



Millennium Development Goals
**The Grassroots Story:
1992 to 2011**



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Foreword

Pan Himalayan Grassroots Development Foundation has been involved with spearheading holistic mountain development in the central and western Himalaya since 1992. Since its inception, Grassroots has focused on enabling communities to plan, implement, operate, maintain and share the costs of bringing forth change and development in various cross-cutting sectors which directly improve their quality of life.

Most of the work with communities began with addressing basic issues like provision of enhanced quantities of safe drinking water, environmental sanitation, renewable energy and rainwater harvesting. Such entry-points led communities to be further engaged with planting-out rootstock of native species of trees and shrubs in order to provide fresh vegetal cover on degraded hill slopes and reverse the tragedy of commons and thereby achieve a sense of ecological security.

Almost a decade of such interactions led communities to organise Self Help Groups, federated as a Producers Company, whereby each shareholder could participate in one or more business verticals aimed at supplementing family incomes in a sustainable fashion. Alongside, the task of improving farming systems and linking farm-gates to urban markets is also seen to be generating a new sense of confidence amongst small and marginal farmers.

In a way, all these outreach programs could be viewed to be assisting communities to reach some of the critical **Millennium Development Goals (MDGs)**, defined by the global community at the World Summit on Sustainable Development held in 2000. However, the MDGs which are supposed to be reached by 2015 are still a far way for millions of people, especially for communities in the Indian Himalayan Region.

There are several reasons for the slow progress towards achieving the basic MDGs. **The Grassroots Story** is limited in its experience, but yet provides some insights regarding the potential for accelerating MDGs: primarily through building upon the capacity of communities to participate in a meaningful manner and training of local youth as *barefoot engineers* to deliver appropriate technologies at the grassroots.

Grassroots would be completing 20 years in March 2012 and it may be well worth the effort to discuss the field experiences through the pages of this document; prepared largely by Veena Titaley, Anna Perris and Ruth Jesson-Smith, student-interns from Brandeis University, USA and Cambridge University, UK. Hopefully, it would generate some amount of debate regarding the strategies which seem to enable mountain communities to harness their energies to bring forth an iota of balance in these times of climate change.

Executive Director
Pan Himalayan Grassroots Development Foundation
December 2011

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Millennium Development Goals (MDGs)



At the World Summit on Sustainable Development held in 2000, India along with 147 Heads of State pledged to adopt 8 Goals to be achieved by 2015 that respond to the world's main development challenges. Based on the principle of every individual having the right to dignity, freedom and equality these Goals address the issues of eradicating extreme poverty and ensuring environmental sustainability.

These MDGs are subdivided into targets and indicators designed to monitor progress within the fifteen year time-frame and focus on three main areas: bolstering human capital, improving infrastructure and increasing social, economic and political rights.

- Human capital targets focus on improving nutrition, healthcare and education.
- Infrastructure targets include increasing access to safe drinking water; sustainable farming practices; and environmental sustainability.
- The social, economic and political targets include empowering women and reducing violence.

Goal 8 also emphasises the role of developed countries in aiding developing countries through a 'global partnership' by supporting fair trade, debt relief, increased aid and technology transfer.

It is realised that human development is about much more than rise and fall of national incomes. It is about quality of life, the level of human well-being and the access to basic social services. The pressures on environmental and natural resources and the repercussions of their degradation on low income livelihoods have become a source of increasing concern.



About **Grassroots**

The primary aim is to initiate peoples action at the grassroots for restoration of ecological security in languishing river basins through holistic mountain development programs, in order to improve the quality of life in the Indian Himalayan Region

Over the past twenty years, Pan Himalayan Grassroots Development Foundation (Grassroots) has been able to evolve a holistic development strategy which channels resources - managerial, technical and financial - directly to people and associations of the communities, working at the village/watershed level.

The emphasis is on self-help participation and the belief that average villagers have the desire, the right and the capability to promote their own welfare and prosperity and to participate in decisions that affect their lives.

Grassroots reaches out to far-flung micro watersheds in the central and western Himalaya through Outreach Program Offices located in the states of Uttarakhand and Himachal Pradesh. Over the past two decades, Grassroots has been able to initiate programs on improving the quality of life of mountain communities through sustainable community development strategies, training and technology transfer, micro enterprises and marketing - by strengthening the capacity of community based organisations, selected voluntary organizations and creation of new forms of organisation.

However, a decade prior to the global declaration of the need for defining MDGs, Grassroots had set out to select local youth and provide them with sufficient skills and knowledge to spread the benefits of appropriate technologies in cross cutting sectors like drinking water, environmental sanitation, renewable energy and rainwater harvesting - with the idea of improving the quality of life for mountain communities, here and now. The training of local youth as *barefoot engineers* continues to be viewed as an essential component of accelerating MDGs.

Grassroots believes that through improvement in basic quality of living, it is possible to encourage communities to participate in long-term engagement in eco-restoration and establishment of sustainable micro enterprises.

The strategy of holistic mountain development could be depicted as below:



The Grassroots Story began in Gagas river basin, Almora district, Uttarakhand in 1992, with the idea of initiating community-driven programs, based on the three pillars of ecology, economy and equity. The progress and benefits of MDGs in the basin has spread to over 100 villages in the form of 220 drinking water systems, 1700 toilets, 200 rainwater harvesting structures and 300 biogas units.

Besides this, degraded village commons are being protected and almost one million saplings have been planted-out to increase availability of biomass as well as assist the process of renewing local hydrological systems.

Alongside, more than 1,200 women affiliated to about 100 SHGs have been able to establish a Producers Company to earn supplementary incomes through an annual turnover of more than Rs. 13.00 million.

