, generating additional pressures on natural capital stock. During the focus group discussions and an earlier study report (Livelihoods Outcomes Study 2007), it was learned that during difficult seasons, a house accumulates more natural assets and transforms it rapidly to cope with the issues. The major vulnerabilities and their trends have been outlined in figure 11, 12 and box 11.

According to the given data in box 11, the dependency on traditional fuel sources is seen in 94 per cent of the households. Likewise, 67.5 per cent of households do not have year-round food sufficiency from regular sources. About 43.4 per cent of households have been facing crop depredation by wildlife. Even the better off and middle class households who have been using bio-gas and improved cooking stoves regularly collect and use firewood for other domestic purposes. While the quantity of firewood might vary according to family size and requirement, it hasn't been rejected completely. Coping mechanisms adopted by the vulnerable community have been migration – both seasonal as well as permanent,

Figure 12: Food Security Months



Source: Khata Case Study, 2010

changes in cropping patterns and undesired loans. The CFCC should make itself more flexible especially for firewood collection to those CFUGs who have other restricted and controlled use pressure and illegal encroachment and increase the area of community forests.

IMPACT OF ISSUES

Khata is a key biological corridor where besides the WWF-TAL institutional support programme, other government and national park interventions have influenced in the processes and their benefits have spilled over. Some significant changes have been observed. These have however induced other in-rooted threats and issues, especially due to fragile socio-political condition, weakening purchasing power, migration, weak response to post-conflict transformation and lack of presence of local governance authorities. An interaction with natural resource management groups and civil society in the corridor concluded on a list of prevalent as well as observed issues. Though a few of them are related to livelihood more than conservation, yet from the community's point of view those cannot be undermined. Doing so will give an opportunity in not only managing more challenges in corridor management but also in extending the landscape's other projects to other development partners who could join hands in addressing and managing such critical issues and challenges collectively. This will be allow landscape conservation efforts to be on an equal footing with partners, with strategic entry point conservation issues and development priorities on the same page thus sustaining and maintaining the biodiversity richness and the functional corridor.

Box 12: A tiger is our natural intimate but a leopard is always an enemy: An indigenous woman's story:

Strangely, an old woman claimed that locals prefer the tiger than the leopard because the tiger does not kill their livestock within their cattle fences and in normal conditions while the leopard does. Interestingly, the presence of tigers in the corridor displaces the local population of leopards and foxes. This is a very significant association of local indigenous community with wild animals particularly in Khata corridor. This reflects the acceptance of the co-existence of wildlife in the Tharu community even as households (14 per cent) are seriously affected by livestock depredation including crop raiding by other species, particularly elephants.

Source: Ganespur, Khata Corridor, KII-Case Study, 2010

The issue of food security is one of the major issues in Khata, especially for marginal farmers and deprived households. A majority of households has unproductive land holdings, either fragmented or less-than-subsistence levels, the proportion going up to 84 per cent among Dalit households. In such a situation, there are two crucial options for a corridor management plan: reducing pressure on corridor biodiversity either through increasing capability or land productivity or diversifying their dependence with other off-farm activities. Marginal, fragmented and unproductive land holdings in the long run severely restrict household food security. Similarly, frequent crop raiding also contributes to food insecurity. The study revealed that there is strong correlation between crop raiding and food insecurity among subsistence farmers. The Khata Corridor is predominantly affected by agricultural land expansion and occupation of such land by marginal and landless farmers. Similarly, freed Kamaiyas and migrants from hill districts have also induced undesired pressures with support and influence from national political parties. Land encroachment beyond marginal and landless farmers for timber logging in the name of land distribution is also rapidly emerging. Ensuring year- round food security is critical for pressure reduction in corridor management. Existing practices of traditional farming technology, incapability to manage crop diseases, weak and irregular income sources, and singular dependence on traditionally adopted agro-base livelihood strategies also contribute towards frequent food insecurity incidents.

The deteriorating national economy due to unstable and fragile political situation and lack of employment and opportunities has accelerated rapid youth migration abroad. It is ridiculous that the government has strategically encouraged migration to other countries in the name of remittances without giving serious consideration to weakening social safety nets and other impacts in the socio-economic sector in the long run. A lack of young energy of course has its impact not only on the local economy but also on the social system and sustainable conservation programmes. Analyzed data indicates about 23 per cent of households regularly receive remittances from abroad, while there is a noticeable increase in demands for loans from local cooperative to go to Gulf countries. These two tangible evidences are enough to indicate that if the trend continues the corridor will begin to experience a decline in capital stock for lending to conservation and livelihoods entrepreneurs rather than others as well as an absence of youth assets that conservation always requires.

