

Environmentally Sustainable Transport and Climate Change

Experiences and lessons from
community initiatives



SGP The GEF
Small Grants
Programme

The Global Environment Facility

The Global Environment Facility (GEF) is an independent entity that unites 176 member governments—in partnership with international institutions, non-governmental organizations (NGOs), and the private sector—to address global environmental issues while supporting national sustainable development initiatives.

The GEF serves as the designated financial mechanism for the international conventions on biological diversity, climate change, persistent organic pollutants, and desertification. It also supports global agreements to protect the ozone layer and clean up international waters. GEF projects are implemented by UNDP, the United Nations Environment Programme (UNEP), and the World Bank. Seven other regional development banks and specialized UN agencies also help manage GEF projects.

As the financial mechanism of the UNFCCC and the leading multilateral entity promoting energy efficiency and renewable energy technologies in developing countries, GEF manages a multibillion climate portfolio that supports more than over 400 projects and enabling activities.

The GEF Small Grants Programme

Operational since 1992, the GEF Small Grants Programme is a corporate programme of the GEF. It is implemented by UNDP on behalf of GEF implementing agencies. It complements the activities and scope of full- and medium-sized GEF projects by disbursing grants directly to non-governmental and community-based organizations in developing countries for initiatives that result in global environmental benefits while enhancing local well-being and livelihoods.

Highly decentralized and demand-driven, SGP encourages maximum country and community-level ownership. Grants are screened, approved and disbursed at the national level by a voluntary national steering committee (NSC). The NSC typically comprises representatives from local NGOs, government, academia, UNDP and occasionally co-funding donors, indigenous peoples' organizations, the private sector, and the media.

In each country, a national coordinator is appointed to carry out day-to-day management of the programme. The coordinators are responsible for reaching out to local NGOs and community-based organizations (CBOs) to inform them of the availability of grants and to encourage communities to send in proposals based on their ideas. Each SGP country programme is guided by a specific Country Programme Strategy (CPS), which details the scope of activities that can be funded by the country programme. The CPS is developed through a participatory process involving a wide range of local stakeholders to encourage local initiative and raise awareness about the mechanism.

The maximum size of an SGP grant is \$50,000. Projects are therefore usually small in size and are meant to demonstrate innovative approaches to addressing global environmental problems at the community level. To achieve this, the process of project design includes all key stakeholders and partners, especially those providing co-financing, and focuses on the capacity development of stakeholders through demonstration and training, awareness creation, and dialogue. Complementary partnerships increase the reach, impact, and sustainability of SGP's demonstration projects. Occasionally, projects supported by SGP at the community level are scaled up to become GEF medium-sized projects and can be implemented by any of the three implementing agencies. In some instances, scaling up is facilitated by other communities, governments, donors, and development organizations.

About this Publication

The data and facts in this publication emerged out of a systematic review of the SGP sustainable transportation portfolio of projects. The review was initiated to fill a gap left from the last major SGP climate change projects review, finished in 2003. The publications that arose from that review—*Community Action to Address Climate Change and Responding to Climate Change, Generating Community Benefits: A Review of Community Initiatives Supported by the Global Environment Facility Small Grants Programme 1992-2003*—omitted sustainable transportation projects, as they were quite new to the GEF SGP portfolio of projects at the time. Since then, the sustainable transportation portfolio of projects has grown, and this publication attempts to close the gap left by the earlier review.

The SGP global database served as the primary mechanism for collecting data and information about SGP projects for this review. This was augmented with extensive reviews of published and unpublished SGP material, outside research, as well as close communication with grantees, SGP National Coordinators (NCs), and UNDP country offices. This publication analyzes the trends in the community-led transport projects and presents selected case studies. Together, they provide important lessons and share invaluable experiences that show an array of methods communities and civil society organizations have used to sustainably ensure the provision of transportation for people while contributing to abating global climate change.

Environmentally Sustainable Transport and Climate Change

Experiences and lessons from community initiatives

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| Acronyms

BRT	bus rapid transit
EV	electric vehicle
CIS	Commonwealth of Independent States
GEF	Global Environment Facility
GHG	greenhouse gas
LEVA	Lanka Electric Vehicle Association
MDG	Millennium Development Goal
NGO	non-governmental organization
NMT	non-motorized transit
PMT	Pune Municipal Corporation
PTTK	Polish Ethnographic Tourism Society
SGP	Small Grants Programme
SVO	straight vegetable oil
TDM	traffic demand management
UNFCCC	United Nations Framework Convention on Climate Change

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| Foreword

Many development sectors contribute to production of greenhouse gases that cause global warming and affect global climate. The transport sector is a particularly significant contributor to greenhouse gases while being a key stimulus to economic development. In most cases, a vibrant transport sector is associated with a thriving business or commercial sector. If transport sector policies are not harmonized with environmental strategies, they lead to local deterioration of the quality of air while contributing enormously to greenhouse gas (GHG) emissions. The transport sector is a vital element of national and regional development, and sound transport sector policies help to limit local pollution and anthropogenic production of greenhouse gas.

As countries develop, the transport sector tends to become one of the most important contributors of greenhouse gases. The 2006 UNFCCC data on GHG show that emissions from the transportation sector grew by 23.9 per cent from 1990 to 2004. Sustainable transport policies are therefore very important today as a way of promoting development and at the same time reducing adverse impacts to the global environment.

Under the GEF operational program on sustainable transport, the GEF SGP provides grant financing to support community-based climate change projects aimed at mitigating GHG emissions at both local and national levels. Local community climate change projects seek to reduce poverty and empower communities while reducing greenhouse gas emissions or preventing such in the future.

This publication is a result of a review of 65 sustainable transport community projects funded by the GEF Small Grants Programme. Lessons and experiences documented in the publication demonstrate that community initiatives play an important role in testing new approaches, raising awareness of new ideas, piloting innovative strategies, and informing and stimulating policy dialogue in a cost-effective way. For instance, community initiatives with local civil society organizations in Pune, India, prompted a policy shift by the city towards supporting *bus rapid transit* and the development of pedestrian and cycling infrastructure. In Chiang Mai, Thailand, the municipal government is re-allocating a portion of its transport funds towards non-motorized transport infrastructure. In other cases (e.g., Sri Lanka, Nepal, Kyrgyzstan, Poland, Jordan, Egypt, and Lithuania), sustainable transport community projects have resulted in government policy shifts and stimulated commercial activities, leading to sustainable strategies for addressing local transport challenges while benefiting the global climate.

The case studies show that local-level community initiatives led to national policy changes that resulted in actions with enormous benefits to the local, national, and global environment. These projects therefore show that GEF SGP projects have improved communities' quality of life while pioneering approaches that contribute to global benefits.

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Section 1: Climate Change, Transport, and Local Community Initiatives

1.1 Climate Change

Climate change is an issue with global significance. Caused by the build-up of heat-trapping greenhouse gases in the atmosphere, climate change has the potential to increase the frequency and intensity of floods and droughts, raise sea levels, disrupt natural and agro-ecosystems, and increase the intensity of storms. Most greenhouse gases are naturally occurring, but their increasing concentration in the atmosphere over the past few centuries is a by-product of human activity, especially fossil fuels burning and deforestation.

While these activities are altering the climate with potentially devastating global consequences, they also represent an important part of the way by which billions of people around the world have improved their lives and developed their economies. The irony of global warming is that the greatest effects of the problem are likely to be borne disproportionately by those who have benefited least from this development and contributed least to the problem. Most developing countries lie in the tropics and subtropics, where scientists predict that the worst climate change impacts are likely to occur.

This theme of common but differentiated responsibilities is enshrined in the United Nations Framework Convention on Climate Change (UNFCCC), and this principle represents the framework through which many global environmental successes have been achieved. As less-developed countries seek to improve quality of life for their citizens, it is important that they not lock themselves into a course of development that is not sustainable, but rather pursue one that meets today's needs and also safeguards the global environment for the sake of future generations. It is equally important that the developed world reduce its current contribution to the problem by radically altering the means by which it maintains its high standard of living.

The Global Environment Facility (GEF) is committed to achieving global environmental benefits in the context of sustainable development. Climate change mitigation activities are central to GEF's mission. Local community climate change projects funded by the GEF Small Grants Programme (SGP) seek to reduce poverty and empower

communities while reducing emissions of greenhouse gases or preventing such emissions in the future.

1.2 Transport, Sustainable Development, and GHG Emissions

In 2006, the world's urban population surpassed the world's rural population for the first time in history. Many more of these new urban dwellers live in slums than ever before, which are often quite distant from jobs, schools, and services. This rapid urban population growth in many cities has strained existing public transit networks and made walking and cycling increasingly difficult, prompting many to acquire and use personal motorized vehicles for their daily transport needs. While urban population has expanded dramatically across the developing world, motorization has exploded, which has led to increasing traffic congestion, decreasing road safety, and increasing emissions of air pollution and greenhouse gasses.

Unfortunately, this dynamic has proved to be somewhat self-reinforcing. As vehicle prices fall and more people acquire personal transport, governments are pressured to build more roads, overpasses, and expressways rather than investing in public transit or non-motorized transit infrastructure. Rather than solving the problem, this sort of auto-centric infrastructure development has exacerbated it, prompting more people to switch to private vehicles, making traffic more congested still and leading to declining modal shares for public and non-motorized transport.

Transport is also the fastest growing source of greenhouse gas (GHG) emissions, accounting for 24 percent of the CO₂-equivalent total, 20 percent of global energy use, and over 50 percent of global oil use. Transport is the second largest source of greenhouse gases after electricity and heat generation, with motorization in the developing world leading the growth of GHG emissions from transport. Although developed countries currently account for the bulk of transport sector emissions, by 2010, developing countries are likely to be the largest source of transport sector emissions. Average vehicle efficiency has increased at the respectable rate of 2 percent per year, but this has been dwarfed worldwide by the sheer growth of the vehicle fleet—

at 4.5 percent per year, expected to result in 1.3 billion motor vehicles worldwide by 2020. Like power plants and other infrastructure-dependent sectors, transport policies can lead to a certain degree of ‘path dependence’, where a given activity or institution becomes self-reinforcing while making alternative pathways increasingly difficult to follow. From a climate change standpoint, it is imperative that transport infrastructure not lock-in high levels of greenhouse gas emissions into the future.

Beyond global concerns like climate change, transport impacts fundamentally on the daily lives of people. Air pollution is worsening respiratory health in many cities around the world, and road accidents are an increasing hazard. Meanwhile countless billions of productive worker-hours are lost ‘stuck in traffic’ every year.

Mobility for the poor is also a crucial factor for achieving the Millennium Development Goals (MDGs). While older transport policy approaches simply worked to facilitate vehicle traffic, evidence increasingly shows that approaches to poverty alleviation through transport development succeed when they increase *people’s access to opportunities and services*—an approach that may or may not involve the promotion of private vehicles. Subsidization of roads for private vehicles is often a subsidy for the wealthy, who are primary users of the roads, while subsidization of public transport, walking, and cycling infrastructure is of more direct benefit to the poor, who use these modes the most.

Several cities in the developing world have made great strides in promoting sustainable transport. Notably, Bogotá, Colombia, has been held up as a model case, implementing a landmark Bus Rapid Transit (BRT) system, putting in place Traffic Demand Management (TDM) policies, and facilitating non-motorized transit (NMT). Several other cities have implemented combinations of these techniques, often with good results. However, municipal governments in developing countries tend to face a number of obstacles in transport reform: 1) funds for investment in transport are often scarce, making municipalities reluctant to try new approaches; 2) roads are less expensive than many other forms of infrastructure; and 3) motor vehicles represent a sign of progress to many.

There likely will always be some role for private motorized vehicles, and it is important for them to be as clean-operating and low-carbon as possible. While there are many carbon and air pollution reductions that can be achieved through legislated efficiency standards and vehicle testing, many

local governments do not have the resources or the institutional or policy frameworks to accomplish this. Increased use of liquid biofuels also shows great promise in providing a sustainable and low-carbon or carbon-free source of fuel, while providing livelihood benefits to rural people and stimulating agricultural economies.

Fewer climate change mitigation gains have been made in the transport sector than in other sectors worldwide. It is a difficult area to approach, as it requires several actions by governments and citizens: behavioural change, infrastructure commitment, and willingness to leverage political and financial capital. However, real progress can be and has been made, and with the worldwide urban population now constituting a global majority, it will become a more important environment and quality of life issue than ever before.

1.3 Local Community Initiatives

The GEF Small Grants Programme supports the implementation of local community initiatives to respond to the global challenge of reducing the climate footprint of transport. Local initiatives promote sustainable, climate-friendly transportation while promoting sustainable livelihoods, community empowerment, and local and global environmental benefits. This is carried out through small projects mainly using ‘non-technological’ approaches. Non-technological approaches encourage modal shifts and integrated land-use planning to encourage mass transit and NMT. More technological options in transport include such examples as research and implementation around hybrid-electric vehicles, hydrogen fuel cell busses, and electric vehicles.

With a few exceptions, community projects have favoured non-technological approaches in the transport sector, as they rely on proven techniques, can more easily be implemented on smaller scales, provide the most tangible benefits to local communities, and are generally much more effective in achieving net emissions reductions. Especially within local communities, GEF SGP sustainable transport funding focuses more on policy and technical assistance than on funding for infrastructure projects and technological research. Giving the bulk of its support to demonstration, awareness raising, capacity building, and policy advocacy activities allows SGP to leverage its limited financial resources—along with co-financing and social capital from community members and other partners—to facilitate endogenous transport reform, rather than imposing it from without.

Local community transport projects provide global climate change mitigation benefits while promoting economic development, community empowerment, and local environmental benefits. Specifically, these projects maintain a focus on the mobility needs of local communities, the poor, and vulnerable—needs that generally have little to do with private motor vehicle infrastructure, and more to do with public transit and non-motorized transport infrastructure.

The Global Environment Facility provides funding to help solve global environmental problems, and transport-related climate change challenges are certainly among the most serious and daunting of these. Community initiatives can play a great role in testing new approaches, raising awareness of new ideas, piloting innovative strategies, and informing and stimulating policy dialogue in a cost-effective way. Communities can thus improve their own quality of life while pioneering approaches that may become increasingly important on global scales.

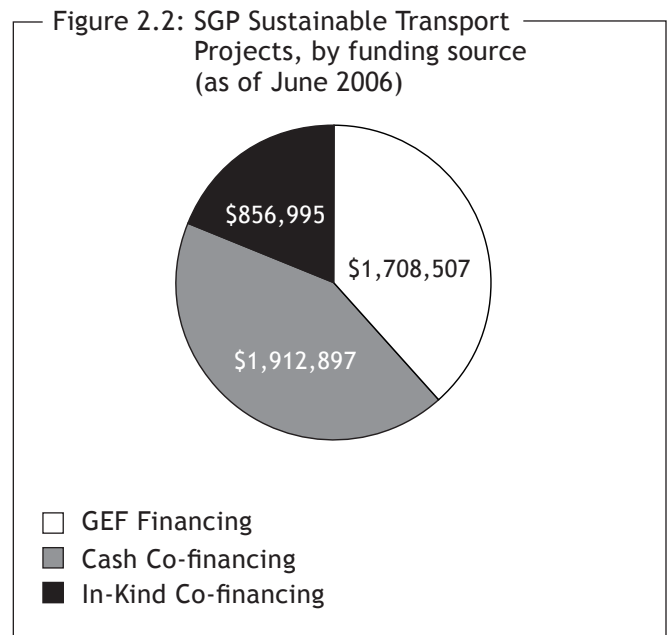
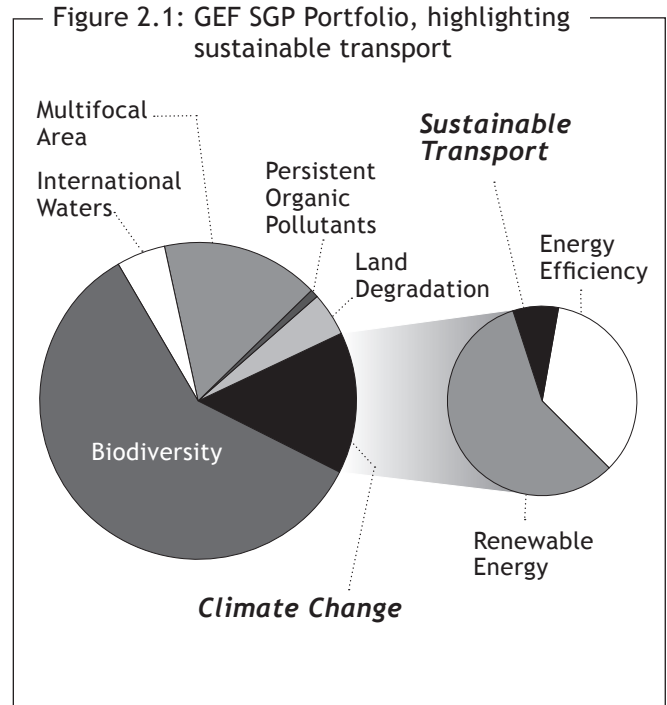
Section 2: Overview of Sustainable Transport Projects

2.1 Introduction

By August 2006, the GEF Small Grants Programme had funded over 6,200 projects, including over 1,000 in the climate change focal area. Sustainable transport is the newest GEF operational program to be implemented by SGP in the climate change focal area; by June 2006, SGP had supported some 65 such projects.¹ Figure 2.1 places sustainable transport in the context of the SGP climate change portfolio, as well as the larger SGP portfolio.