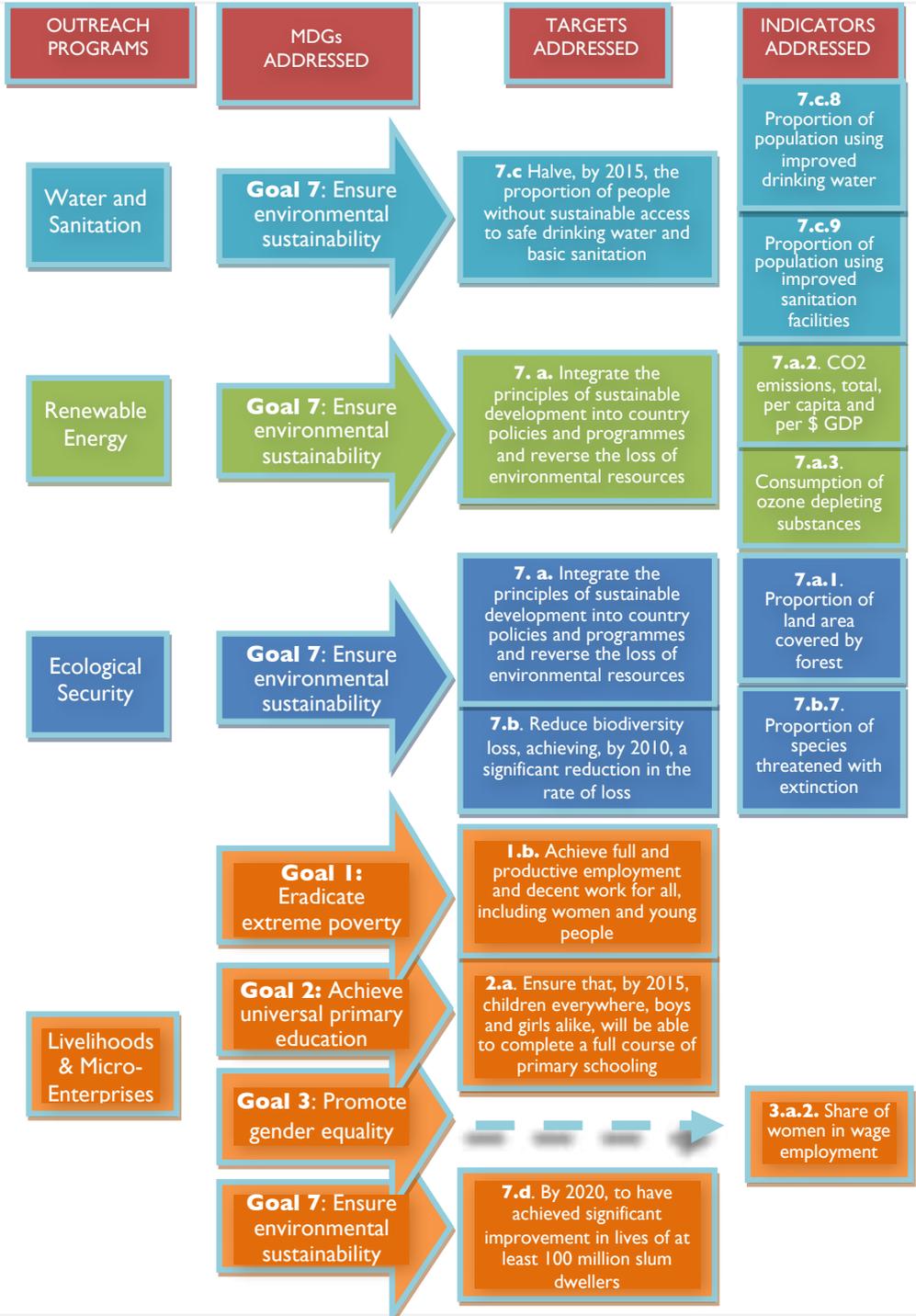
The willingness of communities in Gagas river basin to participate in the process of change and the message about the benefits of MDGs soon spread across the region and Grassroots had to respond to hundreds of communities in far-flung hamlets, located much beyond this river basin.

The outreach to such far-flung communities, however, has been limited to only appropriate technologies in drinking water, sanitation, rainwater harvesting and renewable energy. Two other essential components of MDGs – ecological security and livelihoods improvement - have not yet been touched upon and remain a challenge for the future.

Over two decades, demonstration of community-driven programs has reached more than 800 villages in 60 blocks spread over 10 districts in Uttarakhand and 2 districts in Himachal Pradesh. All together, the outreach efforts have been as follows:

- ❖ 500 hamlets have access to enhanced quantities of safe drinking water through installation of infiltration wells
- ❖ 4000 households have installed twin-pit water-seal toilets
- ❖ 500 roofs in households as well schools harvest and store rainwater
- ❖ 2200 households have access to clean energy for cooking through installation of biogas units

It is clear that such programs address many of the MDGs, particularly Goals 1 & 7. This document attempts to put together the field experiences regarding the strategies adopted for accelerating MDGs, through the active engagement of communities as the primary stake holder, along with some details of the MDGs and the corresponding targets and indicators addressed by the outreach efforts.



Water & Sanitation

Halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation (Target 7 c)

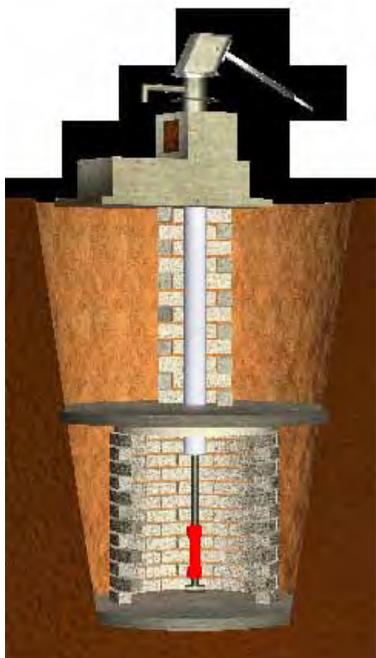


Significant denudation and degradation of vegetal cover in catchment areas of river basins has resulted in poor recharge of primary water resources of most villages. In fact, appraisal of primary water resources in 75 villages of Gagas river basin reveals that 44 percent of water sources have dried-up and only 56 percent are functional, of which merely 23 percent are functional through the year. This adds to the drudgery of women and children who need to travel longer distances to meet daily water requirements.

Grassroots has found it relevant to introduce an appropriate technology application in the form of an Infiltration Well, conceptualised and designed by Dr Tim Rees. These “wells” are based on primary water resources of the village and act as a protected intake structure for subterranean water capillaries, and then fitted with a hand pump or submersible pump, to enable the drawing of water.



Traditional naulas (above left) are often locked during lean summer months to ensure equitable distribution of water and avoid conflicts. Infiltration Wells (above right, 1993) ensures availability of larger volumes on a continuing basis and prevents conflict-situations as well as contamination



Infiltration Wells have not only provided access to enhanced quantities of safe drinking water, but communities have also been empowered to operate and maintain such facilities without dependence on external agencies. Communities have also been positive about contributing 10 to 20 percent of the capital cost of such drinking water facilities. Monitoring of water quality is also being done through trained local youth equipped with simple field kits.

The per capita investment for such community-managed drinking water systems is Rs. 500 as compared to conventional piped water supply systems from distant secondary sources which are at least ten times more expensive.

MDG Target 7.c is being addressed by promoting infiltration wells, rainwater harvesting and environmental sanitation systems for almost 500 village communities with 100,000 people

During the drinking water sector reforms in the last decade, Grassroots demonstrated that hill communities, especially those in the valleys with higher per capita incomes, are capable of planning,



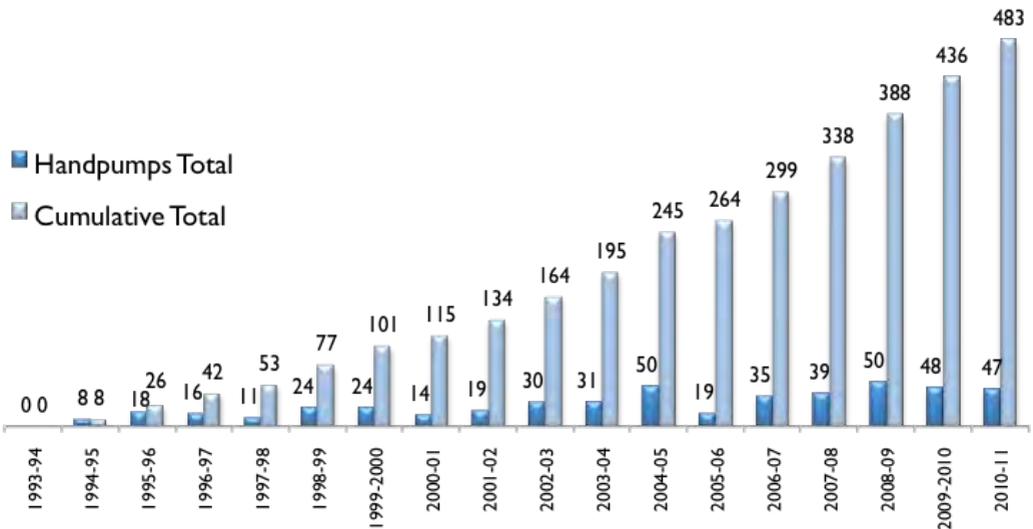
implementing, operating and maintaining pumped-water supply systems. The picture on the left shows the Pump House in Rawalsera village in Gagas river basin – monthly water cess paid by each household meets O&M costs.



