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Department of Forest- and Soil Sciences
Institute of Forest Ecology

Carbon offsetting as an opportunity for sustainable rural development in Nepal - a participatory, community based approach

Proposal for the BOKU Carbon Offsetting System – Call 2015; Vienna, July 2015

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1 Rationale

Nepal is one of the nations enlisted in the list of Least Developed Countries (UNDP 2015) and, according to the UNDP Human Development Index Nepal is ranked number 145. The rural population is above 80 %, two thirds of the working population is engaged in agriculture and the sector contributes approximately one third of the GDP (Dept. of Agriculture Nepal 2015). Marginalization of ethnic groups and poverty are common in rural regions of Nepal, leading to out-migration. Productive members of rural households frequently have to work abroad to make ends meet. In 2013 remittance comprised 29 % of Nepals GDP (The World Bank 2015).

Overutilization of government owned land in Nepal has led to wide spread degradation of vast forest areas which have been converted to grazing land and shrubland during the 20th century. Recognizing the importance of forests for delivering environmental services, in particular erosion control, Nepal made great achievements in the area of community forestry (CF) and participatory conservation since the 1980s (MFSC 2013) and thereby could frequently reverse the negative impacts of former land use practices. Despite efforts to conserve forests and to improve forest condition, overall forest cover has decreased over the past decades while at the same time the area of shrubland/degraded forest has increased (Acharya et al. 2015, figure 1).

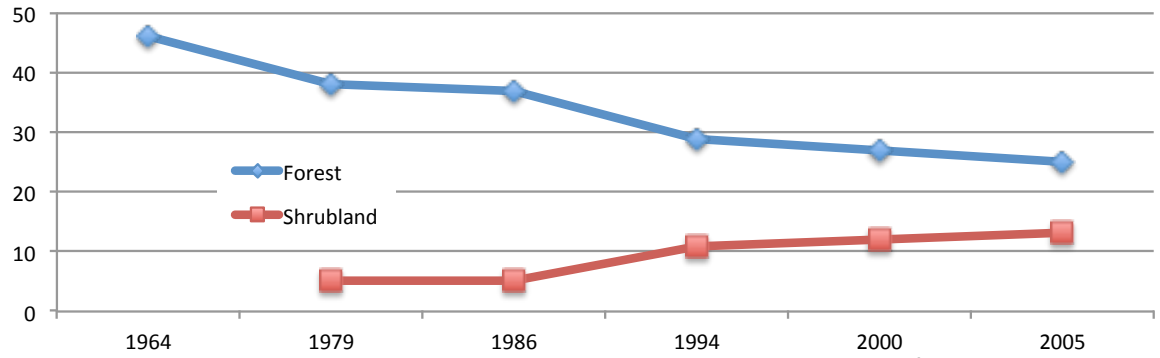

Figure 1: Temporal change of forest cover and shrubland in Nepal (% of total area (147 181 km^2))

According to Paudel et al. 2013 and Acharya et al. 2015 there are pronounced regional differences in pressure on status of forests. In the Mid Hill region, formerly known for severe forest degradation, erosion and deforestation, community based forest management and participatory conservation efforts since the 1980s were a success story. In remote mountain regions, there are conflicting targets. Conservation efforts may compromise traditional patterns of pasture and utilization of forest and non-timber forest products and interventions may cause conflicts between different stakeholders (Paudel et al. 2012). Locally the pressure on forests may even increase due decreased ownership and responsibility of the community and increasing population pressure as a consequence of infrastructure development like hydropower plants and roads (Achyraya et al. 2015, Bruckman et al. 2015). Smuggling of forest products may be an additional driver for illegal logging in remote mountain regions. The areas with most severe deforestation and partly even desertification rates are the lowlands of Terai and the adjacent hills of the Sivalik range (Paudel et al. 2013). Around fifty percent of Nepal's population lives in this region, and both illegal logging and encroachment by poor and/or landless pose a challenge for environmental sustainability and forest integrity.

The mountain and hill regions of Nepal have been hit severely by the April/May 2015 earthquakes, destroying whole villages. High demand for timber for reconstruction and a temporarily increased demand for firewood to cook on open campfires until reconstruction may increase the pressure on forest resources.

Community based forest management (CbF)

Though forest land was historically owned by the government, forests have always been an important resource for rural communities. Forests are not only the main source of fuelwood and construction timber. In particular in remote mountain regions subsistence farming systems rely on a net movement of nutrients from the forest to arable land via grazing, lopping of trees and litter raking (Giri and Katzensteiner 2013).