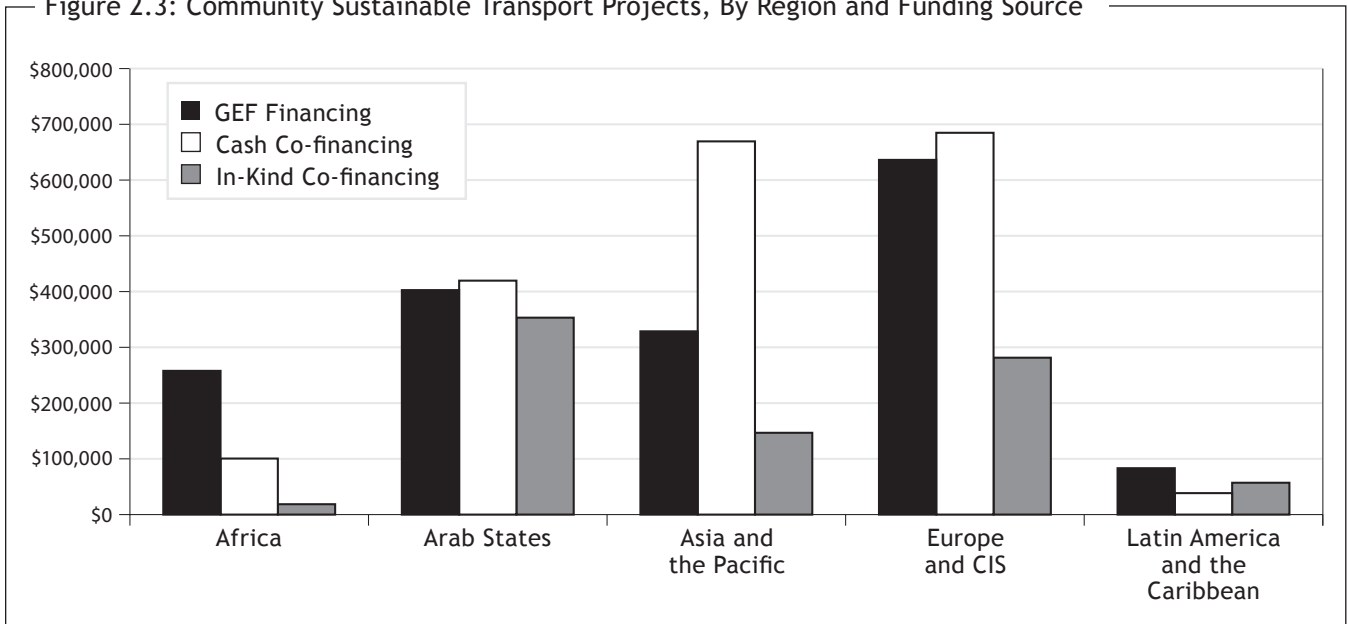
Representing a total GEF commitment of nearly \$1.7 million, the 65 sustainable transport projects have attracted co-financing of \$1.9 million in cash and \$.86 million in kind (43 and 19 percent of the total, respectively; see Figure 2.2), an amount that is significantly higher than the average for SGP projects.

The primary beneficiaries of SGP sustainable transport funding have been countries in the following regions: Arab States, Asia and the Pacific, and Europe and the Commonwealth of Independent States (CIS), although transport projects have been implemented in all regions. (Figure 2.3), see pg 10.



¹ This figure includes several projects in renewable energy and energy efficiency that have relevance to sustainable transportation.

Figure 2.3: Community Sustainable Transport Projects, By Region and Funding Source



Different regions, countries, cities, and communities all have different transport issues depending on their level of development, population density, policy environment, physical environment, and access to technology or resources. As demonstrated by the review, communities take different approaches in different places, based on their circumstances and interests. The projects are all unique and based on climate mitigation approaches that deliver substantial benefit to the partner communities, since there can be no ‘one size fits all’ approach to community sustainable transport projects. While they are all unique, community sustainable transport projects do share a number of common elements. The review examined the projects by characterizing them along two dimensions: type of community initiative and thematic focus.

2.2 Types of Community Initiatives

The projects fall in different categories, but they all aim to make transportation increasingly climate friendly while providing local and global environmental benefits in a variety of different ways. However, a single project may have multiple characteristics that fall in different categories. Table 2.1 summarizes the characteristics of the various types of projects.

Table 2.1

Characteristics of Community Transport Projects, by Type of Initiative

TYPE OF INITIATIVE	Characteristics
Demonstration	Demonstration projects implement a novel or experimental technology or practice at a small scale, with the aim of proving its benefits to potential users in the public or private sectors. The projects are expected to have significant greenhouse gas reduction impacts through replication, mainstreaming, and scaling up. A number of projects falling in this category are successful in meeting those objectives when the technologies or methods practised are applied or adopted.
Networking and Policy Dialogue	Networking and policy dialogue projects aim to inform and trigger policy dialogue to promote an enabling environment for environmentally friendly practices, or to guide policymakers to make increasingly sustainable choices in transport infrastructure development. Where successful, these projects have provided an excellent ratio of funds invested to global and local benefits achieved.
Capacity Building	Capacity building projects help to develop the abilities of grantees or communities to implement certain types of practices or make use of certain technologies. Given that sustainable transport is a rather new GEF focal area, and that many of the grantees are new to transport issues, capacity building has been a significant focus of many projects.
Information/Awareness Raising	Information/awareness raising projects spread information, awareness of issues, and best practices for solving specific issues of interest. Many community sustainable transport projects have had information/awareness raising components, usually combined with demonstration or policy dialogue activities.
Applied Research and Policy Analysis	Applied research and policy analysis projects are similar to demonstration projects and policy dialogue projects in that they experiment with new techniques for achieving local and global environmental benefits with community development, with the goal of discovering best practices.

2.3 Thematic Focus

Project themes refer to the sectoral approach to emissions reduction from sustainable transport. Community sustainable transport projects implemented by June 2006 can be grouped into the following four themes (Figure 2.4):

- mass transit,
- non-motorized transport,
- emissions monitoring and reduction, and
- liquid biofuels.

Figure 2.4: Community Sustainable Transport Projects, By Theme (number of projects)

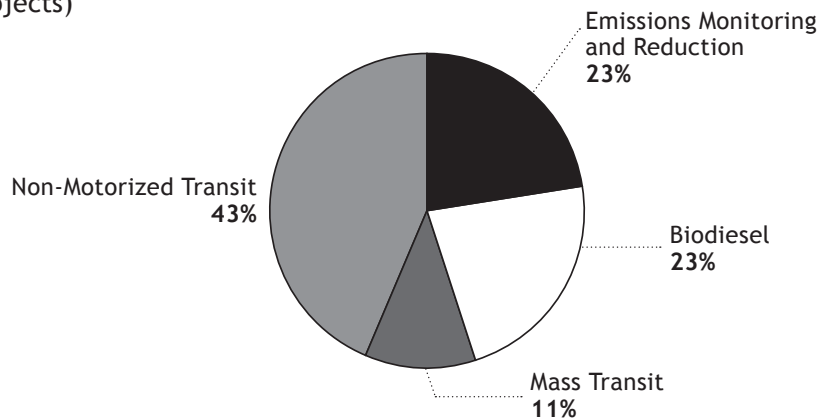
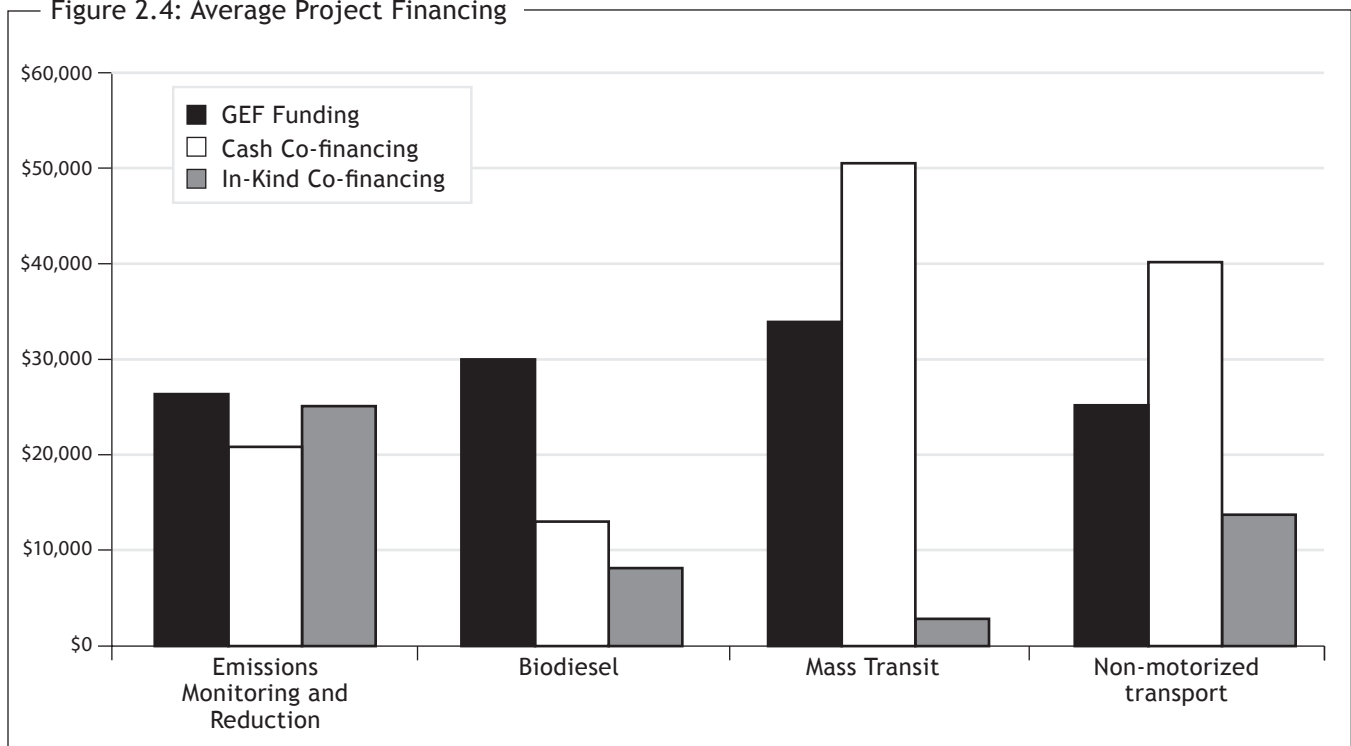


Figure 2.4: Average Project Financing



2.3.1 Mass Transit

Mass transit systems are a key priority in sustainable transport, as they create an alternative to motorized vehicles—reducing greenhouse gas emissions while simultaneously mitigating traffic congestion, improving air quality, and facilitating access by the poor to jobs, education, markets, and services. Mass transit is the only option besides non-motorized transport for many of the poorest city dwellers, and it brings opportunities to those for whom walking and cycling are impossible.

Grant funding is modest, and for municipalities, effective mass transit systems are big investments. Many policymakers, however, need examples to understand the benefits—both long-term and short-term—of effective public transit, including improved public health, increased worker productivity, better road safety, decreased traffic, and local economic benefits. While mass transit may often be expensive upfront and require subsidies to maintain, it prevents external costs such as reduced productivity and dependence on expensive fossil fuels, while potentially attracting investment and facilitating tourism. Community projects in mass transit support information, awareness, and policy advocacy campaigns that help policymakers to understand these points, or support projects to raise awareness and mobilize stakeholders and civil society organizations to engage effectively with their representatives.

Support has been given for demonstration projects for innovative mass transport vehicles, for policy advocacy for BRT systems and TDM policies, and for information/awareness projects that aimed to inform policymakers about the negative consequences of auto-centric development.

2.3.2 Non-motorized Transportation

Non-motorized transportation includes walking, cycling, and other forms of human or animal powered transportation. Both cycling and walking are far less energy intensive than any other form of transportation, generate no noise or air pollution, and represent a healthy form of mobility. Improved cycling and walking infrastructure can also revitalize core urban areas, providing easier and more leisurely contact between shoppers and merchants, improving local economies. In many places, however, cycling and walking are made difficult by inhospitable infrastructure. Lack of sidewalks, lack of designated bicycle routes, lack of road shoulders, and dangerous traffic patterns can discourage cycling and walking. In many places, cycling or walking is quite dangerous—and it is often the poor, the marginalized, and children who bear the brunt of this danger.

GEF SGP supports projects that support cycle- and pedestrian-friendly city infrastructure and policy initiatives; provide cycle touring infrastructure in support of regional ecotourism industries; increase access to bicycles among the poorest; change social attitudes about bicycles; build urban bicycle lanes and separated roads; and build capacity among urban cyclists to ride safely, confidently, and responsibly. All these initiatives share the objective of informing policy and creating awareness of specific barriers to environmentally sustainable transport

From community transport to city-cycle route planning

In Poland, a demonstration non-motorized transport project by the name "*Bicycle Roads System for Six Gminas of the West Pomeranian Region*", implemented a system of bicycle roads connected to a system previously established by another GEF medium-sized project within Gdansk. The project connected those routes to outlying areas, including recreational zones and suburban neighbourhoods. Representing the scaling up of an existing project, this SGP-supported project removed barriers to the use of non-motorized transport in and around Gdansk.

Source: Przemek Czajkowski. 2006. *Sustainable Transport in SGP Projects – Bicycle Roads*. Video CD. SGP Poland.

2.3.3 Emissions Monitoring and Reduction

Projects that fall in this category include all activities that seek to make existing motorized transport modes less greenhouse-gas intensive, or to build capacity to monitor emissions for reductions in the future. Also included are projects that seek emissions reductions by altering traffic patterns, retrofitting existing vehicles, or educating drivers and/or policymakers about more sustainable ways to operate existing motorized transport infrastructure.

The ultimate objective of these projects is to inform policy and give examples for potential mainstreaming of the practices in the public or private sectors. SGP supports demonstration projects to improve existing vehicle fleets, capacity building to monitor emissions, demonstration projects to improve traffic flow and reduce urban congestion, and projects to raise awareness of policymakers about more sustainable transport planning.

Lowered greenhouse gas emissions from motorized transport results in less use of fuel, which can lead to better air quality as well as increased savings on petrol and diesel. With support from SGP, partner organizations, cities, and communities have devised ways that reduce greenhouse gas production from transport activities while potentially saving money in the long term.

2.3.4 Liquid Biofuel Initiatives

The review included projects that support biofuel activities, even though most of them have been funded under energy efficiency and renewable energy operational programmes. They are included because support of biofuel projects has also elicited transport-related policy discussions and action in some countries.

Liquid biofuels are fuels from biological sources. These include biodiesel, alcohol, and straight vegetable oil (SVO). Biodiesel and SVO are made from oilseed crops, used cooking oil, or animal sources. Biodiesel refers to vegetable oils that have undergone chemical conversion to diesel fuel, whereas SVO is unaltered vegetable oil used as fuel, also as a substitute for diesel. Plant alcohols can be distilled from starchy or sugary crops such as maize or sugarcane.