Grassroots outreach in the drinking water sector also led the Government of Uttarakhand to adopt this appropriate technology for wider spread in all hill districts of the state. The line department of the state government has been collaborating with Grassroots and the *barefoot engineers* Guild for the past three years in order to benefit hundreds of villages across the state.

The idea is to assist the department to augment safe drinking water supplies in problem-villages spread over ten hill districts.

The spread of this appropriate technology application has been steady over the years as shown in the graph below:



Briefly, the outreach-impact has been as follows:

350 villages in 54 blocks of 11 Districts of Uttarakhand and Himachal Pradesh. On a typical day, Infiltration Wells are providing 2.40 million litres of safe drinking water to approximately 17,600 households with close to 100,000 people or 25 litres per capita. This has resulted in improved hygiene as well as 'time saving' in terms of fetching water. Women now feel that they have more time to spend with their children, pay greater attention to domestic cleanliness and generally have more independence.

In addition to Infiltration Wells, Grassroots has also been promoting adoption of roof run-off Rainwater Harvesting structures constructed under-ground adjacent to homes, which augments availability of water for various domestic requirements. This facility also seems to assist the adoption of twin-pit water-seal toilets to a great extent.



Random rubble concrete blocks could be made locally and used for construction of storage tanks

A rainwater harvesting unit works simply by collecting rainwater running-off the roof and channelled into an underground tank, where it can be stored and later used for washing, irrigating kitchen gardens and bathing. With an annual precipitation ranging between 700-1,000 mm, the ideal capacity for the rainwater storage tank is 10,000 to 15,000 litres. Then the household would have access to about 100 litres of water daily.

The advantages of this technology are threefold; first, it reduces the pressure on scarce spring water reserved for drinking. Second, as with infiltration wells, it mitigates female drudgery. Finally, the increased volume of available water for washing and cleaning purposes, increases hygiene, decreasing the potential for disease and ill-health.

For several reasons, the climate in the Indian Himalayan Region has changed in the last two decades. Data of twentieth century record 1,500 mm of annual precipitation in several stations in the state of Uttarakhand and elsewhere.

In recent times it is not considered unusual to receive only 500 to 600 mm of precipitation in river basins like Gagas. Very few realise that this basin had been declared as Drought Prone about twenty years ago.

In such a situation, it is imperative to promote the concept of rainwater harvesting, especially for roof run-off storage systems located adjacent to homesteads. However, the challenge is to meet the cost of such a facility - storage tank, filter chamber, gutters and downpipes – which costs about Rs. 3 per litre. It is difficult for an average household to afford an investment of Rs. 30 to 45,000.

Grassroots has been able to provide a small grant of Rs. 10,000 for a typical rainwater harvesting facility and it is not surprising that only 450 households have been able to afford the remaining investment.

Unless larger public investments are directed to this important element of storing rainwater for improving access to water for domestic requirements, the benefit of this technology would bypass communities and water shortages would continue to plague people in the Indian Himalayan Region.

This appropriate technology has also been demonstrated in 40 large schools in the states of Uttarakhand and Himachal Pradesh, benefiting more than 20,000 children. The girl students seem to benefit the most as stored rainwater enables operation and maintenance of water seal toilets, which in turn leads to improved environmental sanitation and individual hygiene and health.

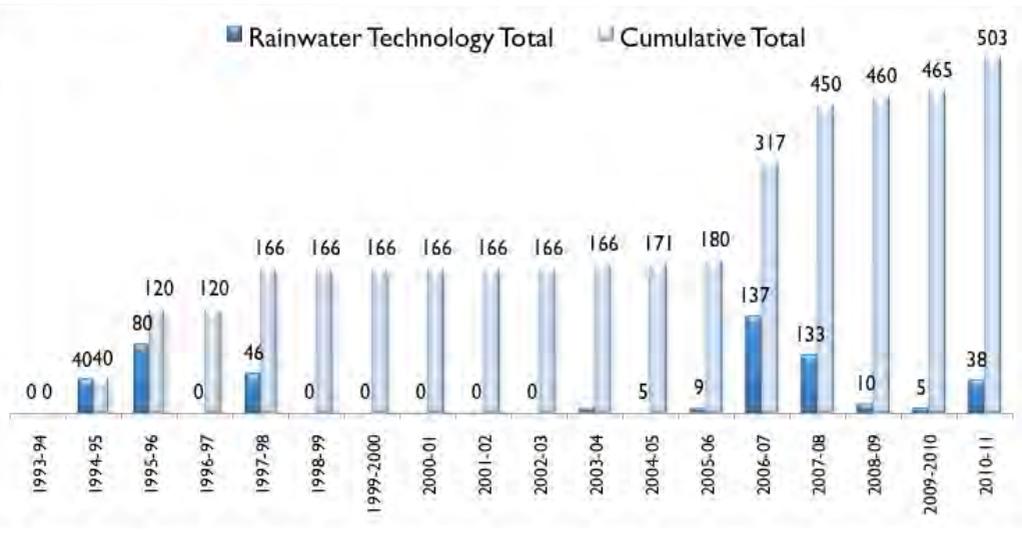




The demonstration of benefits of rainwater harvesting technology in schools have led to generating interest amongst policy makers to promote similar initiatives across the state of Himachal Pradesh. However, even with availability of funds, progress has been slow and poor, largely due to lack of appropriate knowledge, skills and capacity.



Progress of rainwater harvesting technology has been as depicted below:





Grassroots promotes Environmental Sanitation in the form of twin-pit water-seal toilets in order to address the issue of water borne disease and provide an iota of dignity, especially to women.

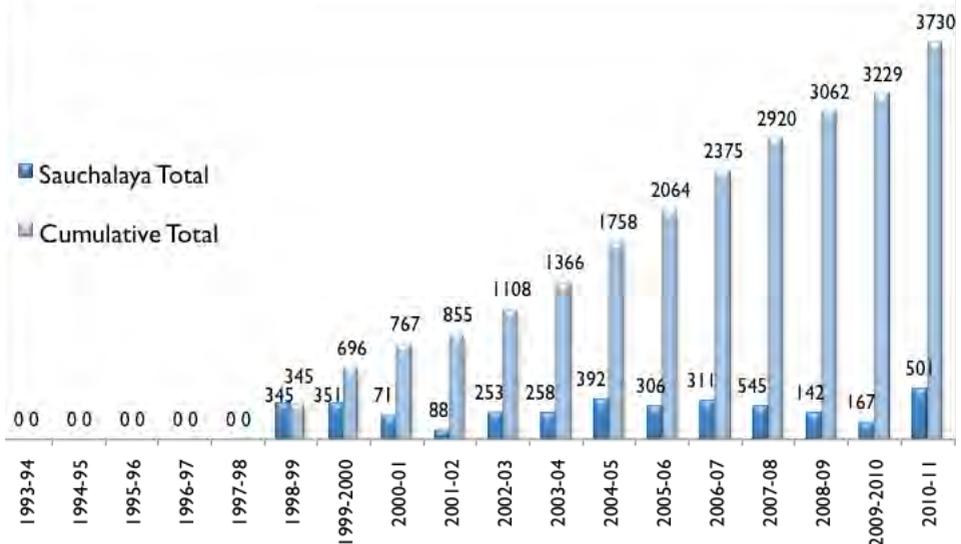
The toilet consists of a water-sealed ceramic pan connected to twin soak pits, which could be used alternately, so that the facility is permanent and would not require external assistance for waste disposal. Typically, 75 percent of the total cost of Rs. 12,000 is borne by the user-household.