As a reaction to overutilization, deforestation and erosion, the concept of generating responsibility of land users by community based forest management has evolved since the 1970s. In particular since the 1990s large areas have been handed over to community forest user groups for sustainable management (MFSC 2013). Besides an increasing forest cover and growing stock, CF has contributed to income generation (also from non timber forest products NTFS) and also to direct or indirect reinvestment (training, workshops) to the forest and has played a significant role in improving livelihood of rural people (MFSC 2013).

With respect to GHG mitigation reforestation of degraded land is one of the most cost-effective measures. In contrast to strict conservation, CF has the potential to supply multiple benefits to local communities. Due to poverty and unstable political situation in the last decades, the establishment of CFs in Nepal over the past 30 years has been made possible mainly by financial contributions of international donors. Recognizing the role of CF management (Karky and Skutsch 2009) and eventually agroforestry activities (Nair and Garrity Eds. 2012, Kumar and Nair Eds. 2011) in C-sequestration and contributing to its further development would meet several targets of the BOKU Carbon Offsetting System.

Reduction of fuelwood demand by improved stove technologies

Fuelwood, agro-residues and in some areas animal dung are used for cooking and heating purposes in many rural households in Nepal. In 2008, fuelwood comprised 78 % of the total energy consumption of Nepal (WECS 2010). Though the Nepalese Government has undertaken huge efforts to promote 'affordable, efficient and appropriate biomass energy technologies in Nepal', like improved cooking stoves (ICS) in order to reduce indoor air pollution and firewood consumption, the majority of rural households still use traditional cooking stoves (TCS) (AEPC 2015).

Investments in improved stove technologies would be a strategy to mitigate pressure on forest resources while having positive effects on health and workload, mainly of women and children. It may be an opportunity to consider such technologies in reconstruction activities.

2 General project outline:

Intervention logic

The intervention logic is visualized in table 1. Together with national representatives (experts to be nominated by the Ministry of Forests and Soil Conservation, Government of Nepal, extension workers, experts of the partner institutions, NGOs, VDC leaders), the socio-cultural context, patterns of forest and land use, and environmental status of sub-regions of the target regions will be evaluated and one or two sub-regions with poor status and a certain development potential for CbF will be selected. Parallel, success and failure of ongoing CbF activities will be analyzed. The reasons behind the present status of the selected sub-regions will be investigated and development options shall be derived in a participatory process of all subgroups at community level. In this process, one or two VDCs or CbF user groups will select potential areas for reforestation and develop a management plan for the community forest area and socially feasible ways for utilizing them. Community representatives with the inclusion of the diverse (ethnic and caste) groups should be involved in the evaluation process, in the drawing of the base line and in monitoring activities. Participatory methods for protecting adjacent conservation areas are also a target of the project (ownership and sustainability). In addition, the options of additional income generation from NTFPs and agroforestry will be evaluated. The development of a reforestation and management plan will be supported via sending CbF-representatives to training workshops and showing them best practice examples. The establishment of reforestations will be supported both in terms of knowledge transfer as well as via provision of seedlings or establishment of nurseries (the latter again being a chance for income generation). On-site training in forest operations shall improve the practices in sustainable forestry. GHG sequestration will be evaluated based upon inventories of carbon stocks and stock changes in biomass and soil. The management should be adaptive and based upon scientific results of inventories and participatory research. Both staff and students of the partner institutions should be involved in the whole process. Partnerships between BOKU, local communities and institutional partners within the project are planned to cover a time period of 20 years. The community and site selection process, status documentation, the development of the community forest management plan and first reforestation activities are scheduled for the first three years of the project. At the same time, the options for supporting touristic development in an environmental friendly way (ecotourism, supply of alternative energy options like solar water heating…) shall be screened.

From the ‘demand reduction side’ the options for improved stove technologies will also be screened in a participatory process. The project partner NAST has tested different ICS models (local production and import) with different thermal efficiency (RETS 2014). However, the social and religious function of the fireplace as a center of communication and ritual has to be considered. The conversion traditional open fire stoves to (improved) mud stoves may be more efficient in reducing firewood demand than ICS (Nepal et al. 2011). In particular in mountain regions optimization for cooking efficiency may not be the main aim, as heating is also an important function of an oven. Training and investment in local technological development may increase acceptance and bear opportunities for local income generation.