Liquid biofuel is carbon neutral. While carbon dioxide is emitted from the fuel as it is burnt, this merely offsets the amount of carbon taken from the air by the oil-producing plant during photosynthesis. Thus the only net greenhouse gas emissions that come from liquid biofuels are those that come from any fossil energies used in their transportation, production, or other life-cycle steps. Most biofuels are also much cleaner burning with respect to most pollutants than petroleum diesel; their use could

Informing policy on emission monitoring

a) In Jordan, an emissions monitoring, and reduction project by the name *Monitoring Emissions Along Highways* worked to introduce vehicle emissions testing. The grantee conducted an intensive monitoring of vehicle emissions and used the results to highlight the risks to human health and global climate caused by pollution resulting from motorized transport. The study results formed the bases for new Government standards, and monitoring has become part of the Government's vehicle annual testing requirements.

Source: Munir Al-Adgham. 2006. *Project Monitoring and Evaluation Document*.

b) In Morocco, another emissions monitoring and reduction project by the name *Amelioration of Air Quality and Reduction of Air Pollution from Vehicles* used applied research and policy analysis, capacity building, and information/awareness raising to support the implementation of a government decree against air pollution. The project designed and implemented an air pollution test for vehicles, which was tried in several Moroccan cities. Agents were trained in the procedure, and the test was eventually carried out on 100,000 motor vehicles. Providing baseline data on Moroccan emissions of air pollution and greenhouse gasses from the transport sector, this project provides a basis for future action.

Source: Lamiss Maciri. 2006. *SGP Database*

lead to significant air quality improvements in urban areas. Moreover, production of energy crops represents a very large potential agricultural market in many areas of the world, and it is only beginning to be tapped. In other areas, used cooking oil that is currently a waste product can be turned into a useful resource.

SGP has supported projects that demonstrate and build capacity to produce liquid biofuel; demonstration projects that use liquid biofuel for stationary engines and road or rail transport; and research and policy advocacy projects that seek to promote an enabling policy environment for mainstreaming liquid biofuel in development activities. Other activities have shown the use of certain biofuel crops in promoting sustainable land management.

Stimulating policy dialogue on biofuel use

a) **In Ghana**, two demonstration, capacity building, awareness raising, networking, and policy dialogue liquid biofuel projects by the names “*Promoting the Production and Utilization of Jatropha Oil in the West Mamprusi District of Northern Region*” and “*Cultivation of Physic Nut to Produce Biodiesel to Mitigate the Threat to Climate Change in Ghana*” worked with women’s groups in rural areas to help them process Jatropha oil into soap for rural bio-enterprises and into biodiesel for the operation of lamps and mills. The second project worked in a different region with 2,000 farmers to produce Jatropha biodiesel on a larger scale. The two projects successfully attracted the interest of policy-makers and a nine-person committee, including the SGP national coordinator, was set up to draft a national biofuel policy.

Source: George Ortsin. 2006. *Project Monitoring and Evaluation Document*.

b) **In Barbados**, a community-based recycling project by the name *Production of Biodiesel from Used Vegetable Oil with the Lester Vaughn Secondary School, Barbados* forged a partnership between a Barbadian secondary school environmental club and a young entrepreneur to demonstrate the potential for converting waste vegetable oil into biodiesel. Students collected used oil from their homes and brought it to the school, where it was purchased by the young entrepreneur, who converted it into biodiesel and glycerine. The fuel was used to power a small generator, which in turn was used to power a small popcorn machine—with the popcorn being sold to provide income for the group. The project demonstrated the potential for upscaling to levels high enough to have business sector applications.

Source: Giles Romulus. 2006. *Project Monitoring and Evaluation Document*.

c) **In Mozambique**, a project by the name *Fuel fences and biodiesel project by planting Jatropha trees for biodiesel production in Gorongosa, Nhamatanda and Chimoio Districts* demonstrated and built capacity for use of liquid biofuel to combat deforestation and provide a sustainable and climate-friendly source of fuel for rural communities. Jatropha was planted on degraded land along roads, and around community farms in rural Mozambique. Building capacity of the communities to produce biodiesel, the project lays groundwork for activities that could eventually be upscaled to become important in the transport sector.

Source: Augusto Urbano Correia. 2006. *SGP Database*

Laying the ground for biofuel link to national transport policy

a) In India a demonstration, capacity building, awareness raising project by the name *Community Promoted Energy Plantation of Jatropha and Power Supply to Communities* sought to spread Jatropha as a tool for improving rural livelihoods, combating land degradation, providing carbon-free energy services. Focusing on women and marginal farmers, the project sought to raise awareness of 3000 people around the village and engage 500 in the cultivation of the crop. A biodiesel refinery is also planned, as is a Jatropha network for the exchange of know-how.

Source: Sodhi Prabhjot. 2006. *Project Monitoring and Evaluation Document* and Email communication.

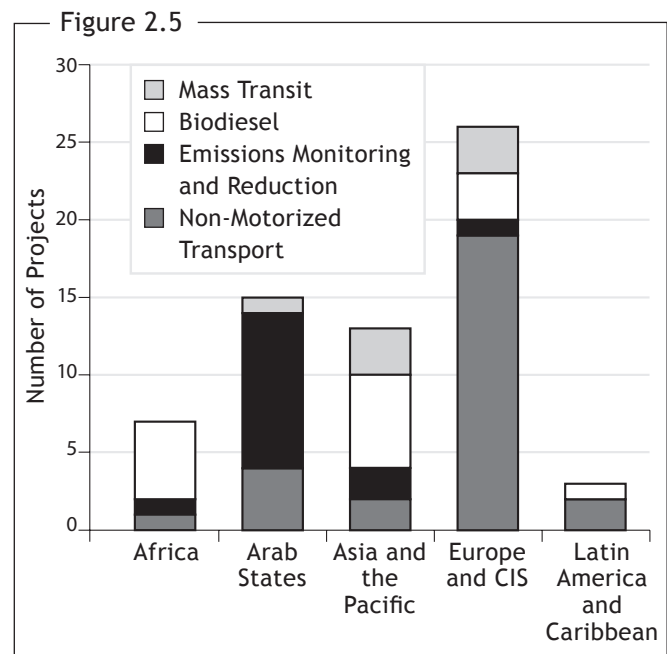
b) In Papua New Guinea, the University of Technology is implementing with the community a project named *Potential of Developing Coconut Oil as a Bio-energy Fuel and Alternate to Fossil Fuel in Papua New Guinea* to pioneer the development of biodiesel production techniques from coconut palm. It aims to mitigate climate change and add value to the produce of coconut farmers. Being implemented by a group consisting of scientists and researchers with community members, the project will remove technical barriers and establish effective practices for the production of biodiesel production in the Papuan context.

Source: Merawe Degemba. 2006. SGP Database.

2.4 Thematic Regional Trends

Figure 2.5 shows a strong correlation between geographic regions and project themes. This reflects two drivers. First, SGP support for community projects is demand driven, and areas with similar sorts of issues are tending to fund similar sorts of projects. Second, the accumulated expertise in particular project areas in regions tends to foster similar projects within the region.

Three notable regional trends are: biodiesel projects in sub-Saharan Africa, the promotion of bicycle routes in Eastern Europe, and the promotion of mass transit and inter-modal transport in urban Asia.



2.4.1 Biodiesel Projects in Sub-Saharan Africa

The majority of community biodiesel/biofuel activities in sub-Saharan Africa focus on the use of *Jatropha curcas* for biofuel, soap and cosmetics production, and reclamation of degraded land. *Jatropha* is a unique plant in that it yields large quantities of oil-rich seeds, while thriving on and reclaiming degraded land. It can also serve as a hedgerow plant, and has several medicinal uses.

Significant funding has gone to demonstration and capacity building projects that have used *Jatropha* as a raw material for lighting, cooking, and soap making, with the goal of scaled up production of liquid biofuel in the future. Biofuels can be problematic in many regions due to potential competition with food crops, energy requirements in growing and processing the fuels, and cost issues. However, the context in many African countries is different, given the abundance of non-arable land on which *Jatropha* may be grown, opportunities for value addition at the local level, minimal management requirements, non-fuel livelihood benefits such as soap and cosmetics production for trade, as well as erosion control benefits and rehabilitation of degraded lands. Along with coconut and oil palm, *Jatropha* has the potential to be one of the most productive oil crops in the world.

2.4.2 Bicycle Routes in Eastern Europe

Bicycle route projects in Eastern Europe comprise over 20 percent of the sustainable transport portfolio by number of projects; these projects are divided between

urban route development and bicycle tourism infrastructure. Urban routes projects are intended to encourage more city residents to begin cycling, creating bicycle-only road networks to make cycling safer and more enjoyable. Rural routes for bicycle tourism development improve rural livelihoods by connecting communities with cycle-tourists—an important component of the regional ecotourism economy—as they raise awareness of sustainable transport policy options at the national level. These routes encourage the conservation of farm and parkland by avoiding more disruptive auto-centric tourism development.

2.4.3 Mass Transit and Inter-modal Transport Advocacy in Rapidly Developing Cities in Asia

Rapid development and urban population growth have outpaced transport planning in many Asian cities. NMT and mass transit have declined as roads have become more congested and cities have become more polluted. The portfolio of projects in this area is a mix of demonstration and policy development projects aimed at improving mass transit and promoting cycling. The projects have produced some excellent policy results with strong potential to mitigate greenhouse gas emissions while improving air quality. They have also improved commute times, conserved fossil fuels, and empowered low-income populations.

Turning transport policy challenge to commercial opportunities

In Lithuania, three separate projects have combined to create an ecotourism bicycle route along the Nemunas River, a scenic, natural area in the south of Lithuania. The three SGP projects worked with municipalities and environmental NGOs to develop bicycle ecotourism routes along the river, attracting international and Lithuanian tourism and promoting rural livelihoods. Development of bicycle tourism avoids over-motorization of the tourism sector—avoiding greenhouse gas emissions while preserving the scenic charm and tranquillity of the region, thus safeguarding the factors that attract people to the region in the first place. The grantees helped the local governments, CBOs and other stakeholders to work together in planning the route, while building the capacity of the local people to benefit from the tourist development through crafts, hospitality, restaurant development, and other small industries. The direct influx of money to the communities as a result of the projects is tens of thousands of dollars per year, and is growing. The three separate projects improved and lengthened the bicycle route, and upscaling activities from domestic and EU funds have come in the form of asphalt and other route improvements.

Source: Neda Leonaviciute and Inga Ringailaite. 2004. *Linking the Interests of Environment and Society*. SGP Lithuania.

Section 3: Results and Impacts

3.1 Barrier Removal

All the reviewed projects seek to remove barriers to sustainable transport, thus allowing partner communities to endogenously craft policies and approaches to climate change mitigation in the context of sustainable development. The ultimate objective of removing barriers is to facilitate activities that will lead to large reductions in emissions of greenhouse gases. The barriers identified from the reviewed projects include:

- institutional or cultural barriers,
- policy barriers,
- financial barriers,
- technical barriers, and
- information/awareness barriers.

3.1.1 Institutional or Cultural Barriers

Institutional or cultural barriers are some of the most common project stumbling blocks. In the context of sustainable transport, these often relate to customs regarding gender that discourage women from utilizing certain transport modes. This issue has surfaced mainly in the field of non-motorized transport. By making walking and cycling safer, and by promoting bicycles as a technology for women's empowerment, these projects remove barriers to a technology that has significant climate mitigation and personal mobility benefits.

3.1.2 Policy Barriers

Policy barriers encountered by SGP-supported community sustainable transport projects have included tax, tariff or import restrictions that discourage sustainable transport. Specifically, projects have encountered subsidies to polluting vehicles, policies that discourage import or registration of electric vehicles, policies of road widening, removal of pedestrian walks, or facilitation of private motor vehicles at public expense. These make more sustainable modes difficult to implement. While policy barriers place a significant brake on the progress of community sustainable transport projects, their removal—through advocacy, policymaking support, or awareness raising—is a significant global benefit arising from local community transport initiatives, allowing larger scale activities to proceed in an improved policy environment.

Stimulating policy dialogue or change

a) **In Poland**, a project by the name *Biofuel for Local Railway Transportation* demonstrated the use of liquid biofuel in the narrow gauge railway transport. The grantee in the project is a Polish NGO that works with local communities to reinvigorate local railway transportation using networks of abandoned narrow-gauge railroad tracks. The trains ferry local children to and from distant schools, deal in light agricultural freight transport, and carry sightseeing tourists in the summer. This project developed the capacity of the grantee to fuel its trains on biodiesel, feedstock for which is locally available from rapeseed oil produced by farmers, animal fat from meat processing plants, and waste oil from restaurants. Apart from removing financial, awareness, and technical barriers to biofuel usage, the project has also helped the NGO's railway activities to be increasingly financially sustainable.

Source: Przemek Czajkowski. 2006. *Sustainable Transport in SGP Projects: Bicycle Roads*. Video CD. SGP Poland

b) **In Iran**, a community project is working to promote the culture of using bicycles as an alternative and environment friendly means of transportation as well as a sport. The project is training community members in safe cycling practices and basic repair, and is working with city councils to establish safe cycling paths and identify recommended routes. Financial mechanisms are being designed to increase access to bicycles among the public, and rallies, cycle races, conferences, and other events are being held to popularize the sport. To make the interventions sustainable, the grantee also built the capacity of the community to form its own cycling recreational and advocacy organization to maintain the sustainability of the project interventions. At the time of writing, the project was still under implementation.

Source: Laleh Darie. 2006. *Project Monitoring and Evaluation Document*

c) **In the Palestinian Authority**, a community pilot project by the name *Shifting towards Environment-Friendly Traffic Signs* demonstrated that flow-responsive traffic signals can aid in reducing traffic congestion. In this largely successful project, traffic was significantly speeded and ambient air pollution was reduced in the intersections monitored. Lowered congestion, if not combined with a corresponding increase in the number of vehicles, can lower greenhouse gas emissions by making transport more efficient. Upscaling to other junctions is under consideration with city authorities.

Source: Rula Jiryas. 2006. SGP Database.

3.1.3 Financial Barriers

Financial barrier removal is one of the central and most obvious objectives of community projects. Where funding is limited to begin initiatives, projects can act as seed money or venture capital, providing the initial investment in a project and getting community ideas off the ground. Leveraging of a community's social capital along with GEF SGP grants has stimulated local investments towards sustainable transport activities.

3.1.4 Technical Barriers

Technical barrier removal becomes important in sustainable transport where the technologies require adaptation to new conditions in project areas, or where local skills to service new technologies are lacking. In SGP transport projects, these have largely become apparent in adapting electric vehicles to new conditions and in developing new biodiesel processing methods and equipment.

Technical response to emission problems

In Kyrgyzstan, a demonstration and capacity building project by the name *Clean Air for Bishkek City: Electronic Ignition Devices* aimed to monitor and reduce emissions by piloting a device that increases the fuel economy of older cars, which are common in Bishkek. The device—inserted into the engine of the vehicle—improves fuel economy by 10 percent, thus reducing greenhouse gas emissions and saving drivers money on fuel costs. By helping with the design and training individuals to construct the devices, the SGP-supported project removed technical barriers to more widespread implementation; ongoing advertising efforts reduced informational barriers. The project is easily replicable and upscalable in Kyrgyzstan.

Source: Esther Ebrahimian. 2003. *Community Action to Address Climate Change GEF SGP*.

3.1.5 Information/Awareness Barriers

Information/awareness barriers are common in sustainable transport advocacy, especially in the context of mass transit, NMT and TDM advocacy. Information and awareness of sustainable transport issues require experimentation or demonstration of the issues to sometimes sceptical audiences. Community projects have provided opportunities to test and demonstrate specific technologies or approaches, and they have informed policymakers, as well as the private and public sectors. A number of projects have recorded substantial impacts towards enabling real change in transport modes.

Introducing new innovative approach

In Kyrgyzstan, three demonstration projects created bicycle hiring stations in the cities of Colpon Anta, Talas, and Karikol. Increasing access to bicycles among residents for whom they were previously out of reach, the hiring schemes also provided employment for a number of workers. The schemes are also an important addition to the regional tourism industry. Partnerships were made with municipalities to integrate bicycle use into local transport policy.

Source: Muratbek Koshoev. 2006. *Project Monitoring and Evaluation Documents*

3.2 Local Benefits and Sustainable Development

In many cases, climate change mitigation measures in the transport sector require large amounts of investment as well as significant leveraging of political will. However, climate change mitigation activities in the transport sector also provide a number of local benefits that can help empower communities and contribute to the achievement of the Millennium Development Goals. A consistent feature of community initiatives in sustainable transport has been the low level of investment and a high degree of local benefits, providing excellent cases that are potentially applicable in a wide variety of contexts. These benefits are economic, social and environmental.