The environmental sanitation component is viewed as an *a priori* for villages adopting infiltration wells as drinking water systems. Communities are encouraged to ensure that all households adopt safe sanitation facilities in order to prevent contamination of shallow sub surface water capillaries.

For example, in *Dusad gadhera* in the *Gagas* river basin, 100 percent households in all villages have installed *sachalayas* and 10 *gram panchayats* have been awarded the *Nirmal Gram Puraskar* by the Government of India.

Over the years, about 4,000 units have been installed in Uttarakhand and Himachal Pradesh.

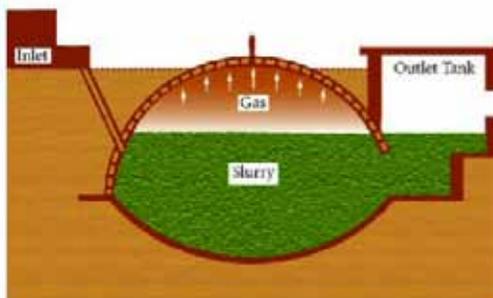


Renewable **Energy**

Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources (Target 7.a)

In most river basins in the Himalaya firewood availability is so poor that it is viewed as a crisis by communities. Women and children have to trudge 4-5 hours, foraging for scarce firewood, basically for cooking. In a situation where peoples daily firewood requirements outstrip the annual incremental biomass growth in the adjoining forests, the only logical solution seems to be the provision of an alternate source of energy.

Over the past two decades Grassroots addresses Target 7.a by promoting a renewable energy option in the form of biogas units which reduce biotic pressure on scarce forest resources and provides clean, smokeless cooking gas, impacting positively on family health.



The environmental benefits of this clean, low-cost technology are numerous. First, it provides greater thermal efficiency compared with burning dung cakes and firewood. Second, it reduces biotic pressure on forest resources, mitigating forest degradation. Further, and significantly, these units are carbon neutral and mitigate the effects of methane in the atmosphere through combustion. Biogas units also afford a number of socio-economic benefits; they provide a clean smoke-free cooking environment, impacting positively on



family health; mitigate the need for collection of firewood, reducing drudgery for women; and eliminate reliance on subsidy driven fuels such as liquid petroleum gas or kerosene, protecting families from the vagaries of the global economic climate.

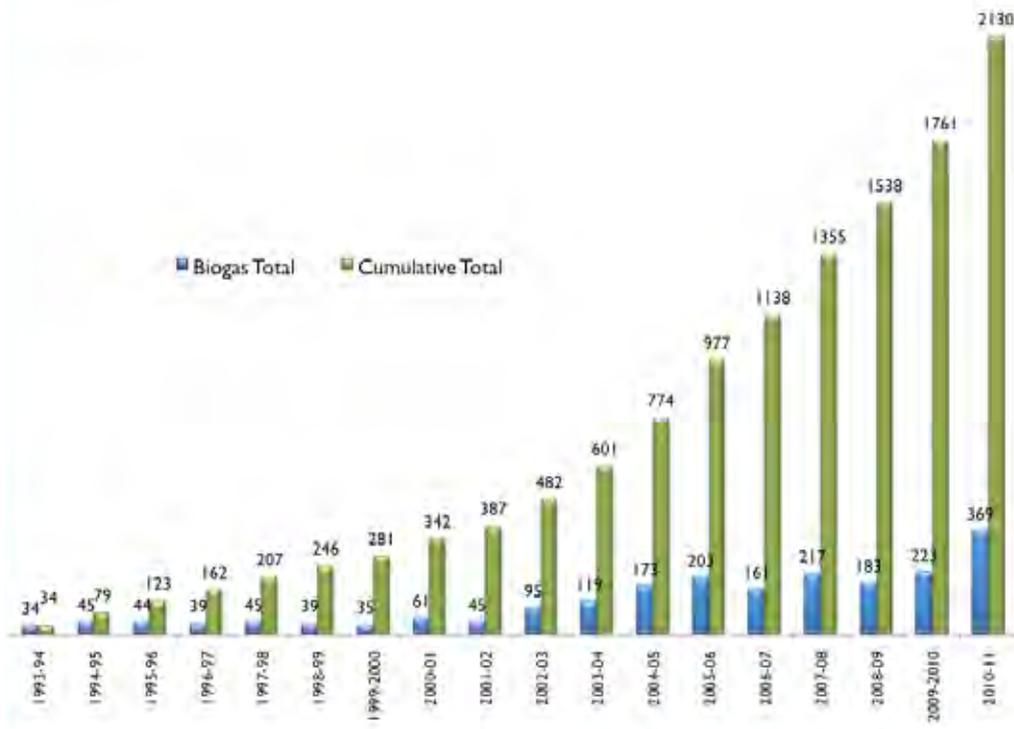
On a conservative estimate, installation of 2,130 biogas units has arrested the pace of environmental degradation by reducing the biotic pressure on scarce forest resources. At least 8,695 metric tonnes (almost 900 truck loads) of firewood consumption has been reduced per year. Additionally, not only have homes turned smoke-free but 7,500 metric tonnes of carbon dioxide emissions/annum have been reduced in the atmosphere.

Building on the capacity of local youth as *barefoot engineers* is a challenge for fulfilling Target 7.a



Biogas technology is a viable alternative to burning cowdung cakes, firewood or LPG

A biogas unit costs Rs.20,000 with Grassroots providing a cost-sharing grant of 50:50 arranged through the Ministry of New & Renewable Energy, Government of India. The units are installed by *barefoot engineers* of Artisans Guilds who also provide comprehensive operation and maintenance skills to the user-households, spread over 690 villages in 37 Blocks of 10 Districts in Uttarakhand and Himachal Pradesh.



Recent user-group dialogues and impact surveys with 650 biogas user-households reveal 94 percent units to be functioning efficiently and the remaining 6 percent units have been functioning poorly due to either migration, under-feeding or damages due to natural calamities. It is imperative to accelerate the spread of this green technology in the Indian Himalayan Region.



Alongside the provision of biogas units as an appropriate technology option to firewood/fossil fuels, Grassroots has in recent years, initiated a program to provide communities with access to Solar Lanterns - compact fluorescent lamps which provide 4-5 hours of bright illumination, and light emitting diodes which provide 6-7 hours of low level illumination.

This technology has three main advantages. First, it offers a source of employment for enterprising villagers who are trained by Grassroots to manage local distribution/charging stations from which families acquire lanterns for a nominal annual rental of Rs. 150-200. Second, it provides guaranteed illumination in areas where the electricity supply is unreliable. Third, solar powered lanterns provide an alternative to kerosene and paraffin fuelled lamp and thereby address climate change by saving an average of 500-600 litres of kerosene over a ten year lantern lifespan, mitigating about 1.5 tonnes of CO².

It is encouraging to note that communities are willing to adopt solar lights, especially for the purpose of enabling children to study in the evenings, at almost 75 percent of the market price. The modus operandi is as follows: good quality sturdy models of solar lanterns are sourced from the manufacturers at wholesale prices and then Self Help Groups in the villages are enabled to procure 15-20 sets and either sell these lanterns to other members or provide a common charging station at a small rental.

Within two years, 500 units are being used in Uttarakhand and Himachal Pradesh and it is proposed to scale-up efforts in the immediate future.

The National Action Plan for Climate Change (NAPCC) of the Government of India also envisages a shift in energy policy in IHR towards renewable sources. Considering that 65 percent of households in the IHR are said to be using firewood as the primary source of domestic fuel - the remaining depend upon LPG cylinders and kerosene - such policy shifts would indeed be necessary to address Target 7.c. Therefore, considering the immense benefits of Renewable Energy options like biogas units and solar lights, there is an urgent need to scale-up public investments, as current funding mechanisms are in-adequate, especially in view of subsidies towards fossil fuel based energy sources like liquid petroleum gas and kerosene.