The migration of young men has contributed towards significant role changes of women not only in the household but also in institutional, economic and community resource management; this is evidenced by their attendance during public audits and group meetings, representation in the

executive committee, loan obtained, involvement in corridor conservation and entrepreneurship. The reduction in male proportions has also led to work diversification for women and old people who were earlier engaged in less-labor intensive work and not in the larger farming and livestock rearing activities. This is illustrated by the change in household assets and their use pattern in the corridors which has contributed towards biodiversity conservation.

There is a need to balance among the human and other assets otherwise dependence and over-accumulation of only physical and financial asset contributes negatively to biodiversity. Over-dependence on remittances will lead to a reduction in the youth population, increase consumption rather than investment, and create economic uncertainties as negative influences on the global economy will affect remittances. These will ultimately have an effect on the local biodiversity as consumption of resources from the corridor will increase. Existing approaches in addressing such issues include providing entrepreneurship skills and subsidizing loans but are not adequate to counter the migration. It is very difficult to retain the local youths' engagement with conservation practices. Unemployed and discontented youth are often misled and used by poachers and traffickers. Addressing this will need an appropriate strategy that engaged the youth, possibly even non-conservation strategies like skill-based entrepreneurship, scholarships, technical skills, cultural clubs and recreation ventures. Khata CFCC's initial strategies towards the youth were limited and not enough in sustaining and motivating the youth towards critical tasks like patrolling at night and female youth engagement.

AREAS TO BE CONSIDERED

The results of corridor management approaches are most visible through various tangible evidence, news in the local media and local reactions. These are crucial in shaping the most appropriate biological corridor management approach which could remain in place and replicated in other critical areas of the landscape in the long term. Though some of the suggestions here are beyond the programme's capacity, they must be considered and conveyed to respective institutions as part of the micro-macro linkages of sustainable livelihood principle. Sustaining the youth's involvement in anti-poaching activities would be crucial for the long term, especially because of the current political fragility. Similarly, an effective private sector and other service providers will be an additional value to the approach. Contradictions in the various laws that govern the corridor's resources, such as the Local Governance Act 1999, the National Park and Wildlife Conservation Act 1973, the Forest Act 1993, and the TAL Conservation Strategic Plan 2004-14 have given rise to questions such as whose right is it first, or whose priority must be addressed first.

These two questions are vital in sustaining the corridor with the participation of the locals in the long run. For example, infrastructural projects such as the construction of Rods, Concret and Cements (Pakki) bridge on the Karnali and improvement and expansion of the linked-road to Rajapur crossing through the Khata Corridor, and an increase in corridor land encroachment by landless (Sukumbasi and Freed Kamaiyas) are significant issues which could not have been addressed without political commitments from all parties and official commitments. The current priority that needs to be discussed among communities, state and interested institutions is how to achieve the balance between creating environment-friendly physical infrastructure that allows for ecological services to continue without disruption and compromising a corridor resource base that allows for appropriate livelihood options and proper conservation strategies.

Box 13: Areas to be considered for Corridor Management:

- Technical support with more programme priority (Science, Conservation and some priority that do not reflect community aspirations e.g. bio-research)
- One door policy: all grants and technical supports should be from CFCC (difficult to know the rational and logic behind their diverse forms of presence)
- Political and bureaucratic influences and pressures have undermined local priorities
- The programme has not substantially addressed political/influence threats
- Challenges to sustain long term youth volunteers' engagement (e.g. CBAPOU, Peer Education)
- No deep focus on local employment opportunities
- Kind compensation against crop, livestock depredation (e.g. insurance, seeds, inputs, steel fencing)
- Less focus on land-use plan and local legal rights (legal provisions to punish poachers and land encroachers locally)

Source: Khata Case Study, 2010

One of the major challenges towards sustaining a long-term conservation stewardship by the community is the migration among its youth. The high local dependency (23 per cent) remittance-based resources needs to be appropriately diversified or reduced while retaining the services of the youth towards conservation efforts. If not, local cooperative funds currently being invested in non-productive investments to send youths abroad will create new challenges in the future as loan demands for migration will be higher than for agro, forest and energy-based enterprises.