3.2.1 Economic Benefits

Economic benefits arising from local community projects in sustainable transport depend upon the project theme, and vary considerably across projects. Several liquid biofuel projects involve the cultivation of oilseed cash crops, which can be processed not only into biofuels but also into glycerine that is used in the cosmetics and pharmaceutical sectors. Used for making soaps and other products, they supplement household income and foster local industry. Urban mass transit, NMT and TDM policy projects have the potential to decrease traffic congestion, thus increasing worker productivity, while reducing fossil fuel consumption and saving resources.

Local community sustainable transport initiatives generate commercial opportunities and employment. In Sri Lanka, a demonstration and policy advocacy project has created a sufficiently enabling business climate to prompt three companies to invest heavily in the electric vehicle sub-sector, creating a number of jobs and significant potential for growth (Case Study 1). In Poland and Lithuania, several cycling-oriented ecotourism projects support rural livelihoods by creating business opportunities in the growing ecotourism sector.

3.2.2 Social Benefits

Social benefits arising from sustainable transport development include the empowerment of local communities, particularly women, the poor and the marginalized. In many contexts, local community members—especially women—have duties in households and informal economies that are not always well-served by commuter-oriented transport development. In many contexts, there are also cultural and economic barriers to women operating

private motor vehicles or bicycles. While these sorts of challenges vary from place to place, community sustainable transport projects are locally driven and have the experience in the local context to advocate for mobility options that best benefit all.

Poor and marginalized members of local communities have different transport needs than others, and private motor vehicles or bicycles are beyond the reach of many. Several projects—notably in Egypt and Kyrgyzstan—have taken distinct approaches to increasing the access of the local communities to bicycles, and ameliorating local traffic conditions in their favour. Other projects have improved the walking, cycling, and mass transit conditions, notably in Chiang Mai (Thailand) and Pune (India). These modes provide the poor with enhanced mobility in ways that other sorts of transport development do not, increasing access to opportunities, education, markets, and services.

3.2.3 Environmental Benefits

Environmental benefits for local communities from sustainable transport projects are diverse and depend largely upon project theme. Biofuel projects using *Jatropha* often have a strong sub-focus on land degradation issues, as the trees are commonly planted on eroded land (see Mali, Case Study 5). NMT, TDM, and mass transit projects frequently have an air pollution/respiratory health component (see Pune, Case Study 2; Chiang Mai, Case Study 6; Colombo, Case Study 1; Kathmandu, Case Study 5), while cycling-related ecotourism projects often aim to conserve open space and traditional agricultural landscapes (see Lithuania cycling routes, Case Studies 4, 5, and 7). Modal switches away from private vehicles also reduce noise pollution and improve road safety, enhancing urban quality of life. Ultimately, all community sustainable transport projects have a policy-informing function that is aimed at replication, upscaling, and mainstreaming for greater achievements of local and global environmental benefits.

Section 4: Community Sustainable Transport Projects: Case Studies

This chapter discusses ten case studies divided into two categories:

- mass transport and non-motorized transport policy and institutional support projects, and
- biofuel support projects.

4.1 Mass Transport and Non-motorized Transport Policy and Institutional Support Projects

Case Study 1:

Sri Lanka: Introduction of Electric Vehicles, Colombo

Project Data

Name: Introduction of Electric Vehicles to Sri Lanka by the Lanka Electric Vehicle Association

Grantee: Lanka Electric Vehicle Association

Location: Colombo, Sri Lanka

SGP contribution: \$28,946.16

Cash co-financing: \$4,515

In-kind co-financing: \$5,916

Start date: May 2003

Technology: Three-wheeled electric vehicles

Type of project: Demonstration, Capacity Building, Awareness Raising, Networking and Policy Dialogue

Type of transport: Urban

Project Overview

Colombo is a bustling city with 25 percent of Sri Lanka's population, 60 percent of its motor vehicles, and a major air pollution problem. Inefficient vehicles, especially motorbikes and three-wheelers, both contribute to toxic air pollution and emit large amounts of CO₂ per unit distance travelled. Being a relatively dense and compact city with abundant supplies of relatively inexpensive electricity, electric vehicles have a good deal of potential in the city's mass transit sector. This creates a unique opportunity to introduce zero-emission electric vehicles

to the dense core areas of Colombo—improving the quality of the air while decreasing the greenhouse gas emissions from the transport sector.

This project sought to demonstrate the viability of, and pave the way for, commercial introduction of three-wheeled electric vehicles in Colombo. Initial project activities made it evident that policy barriers were far greater than technical ones, prompting the grantee to change focus towards advocacy for an enabling policy environment for electric vehicles. Considerable success has been achieved, and several private firms are now beginning to manufacture and import electric vehicles (EVs). The government has also thrown its support behind the technology, and is considering using electric busses to upgrade Colombo's mass transit system.

Implementation

This project sought to demonstrate the viability of electric vehicles in mass transit applications in Colombo by building capacity for their assembly and maintenance. Immediately on importing the chassis for the first prototype vehicle, however, the project ran into an unexpected barrier when it was discovered that there was no Sri Lankan customs code covering electric vehicles and the prototype could not be cleared for entry.

At that point, the focus of the project was changed from demonstration and capacity building to policy. The grantee approached the director of fiscal policy and lobbied for an amendment to the customs code to allow for the import of the vehicles. This was eventually granted, the vehicle was brought in, and a team of 10 youths was hired to be trained in assembling and servicing the vehicle.

Though the vehicle was granted access to the country, it was further hindered by yet another policy barrier: as there was no provision in the Motor Traffic Act covering electric vehicles, the vehicle could not be registered to drive on Colombo's roads. Finding itself in a lobbying role once more—this time with the Ministry of Transport—the grantee succeeded in securing an amendment to traffic codes, permitting the vehicle to ply the streets of Colombo.

A demonstration of the vehicles was then made to Sri Lankan national government officials, as well as to Colombo municipal officials. Being quite cognisant of Colombo's air quality problems, and being suitably impressed by the vehicle trials, the government decided to throw its support behind increased EV transport in Colombo. A cabinet subcommittee was set up to make recommendations on lowering import duties on EVs, while the grantee was requested to produce a proposal for the import and deployment of 25 electric busses for mass transit duty on Colombo's streets.

Meanwhile, private sector actors have taken advantage of the improving policy and public awareness climate around electric vehicles to begin developing commercial EV markets. Three Sri Lankan firms are spearheading the commercial EV sector in Sri Lanka—Ceyto Lanka, Ceylinko Consolidated, and Super Star (pvt) Ltd; they are importing, assembling, and manufacturing electric three-wheelers, small electric cars, and electric motorcycles, respectively. These companies are being funded by investors rather than grants, and their future looks quite promising as the policy environment surrounding electric vehicles continues to improve, and as electricity continues to remain less expensive than imported petroleum fuels.

In the meantime, use of EVs is taking off in the ecotourism sector, with eco-hotelier Sanasuma Development (pvt) Ltd demonstrating and using the vehicles in its hospitality operations, while the city of Kandy is exploring increased use of electric vehicles in its tourism sector as well.

Technology

Electric vehicles, whether in the form of two-, three-, or four-wheelers, have significant potential in many places to simultaneously reduce urban air pollution and greenhouse gas emissions— especially when they are used in a mass transport context and displace private vehicles. Most electricity is produced at centralized sources, whose efficiency is generally easier to improve and whose emissions are easier to regulate than those from non-point sources such as automobiles. Moreover, electric vehicles may be powered with carbon-neutral sources such as hydroelectric or wind where available. Especially in areas where a significant portion of the electricity mix comes from hydropower such as Sri Lanka, electric vehicles may be charged during the evening, when there is low demand on the electric grid and often excess electricity to spare.

While electric vehicles cannot generally equal the range or power of conventionally fuelled vehicles, they can be appropriate for urban transport where electricity supply

is plentiful, traffic stops are frequent, and great speed is unnecessary. EVs generally produce dramatically less noise, thus potentially improving urban quality of life.

Results and Impacts

a) Environmental Benefits

Global: Especially where they replace inefficient and obsolete fossil fuel private vehicles, EVs have the potential to significantly decrease the greenhouse gas emissions associated with urban transport. This benefit is particularly great in the case of Colombo, where a significant proportion of the electricity mix is generated from non-emitting hydropower.

Local: Electric vehicles produce no emissions of toxic air pollution, and their increased use in Colombo can significantly improve the city's air quality.

b) Livelihood Benefits

Commercial Development: By demonstrating the viability of, and improving the policy environment surrounding, electric vehicles, the grantee has prompted large-scale private investment in the sector by a number of firms. The three companies investing in EVs are a combination of established conglomerates and new start-ups; the approaches they are using include both complete local vehicle manufacturing and local assembly of imported components. The companies have significant potential to generate employment as they and the sector grow.

Health: Increased use of EVs should improve Colombo's air quality, reducing the burden on respiratory health and saving the government, which subsidizes the public hospital system, money.

Savings: The main users of three-wheeler taxis and public busses are lower- and middle-class people. Given the relatively low price of electricity compared to fossil fuels in Sri Lanka, a growing proportion of EVs in the city's public transport fleet has the potential to reduce the burden of transport expenses for much of the city's population.

c) National Benefits

Colombo has 25 percent of Sri Lanka's population but over 60 percent of its motor vehicles. Since the city is quite compact, EVs could largely displace internal combustion vehicles, saving fuel and making the national economy less dependant on petroleum, whose price and supply are continually volatile.

d) Partners

The private sector is playing a central role in the creation of the EV sector in Sri Lanka. The vehicles have both global and local environmental benefits, and local economic benefits that represent real opportunities to Sri Lankan firms.

The eco-hotelier Sanasuma Ltd assisted with the initial demonstration activities aimed at government officials and continues to use the EVs in its hospitality operations. Three main private firms are taking advantage of the improving state of public policy and awareness around electric vehicles. Ceytro Lanka is a small company engaged in the manufacture of electric three-wheelers, primarily for use in the ecotourism sector. Ceylinko Consolidated is a large Sri Lankan conglomerate and is investing in the import of small electric cars from India, aimed at the private market. Super Star (pvt) Ltd is beginning to import electric motorbikes. While these three vehicle companies are not partners with this project per se, their continued growth and development in the EV sector constitutes a nascent EV business community, which has the potential to become an important force in Sri Lankan transport policy.

Lessons Learned

a) Barrier Removal

Policy: Initially planned as a demonstration and capacity building project, when circumstances required a policy change, the grantee sought and achieved 1) an amendment to the customs code to allow for the import of the electric vehicles, and 2) an amendment to the traffic code to allow the vehicles to be registered and driven in Colombo.

Information/Awareness: Electric vehicles were largely unknown and untested in Sri Lanka before this project. Their potential for contributing to air quality improvement and climate change mitigation had not yet been explored, as is evidenced by the complete lack of an import or transport policy framework for them. By completing the initial demonstration and policy legwork, the grantee has thrown the door open to 'organic' upscaling, which is being carried out by the private and public sectors independently, requiring little further urging from NGOs or environmental pressure groups.

Financial: By demonstrating a prototype electric vehicle and taking the initial risk with the demonstration prototype, the grantee assumed a large portion of the financial risk that is inherent in the initial phases of business project development. By removing much of that risk through its

demonstration project, the grantee removed an important financial barrier from EV implementation in Sri Lanka.

b) Project Approach

This project was envisioned from the outset as a technical demonstration project, and its leader is an engineer. However, finding that the barriers to increased EV use in Sri Lanka resided more in policy arenas than in technical specifications, the grantee switched the project focus to policy dialogue activities, opening the import and vehicle registration processes to EVs. This demonstrates a *flexible project approach*, wherein the grantee adaptively managed the project approach based on challenges that arise throughout the course of the project, rather than blindly carrying through with a predetermined plan in the face of unexpected barriers.

c) Scaling Up

The Colombo municipal government is considering renewing its fleet of buses with new ones designed to run on electricity. Additionally, the private sector is investing heavily in EV technology across the island. Upscaling is happening organically by businesses and government, testifying to the practical, effective nature of EVs in the Sri Lankan context.

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Case Study 2:

India: Environmentally Sustainable, People-centred Urban Transport, Pune

Project Data

Name: Environmentally Sustainable, People-centred Urban Transport

Grantee: Parisar Samrakshan Samvardhan Samstha (Parisar)

Location: Pune, India

SGP contribution: \$15,385

Cash co-financing: \$3,516

Start date: January 2004

Type of project: Networking and Policy Dialogue, Information/Awareness Raising

Type of transport: Urban

Project Overview

Pune is a burgeoning city in the Indian state of Maharashtra. With a vibrant industrial sector as well as a growing IT sector, the population of the Pune metropolitan area has grown from 800,000 in 1971 to its current 4.5 million. This rapid development has outpaced public transit services, and unplanned neighbourhoods have sprung up in areas poorly served by the Pune Municipal Transport (PMT) bus network. As public transit has come under increasing strain and the price of motor vehicles has come down, motorization has exploded, polluting the air and making walking and cycling increasingly dangerous. Since the 1960s, Pune's road network has increased by a factor of 5, while the number of vehicles has increased by a factor of 87. Formerly known as the 'cycle city of India', Pune now experiences over 300 road fatalities per year and the fifth worst air pollution in Asia. The drive towards motorization has made transport less affordable and more burdensome for the poor while spewing greenhouse gasses and large amounts of toxic air pollution.

The grantee, Parisar Samrakshan Samvardhan Samstha (Parisar), is a Pune-based environmental NGO. Parisar mobilized a diverse network of stakeholders from a variety of sectors, NGOs, and communities throughout the city into the Pune Traffic and Transportation Forum (PTTF), which lobbies for, raises awareness about, and crafts policy for sustainable transport, traffic demand management, and non-motorized transport in the city. Acting simultaneously as a pressure group, a think tank, and a policy watchdog, the grantee and its partners have

been instrumental in persuading the city to implement (beginning in 2006) several NMT and BRT policies and projects.

Implementation

Parisar has been active in urban transport in Pune for a number of years, lobbying successive city administrations for improvements in the PMT. Although most were reluctant to address politically sensitive issues such as traffic demand management, or were not particularly receptive to civil society organizations, Parisar gained experience during those years in municipal traffic and transport advocacy, developed networks of partner organizations representing various stakeholders, and developed a suite of policy recommendations for the city. With a new, more sympathetic administration taking charge in June 2004, the grantee was offered an opportunity to present its case for NMT, BRT, and TDM to the administration.

Several presentations, seminars, and informal discussions were held between the PTTF and city officials during the second half of 2004. While city officials were broadly supportive of some sustainable transport measures, they required considerable convincing in many areas, including adding sidewalks to Pune's narrow streets, the continued relevance of bicycles in an age of increasingly available motor vehicles, and the utility of bus-only lanes. Initially, the view of the Pune Municipal Corporation (PMC) was that traffic was too heavy for these measures. Using examples from sustainable transport accomplishments in Singapore, Bogotá, London, and Curitiba, the grantee slowly shifted the view of the PMC towards recognition that certain forms of traffic restrictions actually speed traffic rather than restrict it while also benefiting the environment, improving public safety, and increasing the mobility of the poor.

As city officials became increasingly receptive, outside experts were brought in and administrators from the PMT were included. Holding a seminar entitled 'One Right Turn: Critical Issues in Urban Mobility for Developing Countries for Coming Decades', the grantee attracted participants from noted NGOs such as the Delhi-based Centre for Science and Environment, transit officials from Delhi and Mumbai, other noted Indian advocates for BRT systems, and officials from the Central Institute of Road Transport. The seminar was well-received by officials and garnered a lot of media attention, catalyzing popular support. A major publication on sustainable transport came out of the seminar; combined with an

appearance by Enrique Peñalosa and his flagging-off of a major cycle rally (~4500 cyclists), it went a long way in persuading the PMC to take a more sympathetic approach to NMT, BRT, and TDM.

In early 2005, PMC hired a consulting firm to help develop a transport action plan, with the grantee being given a role in the oversight of their work. The consulting firm's recommendations were largely auto-centric and failed to take account of the progress of the past year. The grantee engaged the consultants and successfully persuaded them to revise the document. For unclear reasons, however, the recommendations were not accepted by the PMC, casting doubt on future progress.

The 2006 municipal budget allayed these worries, however, when it made significant financial commitments to sustainable transport development, including:

- upgrade of Pune's citywide cycling network, including several kilometres of cycling tracks,
- initial funding for a multi-million dollar BRT system, including construction of two initial routes, and
- mandated footpaths for all public roads in the city.