While doing so, Grassroots experience clearly reveals the need to simultaneously invest in training and skill-building exercises. It is perhaps significant to mention that the poor actually spend a larger share of their disposable income towards cooking energy than those with higher incomes. Thus, a shift towards a more egalitarian renewable energy funding policy is urgently required in order to make the air electric with excitement for marginalised communities in the Himalaya.

Ecological **Security**

Ensure environmental sustainability and reduce the loss of biodiversity
(Target 7.a & 7.b)

During the 1992 Earth Summit the importance of mountain ecosystems was recognised and Sustainable Mountain Development was included into Agenda 21 of the Rio Declaration. Since then various initiatives have been undertaken globally to highlight the role of indigenous mountain communities as custodians of biodiversity, water and other ecosystem services and also the critical role that it plays in determining climate in the surrounding areas.

Traditionally mountain communities have predominantly been agrarian, connected intimately with nature and, in recent times, we are witnessing a global concern about reaching a consensus that such communities – dependent on natural resources – are the ones who would be facing the consequences of climate change the most.

The Indian Himalayan Region (IHR) is spread over ten mountainous states and partial hilly regions of two other states with a total land area of 5.37 lakh sq kms and a population of 51 million (2001). It is indeed a unique landscape in the planet, the Himalaya being the highest mountain chain, just as the Andes are the longest.



Nandakot Himalaya, Ranikhet, Uttarakhand

The people of IHR (4 percent of the country population) have traditionally been custodians of 16 percent of the country's land area with 70 percent of the biodiversity hot spots and one of the world's largest reservoirs of water resources. The IHR, undoubtedly, also has significant impact on ecological security and quality of life for over 300 million people downstream, in the Indo-Gangetic plains.

In view of this, the Government of India has recently released the National Action Plan for Climate Change which recognises and provides the IHR its due importance. The document states the intention to promote community based management of ecosystems through incentives to community based organisations for protection of village commons, forests and water resources.

The interface between man and nature is a necessary condition for survival of mountain farming systems, which depends upon adequate flow of a stream, biomass supplies from the forest support area in terms of tree leaf-fodder and tree leaf-litter for organic compost - which may or may not have a market value.

The loss or lack of title to environmental assets is viewed, by Grassroots, as an additional component of poverty, leading to the conclusion that environmental conservation is actually a necessary fundamental to poverty alleviation. Briefly, concepts like sustainable mountain development are more like a mirage in the desert unless forest ecosystems are restored for adequate hydrological and nutrient recycling functions.

In accordance with the stated objective of MDG 7 as defined in Target 7.a & b which aims at reversing the loss of biodiversity and environmental resources, Grassroots has been initiating eco-restoration activities aimed at providing fresh vegetal cover coupled with taking appropriate measures for improving soil and moisture conservation in order to impact on the hydrology of river basins. Such initiatives are launched with active participation and cooperation of all the stakeholders with community members playing the key role.

This approach has forged a coalition of interest between stakeholders in Gagas river basin, Almora district, Uttarakhand to share lessons regarding ecological restoration which leads to fulfilling the millennium development goals in the following manner:

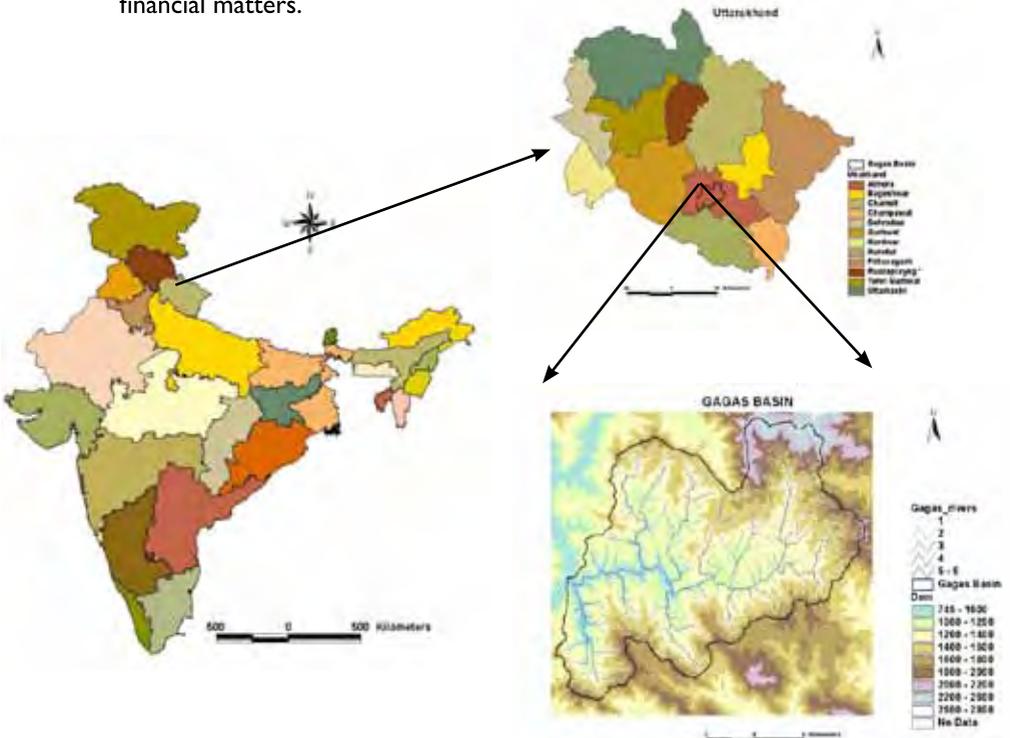
- ❖ Providing a fresh vegetal cover on degraded commons and renewal of traditional methods for soil and moisture conservation
- ❖ Improving food security and livelihoods through land-use optimisation and establishment of market linkages directly between producer-farmers and consumers



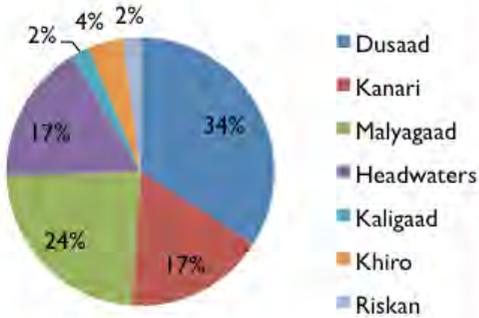
The focus on renewal of the hydrological cycle and its linkages with sustainable mountain farming systems has led to the galvanisation of marginalised communities in the river basin to form appropriate institutional structures at the grassroots – self help groups of women at the hamlets have led to the creation of a dynamic basin level federation, slowly leading to the establishment of a multi stakeholder platform.

The Gagas river originates in the sacred forests of Pandokholi in Almora district, of the Kumaon Himalaya in the state of Uttarakhand. The river is largely defined through the flow of over fourteen major streams/creeks or *gadheras* on both banks, and flows for about 50 kms prior to merging with Ramganga (West) river. Gagas river basin is spread over 500 square kms with a population of over 120,000 in 370 villages.

Inter and intra river basin dialogue is evolving strongly as a new feature; through regular cross visits, capacity building workshops and social audit of physical and financial matters.



Protected Commons



Over the years, community-driven eco-restoration has been consolidated in about six *gadheras* – Dusaad, Kanari, Khiro, Malyagaad, Riskan, Kaligad - and the Headwaters.