Table 1: Intervention logic of the BOKU Carbon offset project

	Objectives & activities	Indicators / costs (activities)	Means/Source of verification	Assumptions/Obstacles/External factors
Goal	Contribute to sustainable development of rural communities by participative implementation of carbon offset activities	1. Improvement of multidimensional poverty/happiness indices of the communities (e.g. Akire & Foster 2007) 2. Carbon offset at community level (Mg CO_2-eq)	1. Surveys: interviews, questionnaires… *Accompanying research*[1] 2. UNFCCC CDM methodologies *Accompanying research*[1]	1. CO2 offset goals will not change over the project lifetime 2. National Nepalese strategies and strategies of regional authorities will not conflict with project aims 3. Governance
Specific objectives	1. CO_2 sequestration by community based forest management and agroforestry 2. Reducing fuelwood demand and emissions by ICS 3. Learning from success and failure	1. Effects of participatory measures on community managed forest area and number of households applying agroforestry Increase in biomass carbon stocks, mid term also in soil carbon stocks[1] 2. Development of fuelwood consumption 3. Feedback to regional management strategies (rules and regulations, guidelines , dissemination)	Coupling ground based inventories, remote sensing[1], laboratory analyses, interviews, questionaires	Assumptions: Readiness of the communities, engagement, entepreneurship External factors: Stochastic disturbances like forest fire, diseases

Activities	1. Preparatory meetings, situation analysis, selection of VDCs/communities 2. Evaluation of the socio- cultural and economic setting within the selected VDCs/communities 3. Stakeholder meetings, training (facilitators), participatory planning 4. Application of measures developed in the participatory process (e.g. reforestation, protection, support measures like establishment of a nursery…) 5. Development/adaptation of participatory monitoring concepts and monitoring, training a. for poverty/happiness status b. for C-sequestration 6. Provision of improved cooking stoves/alternative: training and investment in local technological development and or biogas units	1. Workshop in Kathmandu 2. Field visit by researchers 3. Activities governed by state/conservation area representatives, extension staff, researchers 4. Activities governed by community/VDC-members in a participatory process 5. a. Capacity building through the participation process b. Assessment by the community members (they may use a different set of indicators, see Wondie et al. 2015) and researchers[1] 6. a. Random sampling plan development b. Determination of existing cooking techniques c. Calculation of baseline emission of existing traditional cooking stove d. Calculation of project emission, leakage emission e. Selection of Improved Cooking stove f. Selection of distributors g. Trainings on ICS h. Capacity building of local community i. Post monitoring j. CO2-compensation	1. Protocol 2. Report, contracts 3. Reports, management plans, field visits 4. Contracts, invoices… 5. Independent verification by BOKU representatives (rapid surveys) 6 a. Feasiablity study of the site and focus group discussion b. Baseline survey c. Adopting CDM approved baseline emission calculation methodology d. Calculation of emission (fossil fuel, electricity, plantation and biomass burning, etc.) e. Based on Nepal Interim Benchmark for Solid Cook Stove (NIBC) and material life ICS will be selected f. Following set guidelines suggested in e section g. Operation, repair and maintenance of ICS h. Investment to develop local material (mud, stone) ICS stove for long run sustainability of technology i. Penalty and reward to ICS distributor j. Calculation of annual CO2 emission reduction following CDM approved methodology	Full projected funding over the implementation time Human and technical resources available…

Expected results	1. Two or three VDCs ready for participation 2. 'Unbiased' information on the socio- cultural and economic setting within the selected VDCs/communities and potential pitfalls for good governance and implementation 3. a. Management and implementation plans at VDC-level b. Local facilitators representing ethnic groups and gender 4. a. Reforestation / protection of 80 ha degraded grazing land/shrubland, nurseries established b. 20 ha of tree-less farmland converted to agroforestry 5. a. ***Sequestration of 20 000 Mg CO_2eq over 30 years*** b. Overall improvement of livelihood from carbon offset 6. 500 cooking stoves provided (and/or biogas units), **reduction of 1500 Mg CO_2 over the utilization period of 10 years**	1. Agreement with government authorities and VDC representatives 2. Report & publication 3. a. Management plans developed and communicated in a participatory process b. Number of local facilitators and information on their activities 4. Mapped area & status; number of seedlings planted 5. a Biomass stock changes, soil carbon changes b. 'Poverty/Happiness indicators' 6. Number of stoves provided and /or delivered by local manufacturers	1. Signed agreements 2. Report evaluation 3.a. Evaluation of the management plans b. Evaluation of the facilitation activities (interviews etc.) 4. Visual inspection and results of 5. 5. a. Repeated inventories, application of UNFCCC-methodologies[1] b. Interviews, questionnaires 6. Household surveys, invoices	1. Full support from official authorities 2. Access to all and information from all ethnic and social groups within the VDCs 3. Full involvement of all stakeholders into the participatory process 4. Readiness and area available 5. a. Sufficient human and technical resources b. Good governance, political stability