These provisions represent outstanding successes and pave the way for further progress in the future. Parisar and its partners continue to lobby for sustainable transport and serve as policy watchdogs, monitoring city policy and ensuring continued improvement.

Results and Impacts

a) Environmental Benefits

Global: By encouraging infrastructural changes to promote modal shifts in transportation systems, this project is contributing to greenhouse gas emission reductions now and into the future. By changing perceptions of policymakers and establishing the beginnings of NMT, BRT, and TDM programmes, the project has also set the stage for continued reductions and emissions prevention into the future.

Local: Reduction in the numbers of motorbikes, auto-rickshaws, cars, and trucks has the potential not only to significantly improve the air quality of Pune and its environs, but also to improve quality of life by reducing noise and congestion and to reduce the threat to the city's environmental assets from auto-centric development.

b) Livelihood Benefits

Safety: With motorbikes in the bicycle lanes, poor road discipline, and extreme congestion, Pune's current transport infrastructure is considered unsafe by many people. Increased investment in public transit, improved infrastructure, traffic calming measures, and a general reduction in the use of motorized vehicles should improve the road safety situation and entice more people to walk or ride bicycles where they previously feared for their safety in doing so.

Gender: Women in Pune are less likely to operate motor vehicles than men, and are more likely to walk or take public transit. Many women in Pune would cycle, but for their perception that the activity is unsafe. Improving the safety of traffic will make cycling a more acceptable activity for increasing numbers of women. Also, since the majority of pedestrians and users of public transport are women (whereas men are more likely to cycle or take a motorbike), improvements in these modes will directly affect the welfare of women.

Marginalized and Vulnerable: Transportation represents a higher proportion of total household income for Pune's poor and middle-income households than it does for Pune's high-income households. Making public transport more effective, making it reach neighbourhoods that it currently does not, and making cycling and walking more viable will improve the mobility of lower-income households, giving them greater access to education, opportunities, markets, and services, while reducing the proportion of their income that is spent on transportation.

Reduced Congestion: Reducing traffic congestion benefits Pune's economy by improving worker productivity by reducing traffic-related tardiness and absenteeism. The situation has grown so bad that several large employers in and around the city currently charter private busses to shuttle their workers to and from their shifts. Reducing traffic congestion can improve Pune's business climate and quality of life simultaneously.

Lessons Learned

a) Barrier Removal

Information/Awareness: The project began with awareness raising, placing the issue of sustainable transport into the forefront of the minds of policymakers who had previously not considered bicycling, mass transit, and traffic demand management to be viable or progressive options.

Institutional: Over the past few decades, Pune's approach to transport development has been largely limited to widening roads and constructing flyovers. This makes cycling and walking less viable and has led to increasing numbers of motor vehicles. The grantee sought to remedy this through citizen involvement, working with both sympathetic officials and citizenry to develop a constituency for sustainable transport infrastructure that will hopefully guide how the city develops into the future.

b) Project Approaches

This project achieved remarkable policy success in part because it *leveraged social capital* by mobilizing coalitions of stakeholders, including low-income residents, environmentalists, journalists, former bureaucrats, and good governance campaigners. The grantee also effectively used outside expertise, exploiting national and global networks of sustainable transport professionals from other Indian cities and NGOs, as well as foreign experts who have implemented successful programs elsewhere. Each of these project participants brought different strengths to bear on the project and represented different and complementary constituencies and interests.

The *policy advocacy* approach of the grantee uses GEF SGP funding to support not implementation or procurement, but efforts to make the city redirect transport resources from increasing road building to sustainable transport development. This represents an excellent return in both local and global environmental benefits to GEF funding, while the localized implementation of the advocated activities ensures increased local ownership of the project, improved prospects for economic and social sustainability, and high potential for replicability in other cities and regions in the country.

c) Scaling Up

The grantee remains committed to sustainable transport development in Pune and continues to press to see the city's commitments properly implemented and expanded. The PTF now has a life of its own; it is expected that it will be registered as a trust and has become a major and growing force in Pune civil society.

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Case Study 3:

Nepal: Electric Busses to Improve Urban Air Quality and Mitigate Climate Change, Kathmandu

Project Data

Name: Electro-bus Project

Grantee: Himalayan Light Foundation

Location: Kathmandu, Nepal

SGP contribution: \$33,000

Cash co-financing: \$194,884

In-kind co-financing: \$30,000

Start date: December 2003

Technology: Electric vehicles

Type of project: Demonstration, Awareness Raising, Networking and Policy Dialogue, Applied Research and Policy Analysis

Type of transport: Urban

Project Overview

Kathmandu's air is among the most polluted in the world. The city is located in a compact valley, and air pollution becomes trapped between mountain ranges to the north and south. Most of this pollution comes from poorly tuned diesel vehicles; it has increased the incidence of respiratory disease in the city significantly. The government has approached the problem through a mix of policies, including bans on some of the worst polluting vehicles, mandates for improved emissions, and bans on certain types of vehicles in the core urban area during the daytime.

Electric busses have the potential to significantly reduce emissions of greenhouse gasses and air pollution in Kathmandu. Due to the compact nature of the city and its abundant hydroelectricity, electric vehicles are both practical to operate and inexpensive to charge. The Safa Tempo (a three-wheeled EV) has been introduced and has become quite popular in recent years, though the city's system of busses and minibuses has continued to rely on dirty, diesel-fuelled vehicles. Electric busses have potential to serve as a pollution free and climate friendly component of Kathmandu's mass transit system.

The grantee, the Himalayan Light Foundation, designed this project to demonstrate the effectiveness of four-wheeled electric busses for mass transport and light goods haulage in Kathmandu. The project raised awareness of

their potential local and global environmental benefits and advocated for an improved policy environment for them. The project was quite successful in sensitizing policy-makers as well as the general public to the potential role of electric busses in Kathmandu's transit system, and policy advocacy, regulatory framework enhancement, and EV promotion activities continue.

Implementation

The project began with the import of three electric bus chassis and component sets from the United Kingdom. Delayed at the border due to some complications with the customs code, the vehicles eventually were cleared for import and registered to serve as public busses. During testing of earlier prototypes, it was discovered that the motors that arrived with the vehicles were underpowered for tackling the steep slopes of Kathmandu's streets. After some experimenting with various technical solutions, the vehicles were successfully retrofitted with new motors and successfully tested in a variety of applications, including hauling goods in the central areas of the city, shuttling tourists, and as normal city buses. Prototype chargers and charging stations for electric busses were also created.

Several press conferences and seminars were held, exposing decision makers as well as the general public to electric bus technology and dismantling perceptions about the unreliability or necessarily higher costs of the technology. The project advocated policies to streamline the import and registration process and to improve the tax code to which electric vehicles are subject.

While the project has been successful on several fronts, continued progress with electric busses in Kathmandu has been slow. Electric busses continue to be more expensive to operate than diesel busses both because the price of diesel fuel is subsidized and because diesel busses can be operated with more than the legal number of passengers without obvious diminution in performance.

Technology

Nepal's electricity supplies are almost entirely hydroelectric. As river flow during the night and day is equal, considerable power is produced at night, when there is little demand or use for it. Electric vehicles have considerable potential in Kathmandu because this surplus power is cheap and because there is less demand for their services during nighttime hours when they are charged.

One drawback of electric vehicles is their relatively short range compared to internal combustion engines. While this is a problem in sprawling cities or in long-distance

haulage where distances are long and speeds are high, electric vehicles are quite appropriate to Kathmandu's short distances and congested streets.

Results and Impacts

a) Environmental Benefits

Global: Electric busses are emissions-free and can potentially replace heavily emitting petrol and diesel vehicles. Moreover, they are especially climate friendly in the Nepali context, where the power used to charge them also comes from emissions-free sources.

Local: Electric vehicles produce no emissions of particulate matter or other toxic air pollutants; widespread scaling up of this demonstration project could eventually mitigate an estimated 20–30 percent of the on-road vehicular emissions in the valley and thus have the potential to significantly ameliorate Kathmandu's air quality.

b) Livelihood Benefits

Commercial Development: Anticipating a time when electric busses might be mainstreamed, a Nepali firm has designed a prototype chassis for the electric busses. Domestic production of electric bus components in the future could add to Nepal's already burgeoning EV industry.

Employment: Several technicians were hired to maintain the vehicles and to help in adapting their engines to the requirements of Kathmandu's steep roads. Future mainstreaming of electric busses in Nepal could create many jobs—not just in maintenance, but in the production, assembly, and operation of the vehicles.

Health: Being zero emissions vehicles, electric busses do not contribute to respiratory ailments caused by poor air quality.

Poor and Marginalized: Kathmandu's poor are the main riders of busses, and fares have steadily risen in recent years with climbing local and global fuel prices. Electric busses offer the potential to stop these fare increases and lower them in the long term, as their fuel is cheap and abundant.

Safety: While electric three-wheelers have gained in popularity in Nepal following the ban on diesel three-wheelers, they share the same safety problems, stemming from the lack of stability granted by the fourth wheel. Electric four-wheelers seat more passengers and do not have the same safety issues.



Initial demonstration of electro-busses to stakeholders in Kathmandu. The inauguration of the busses was followed by a road test for stakeholders in government, civil society and the private sector, and was covered by national media.

c) National Benefits

The Nepali Oil Corporation spends several million dollars a year subsidizing the price of imported diesel fuel. Moreover, this subsidy keeps the price of diesel fuel cheap by comparison, discouraging the implementation of electric vehicle technologies to their full potential. In addition, EVs and their components are taxed. Changes to the fuel subsidy policy could improve the environment under which electric vehicles compete, while increased utilization of EV technology could significantly save money for the government and for the nation as a whole by lowering fuel costs.

d) Partners

Several partner organizations helped make this project possible. Co-financing organizations include the British Embassy in Nepal's Climate Change Challenge Fund and the Swiss Agency for Development and Cooperation. NGOs with similar missions assisted in awareness raising and policy dialogue activities, contributing similar experience and sharing expertise. Private sector firms cooperated generously with the project, allowing use of charging facilities and designing prototype charging apparatuses for the electric busses.

Lessons Learned

a) Barrier Removal

Information/Awareness: The grantee held a number of well attended press conferences, World Environment Day events, and seminars to raise awareness of a number of issues surrounding air pollution, climate change, and electric busses in Kathmandu. For example, many Kathmandu

residents and policymakers did not appreciate the connection between vehicular emissions and respiratory ailments, nor were they aware of the linkages between air quality and tourism appeal. In spelling out this relationship to policymakers and to civil society organizations and the general public, the grantee advanced the case for electric mass transit in Kathmandu.

Policy: The project removed a number of regulatory framework barriers to electric buses that had initially hindered implementation of the project. This reflects SGP's *learning by doing* approach. The grantee was instrumental in clarifying customs policy for the import of EVs and influenced urban transportation policy to allow electric buses to ply Kathmandu's streets.

Technical: The grantee adapted the stock motors in the electric buses to Kathmandu's steep slopes. Future projects will thus know the power requirements for operating in Kathmandu.

b) Challenges

From several points of view, the Electro-bus Project was a success. It demonstrated the viability of electric buses in a Nepali context, removed several barriers, and developed a model by which the use of electric buses might be scaled up in coming years. That said, it is undeniable that the project faced significant challenges that might be instructive to future EV mass transport projects.

First, electric buses are generally not as powerful as their diesel counterparts. While this is generally not a problem for an electric bus carrying a full load of passengers, diesel buses in Nepal are commonly *overloaded*. Overloading creates more profit for the operator and makes operators reluctant to switch to electric buses. Second, the vehicles—designed for use in the United Kingdom—were underpowered to handle local conditions and required significant modification before they were able to successfully ply Kathmandu's streets. Both of these factors point to the need for project design to consider local factors. Other local factors to be considered include 1) weak capacity in the government vehicle pollution testing and regulation units, which allows failed internal combustion vehicles to ply unhindered, and 2) weaknesses in traffic code enforcement, which results in the continued operation of hazardously overloaded vehicles.

On the other hand, the approach of this project was to demonstrate the utility of the vehicles, and then to influence the regulatory framework based on the success of the demonstration activities. While significant inroads

were made, the policy changes required for creating a true enabling environment would have been quite far-reaching and would have conflicted with the priorities of numerous other interest groups. The lack of such policy change has delayed more widescale implementation.

Scaling Up

Upscaling activities for this project could take two forms: niche implementation and widespread implementation. For niche implementation, one of the original demonstration vehicles will soon be shuttling foreign tourists to and from the airport. Similar niche activities involving mass transit, comfort, and an ecologically minded customer base could successfully utilize electric buses, and the grantee is pursuing this option. Widespread implementation could be promising in the future, given a proper economic and policy climate and once the overcrowding issue ceases to be as relevant. Other NGOs are now progressing with more studies to quantify the social and financial costs and benefits of electric vehicles, to advocate for an enabling environment for them.

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Case Study 4:
**Lithuania: Bicycle Ecotourism in the
Lithuania–Poland Border Region**

Project Data

Name: Development of Bike Tourism in the Border Region of Lithuania and Poland

Grantee: Community Atgaja

Location: Southern Lithuania (Marijampole, Kalvarija, Kazlu Ruda, Sakiai, and Vilkaviskis districts)

SGP contribution: \$50,917.57

Cash co-financing: \$103,491.64

In-kind co-financing: \$24,142.55

Start date: February 2003

Technology: Bicycles

Type of project: Demonstration, Capacity Building, Networking, and Policy Dialogue

Background

Lithuania has a growing ecotourism sector. Its vast forests, hundreds of lakes, pristine beaches, excellent bird watching, and serene countryside increasingly attract visitors from abroad, as well as Lithuanian city dwellers seeking a holiday closer to home. These visitors all require transport, however, and unplanned growth in the ecotourism sector could potentially bring increasing volumes of cars—polluting the air, emitting greenhouse gasses, and spoiling the qualities that attracted tourists to the region in the first place. On the other hand, the livelihood benefits of ecotourism give people an economic incentive to preserve their environment.

NGOs and communities in Lithuania are increasingly working together to provide infrastructure and services to bicycle tourists. These services facilitate bicycle touring in the region while ensuring commercial and local employment opportunities as bicycle tourism continues to expand.

This project focused on the border area between Lithuania and Poland, in the Suvalkija and Suwalki regions, respectively. While bicycle ecotourism has already been somewhat developed in Suwalki, Suvalkija benefited little from these trends, and communities were not fully aware of the potential benefits of bicycle tourism or the infrastructural requirements to begin tapping the market. Bringing opportunities to both

regions and linking them has increased the number of routes and destinations for bicyclists, encouraging the continued expansion of the sector.

Project Overview

The project developed bicycle tourism infrastructure in the Suvalkija and Suwalki regions, in the form of a 350 km signed route and nine resting places and campsites. The project raised the awareness of local people about potential commercial opportunities inherent in increased bicycle tourism and built the capacity of residents and municipalities to service those needs. These activities, combined with international tourism promotion, have increased the number of bicycle tourists in the region, encouraging more cycle tourism development.

Implementation

Implementation initially focused on awareness raising activities, sensitizing local government officials, business people, and NGOs to bicycle tourism and the potential role it could play in their area. The grantee, Community Atgaja, and its Polish counterpart organization, the Polish Ethnographic Tourism Society (PTTK), conducted a number of seminars, workshops and conferences with local government officials to inform them about the project's goals and secure their cooperation in selecting routes for the project. The municipalities decided the route, leading to the creation of the Special Plan of the Region, which was presented to the Lithuanian National Road Administration for official route marking and sign posting.

Construction of the camp sites and resting places was undertaken by the local communities, with assistance from another partner organization, the Office of the Nemunas Euroregion. Forty informational/directional signs were also installed. In addition, there has been significant small enterprise development along the route, with farmers selling produce and others selling snacks, refreshment, and other services to the cyclists during the summer months.

The route was introduced to the public through an Internet promotional campaign, as well as through leaflets, brochures, media outreach, and international tourism exhibitions in 2003 and 2004. The route was inaugurated with an international bicycle tour, in which about 55 riders from Lithuania, Poland, and other countries participated. The number of cyclists has increased since the launch, and the communities are increasingly

enthusiastic, as many people are benefiting from the commercial opportunities that have come from cycle tourism development.

Technology

Bicycle infrastructure can take many shapes. In this case, the right of a bicycle to ride on equal terms with motorized transport on multi-use roads was emphasized, as opposed to different approaches in which specific bicycle-only infrastructure is created or automobiles are banned from roads and the space is devoted to pedestrians and cyclists. Here, the cooperation of the Lithuanian National Road Administration was secured to mark the cycling route, helping to ensure that drivers respected the right of the cyclists to the road.