It is significant to mention that communities in the river basin have been enabled to raise over 200,000 saplings/annum of about 50 species of native trees and shrubs in various small village-level nurseries. Alongside, planting-out saplings and protection of commons through 'social fencing' has led to a feasible way-forward for conservation of biodiversity in the various *gadheras*.



Village Nurseries provide mature saplings of essential native tree species and also encourages communities to participate in protection and conservation of commons, besides an employment opportunity in the local market.

Tree-planting has become a regular feature in the life of communities, once during the *chaumas* or monsoon and if they 'get lucky' then during winter precipitation too.





Revival of traditional moisture conservation is leading to addressing the larger issue of management of forests and the need to focus upon the twin concept of Forests & Water. In recent times, interactions during a multi stakeholder workshop led to the government allowing self help groups of women to enter reserved forest areas for revival of this tradition, with the hope that streams/*gadheras* would be rejuvenated once again. Pictures show the chairperson of the *Manch* (center) guiding such exercises within the Ukkhallelkh Reserved Forest.



Protection of village commons has led to the immediate benefit of five-fold increase in fodder-grasses



Communities walk-the-talk, literally! Dialogues have led women to grow new forests on over 500 hectares of degraded village commons, which are the critical catchment areas for renewal of hydrology and rejuvenation of fragile springs. Early success in one *gadhera* has motivated 5,500 families in 6 *gadheras* and the headwaters to form *gadhera bachao samities* and join the *Gagas Bachao Abhiyan*.

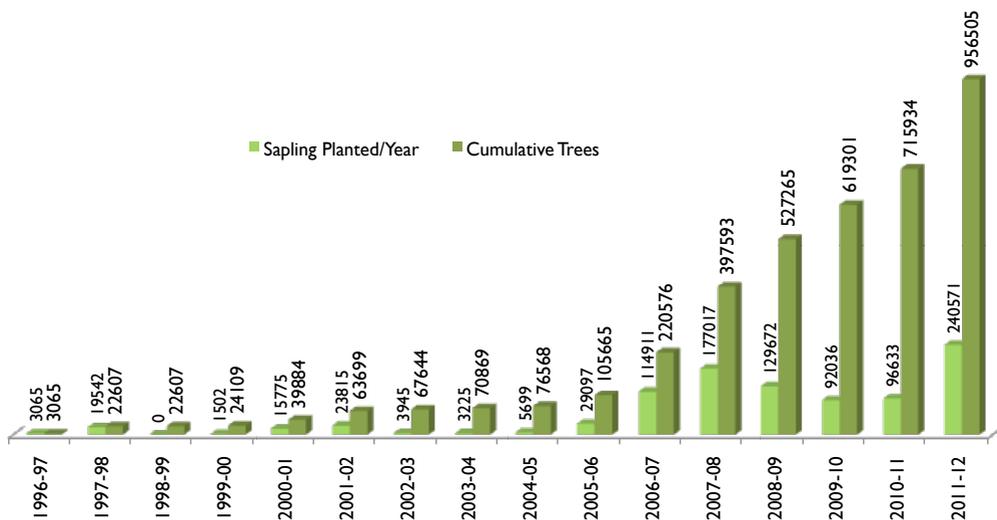


Alongside planting trees and growing forests, (within 7-8 years as shown in the pictures) communities have been motivated to intensify efforts towards moisture conservation through designing *khals* in appropriate locations on the commons - in the past few years, 600 *khals* and 100 check-walls have led to increasing the rate of infiltration and thereby the recharge of subterranean water capillaries.

Participatory monitoring exercises reveal encouraging changes in the landscape: annual vegetation census shows survival of saplings varies from a low of 30 percent to a high of 75 percent, biodiversity in selected spots have increased in terms of herbaceous and grass species. Similarly, hydrological monitoring exercises clearly indicate that dry *naulas* and springs are also being rejuvenated – this has been documented in several villages in Dusad *gadhera*.

(A dry spring below the protected commons in Malla Satinagaon has revived between 2006 and 2010 with an average flow of 7 litres per minute, which amounts to 10,000 litres of water per day. It is quite possible that farmers would soon plan to store this bounty of nature for minor irrigation. Four other *naulas* in neighbouring villages also provide similar indicators of renewal of hydrology.)

The nature and extent of planting-out almost a million saplings have been as follows:



Ecological security is a complex mosaic affecting Food Security especially as mountain farming systems are dependent on village commons or adjoining forest areas, which act as support areas, with at least sixty percent canopy, ideally of broad leaved tree species. Broad leaved tree species along with native shrubs as an under-storey reduces the kinetic energy of rainfall and thereby encourages natural recharge of hydrological systems and also provides abundant leaf litter - an essential component for making farmyard manure and sustaining soil fertility. Ideally one unit of cropland requires six to seven units of forest land as support area.

Across the Gagas river basin, the ratio is skewed unfavourably – 19,200 hectares of cultivated land would require 134,000 hectares of forest land. In reality, there is only 10,500 hectares of reserved forest plus another 5,800 hectares of community forests which adds up to 16,300 hectares of forest land – a ratio of less than 1:1. This clearly indicates the un-sustainability of farming systems in the river basin.

Over the last century, policies regarding natural resources have meant exploitation of forests to generate revenue for the state government. Whereby, natural broad leaved forests have been replaced with monoculture of pines and other timber species. Moreover, indiscriminate grazing by cattle on the hill slopes has worsened the situation. These factors have also adversely impacted on the renewal/recharge of the hydrology of this river system.

However, it is not simply a problem of water shortages. It is a complex package of pressures that includes the entire fragile mountain ecosystem: biodiversity, firewood consumption, plant and soil ecology. Any change in surface characteristics have a gigantic impact on the hydrology cycle, but little attention has been given to determine how soil compaction and vegetal changes affect water infiltration and surface run-off. Ultimately, loss of appropriate forest cover has impacted adversely on mountain farming systems in terms of food security and poor hydrological recharge.

This problem of ecological degradation leading to food in-security has been analysed rather succinctly by several communities. For example, data of 18 villages represent the situation across the river basin: irrigated farm land has reduced from 9 percent to less than 1 percent, resulting in significant reduction in food production – down from 94 kgs to 15 kgs per unit. This, in turn, has resulted in migration amongst 40 percent of households, who are forced to earn livelihoods through participation in the growing service sector in distant urban areas. Amongst those staying back in the villages, 25 percent of the households need to walk few miles every day in search of daily wage labour, impacting once again on health as well as dignity of traditional mountain farmers.

While communities have been engaged towards eco-restoration activities, farmers have continuously expressed the need to strengthen livelihoods opportunities within the river basin.

To address this need, Grassroots has been able to assist farmers to undertake the following measures in order to strengthen MDGs related to on-farm livelihoods opportunities:

- Revive cultivation of traditional rain-fed crops
- Introduce suitable high value crops like chamomile
- Improve soil fertility
- Train para-vets in order to improve local livestock breeding practices
- Promote certification process of organic foods and establish bridges between farm-gates and consumers



Improved Rice Cultivation, Chamomile Gardens, Para Vets & Traditional Crops

So far, progress in this sphere of MDGs has been as follows:

1. Five hundred women members of 40 SHGs in 15 villages have formally pioneered Participatory Guarantee System as an institutional mechanism for ensuring organic farming systems are practiced in Gagas river basin – 500 acres of terraced farm lands have been identified by these small farmers and it is envisaged that this system would be scaled-up across the basin.

Farm produce is being aggregated from these members as well as others for processing, packaging and marketing under HimKhadya brand and the future for marketing 'safe foods from the mountains' seems to be positive.