[1] Besides the assessment using approved methodologies, it is planned to involve researchers (students at bachelor, master and PhD level) in applying, adapting and improving methods in the respective fields

Why and where (target regions):

The recently established **Gaurishankar Conservation Area** (GCA; National Trust for Nature Conservation NTNC, 2013) would provide the chance to involve in and contribute to a 'clean development' in the sense of UNFCCC, at the same time being pro-poor sustainable which can serve as a model for other regions. According to the management plan (NTNC 2013), 60 % of the households in GCA are poor according to national poverty lines. GCA is one of the areas most severely hit by the April/May 2015 earthquakes (Bruckman and Katzensteiner 2015). The region has a pronounced ecological diversity (different altitudinal zones), ethnic and cultural diversity (with diverse structures of co-operations and participation) and land use diversity – from subsistence terrace farming in low elevations to transhumance in the high elevation belt (see NTNC 2013, Tautscher 2004).

Within an ongoing pilot study on sustainable forest management and erosion control in the Nepalese Himalayas (funding by OEAW), some of the applicants have joined a workshop in Kathmandu and field surveys in Gaurishankar conservation area. During these activities both representatives of NTNC, GCA and village development committees (VDC) have been contacted and the environmental status and prospects for development of a VDC has partly been evaluated. The experience gained in this pilot study will be considered for the current research proposal.

Prior to the 2015 earthquakes some villages benefited already from tourism, remote and to foreign visitors restricted parts of the park area however remained still extremely poor and food insecure. The establishment of the conservation area may bear opportunities (income generation from tourism activities) as well as threats (marginalization and outmigration) for the livelyhood of the local population. The intervention logic of the project proposal is to support equal participation (in a participatory process) of all (ethnic and caste) groups in the community based forest management to ensure a sustainable development path. During such a process multiple benefits from a CO_2-compensation mechanism and equal opportunities for all people living in remote villages may be achieved. In particular the involvement during the reconstruction phase may contribute to the long-term development of one or two VDCs in GCA. Among the various local ethnic and caste groups exist different social organisations, even conflicts between them and various degrees of access to planning, management and controlling within GCA (Paudel et al. 2012; Bruckman et al. 2015). In particular in that view the project might develop to a paradigm for participation. With help from our partner NTNC we want to bring the full support to the whole community and such an open, participatory process may create trust in the long run.

The second region: The **Siwalik** region is regarded as one of the major physiographic regions of Nepal as it comprises 36 districts and extends from east to west covering 13.6% of the total landscape of the country. The region has significant social, ecological and environmental values as it provides important sources of livelihood to the people, biodiversity and a basis for evolution knowledge of Asian flora and fauna. Despite its significant importance, the fragile landscape of Siwalik region is degrading at an alarming rate due to increased human pressure (livestock grazing, timber smuggling, illegal tree felling, etc). Consequently, these have accelerated the loss of soil and biodiversity, floods, riverbank cutting and decrease in farm land productivity and have left poverty and land degradation as a landmark (Giri, et al 2012). Considering the importance of Siwalik, a pilot study conducted by NAST in 2 VDCs of Dhanusha district (Eastern Siwalik) documented that more than 50% of the total population (Giri and Bhatta, 2014)) are dependent on forest for fuelwood and other non timber forest products. The encroachment in the forest ecosystem causes a lack of regeneration of economically important timber species like *Shorea robusta*, *Dalbergia sissoo*, *Dalbergia latifolia*, etc. (NAST Annual Report, 2013 & 2014). Higher dependency on forest for fuelwood from the same region was also reported by National Population and Housing Census (2011). On the one hand, the area and coverage of the forest is

decreasing rapidly but on the other hand there is no reduction on fuelwood consumption pattern resulting in illegal felling of trees. Alternative energy sources (biogas, improved cooking stove, etc.) have proven to be successful intervention in minimizing people's dependency on forest fuelwood.
At the same time these Sal (*Shorea robusta)* forests would bear opportunities for the sustainable production of valuable timber. To involve in community based forest management strategies in a participatory process may again create multiple benefits from a CO_2-compensation mechanism.