Results and Impacts

a) Environmental Benefits

Global: This project helped to streamline and integrate regional bicycle networks, improving both bicycle tourism and local bicycle transportation and avoiding production of greenhouse gasses from motor vehicles.

Local: The project has increased community support for and understanding of ecotourism, which could potentially maintain interest in the conservation of natural habitats, biodiversity, and other environmental goods, as communities experience continuing economic benefits from safeguarding those resources.

b) Livelihood Benefits

Commercial Development: Commerce developed as communities began to sell goods and services to cyclists along the route. Sectors that benefited include restaurants, hotels, small micro-enterprise kiosks, and farmsteads along the route. Many farmers in the area are also branching into agro-tourism—where tourists stay as guests in farm households.

Improved Health: Cycling is an excellent form of exercise.

c) National Benefits

The Polish–Lithuanian bicycle route connects bicycle tourism infrastructure in both countries, supporting regional ecotourism development. Later, as SGP Lithuania began to fund more bicycle projects, experience from this project was used in training and capacity building activities.

d) Partners

This project featured a rich diversity of partners, including municipalities, community organizations, the private sector, and local, national and international NGOs. Cooperation among the various groups was central to the success of the project, as each brought different sorts of capabilities to the table.

The municipalities were the foundations of the project; they were involved in the selection of the route and the location of the campsites and resting sites. They also were active participants in the international tourism exhibitions, as well as in other outreach and implementation activities. Several municipalities financially co-sponsored the project, in addition to giving material support in other ways.

On the Polish side of the border, PTTK coordinated route selection and municipality participation in much the same way as Community Atgaja did on the Lithuanian side. Other community organizations donated their labour and time to the construction of the campsites and the installation of signs, while NGOs helped to engage communities, coordinate outreach, or assist in promoting the project.

Special note should be made of the Office of the Nemunas Euroregion, which contributed significant financial resources to the implementation of the project and coordinated media outreach. Lastly, the private sector was involved in the development of the project, co-funding project infrastructure, especially regarding provisioning stations for the expected tourists.

Lessons Learned

a) Barrier Removal

Policy: Lithuania's legislation around planning, approval, and development of cycling routes and securing the support of the Lithuanian National Road Administration is complicated and can be difficult. While these activities presented challenges for the grantee and its partners, they also helped build capacity among both regulators and NGOs to facilitate future similar activities.

Information/Awareness: Many people in the project regions knew little about the potential of bicycle tourism to improve their livelihoods. The project addressed this challenge through media outreach, workshops, and seminars involving local stakeholders. These awareness raising activities focused especially on private business people and farmers who could potentially benefit from agro-tourism activities.

Financial: While the costs of developing, building, and promoting regional bike infrastructure are inexpensive compared to many forms of tourism development, cost remained a significant barrier. Funding for this project acted as venture capital—providing for the initial implementation of the project so that it would bear fruit for the livelihoods and economies of the region. In addition, the leveraging of significant in-cash co-financing was invaluable to this project and demonstrates how SGP funding can serve as seed money to attract the interest of other donors.

b) Partnerships

Partnerships were essential to the success of this project, and the grantee and its partners worked together superbly. By enlisting so many organizations, municipalities, and businesses around common goals, resources became available that would not have been forthcoming otherwise. The grantee shared responsibility among its partners, allowing the municipalities to work together on route planning and other organizations to work on building the infrastructure, while the grantee coordinated the whole enterprise. This approach was quite effective and could be emulated in other areas with well-developed networks of organizations.

c) Scaling Up

Scaling up of project activities is actively being pursued, and an application for European Union structural funds is pending. If approved, the EU funds will improve signage along the route, improve the roadways in certain sections, and further promote and market the region's cycle tourism activities to potential visitors.

While upscaling-related improvements may benefit the project, its main strength may lie in its reproducibility. The project methodology was simply to build a coalition of interested stakeholders, identify the cycling route, build simple infrastructure, promote the project, and produce cycling guides to support visitors. In a sense, this project itself was a replication of pre-existing bicycle route projects in both Poland and Lithuania. Replication of projects of this nature adds value to all of them, as an integrated network of regional bicycle routes will lure more prospective bicycle tourists than more scattered ones. Given the increasing demand among many in Europe for opportunities to experience natural surroundings, and the heavy interest in cycling in the region, prospects for replication of this sort of project are quite good, informing several other SGP projects in this region.

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Case Study 5:
**Lithuania: Innovative
Velotourism Services, Vilnius**

Project Data

Name: Innovative Velotourism Services in Vilnius

Grantee: House of Europe

Location: Vilnius, Lithuania

SGP contribution: \$15,650

Cash co-financing: \$15,422

In-kind co-financing: \$1,415

Start date: June 2004

Technology: Bicycles (Velomobiles)

Type of project: Demonstration, Awareness Raising,
Capacity Building

Project components: Air Quality, Employment/
Livelihoods, Ecotourism

Number served: 25 employees, 2 private companies,
12,000 tourists, residents of Vilnius

Type of transport: Urban

Background

About 88 percent of the air pollution in Vilnius comes from motor vehicles. While the city is approaching sustainable transportation on many fronts—planning improvements in its ageing mass transit system—a group of young people, interested in improving the urban environment while fighting climate change and providing jobs, has introduced velomobiles (also known as pedicabs) to the streets of Vilnius. Currently serving summertime tourists, the vehicles generate livelihoods for young people in the city while demonstrating an innovative, clean urban transportation method.

Project Overview

The aim of this project was to raise awareness of climate change while demonstrating innovative approaches to GHG emissions reduction from the urban transport sector. Meanwhile, the project provided summer-season jobs for young people and helped to support the city's growing tourism sector. Several velomobiles were constructed and used, serving almost 10,000 passengers in the first year of the project. The project has generated significant media interest and has highlighted the role that non-motorized transportation can play in Vilnius.

Implementation

The project began with information gathering and market research. The grantee first designed surveys to determine the level of demand for velomobile service in Vilnius and the preferences of potential users, then used the data to inform its prototype velomobile designs. The vehicles were fabricated by a local bicycle framebuilder. During the run-up to the tourism season, sponsors were identified, promotional activities were carried out, and drivers were hired and trained. Activities during the first year were successful, as several thousand passengers were taken around the town and a significant portion of those availed themselves of tour guide services.

Results and Impacts

a) Environmental Benefits

Global: Velomobiles are emissions-free, human-powered vehicles that contribute to greenhouse gas mitigation by displacing demand for motorized taxi services. These velomobiles have also contributed to the institutional development of non-motorized transport in Vilnius, with the project securing permission to operate the vehicles on the street and securing insurance for the vehicles from a local insurance company. This reduces the barriers to similar non-motorized transport projects in Vilnius in the future, smoothing the way for a decreasing share of cars and other fossil-fuel-consuming vehicles in Vilnius's transport sector in the future.

Local: In displacing automotive transport modes, velomobiles contribute to reduced toxic air and noise pollution, reduced traffic congestion, and a general improvement in Vilnius's quality of life.

b) Livelihood Benefits

Employment: The project created opportunities for 25 local young people to operate the velomobiles and serve as tour guides; two private companies resulted from the project.

Tourism Development: Adding an innovative service aimed at the tourist sector should improve the image of the city and help it to continue to attract over 12,000 international tourists annually.

Commercial Development: In effect, the grantee has tested velotourism services in Vilnius as a business model. Expecting to produce profits beginning in 2008, the project has given entrepreneurs the necessary confidence to begin similar activities in Vilnius or elsewhere in Lithuania. Several other private velomobiles have begun business since the onset of this program.

c) Capacity Development

The project developed the capacity of Lithuanian entrepreneurs to begin velotourism businesses. Other Lithuanian towns with significant tourism industries are planning on importing the model. The project also has improved the capacity of local bicycle fabricators to design and build velomobiles.

d) Partners

Partnerships were central to the project. Several private firms donated printing, promotional, and maintenance services and other in-kind support to the project, while strong partnerships were formed with local bicycle fabricators for the production of the velomobiles. Significant co-financing was provided by the World Bank.

Lessons Learned

a) Barrier Removal

Financial: This provides an example of how GEF funding can serve as venture capital, removing uncertainties about the economic viability of projects, to enable deployment of environmentally friendly technologies sooner than the market might implement them otherwise.

Information/Awareness: At informational workshops and events, the grantee raised awareness of Vilnians about the need to mitigate greenhouse gas emissions in the transport sector

Policy: This project secured the right of velomobiles to the road, while the presence of the velomobiles on the road has made drivers more accustomed to their presence, making the streets safer for all. In addition, insurance was secured for the velomobiles, removing a barrier to the implementation of similar activities in other places in the future.

b) Scaling Up

The grantee plans to acquire an additional 8–10 velomobiles with profits from continuing operations. Over the course of the project, other individuals and businesses not associated with the grantee have secured and begun to operate velomobiles on the streets of Vilnius, effectively doubling the city's velomobile fleet. Other companies have begun or are planning similar projects for several other tourist destinations in Lithuania.

The upscaling activities coming from this project have followed an organic, spontaneous pathway. The role of SGP in the case of this project was to remove the start-up risk by providing cash for a trial run, demonstrating the project, discovering and solving problems, then presenting the model for use by any interested parties.

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Case Study 6:
Thailand: Cycling for Traffic Calming and Energy Saving, Chiang Mai

Project Data

Name: Cycling for Traffic Calming and Energy Saving in Chiang Mai

Grantee: Chiang Mai Sunday Bicycling Club (CMBC)

Location: Chiang Mai, Thailand

SGP contribution: \$23,735.66

Cash co-financing: \$379,839.29

In-kind co-financing: \$783.05

Start date: July 2005

Type of project: Policy Dialogue, Demonstration, Capacity Building

Type of transport: Urban

Thematic area: Non-motorized Transport

Project Overview

Chiang Mai is a rapidly growing city in northern Thailand, with a core urban population of approximately 700,000 and a metropolitan area encompassing 1.6 million people. As the economic, cultural, and religious hub of northern Thailand, the city has attracted significant migration from the surrounding rural areas, as well as from the southern part of the country. This growth has outpaced planning in the transport sector, and Chiang Mai suffers from poor air quality and massive traffic congestion. It is estimated that residents make 1.8 million commuter trips per day, and that 91 percent of these trips are made with private vehicles. The city's motor vehicle fleet numbers approximately 108,000 personal cars, 141,000 personal trucks, and 681,000 motorbikes. Other existing urban transport modes include converted pickup trucks that serve as minibuses and three-wheeled taxis locally known as 'Tuk-Tuks', after the sound of their two-stroke engines.

Improvements in Chiang Mai's transport infrastructure could bring several synergistic local and global benefits. Decreased traffic congestion will improve commute times, reduce noise, and mitigate toxic air pollution—improving the quality of life and saving money on fuel for city residents—while reducing greenhouse gas emissions from the urban transport sector. The city of Chiang Mai is approaching transport sector reform on several fronts; a BRT system is planned, in coordination with SGP co-financed cycling infrastructure and empowerment activities.

Obstacles to increased utilization of non-motorized transport in Chiang Mai include lack of dedicated bicycle lanes, lack of suitably marked bicycle routes, and under-developed urban cycling skills among the potential population of cycle commuters in the city.

The project aims to promote cycling and to make it more accessible to Chiang Mai residents. Still under implementation, the project aims to improve cycling infrastructure, teach bicycle safety and maintenance to city residents, prepare instructional materials, hold workshops and seminars, and produce publications and Websites promoting cycling. The project has lobbied for and received strong support from the municipal and national governments, and has become an important component of Chiang Mai's transport reform effort. City residents have enthusiastically embraced the project, forming cycling clubs and participating in group rides.

The goals of the project include 20,000 new bicycle commuters, 75 percent of whom previously used personal motorized vehicles, with an average commute of 20 kilometres round trip. This translates to an average of 400,000 bicycle kilometres daily by the end of the grant period.

Implementation

The Chiang Mai Sunday Bicycling Club (CMBC) has led recreational rides in and around the city on Sundays for several years, and has branched into bicycle transportation advocacy. The initial impetus for the SGP co-funded project came in large part from a group bicycle rally from Bangkok to Chiang Mai in October 2004. An important symbolic act, the campaign led the mayor of Chiang Mai to declare his support for improved bicycle infrastructure and to promise to implement a system of strategic bicycle routes. The CMBC project has expanded and coalesced since this declaration of support.

One of the main thrusts of the project is to identify a system of safe bicycle routes. These routes will form a network of cycle-friendly streets in Chiang Mai, with associated bike lanes and signs. Identification of routes is still being carried out, and the painting and signing of the bike routes will be completed after they are identified and confirmed with the city government. Notable successes so far include cooperation with local police and military stations, who have allowed cycling shortcuts through their premises.

Regardless of the quality of bicycle infrastructure, however, cyclists need to feel secure while riding their bicycles on city streets. A survey conducted by CMBC indicated that 60-80 percent of residents would consider using bicycles if they believed that the routes were safe—and that they currently do not. While proper infrastructure is an essential part of bicycle safety, development of safe cycling skills is equally important. CMBC leads group bicycle rides—both for recreation and as a part of their bicycle advocacy activities—through the streets of Chiang Mai several times per year. These rides help cyclists to feel more comfortable on the streets and teach them valuable urban cycling techniques such as signalling and riding predictably. CMBC is also creating a bike safety manual and training local youths as bike safety mentors, to impart these skill to members of their communities. These skill-sharing activities also encompass basic bicycle maintenance techniques—such as repair of punctured tires, brake adjustment, and other simple repairs.

Another large component of cycling safety is education of motorists. Motorists need to understand that cyclists have a right to the road; they need to learn to avoid bicycle lanes and to refrain from parking in them. Much of this work involves enforcement of existing regulations, and the CMBC is currently engaged in advocacy efforts to encourage the municipality to address these issues. Also, CMBC has been holding public seminars and campaigns to raise public awareness about bicycles and how motorists should interact with them.

The project also promotes inter-modal linkages. With a bus rapid transit system planned for the core areas of Chiang Mai, talks with municipal planners are underway to establish bicycle parking stations at strategic locations along the BRT system, so that commuters may ride their bicycles to the beginning of the transit system, park them, and ride the bus to their final destination. For those cyclists intimidated by the traffic density in the core urban area, successful inter-modal integration of this sort will remove yet another barrier to increased cycling in Chiang Mai.

CMBC publishes a monthly magazine and hosts a Website (www.cmbikenet.org) highlighting group rides, cycling events, news, and opinions. This combination of group rides, advocacy, awareness raising, and regular communication is helping to begin the process of institutionalizing cycling in Chiang Mai, which has the potential to lead to significant environmental, economic, and quality of life benefits for the city.

Results and Impacts

a) Environmental Benefits

Global: Cycling, along with walking, is arguably the most environmentally friendly form of transportation available, as it produces no greenhouse gas emissions aside from the comparatively tiny amounts of CO₂ exhaled by human 'motors'. If the project reaches its goals, it is estimated that it will prevent emissions of approximately 290,000 tons of CO₂ annually.

The project also raised awareness about global warming issues in the context of its campaigns, rides, and seminars, placing its cycling advocacy activities within the broader context of GHG emissions reduction.

Local: Increased bicycling and reduced driving will reduce emissions of toxic air pollution. Moreover, cycling is far less noisy than driving and can contribute to a significant reduction in noise pollution.

b) Livelihood Benefits

Improved Productivity: As traffic congestion improves, workers waste less time in traffic.

Savings: Increased cycling means less money spent on fuel.

Improved Health: Reductions in the number of trips taken by car and motorbike improve air quality and thus health. Moreover, cycling is an excellent form of exercise. Beyond increasing the number of commutes taken by bicycle, it is CMBC's goal to increase the recreational and sporting profile of cycling in Chiang Mai.

Community Empowerment: New bicycle commuters are encouraged to assert their place on the roads.

Tourism: Making the city less polluted, quieter, and more pleasant has the potential to improve its reputation among international tourists who provide an important component of Chiang Mai's economy.

Urban Poor: Cycling is accessible to many for whom private vehicles are prohibitively expensive.

c) National Benefits

Chiang Mai's example of reduced dependency on fossil fuels could be replicated in other areas of the country, leading to significant nationwide energy savings.

d) Partners

The municipality of Chiang Mai is a very active partner with this project. The Mayor, Mr. Boonlert Buranupakorn, has given high-profile support for the project, while the Commission of Chiang Mai City Traffic has helped to leverage the cooperation of the Chiang Mai police and other city bureaus. Cooperation from the police is especially important, as they have provided cyclists with shortcuts through their premises and because it is they who must ultimately enforce the bike lanes. The municipality has also provided significant co-financing for the project.