Upland irrigation systems have been modernised in Palor river basin to improve the existing open-channel irrigation system through laying of underground irrigation pipes and construction of appropriate inlet chambers at the headwaters. This has resulted in improving irrigation systems spread over 90 acres – an addition of 20 percent of un-irrigated land.

On the whole, 98 families are the beneficiaries of this diversion-based upland irrigation program. It is significant that these families contributed the entire labour for burying pipelines and investing in distribution pipes as well as sprinklers, which amounts to 30 percent of the budget for upland irrigation system. Within a period of two seasons, farmers have been enabled to triple their incomes.



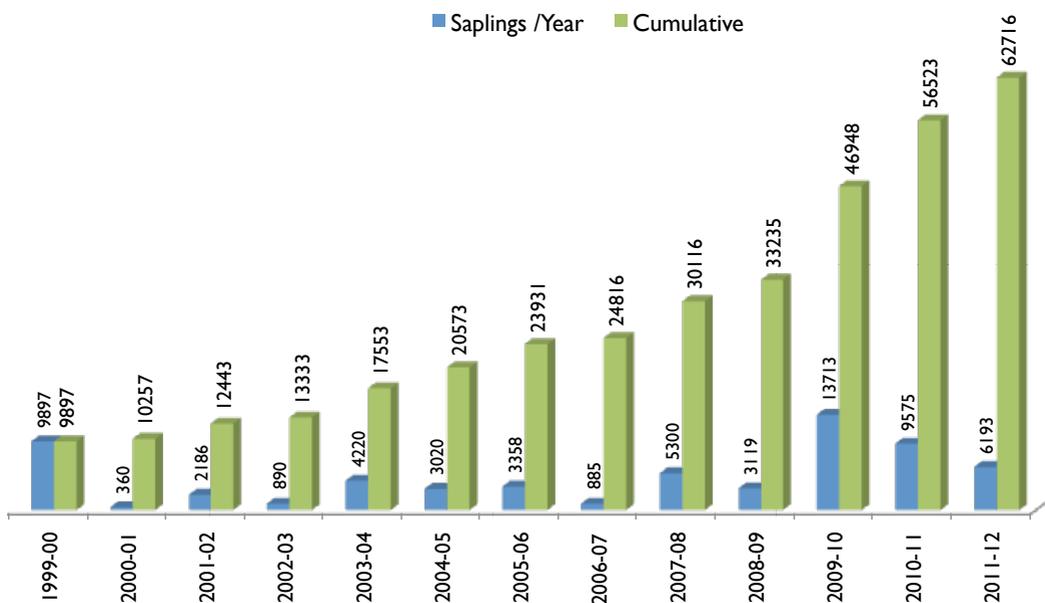
Upland irrigation system in Palor river basin, Himachal Pradesh

About 800 milch cattle have been inseminated with proven-semen through a local youth trained as a para-vet in Kanari *gadhera*, Gagas river basin over a period of 4 years. As a result of this, 500 calves have been added in the homesteads of small farmers, leading to increased incomes and improved nutrition.

Over the years, 25 varieties of over 62,000 fruit tree saplings have been raised in small village nurseries and planted-out by 5,100 farmers in 280 villages in various *gadheras*.

In recent times, farmers have been able to improve nutrition and food security through the fruits of these trees and also earn sustainable supplementary incomes through local market sales upto Rs. 1,000 or so. So much so, that the farmers have added new value added products like guava jelly in the range of products manufactured by the women's co-op in Gagas river basin.

Details of fruit tree saplings planted-out over the past years are as follows:



Livelihoods & **Micro Enterprises**

Eradicate extreme poverty and hunger (Goal 1)
Promote gender equality and empower women (Goal 3)
Achieve full and productive employment and decent work for all, including women and young people (Target 1.b)



The World Bank estimates that, globally, the number of people living below poverty line will fall from 1.80 billion in 1990 to below 900 million by 2015. In India, poverty rates are expected to fall from 51% in 1990 to 22% by 2015. These projections suggest significant global progress towards achieving MDG1. However there continues to be an on-going lag between economic stability and employment.

Lack of formal employment opportunities force many people to engage in 'vulnerable employment', characterised by informal working arrangements, lack of adequate social protection, low pay and difficult working conditions.

The degradation of fragile ecosystems in the Himalaya has impacted negatively on sustainable mountain farming systems. This has affected traditional food security, resulting in economic insecurity, out-migration and increasing numbers of women-headed households. A holistic development approach combining eco-restoration, sustainable farming practices and innovative micro-enterprises is necessary in order to address this situation, reduce poverty and improve upon employment targets.

Data in the Gagas river basin reveals that 10 percent of households have migrated permanently and 30 percent of adult males have migrated temporarily to urban sweatshops to supplement family incomes. Such significant rates of migration are leading to severe strains on local societies where responsibilities have to be borne by women alone. Alongside, elderly members are also facing major hardships with no help for domestic chores or during times of illness, leading to severe mental depression.

Grassroots livelihoods improvement program promotes micro-enterprises designed to secure sustainable supplementary income for local farming communities. However, as per Grassroots firm belief that the average villager is both desirous and capable of improving their own quality of life, Self Help Groups plays a pivotal role in the planning, implementation and management of these initiatives.

To secure and consolidate a fresh balance in the quality of their lives, SHGs have been involved with creating a platform for establishment of pro-poor business ventures with farming-families as the primary stakeholder, federated in the form a producers company.

Efforts over the past few years has led to the creation of a network of 1,200 women who are involved with various viable business activities which provide small yet significant incomes on a sustainable basis:



- Farm women are involved with the production and sale of hand-knitted woollen jumpers
- Fruit growers are adding value to local soft fruits like apricots and plums through production and marketing of natural fruit preserves and pickles
- Bee keepers harvest honey in different seasons through the year and market natural honey, even to France!



- Hundreds of small farmers market traditional crops through a brand called HimKhadya
- And, almost a thousand small farmers rear free range poultry birds which provides home nutrition through consumption of eggs and cash through sale of mature hens at a premium.

However the most significant aspect of these local efforts in promoting the spirit of enterprise is a concern of the institutional framework at the grassroots level. Each and every business is directly controlled by the producer-groups; who own the assets and are equal shareholders of the business. This arrangement enables the greatest portion of the consumer's rupee to reach the producer. Each year, these groups are in a position to distribute fifty percent of net profits as bonus, based on member-participation levels in business verticals.

Between 2007 and 2010, per capita supplementary incomes have increased by 30 percent and bonus distribution in a typical year has been as follows:

Fruit Preserves & Pickles Unit	- 15 percent
Hand-Knits Unit	- 10 percent
HimKhadya Unit	- 12 percent

Currently the annual turnover of these small rural enterprises amounts to Rs. 13.00 million. Plans are underway regarding the way forward for scaling-up such/and other initiatives to at least Rs. 50.00 million per annum in the next three to five years through the consolidation of the nascent Mahila Umang Producers Company, headquartered on a high ridge near Ranikhet town in the Gagas river basin.



Self-help groups form the backbone of micro-enterprise initiatives and local development programs. SHGs comprise of 10-20 women who meet regularly to support each other on a financial and personal basis. Microfinance is an integral aspect of the function of these SHGs. Each group operates their own passbook and bank account into which every member deposits Rs.10-100 per month. The account acts as a credit store, enabling members to take low-interest loans based on individual requirements, for example, livestock purchases or healthcare costs. This arrangement provides members with financial independence, liberating them from rapacious money lenders.

So far, there are 185 SHGs with membership of 2,687 women who have accumulated a Revolving Fund of Rs. 5.00 million, of which fifty percent is used for inter-lending.