3 CO_2-reductions:

Reforestation of degraded grazing land: Based upon results of two BOKU MSc studies (Baral 2008, Rai 2009) and a PhD study (Giri 2011) in different regions/biomes in Nepal, a conservative approximation of the net CO_2 sequestration potential of the community forestry reforestation measures will be 5 t CO_2 per ha and year on site over a time period of 30 years. In the Gaureshwar Community Forest in the Mid Hills, under sub-tropical climate Baral (2008) found even a carbon sequestration of 11 $Mg.ha^{-1}.a^{-1}$ in aboveground biomass. This estimate already accounts for the fact that the systems will provide basic needs of the community (fodder, litter and fuelwood).

Though this estimate is in the upper range of scenarios used for carbon abatement cost calculations of CFM set by Karky and Skutsch (2009), the real sequestration potential will be higher. Utilization of forest litter and fodder finally contributes to high soil carbon stocks of arable fields. In addition, these practices are the basis for organic farming and prevent the use of energy intensive fossil fertilizers (Giri and Katzensteiner, 2013). According to Giri and Katzensteiner (2013), 1-4 ha of forest is required to cover the nutrient demand for 1 ha of arable land. By optimizing community forest management, the pressure of illegal harvesting in conservation areas will decrease, an additional benefit for GHG mitigation.

Forest conservation: In the GCA, forest conservation in the long run will build up carbon stocks in vegetation, coarse woody debris and soil. Assuming a sequestration rate of 1 $Mg.ha^{-1}.a^{-1}$, 200 ha of set aside, intact forest over 30 years will sequester another 6000 Mg of CO_2-equ.

Implementation of agroforestry practices: Due to huge elevation gradients agroforestry practices in Nepal are diverse. Common practices are planting of cardamom with alder, homegardens and depending on elevation bananas, fruit and fodder trees along bunds. Such activities might be combined with apiculture which relies on bee flora. Considering the wide range of reported values for the C-sequestration potential of agroforestry practices (Nair 2011), a conservative estimate of 1 t CO_2 per ha and year over a time period of 30 years is assumed. This calculation accounts for the sequestration of carbon in biomass of shrubs and trees; the magnitude is supported by results of Rai (2009).

Improved cooking stoves: It is estimated that in Nepal firewood consumption per household per day is approximately 6 kg while installation of ICS estimates 4 kg/hh/day firewood (RETS, 2014). Investigations showed that there is a reduction of 2 kg/hh/day of fuelwood, which considerably helps to reduce the GHG emission. Considering the large uncertainties in assessing the climate impacts of cookstoves (Lee et al. 2013) a very conservative estimate for GHG-emission reductions from improved cooking stoves of 0.3 Mg CO_2-equ per stove and year has been applied.

Biogas units: Research indicated that a biogas unit can save nearly 4.5 tons of firewood, and reduces the emission of 4.06 metric tons of CO_2 equivalent annually. Each biogas plant produces 1.75 tons of organic fertilizer each year, thereby reducing the dependence on imported chemical fertilizers (Banerjee et al. 2011). The establishment of alternative energy (biogas plant &/or ICS) may create a win-win situation by reducing fuelwood and kerosene consumption, minimize air pollution, increase crop production by use of slurry and benefits from CO_2-compensation mechanism.

The final *CO_2 reduction calculation* will be based upon UNFCCC/CCNUCC methodologies (AR-AMS0007, AR-AMS0004).

The calculations will be supported by measurements of stocks and stock changes of soil, biomass and coarse woody debris at permanent sample plots to be measured in five years intervals. Assuming a project area of 20 ha farmland which may be converted to agroforestry, 80 ha degraded shrubland which will be reforested and 200 ha of strictly conserved and protected forest the net GHG sequestration over 30 years will be 18 200 Mg of CO_2-equivalent. In addition 500 ICS may sequester 1500 Mg CO_2 over their lifetime of 10 years. In total the conservative approximation for CO_2 reduction over 30 years is 19 700 Mg.

4 The participatory process:

The participatory process will be based upon experience of local partners in successful CFM projects in Nepal as well as experience of scientists within projects in Nepal, Ethiopia and China. To strengthen communal co-operation, participation and transparency are the guiding principles.

The workshop and visit to the proposed project area in April 2015 within the pilot study mentioned above has been used to get in contact with government and NTNC authorities and for identification of stakeholders.

As a first step we will carry out a situation analysis. Preparatory meetings with government authorities and stakeholders, as well as field visits of Nepalese and international researchers will assist in selecting communities/VDCs that will be invited to participate in the project.