Lessons Learned

a) Barrier Removal

Financial: Bike lanes, cycling capacity development, and cycling advocacy require very little investment compared with other transportation development activities. This makes these sorts of activities especially suited to GEF support in the context of the Small Grants Programme.

Information/Awareness: On the part of citizens, this project has helped to teach urban cycling skills, empowering people to take to the roads where they might have otherwise been intimidated. To the policymakers, the project has helped to portray cycling as a serious, effective, and environmentally friendly urban transport mode, rather than a marginal, low-status, or peripheral activity.

Policy: By mobilizing active cyclists and recruiting new ones, the project has helped to organize a strong cycling constituency in Chiang Mai in the form of cycling clubs. SGP support has helped to coalesce and build these groups, who are now continuing to lobby to ensure that the municipality upholds its agreements and extends the activities past the initial implementation period.

b) Scaling Up

As the project is not yet completed, it is difficult to say exactly how the project might be scaled up or replicated. However, other provinces in Thailand have adopted cycling, and it is in part due to those experiences that CMBC has been inspired to launch its campaign. Given the low implementation costs of urban cycling promotion activities, reducing barriers to increased adoption generally involves generating political will among policy-makers and building enthusiasm among the pool of potential urban cyclists. CMBC is attempting to bolster both, with promising results so far.

Experience from many cities around the world suggests that as more cyclists take to the roads, they encourage others to follow suit, especially when there is adequate infrastructure and the activity is perceived to be safe. As this occurs, motor vehicles become more accustomed to them, and cycling can become safer as a result. It is hoped that this project will be successful in prompting this sort of 'organic upscaling'.

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Case Study 7:

Lithuania: Promotion of Bicycle Transport, Siauliai

Project Data

Name: Promotion of Bicycle Transport in Siauliai

Grantee: Siauliai County Ecological Study Centre

Location: Siauliai, Lithuania

SGP contribution: \$49,982

Cash co-financing: \$36,126.38

In-kind co-financing: \$49,204.31

Start date: October 2002

Technology: Bicycles

Type of project: Demonstration, Awareness Raising, Networking and Policy Dialogue

Background

Siauliai is Lithuania's fourth largest city, with around 134,000 inhabitants. With the establishment of a bicycle factory in 1951, Siauliai became known as the Lithuanian Bicycle Capital. A bicycle museum opened in 1980, and 10 kilometres of bicycle routes were created. From the 1950s to the 1980s, bicycles were a common mode of transport in Siauliai, with automobiles being out of reach for the vast majority of the population. As the changing political climate brought more cars, bicycle routes were neglected and the streets became increasingly dangerous for cyclists. This project sought to reverse the decline of Siauliai's cycling heritage and to encourage a new generation to begin cycling, making the city safer, less polluted, and more pleasant.

Project Overview

This project aimed to increase the number of trips taken by bicycle in Siauliai, thus increasing mobility for local residents and reducing the use of motorized transport. The project took a three-faceted approach: popularizing cycling, providing cycling infrastructure, and rehabilitating the Siauliai bicycle museum. Achieving its objectives, more people now cycle in Siauliai, especially schoolchildren.

Implementation

Five local educational institutions had modern bicycle storage facilities built on their grounds, enabling students to securely park their bicycles during the day. The facilities have a capacity of 50 bicycles each, were co-financed by the schools, and prompted a large increase in the number of students and teachers commuting via bicycle.

The municipality created 11 kilometres of new bike routes and installed 52 new road signs, adding to Siauliai's existing bicycle infrastructure. The Siauliai bicycle museum was also renovated.

Shortly after its renovation, the bicycle museum held a children's poster contest on the theme of 'I Prefer a Bicycle'. Selected posters were included in a 2004 promotional calendar, and other posters and leaflets highlighting the role of bicycles in mitigating climate change were produced.

Towards the end of the project period, Siauliai's cycling activities were highlighted during 'European Mobility Week', an international campaign held in Siauliai. Events included group rides with Siauliai's mayor, a concert, and bicycle races featuring Olympic track cyclists. Lastly, in October 2003, a national conference titled 'Bicycle Transport in Cities: Situations and Perspectives' was held in Siauliai. It attracted 74 people and discussed diffusion of the types of activities undertaken in Siauliai to other Lithuanian cities.

Results and Impacts

a) Environmental Benefits

Global: Bicycles are an emissions-free form of transportation, and encouraging people to switch from motorized transport to bicycles will reduce overall emissions of greenhouse gasses.

Local: Increasing shares of trips taken by bicycle has the potential to increase the quality of Siauliai's air, while reducing noise and improving quality of life. The municipality created 11 kilometres of new bike routes and installed 52 new road signs, adding to Siauliai's existing bicycle infrastructure.



The Mayor of Siauliai, Mr. Vytautas Juskus, showing his support for cycling. The municipality of Siauliai was an important partner in this project, being responsible for the demarkation and signing of the routes.

b) Livelihood Benefits

Increased Mobility: The new infrastructure improved the mobility of Siauliai residents, especially schoolchildren and teachers.

Safety: By providing cycling-specific infrastructure, the project helped ensure road safety— especially important for new cyclists.

Health and Fitness: Cycling is an excellent form of exercise. Beyond promoting cycling for the purpose of commuting to work and school, this project promoted cycling as a leisure activity, including a bicycle route to Rekyva Lake, a popular local recreation area.

c) National Benefits

Siauliai's experience with this project has been successful, and it has been closely watched by a number of other municipalities interested in implementing similar projects. The city of Klaipeda has implemented two similar bicycle storage facilities in schools.

Proceedings from the national conference were submitted to several government ministries, and the Ministry of Education and Science has shown particular interest in the recommendations.

d) Capacity Development

Implementing this project built the capacity of the grantee, the municipality, and their subcontractor to implement similar projects in the future. The project also provided a model that other cities in Lithuania or elsewhere in the region may choose to emulate.

e) Partners

The main project partners included Siauliai educational institutions and the Siauliai municipality. The various schools contributed funding and space, and contributed to advocacy and information campaigns. The municipality coordinated the bicycle routes and was responsible for their construction and signage. Other partners included local environmental NGOs, the local police office, and the local bicycle factory.

Lessons Learned

a) Barrier Removal

Financial: The municipality of Siauliai had been interested in the renovation and expansion of its pre-existing bicycle infrastructure for some time, but the cost of the planned project had been prohibitive. GEF SGP not only provided funding, it leveraged co-financing from several different groups, notably the local bicycle manufacturer Baltik Vairas.

b) Scaling Up

The project has been watched by a number of other Lithuanian cities and government ministries, and the conference during European Mobility Week was well attended. Prospects seem good for project replication in other areas.

Within Siauliai, several other schools are asking for bicycle storage facilities, and new bike routes have been planned and constructed since the completion of the SGP project. The bicycle museum is attracting increasing numbers of visitors, and the schools continue to retain the bicycle/climate change poster competition as a part of their curriculum.

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Case Study 8:
Egypt: Facilitating the Use of Non-motorized Transport, Beni Sweif

Project Data

Name: Facilitating the Use of Non-motorized Transport

Grantee: The Environmental Protection Association, Beni Sweif

Location: Beni Sweif Governorate, Egypt

SGP contribution: \$24,469

Cash co-financing: \$15,117.81

In-kind co-financing: \$9,292

Start date: August 2004

Technology: Bicycles

Type of project: Demonstration, Awareness Raising

Type of transport: Urban

Project Overview

Beni Sweif is a largely agricultural governorate in north-eastern Egypt, about 120 kilometres south of Cairo. Local transport prices have increased in recent years, and transport comprises an ever-larger share of the limited resources of low-income people. Bicycles represent a sustainable and cheap means of transportation for these people, but many simply cannot afford the relatively high upfront expenditure. The grantee—the Environmental Protection Organization of the City of Beni Sweif—partnered with charitable societies in three village communities to reduce the barriers to bicycle ownership among the poorest, while spreading acceptance of bicycles as a mainstream and effective form of local transportation. Three hundred and forty bicycles were purchased and distributed to partner organizations in the villages. Residents were given the opportunity to purchase the bicycles under a credit scheme that was administered by the partner organizations. The programme is quite popular, and demand has far exceeded supply. Outreach campaigns have been conducted, and the grantee is involved in policy dialogue with the governorate to further facilitate bicycle transportation.

Implementation

Bicycles models were chosen for the project based on price and suitability for local conditions, and were distributed to the three partner organizations. Local residents had the opportunity to purchase the bicycles for around \$80, paying in small instalments after a modest initial down payment. The loan carries 8 percent interest annually. The project was promoted with newspaper advertisements, stickers, and posters, and was received quite enthusiastically. All of the bicycles were purchased within a very short time, and the waiting list for a new bicycle is quite long. Twenty-five percent of the residents of these communities now ride a bicycle as a primary mode of transport, up from 20 percent before the project started.

Loan recovery has been effective, as the partner organizations were all based in the villages where the bicycles were distributed and the borrowers were acquainted with the lenders. The income to the project from the interest will ensure the sustainability of the project, paying for one village resident to serve as a part-time bicycle mechanic at a nominal wage and eventually allowing for the purchase of more bicycles by the scheme. Also ensuring the sustainability of the programme are policy dialogue activities with the governorate. Local politicians have been receptive, and plans are under consideration to create bike lanes and otherwise make local transport infrastructure more bike-friendly.

Results and Impacts

a) Environmental Benefits

Global: Bicycles are a zero-emissions mode of transport. Where they displace motorized transport, they contribute to a reduction in GHG emissions.

Local: Results of the project included a noticeable reduction in traffic congestion in the target communities. This could improve air quality, especially if bicycle transport continues to grow in the region.

b) Livelihood Benefits

Savings: As the proportion of household expenditure devoted to transport has risen, this project has allowed low-income households to devote resources to other priorities.

Poor and Marginalized: While a bicycle can save its user money over time, its upfront cost can represent a significant hurdle to the poorest members of the community. This project addressed that stumbling block with its decentralized credit scheme.

c) Partners

The partner organizations that assisted with this project were a mixture of village development, charity, and environmental organizations, as well as Zakat distribution committees. In addition to creating familiarity between those selling and those purchasing the bicycles, the partner organizations helped local residents donate funds to the project, which continues to be a significant source of its ongoing support.

Lessons Learned

a) Barrier Removal

Financial: Bicycles were beyond the reach of many of the people of Beni Sweif that needed them most. This project, through its credit scheme, has brought them within reach. SGP funding acted here as venture capital to begin the project and ensure its continuity.

Information/Awareness: Bicycles have been a common transport mode in Beni Sweif for quite some time, but local authorities generally had an ambivalent attitude towards them. Dialoguing with local politicians, the grantees have helped change the attitude towards cycling from one of benign neglect to one of active promotion.

b) Financial Mechanism

Moral hazard can be problematic in microfinance schemes. Rather than establishing a centralized hub for the purchase of the bicycles under the loan scheme, the grantee partnered with local organizations to implement the scheme in the villages. The borrowers and the lenders had a pre-existing relationship, making them less likely to try to take advantage of one another. By eliminating much of the moral hazard, the grantee is able to charge less for the bicycles, and ensure that more of the income goes to perpetuating the project after paying expenses.

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4.2 Biofuel Support Projects

Case Study 9:

Mali: Reducing Transport Sector GHG Emissions, Ensuring Local Economic Development, and Fighting Desertification

Project Data

Name: Réduction d'émission de gaz à effet de serre dans le secteur du transport tout en assurant un développement économique local et la lutte contre la désertification (Reduction of greenhouse gas emissions from the transport sector while ensuring local economic development and fighting desertification)

Grantee: Mali Folkecenter pour les énergies Renouvelables (Mali Folkecenter)

Location: Bamako, Mali

SGP contribution: \$45,382.59

Cash co-financing: \$43,841

Start date: April 2005

Technology: Jatropha, Straight Vegetable Oil Fuel

Type of project: Demonstration, Capacity Building, Information Dissemination

Project components: Air Quality, Land Degradation, Livelihoods

Project Overview

Mali is dependent for its fuel needs on imports from its coastal neighbours. While Mali may not have significant fossil energy resources, it does have abundant renewable energy resources, and land suitable for cultivation of *Jatropha curcas* is a significant component of these. *Jatropha* is a drought resistant, oil producing tree/shrub with minimal management requirements and excellent erosion control properties.

The grantee, Mali Folkecenter, has been working with *Jatropha* for several years now, establishing plantations and using the crop to promote energy self-sufficiency, sustainable livelihoods and women's empowerment. The Mali Folkecenter's accomplishments include the development of *Jatropha* oil filtration techniques, the conversion of vehicles to run on *Jatropha* oil, the demonstration of the use of *Jatropha* for reclaiming degraded land, and the development of the *Jatropha* energy platform, an integrated tool for processing *Jatropha* and providing energy services to rural areas.

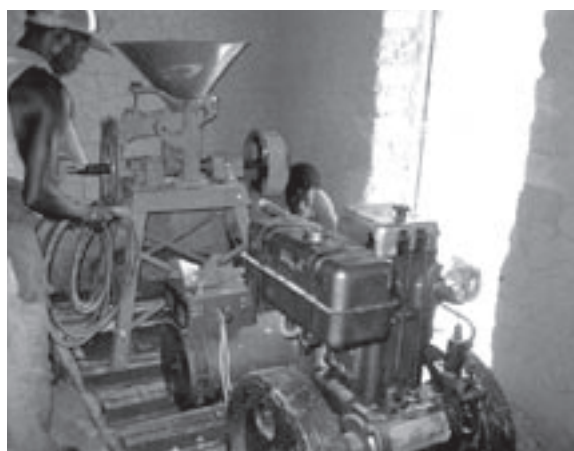
The project, which is still under implementation, seeks to demonstrate potentials for fostering local economic development and combating desertification by converting a new pickup truck to run on Jatropha oil, and developing a supply chain to power the truck. Activities include development of Jatropha plantations in several villages, demonstrating the extraction and use of the oil, working to popularize the plant, and building up an enabling policy and institutional environment for its upscaling, with the goal of speeding the introduction of Jatropha as a major transport fuel in Mali.

Implementation

This project began with meetings with assemblies of 12 rural villages, explaining to the residents the rationale and potential benefits of the project and securing their cooperation. A total of 35 hectares were planted among the 12 villages, whose residents had previously been using Jatropha for fencing, soap, and medicinal purposes on a small scale.

While the planting of Jatropha trees represents the beginning of the supply chain, the pressing and processing of the seeds represents the next stage. The grantee created a demonstration version of its Jatropha energy platform,² an integrated Jatropha processing tool that also provides other energy services such as milling and battery charging. The grantee then converted a new pickup truck to run on the oil, teaching several mechanics how to make the conversion in the process.

Both the pickup and the demonstration platform were used as props in Jatropha promotion activities, including an upcoming film, Web material, and brochures. The grantee also co-organized a national Jatropha conference in cooperation with the Malian Ministry of Mines, Energy, and Water. On the village level, the grantee empowered one woman per community to serve as the Jatropha focal point, to spread knowledge of planting and management methodologies to nearby villages that become interested. It is hoped that this engagement with national and grassroots actors will promote linkages between those who could potentially produce Jatropha oil and those who could potentially consume it in the transport sector, creating synergies that will bring its price down relative to petroleum, catalyzing its implementation on an increasingly wide scale.



The grantee, Mali Folkecenter, has developed a multifunctional energy services platform powered by Jatropha oil. The platform provides milling and battery charging services to local people, and also creates its own fuel by pressing Jatropha seeds for their oil.

Technology

This project focuses specifically on the use of Jatropha oil in the transport sector as a straight vegetable oil fuel, rather than biodiesel. The advantage of SVO is that it requires minimal processing apart from filtration, though diesel-powered vehicles must be converted to deal with SVO effectively.

The Jatropha management techniques used in this project included a mixture of hedgerow plantations around gardens and plantations of the crop on degraded lands. Once planted, the crops received no additional management or fertilization, but the trees produced leafy mulch and prevented erosion.

Results and Impacts

a) Environmental Benefits

Global: Increased use of biofuels in the transport sector displaces fossil fuels, thus displacing the GHG emissions from those fuels.