Increasing crop raiding and livestock depredation has been affecting seasonal food sufficiency. While this has been compensated to some extent by planting unpalatable crops on nearly 17 per cent of the lands, it does not

completely avoid grievances against wildlife by the affected community and family. The study found that the farming of unpalatable crops has been adopted by not only those households affected by crop raiding but also by those who have adopted the plant as a cash crop and are looking towards an extended market opportunity. However, this has also presented another challenge. Farmers with larger land holdings have adopted the crop and have captured the market for the crop, using their influence with the vendors. They have manipulated prices as well. This leaves the small farmer with marginal holdings with low prices for their product, as they do not have the necessary quantity or power to influence market prices. This needs to be balanced, and large farmers should not be encouraged to cultivate cash crops, as it has become an income-generating strategy.

Besides this intervention, the management approach in the Khata Corridor has also introduced other mitigation measures such as bio-fencing, watchtowers, solar fencing, economic incentives especially for human injuries and casualties, and establishment and mobilization of relief fund. There have been no instances of retaliatory killings and injuries to wildlife which is a positive sign for tolerance towards the presence of wildlife (See story of harmony in Box: 12).

The corridor habitants is also affected by the prevalence of environment-borne diseases – vector-, air-, and waterborne – and communities living within are seasonally affected by them. The favorable climate induces several vector-borne diseases and epidemics. A Japanese Encephalitis and Kalaazar Epidemic left a terrible impact on the local economy and human resources. The current study shows that 14 per cent of the households have been affected by vector-borne diseases, especially among infants and children below five. Deprived households who cannot afford preventive measures are most likely to be affected by it. Further, findings show that a few households (0.8 per cent) saw another death during the next one year (See Box:11).

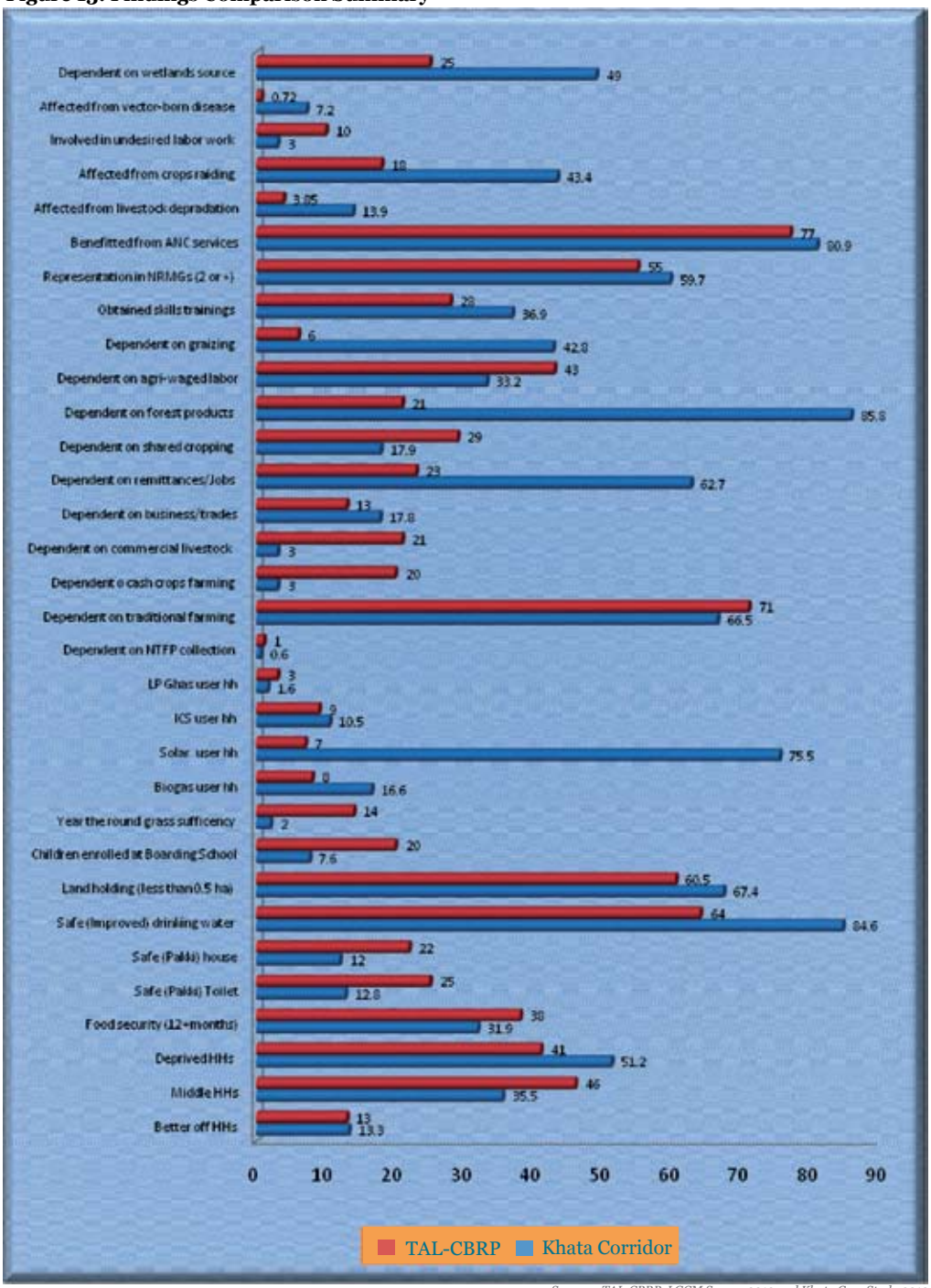
A large proportion of the community, especially among indigenous Tharus (49 per cent), is directly dependent on wetland and river resources for their livelihood. The challenges they face are scarcity of water and drying up of wetlands and streams due to climate change. Among those communities dependent on wetlands and river resources, the indigenous communities of Tharus and Sonaha-Raajis are most affected because their dependency is not only for food and water but also for water's high cultural significance in their rituals, while also being a source for high nutritional value food such as snails, turtles, fish, frogs, rats, snakes, birds and edible wild vegetables like nettle, yam, fern and green leaves. Dalits and other communities are mostly dependent on micro-irrigation techniques, cattle rearing and NTFP collection to sustain their households (See box:

11). Two project studies (NNIPS 1995 and UNICEF/Helen Keller 1999) carried out in the eastern Terai found that pregnant Tharu women are comparatively less anemic than those women without wetland food items, especially snail, fish, rats and frogs, including wild green vegetables in their diet. The decline in wetland areas due to erratic rainfall and climate change has increased the scarcity of such indigenous food sources thus directly impacting those families dependent on such sources for additional nutrition. This negative impact can be projected as an emerging health and nutritional vulnerability for these families. It also affects those families who are dependent on wetlands for raw material collection for their own domestic and small-scale commercial purposes. Besides this, decline in wetlands is a loss of habitat for various species of fish, insects and reptiles.

In addition, a majority of farmers are now regularly using chemical fertilizers (69 per cent) and pesticides-insecticides (49 per cent) to avoid crop failure (See Box:11). This has also resulted in a decline in insects responsible for pollination – directly affecting the small scale industries of apiculture, aquaculture, sericulture and horticulture. Another challenge that requires serious consideration is the fact that very few families have all-year-round food sufficiency (32 per cent). Other factors that negatively impact conservation efforts in the corridor are fragmented and marginal holdings of arable land, traditional farming technology, unsustainable farming practices, migration, and unskilled agricultural labor force. Some households in the corridor do not have sufficient resources for securing a three month food sufficiency, and child labour and underpaid work – both illegal now in Nepal – have also been accepted as resource generating measures. This is further confirmed by the 3.5 per cent dropout ratio among school-going children and a majority of them are engaged in domestic chores. These deprived conditions have also created a situation where 2 per cent of the population has taken loans at high interest from informal sources (See Box:11).

The local community has pinpointed towards two causes for the decline in the natural capital and wildlife in the corridor. The first is because of nature-induced disasters and the second is a result of human activities. There is strong evidence to prove the first, especially in the recent displacement of the Gangetic Dolphin from the Karnali after the river's flow was naturally diverted – even the Geruwa River is now drier than earlier, as recorded by the community, due to this change in the river's flow. However, according to an ethnographic analysis of the local Sonaha fishing community, the displacement of the dolphins could also be a result of over-fishing as the dolphin requires a sufficient stock of prey-base fish such as Sahar fish (a type of Gangetic dolphin's preferred fish food).