The participatory process must run through a series of steps that need careful preparation and planning:

1. Revisit and update situation analysis
2. Identify current stakeholders (high fluctuation!)
3. Obtain permission to work by government authorities (must be informed by high level authorities at BOKU)
4. Preparatory meetings (who are the stakeholders?)
5. First draft design of methods of engagement (participatory team - who will facilitate in Nepal)
6. Discuss design with stakeholders, adapt methods design for consensus
7. START PROCESS of the participatory process

In a first phase the project will focus upon one VDC, preferably a smaller VDC in the GCA buffer zone with high population density (e.g. Chilankha: 661 households, 2875 inhabitants, high population density and ethnic diversity – Tamang, Sherpa, Upper Hindu Casts as Bahun and Chhetri, and occupational casts). The knowledge and experiences gained will help to implement activities under different agro-ecological settings in the coming years.

Austrian scientists, together with Nepalese scientists and experts and locals will evaluate the ethnic and cultural context and economic setting within the selected VDC. This step is important to avoid exclusion of marginalized groups from the participative process. An important outcome of this process will be the identification of potential local facilitators. Semi-structured, open-ended interviews, group discussions, resource and livelihood mapping, visualization and other methods will help to learn more about local traditional managements of the natural resources, present patterns of use of and access to the resources among the various sub-groups as well as their potential conflicts, sources of income and expenditure in terms of land use and daily life, land tenure issues, individual and cultural attitudes towards conservation, impacts of GCA activities (see Tautscher, 2011). Visions for the future (land use, conservation, options for income generation) will be developed with the consolidation of a participatory process. Thus we will learn about the expectations and demands on future forest resources as well as the potential of the people to contribute to their development e.g. in terms of labor.

Planning of reforestation, protection, conservation, agroforestry activities as well as the decision for changing cooking and heating habits will be an outcome of the participative process. Possible support measures are activities such as the establishment of a nursery or training and support of a local manufacturer of stoves. This also provides a chance for training and income generation for poor community members.

Monitoring of the activities will be achieved by trained community members as well as researchers and extension workers. The monitoring of success or failure of the measures should be undertaken in a semi-structured way (visual inspection, interviews, group discussion, field excursions of CF members, researchers and extension workers).

5 Co-benefits:

The proposed project intends to target multiple and positive co-benefits. An important aspect is the iinvolvement of the rural communities in the process of the establishment of conservation areas, thereby avoiding marginalization of rural stakeholders. The support of a participatory process of establishing CbFM as a sustainable development path additionally leads to the following co-benefits:

Ownership:

- Increasing capacities of rural communities
- Increasing the capacity of the implementing stakeholders (organisations) working on environmental problems
- Student involvement to carry out master and PhD thesis research

Participation and inclusion:

- Create linkages between community members, extension workers, Nepalese and international scientists
- Develop a nursery and reforestation site for trainings and visits in order to establish an entry point for upscaling and multiplying activities.

Empowerment:

- Foster multi-stakeholder training in forest management, reforestation and small-scale farming to lead to empowerment and capacity development
- Developing marketing strategies and ecotourism initiatives
- Knowledge dissipation

Sustainability:

- Closing the nutrient loop by transforming degraded shrubland into farmland and forests
- Reduce environmental impacts due to improper management practices
- Disseminating and scaling-up of best practices to other sub-districts

In a case study in the mid hills of Nepal, Baral and Katzensteiner (2009) could show that over 30 years the community was able to optimize the species composition in their CF according to their needs, while at the same time keeping species diversity high and conserving the adjacent primary forest.

Equity, equality and non-discrimination

- Job creation in off farm activities (focus on vulnerable groups such as single mothers) creates income – special courses shall provide extended services for vulnerable groups, e.g. training in entrepreneurship for NTFPs.

Health effects: Reduced fuelwood demand by improved stove technologies reduces workload mainly for women and children. In addition there is a considerable reduction in indoor air pollution.

6 Experience and capacity of the consortium:

The consortium covers a wide range of expertise: research of the scientists involved covers ecological consequences of climate change, forest management, agroforestry practices, carbon cycle, biodiversity and conservation, forest policy, cultural anthropology and participatory research. All of the scientists have experience in collaborative research with partners in developing countries. Together with institutional partners the project will have strong impact upon livelihood and carbon sequestration.

Gabriele Tautscher is a Cultural Anthropologist and lecturer at the University of Vienna, Department of South Asian, Tibetian and Buddhist Studies. She has decades of work experience in Nepal and has evaluated the socio-cultural context of conservation policies for GCA. She will be responsible for the evaluation for the socio-cultural and economic setting within the VDC selected for the project and will instruct Nepalese experts and local facilitators.

Birgit Habermann and Florian Peloschek are employees at the Center for Development Research at BOKU. They have broad experience in participatory research, among others they are engaged in the Carbon Offset Project Ethiopia. Together with Gabriele Tautscher and Nepalese colleagues they will facilitate the participatory process and develop and test methods for evaluation of impacts on the socio-economical and cultural status of the communities.