These SHGs have further selected 12 Board Members to govern the nascent federation of SHGs called Mahila Umang Producers Company. The plan is to enable 3,000 women shareholders earn supplementary incomes to the tune of Rs. 15,000 annually.

However SHGs are not simply financial and business ventures. They provide the institutional framework through which many programs, such as community forestry, agriculture and livelihoods improvement are activated and managed. Further, they address MDG 3 by providing a mechanism to empower women by increasing their confidence in political and social arenas and enabling them to gain financial independence through on/off farm income generating activities. Grassroots supports the development of SHGs through on-going provision of capacity building with respect to management, governance and accountability.

MDG 8 is also being promoted through adoption of Fair Trade principles and Participatory Guarantee System for certification of organic farm produce.





Yet another critical factor which led to accelerating MDGs has been due to the strategy regarding selection of local youth and providing them with sufficient skills and knowledge to spread the benefits of appropriate technologies in cross cutting sectors like drinking water, environmental sanitation, renewable energy and rainwater harvesting - with the idea of improving the quality of life for mountain communities, here and now.

It may also be within the limits of prudence to mention that the success of this strategy was largely due to the courage, spirit and dedication of an extraordinary *barefoot engineer* - Puran Ram, who was indeed a rare leader, till his last breath on 7 August 2010.

Over the years, Grassroots field experiences of promoting MDGs through appropriate technology applications has led to the consolidation of two dedicated teams of *barefoot engineers*: Kumaon Artisans Guild in Uttarakhand and a similar Association in Himachal Pradesh. These guilds are largely responsible for implementing the plans of communities interested in adopting MDGs. The regular market, unfortunately, does not provide a sustainable force of *barefoot engineers* who would be available in remote hamlets in the central and western Himalaya.

These Guilds operate as independent organizations and Grassroots is viewed as a shadow organization, with the primary task of strengthening their managerial capacity and other essential technical knowledge and skill sets. Over the years, processes have been set in motion to enable the Guilds to emerge as key players in promoting appropriate technologies which directly accelerate MDGs.

As shown in the Table below, the emergence of *barefoot engineers* guild/s has not only led to accelerating MDGs but has also led to creation of significant sustainable employment opportunities over the last decade and more. On an average, a skilled artisan would have been earning Rs. 75,000 per annum.

Particulars	Skilled Mandays	Un-Skilled Mandays	Total Mandays	Earnings (Skilled) Rs.in lakhs	Earnings (UnSkilled) Rs.in lakhs	Total Earnings Rs.in lakhs
Infiltration Wells	15,000	60,000	75,000	37.50	90.00	127.50
Sanitation	40,000	60,000	100,000	100.00	90.00	190.00
BiogasUnits	35,000	33,000	68,000	87.50	50.00	137.50
Rainwater Harvesting	6,000	12,000	18,000	15.00	18.00	33.00
Totals	96,000	165,000	261,000	240.00	248.00	488.00

In addition to training *barefoot engineers*, Grassroots had also initiated other enterprises designed to build the capacity of local youth by imparting appropriate skills and knowledge. For example, over 100 local youth have been trained as carpenters/cabinet makers to add value to local timber. This trainee-group, tentatively named 'CarpenTree', was operational during 1995-2002, reaching an annual turnover of over Rs.13.00 lakhs. These trainees ultimately went on to become independent carpenters, working in their own villages to earn sustainable incomes to the tune of Rs. 90,000 per annum.

Grassroots has also initiated a pilot computer literacy program. This program consists of a six month training period designed to familiarise youth with the basics of operating a computer system as well as simple functions such as word processing, spread-sheet and internet navigation and data entry. The ultimate aim of this program is to increase the confidence and skills of local youth in order to enable them to access the benefits of global communication and information systems and thereby become more competitive in the employment sector.



Partners-in-Change & **Way Forward**

Develop a Global Partnership for Development (Goal 8)



The global challenge of achieving Millennium Development Goals cannot be realised by any single government organisation of any nation. Partnership and collaboration between different stakeholders is crucial in achieving synergy and sharing knowledge. Within India, there are numerous examples of such partnerships and Grassroots is indeed a very small organisation which works with a number of partners-in-change including governmental, voluntary and business organisations in order to address the unique challenges of development in the context of the Himalaya.

The complexity of mountain eco-systems requires a holistic development approach which can only be achieved through collaboration between different stakeholders at a local, national and international level to forward the targets set out within the MDGs.

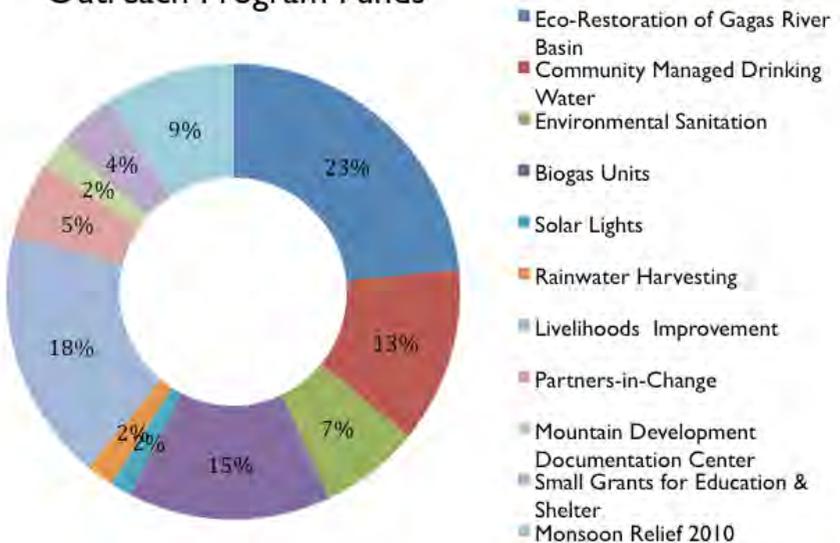
Over the years, Grassroots has forged partnerships with the idea of accelerating MDGs through technology-transfer and capacity-building programs through a process of Sharing and Learning. Over the last decade, some progress has been achieved in this regard with government institutions, voluntary sector and educational institutions.

For example, the government is convinced about supporting the spread of biogas units as a renewable energy option and similarly, infiltration wells has been adopted as an appropriate technology option in the drinking water sector.

Similarly, voluntary organisations have been motivated to spread the benefits of appropriate technologies which directly accelerate MDGs. However, forging further partnerships with change makers and consolidating ways and means of furthering MDGs remains a challenge for the years ahead.

Considering that Grassroots believes that communities may find a fresh balance in their lives, even during times of climate change, through ecological security, the various Outreach Programs of the organisation in any typical year has been as shown below. The focus has primarily been on accelerating MDGs, through provision of enhanced quantities of safe drinking water, access to sanitation and rainwater and adoption of renewable energy options along with eco-restoration and livelihoods improvement programs.

Outreach Program Funds



It is clear that MDGs can be accelerated through community organisation and capacity building of people at various levels, including that of policy makers. It is encouraging to note that the Planning Commission, Government of India has finally formed a Working Group for Indian Himalayan Region in 2011 to address these issues in a holistic manner and it is envisaged that more appropriate policies towards ecological security in fragile mountain ecosystems may well be the new order.

It is also quite clear that communities are willing to share the capital costs of implementing MDGs to the extent of 10 to 70 percent, besides paying for the entire recurring costs of maintenance. The main challenge is to create a platform for knowledge sharing and building effective partnerships both within the IHR and with other mountain nations in order to enable swifter spread of appropriate technologies which directly accelerate MDGs.



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