Figure 13: Findings Comparison Summary



Sources: TAL-CBRP, LGCM Survey 2010 and Khata Case Study 2010

CONCLUSION

Asset transformation is a critically significant process that needs to be understood from an insider's perspective rather than an outsider's.

One of the important outcomes of this study has been the fact that an approach to put both biodiversity and livelihood in the same project basket is the most appropriate way to address prevalent issues in a critical corridor. This is because of a prevalence of diverse priorities among heterogeneous socio-ethnic and economic groups determines their ability to contribute to their environment. When reviewing inputs from the users and partners, one has to strive towards achieving a result that will show significant involvement of the community and users while generating resources and opportunities that will allow for an improvement in the community's livelihood and wellbeing as well as increase their representation in local resource management groups. This will also allow for good governance practices to seep in and institutionalize a socially inclusive process where the community's adaptive capability improves and their interest in conservation is sustained. Such a process will also result in improvements in health and sanitation, increase youth participation in conservation activities and promote conservation and corridor resource management, even beyond the border in Khata's case.

The integrated livelihood option has always focused on community and institutional sustainability. This approach promotes sustainable use of bio-resources while enhancing household and institutional capability using available opportunities and assets. This also results in an increase in economic capacity, marking a rise in savings and asset accumulation, even though the project stresses more on preserving the biodiversity than increasing income levels.

Asset transformation is a critically significant process that needs to be understood from an insider's perspective rather than as an outsider. Until and unless this is included in the project's aimed results, it is possible that one may not have enough tangible evidence to suggest the project has achieved its desired results. The study shows that US$ 87500 was raised from local resources and project grants but the budgeted expenditure was estimated around US$ 61111 in fiscal year 2008/09. This is a significant sign of a community being able to generate more than its project inputs excluding local leverages in kind forms. Environmental projects that desire multiple results especially in poverty reduction and sustainable development while conserving the biodiversity require an integration of appropriate approaches which are more relevant and contextual. A multi-pronged approach allows for the enhancement of capability while transforming opportunities and assets. The Khata Corridor management

model has been able to replicate this to a significant level. To conclude, the approach taken up in Khata best illustrates a complete landscape conservation vision to a wider audience. The efforts here lay high priority at empowering institutional capability while focusing on integrated community efforts towards conservation and livelihood simultaneously. Social inclusion and good governance principles have contributed towards securing livelihood and reducing not only pressures on the corridor's biodiversity but also underlying social grievances against resource use and consumption. These interventions complement to become a motivating factor that allows for conserving soil fertility and productivity while promoting environmental awareness.

However, rapid soil erosion on the banks of the Geruwa River impacts not only communities but also results in a loss of connecting habitat caused by soil erosion and flooding. This results in higher crop depredation due to increased wildlife movement on other lands, which induces insecurities among the lands' proprietors. This reduction in land area in the corridor will be a future challenge to the Khata CFCC despite an improvement in wellbeing, as it will result in loss of biodiversity and habitat and decrease the area under cultivation. This example just scratches the surface but highlights the connections between local population and the other forms of life in and around the area. What matters at the end is that humans must realize protecting the environment will benefit them as much as it benefits nature.

There has been a positive changes in the forest encroachment levels, especially by local subsistence users, and they have been found to coexist in harmony with nature and wildlife. The engagement and participation of such users in corridor conservation also indicates that though a majority of them are deprived in terms of monetary assets, they are capable of leading and responding appropriately to challenges to conservation and biodiversity. This means that low incomes and social deprivation is not necessarily a predominant threat to conservation, although it definitely poses a challenge at the individual level.

Community cost sharing (kind) and leveraging is more fruit full particularly in forest and natural resources based entrepreneurship and activity which are more labour-intensive in nature compare to livelihoods and research activities. It has been proven that the local leverage to this area raised from 25 to 75 per cent (average 43.85)of total intervention cost. This indicates investing in livelihoods and related activity induces and stimulates more community stewardships and engagement in Corridor conservation.

ANNEX

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BRIDGE CONSTRUCTION IN GERUWA AFFECT CORRIDOR CONNECTIVITY © TARA P GNYAWALI WWF NEPAL

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