Wu Shuirong's research focuses on environmental economics. She, together with Mohan Devkota and Viktor Bruckman is partner in the mentioned pilot study on sustainable forest management and erosion control in the Nepalese Himalayas. She is also Deputy Coordinator of the International Forest Research Organisation (IUFRO) working group on Valuation of Ecosystem Services and Carbon Markets. Together with Nepalese colleagues and in collaboration with the other partners she will evaluate the impact of the measures upon ecosystem services and provides the IUFRO network.

Klaus Katzensteiner has expertise in forest soils and forest carbon cycles and has already supervised students from Nepal working on community forestry, carbon and nutrient cycles and biodiversity.

Georg Gratzer is expert in forest dynamics research and coordinator of the of Mountain Forestry master programme at BOKU. He has decades of working experience in the Himalayas and Bhutan.

Viktor Bruckman works for the Commission for Interdisciplinary Ecological Studies at the Austrian Academy of Sciences. In his research he focuses on sustainability of bioenergy systems and in particular on management effects on carbon status of forest soils..

Anjana Giri is Unit Chief of the Biological Resources Unit, Faculty of Science, Nepal Academy of Science and Technology. She did her PhD thesis at BOKU on carbon and nitrogen cycles of CF systems. At present she is also involved in research on the implementation of ICTs and biogas in the Shivalik region.

Mohan Dekota is Botanist and Associate Professor at the Botany Department of Tribhuvan University – Amrit Campus. He is expert in land use effects on biodiversity and did his PhD thesis on mistletoes of the Annapurna Conservation Area at BOKU.

Govinda Gajurel is Member Secretary of National Trust for Nature Conservation Nepal (NTNC). NTNC is responsible for the management of one of the proposed study areas: the Gaurishankar Conservation Area.

Klaus Katzensteiner, Georg Gratzer, Anjana Giri and Mohan Devkota will provide expertise on forestry and agroforestry, carbon sequestration and environmental monitoring.

Viktor Bruckman, Wu Shuirong, Mohan Devkota and Klaus Katzensteiner will provide results and expertise from an ongoing pilot study on sustainable forest management in GCA.

Anjana Giri and her colleagues at Nast will support the process of the implementation of ICT technologies.

Govinda Gajurel and his team at NTNC and GCAP will support the activities in GCA in all stages, and implement the project results in adative management strategies of conservation areas.

Florian Peloschek will be responsible for the project management.

7 Integration into teaching and Research:

For Nepalese and BOKU students both at Nepalese institutions as well as at BOKU and at the University of Vienna such projects will be ‘study objects’ for seminars as well as MSc-thesis (e.g. in the BOKU program Master of Mountain Forestry) and PhD-thesis, qualitative and quantitative results of the case studies will be included into teaching. From experience of the partners, such well-documented sites are usually attractive for research projects. Of course the results will found the basis for scientific publications and extension.

A related application for preparatory funding of an APPEAR project between TU, NAST, and BOKU is developed currently. A full project might support the related research activities.

8 Costs:

see budget plan (seperate document)

Total budget for 20 years	**354 000 €**
Price per Mg CO_2-equ:	
conservative estimate (Basis 13 700 Mg):	**approximately 26 €**
Realistic estimate (Basis 19 700 Mg):	**approximately 18 €**

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10 Budget plan

Carbon offsetting Nepal - Time schedule & cost calculation

Activity	Year 1 (2015/16)		Year 2 (2016/17)		Year 3		Year 4		Year 5		Year 6-20		Subtotal activity
	number	costs	*number*	costs	*number*	costs	*number*	costs	*number*	costs	*number*	costs	
1. Preparatory meeting Kathmandu[§], Evaluation workshop Kathmandu													14285
a. Workshop (room, catering)	*1*	500							*1*	500			
b. Flights (VIE KTM ret, PEK KTM ret) incl. Visa	*4*	4000							*4*	4000			
c. Allowances (5 days pP, 3 P)	*3 P, 5 days pP*	1320							*3 P, 5 days*	330			
d. 1 BOKU project funded staff scientist	*5*	1710							*5*	1925			
2. Evaluation of cultural/socio-economic settings in VDC/community 1 (2015), 2 (2018)													14842
a 1. Contract Tautscher (1 month field survey+report writing+participation prep. meeting) region 1		7000											
a 2 Contract Nepalese researcher region 2						4000							
b. Local facilitator	*20 workdays*	600			*20 days*	618							
c. Porter	*20 days*	400			*20 days*	424							
d. Grant for Nepalese student	*1*	600			*1*	600							
e. Local transport		300				300							
3. Stakeholder meetings, participatory planning (year 1&3)													26161
a. Nepalese scientists field allowance	*2 * 10 days*	1000			*days*	1000							
b. 1 BOKU project funded staff with PhD	*12*	4104			*12*	4354							
c. 1 BOKU project funded staff with PhD allowance	*12*	792			*12*	792							
d. 2 External scientst allowance	*12*2*	1584			*12*2*	1584							
e. Porters	*3 a 8 days*	480			*3 a 8*	525							
c. Transport		300				300							
f. Grant for Nepalese student		1200				1200							
g. 4 local facilitators (male/female/ethnic groups)	*4 a 20 days*	2400			*days*	2546							
h. Flights (international) incl. Visa	*1*	1000			*1*	1000							

Carbon offsetting Nepal - Time schedule & cost calculation

Activity	Year 1 (2015/16)		Year 2 (2016/17)		Year 3		Year 4		Year 5		Year 6-20		Subtotal activity
	number	costs	*number*	costs	*number*	costs	*number*	costs	*number*	costs	*number*	costs	
4. Applicaton of measures to be developed in the participatory process													79599
a. Provision of seedlings (alternative nursery; 10000 per area)				5000		5000		10000		5000			
b. Salary for local staff (planting) per region & year 20 persons 10 days			*200*	4120	*200*	4244	*400*	8742	*200*	4502			
c. Salary local guard/ranger (1 day per week)			*30*	927	*52*	1655	*82*	2688	*104*	3512	*1560*	24210	
5. Monitoring, training													68880
a. Status evaluation & monitoring (biomass, soil) per region (2016/18), Monitoring in 5 years intervals													
a.1. 4 local facilitators a 10 days per year & region (start 2016 rsp. 2018)			*40*	1236					*40*	1351		4500	
a.2 1 local extension worker 10 days per year & region (start 2016 rsp. 2018)			*10*	618					*10*	675		2500	
a.3. Evaluation by Nepalese experts contracts (TU)				5000						5000		15000	
a.4. Chemical analytics etc. (NAST) status & after 20 years				5000						5000		5000	
b. Social aspects by Nepalese Experts contracts (?)				3000						3000		12000	
6. Cooking stoves													29000
a. calculation basis: 500 stoves a 50 €		12500				12500							
alternative: investment in technological development													
b. Stove testing (contract RES/NAST) & eficiency calculation				4000									

Carbon offsetting Nepal - Time schedule & cost calculation

Activity	Year 1 (2015/16)		Year 2 (2016/17)		Year 3		Year 4		Year 5		Year 6-20		Subtotal activity
	number	costs	*number*	costs	*number*	costs	*number*	costs	*number*	costs	*number*	costs	
Project management BOKU (year 1&2: 25 days p.y., year 3: 20 days, year 4-20:10 days p.y.)	*25*	7000	*15*	4326	*15*	4456	*10*	3060	*10*	3151		60371	82364
BOKU project funded staff in A (scientific support) *(field visits not included!)*	*10*	3420	*5*	1761	*5*	1814	*5*	1869	*10*	3849			12713
Overheads BOKU (5% of project funded personell)		812		304		531		246		446		3019	5359
Overheads NTNC		1000		1000		1000		1000		1000		2000	7000
Overheads NAST		1000		1000		1000		1000		1000		2000	7000
Overheads TU		1000		1000		1000		1000		1000		2000	7000
Sub-total year		**56022**		**38293**		**52443**		**29605**		**45241**		**132600**	354203
													354203

[§]Synergies shall be utilized (schedule adjusted with other meetings/projects), no 'doublecounting' --> coordination with field visits

Staff costs per day (valorization 3 % per year)					
BOKU project administration*	280	288	297	306	315
BOKU project funded staff with PhD*	342	352	363	374	385
BOKU permanent staff	0				
OEAW permanent staff	0				
TU permanent staff	0				
NAST permanent staff	0				
NTNC permanent staff	0				
CAF permanent staff	0				
Local porter	20	21	21	22	23
Local facilitator	30	31	32	33	34
Local extension worker	60	62	64	66	68

Daily allowance	
Austrian scientific staff in Nepal***	66
Nepalese scientific and administrative staff in Nepal	50

* BOKU audited costs
** based on https://www.fwf.ac.at/en/research-funding/personnel-costs/
*** based on Austrian Ministery of Finance regulation