Local: Where Jatropha is grown on degraded soils, it provides land reclamation services while providing income to local people. Being deciduous, Jatropha leaves provide mulch, and the seedcake left over from the oil press provides an excellent fertilizer.

b) Livelihood Benefits

Income Generation: Jatropha provides another cash crop for the farmers involved. Oil extracted from the seeds can be used to make soap; power small milling engines, stoves, and lanterns; and be sold for use as motor vehicle fuel.

² Viewable at the grantee's website: http://www.malifolkecenter.org/lowersection/Dep3_NRM/jatropha/energy_platform/jat_energy_platform_frames.html

Women's Empowerment: This project focused on female farmers as the main producers of Jatropha. Customarily, small-scale Jatropha collection from hedgerows and wild trees was a woman's task. As Jatropha is increasingly commercialized, the grantee has ensured that women remain central to the production of the crop.

c) National Benefits

Large-scale utilization of Jatropha oil in the Malian transport sector could offset some of the country's expenditure on imported fossil fuels. By demonstrating viability, and working to develop market linkages and an enabling policy environment, this project works towards that goal.

d) Capacity Development

In the case of demonstration projects that seek to promote a new and promising technology, capacity building and awareness raising go hand in hand. The project enhanced the profile of Jatropha in the minds of policymakers, while teaching auto mechanics to convert vehicles to run on the oil and helping rural women to grow and process the crop. These activities built awareness among the various stakeholders of their capacity to service the others, developing a strong Jatropha supply chain for its eventual implementation on a larger scale in Mali.

Lessons Learned

a) Barrier Removal

Information/Awareness: For Jatropha to be produced on the scale necessary to become a major force in transport, information about it needs to be widely disseminated to potential growers—a challenge in much of Mali given the remote nature of many villages. This project succeeded in bringing cultivation of the crop to several new areas and establishing focal points in the villages so that neighbouring peoples could learn the technique and replicate it themselves.

The project also created a demonstration version of its Jatropha energy platform, a multi-service group of technologies that can process as well as provide energy services such as battery charging and grain milling. Visitors to the grounds of the Mali Folkecenter in Bamako can now view the platform, setting the stage for investment and/or upscaling the platform technologies.

Cultural: Jatropha has traditionally been a hedgerow crop in Mali, planted as fencing around gardens. Typically, men have owned the gardens, while women have gathered the Jatropha seeds for artisan soap production. As the grantee and other organizations promoting Jatropha in Mali have expanded its production, increasing numbers

of men have taken interest in the plant, threatening to reduce access to hedgerows and to co-opt the degraded-land plantations, supplanting the gains made by women through Jatropha projects. The grantee has avoided this potential obstacle through a participative project design methodology, holding discussions with village residents before projects are implemented to ensure that all stakeholders agree on a framework for the roles of various social groups with respect to the project. Clarifying these arrangements in advance avoids disagreement in the future.

b) Scaling Up

Bringing Jatropha into mainstream use in the transport sector requires the establishment of a strong market. This will assure producers that they will continue to profit from growing it, and assure businesses, policymakers, and potential users of Jatropha that it will continue to be available and is worthy of investment. The grantee is doing this by supporting all levels of the supply chain—promoting the plant among policymakers, assisting in integrating Jatropha with other farming activities, and working with bilateral development agencies as even more land is planted in the crop.

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Case Study 10:

Tanzania: *Jatropha Curcas* for Sustainable Livelihoods and Rural Bio-enterprises, Monduli

Project Data

Name: Production of *Jatropha* Seeds for Income Generation and Promotion of Rural Bio-enterprises, Monduli

Grantee: Kampuni ya Kusambaza Tekinolojia Limited (KAKUTE Ltd)

Location: Monduli, Tanzania

SGP contribution: \$21,267

Cash co-financing: \$174,568

In-kind co-financing: \$9,400

Start date: September 2004

Type of Project: Applied Research, Demonstration, Capacity Building

Project Overview

Tanzania's transport sector is primarily roads-based, and its demand for fuel is growing rapidly. Because Tanzania imports virtually all of its fuel requirements, petroleum expenditures are a major burden on the Tanzanian economy and on many people's livelihoods. Biofuels have excellent potential to significantly contribute to Tanzania's energy mix, especially in the transport sector. The production of energy crops such as *Jatropha curcas* could become an important economic activity for the country's rural majority and throughout the semi-arid tropics. Being a hardy, shrubby tree, *Jatropha* tolerates low rainfall and poor soil, while giving a good yield of energy rich but inedible oil. Parts of the plant can also be used for various medicinal purposes, while its resilience makes it excellent for reclaiming degraded lands where food crops will no longer grow.

Plant oils have many uses besides biofuels for transport. While the costs of biofuel production are coming down as the price of petroleum is rising, fossil fuels continue to be less expensive, although the day when this situation is reversed in Tanzania may be rapidly approaching. In the meantime, plant oil biofuels can also be used to produce soap or serve as cooking and lighting fuel in remote areas where imported petroleum products are only sporadically available—thus providing livelihood benefits while building capacity for future upscaling to fuel the transport sector.

Extensive biofuel research has been carried out by public, private, bilateral, and NGO actors. Because 80 percent of Tanzanians are employed in smallholder agriculture, any significant inroads made by biofuels in the transport sector or in other energy sectors will need to incorporate smallholders in the production process, especially if biofuels are to promote sustainable livelihoods and serve as an engine for rural development.

While native to the Americas, *Jatropha* has long been established in Tanzania. Local uses of the plant include traditional medicine and as living fencing material. The purpose of this project was to introduce and expand production of *Jatropha* as a cash crop and as raw material for plant-oil industries and to demonstrate its potential in reforestation, erosion control, and reclamation of degraded land. Working with women's groups, the grantee, KAKUTE Ltd., trained over a thousand people in *Jatropha* production techniques who then planted several hundred acres in the crop. The project successfully demonstrated the livelihood benefits of the crop by helping many to get started farming *Jatropha* as a cash crop and others to begin soap-making businesses. Along with partner organizations, the grantee has gone on to advocate for an improved policy environment for biodiesel, with promising results so far.

Implementation

KAKUTE and its partners have long been conducting research into the biofuel potential of *Jatropha*, and the focus of this project was to demonstrate its livelihood benefits in the context of local communities. The project began with the establishment of a pilot demonstration farm, which was used as a training tool for new *Jatropha* farmers. Approximately 1,530 people were trained in *Jatropha* management techniques, and 400 hectares of *Jatropha* were planted on marginal lands donated by the communities involved. Partner organizations assisted with capacity building workshops, aimed at imparting necessary skills for successful cash crop management. Implementation on the village scale was coordinated by 17 different village-based women's groups, which produced the seedlings and cuttings for planting.

The project provided the necessary processing equipment, including three oil extracting presses and five sets of soap-producing equipment, to several women's groups free of charge. In the first four years of the pilot project, 52,000 kilograms of seeds were sold to oil processors for approximately \$7,800, producing 5,125 litres of oil worth about \$10,250 on the local market, as well

as 3.5 tonnes of soap worth \$20,533. The amount of oil and soap produced is far below the capacity of the land to produce *Jatropha* seeds, but goes a long way to demonstrate the potential profitability of the crop.

Soap is the most valuable of the commodities produced; it commands higher prices than conventional soaps due to its superior cosmetic and medicinal properties. In addition to providing equipment, the grantee and its partner organizations have supported soap production activities by helping women's producer groups to standardize their products to make them more viable in mainstream markets. Current buyers of the soap include various Tanzanian ecotourism enterprises as well as domestic customers, and the grantee is currently pursuing international market opportunities through its sister organizations *Jatropha Products Tanzania Limited (JPTL)* and *Pamoja Inc.*

The grantee also provided 10 stoves and 100 hurricane lamps that operate on *Jatropha* oil and provided an immediate use for the produced oil, as *Jatropha* oil can be used as fuel in the lamps currently in wide use in the region. While the stoves are currently too expensive for immediate mainstreaming, the development of a cheaper stove could tap this potentially large market.

Communication and awareness raising around *Jatropha* is the final component of this project. Awareness of the activities was raised throughout the local area by means of a radio programme, while the project's Website promoted it internationally. Teaming with several other NGOs and private companies involved in *Jatropha* activities, the grantee held a national conference that attracted other local and international NGOs, bilateral and multilateral development organizations, public officials, and local stakeholders. The conference presented this and other *Jatropha* projects in Tanzania in order to prompt a national discussion on how to best promote *Jatropha* as an energy crop, to support rural livelihoods, and to reclaim degraded land.

Results and Impacts

a) Environmental Benefits

Global: As they grow on deforested land, *Jatropha* trees absorb atmospheric carbon dioxide. Furthermore, carbon dioxide emissions from burning *Jatropha* oil or any other biofuel are cancelled out by the plant's uptake of CO₂ in producing the oil. Especially in Tanzania, where diesel accounts for more than half of liquid fuel consumption, upscaled use of biodiesel—for which *Jatropha* is one of the best sources—could significantly reduce present and future greenhouse gas emissions from the rapidly expanding transport sector.

Local: This project used *Jatropha* to reforest degraded land. Large-scale reforestation ameliorates microclimates and reduces soil erosion, while the plant's flame-retardant properties guard against wildfires.

b) Livelihood Benefits

Rural Livelihoods/Commercial Development: *Jatropha* oil currently sells in local markets for approximately \$2 per litre, and it takes approximately 10 kilograms of seeds to produce one litre of oil. Given that yields in dry areas can reach two to three tonnes per hectare, this represents a significant source of potential income for farmers and oil expellers. At present, the market for *Jatropha* oil is too thin and there are not enough seeds to begin full commercial processing. To accommodate the anticipated future demand in the market for biofuel, the grantee is working with its partners to develop both market and production capacity.

Sustainable Agriculture: *Jatropha* can reclaim degraded lands, maintaining the viability of a region's long-term agricultural base.

Women's Empowerment: Women's groups are the main beneficiaries of the project. Use of *Jatropha* for domestic fuel—especially for cooking—has the potential to reduce the need for charcoal, fuelwood, or other conventional cooking fuels and to save money and/or reduce drudgery. Moreover, the income generated from *Jatropha* activities has the potential to make women increasingly independent.

Education: Lessons about *Jatropha* have been integrated in the curriculum of local schools. Children learn about the uses and growth of *Jatropha*, as well as about the role of *Jatropha* in reforestation of degraded land.

Employment: *Jatropha* harvesting is labour intensive, and upscaled *Jatropha* production potentially can generate significant rural employment.

c) National Benefits

Tanzania imports nearly all of its fuel requirements, placing a major burden on the national economy. Given the large amounts of land suitable for production of Jatropha and other biofuels, and given that little of this land would be used for food crops, biofuel crops have significant economic potential in Tanzania.

d) Capacity Development

The project developed the capacity of farmers to produce Jatropha seeds, and the capacity of the women's groups to process and market them. This involved not just agronomic training and soap production training, but development of business skills, organizational dynamics, and cooperative leadership. Already registered as formal community-based organizations, the women's groups are currently in the process of being registered as formal cooperative entities.

e) Partners

This project involved the collaboration of a diverse array of project partners, including CBOs, NGOs, the public sector, and bilateral organizations. Most central to the success of the project were the 17 different local women's groups, who actually implemented much of the project.

The grantee, KAKUTE, initially approached the project as a subcontractor for Heifer International and received significant financial support from the U.S.-based McKnight Foundation. Support for implementation activities came from TaTEDO (Tanzania Traditional Energy Development and Environment Organization), which helped with capacity building for planting activities, while other NGOs contributed to capacity building exercises for marketing the project's products. Research assistance came from the University of Dar Es Salaam, which assisted in the development of the Jatropha-powered engine. Finally, bilateral organizations have been major funders of Jatropha activity in Tanzania, especially the German development agency Gesellschaft für Technische Zusammenarbeit (GTZ). Moreover, GTZ has engaged the government in policy dialogues, trying to identify the best approach to creating an enabling policy environment for Jatropha's eventual use in the transport sector. In this mix of project partners, the role of GEF SGP has been to catalyze CBO involvement and to emphasize the linkages of biofuels in Tanzania to climate change issues.

Lessons Learned

a) Barrier Removal

Financial: The technology used to produce Jatropha oil is simple, but its costs are beyond the reach of many communities with the greatest need. This project covered the capital costs of pressing and soap production equipment. Future incarnations of this project could involve microfinance or other innovative financial mechanisms for procuring processing equipment.

Information/Awareness: Training and demonstration activities reduced these barriers. The pilot demonstration farm showed trainees the full range of steps from cultivating the plant, to harvesting the oil, to using it in engines. The project also sensitized farmers to the potential market for Jatropha as an oilseed. Awareness-raising activities consisted of meetings, brochures, radio programmes, a Website, and demonstration sessions at the pilot farm.

Policy: In highlighting the potentially significant role of Jatropha and other oil crops in Tanzania's energy mix, the grantee contributed to a climate of interest among Tanzanian policymakers. Officials from several different ministries—many of which were represented at the KAKUTE Jatropha conference—are currently in dialogue with bilateral and multilateral organizations about the best ways to facilitate Jatropha through different policy approaches.

b) Scaling Up

Projects similar to this one are replicable in any semi-arid area where people are eager to diversify their livelihoods and there is a need for alternative energy and/or a potential market for soaps. The main climate change mitigation impacts of this sort of project will more likely be felt in mainstreaming, as significant amounts of CO₂ are sequestered by the trees and emissions are offset by the use of biofuel. However, mainstreaming would also require a formalized institutional arrangement among private interests, public stakeholders, and local communities. The Tanzanian government is working on this, as well as on the surrounding policy issues, while several NGOs are working to bring the implementation costs within the reach of local communities.

d) Project Approach

This project demonstrates how technologies anticipated to become important at a future time can be implemented earlier than they might otherwise be by designing the project to give *graduated benefits*. At different scales of implementation, and given different external conditions, *Jatropha* gives different returns. On a small scale, while petroleum remains less expensive, *Jatropha* is an excellent plant for improving rural livelihoods and basic energy services while safeguarding against land degradation. However, in the context of increasing fuel prices, widespread upscaling of *Jatropha* in a national, regional, or international context could have significant impact on the transport sector, positive carbon sequestration outcomes, and national economic benefits, while retaining the rural energy services and livelihood outcomes from previous stages of the project.

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Section 5: Seven Lessons from the Review and Case Studies

Seven major lessons drawn from the project review and the case studies are grouped into two categories: 1) approaches that ensure success of local community sustainable transport projects, and 2) best methods of initiating the process of replication, upscaling, and mainstreaming.

5.1 Lessons on Implementation Approaches

Lesson 1:

Flexibility in project execution is critical.

Transport is fundamental to the way people live their lives and access goods and services. Transport modes quickly become embedded in both formal and informal institutions and in local economies. Thus changing transport modes to make them more sustainable involves not only technological and behavioural change but institutional change as well. To achieve sustainable transport, a flexible approach to the execution of the project is important. Here *approach* refers not to the subject theme or the operational type, but to the guiding strategy for project design that seeks to ensure substantial impacts.

The most successful projects recognize that adapting to varying local circumstances and proposing different solutions is an implementation strategy. Successful projects focus steadily on the outcomes that they would like to achieve, while retaining maximum flexibility in how those goals are achieved. This sort of adaptive project management was shown in the Sri Lankan electric vehicle case (Case Study 1), which started as a simple demonstration project, but gradually changed into a policy advocacy project as it became apparent that the vehicles could best be promoted by improving the policy environment under which vehicles operate.

Lesson 2:

Graduated and sequenced achievements sustain project impacts.

Some projects promote community action to demonstrate the viability of a technology that either will require massive upscaling to show significant global benefits or is anticipated to become economically valuable at some point in the future. In situations where immediate and massive impacts and benefits may be less relevant on small scales, or be unprofitable at present but valuable in the future, approaches incorporating graduated benefits are likely to succeed, as is illustrated by the case studies. This means that, while most benefits and major impacts will come at a larger scale at a future time, there will be enough benefits and substantial impacts to community's livelihoods at the small scale in the present to ensure community interest and project sustainability. Projects with graduated benefits are about *capacity building* to help communities build skills and develop practices that promise important economic and environmental rewards later.

This is shown quite effectively in the *Jatropha* projects in Mali and Tanzania (Case Studies 9 and 10). While selling biofuel may not today be an economical activity, the use of *Jatropha* for soap production or for combating land degradation does have tangible benefits—enough to secure enthusiastic community support and organic replication observable in both projects. While liquid biofuel is still more expensive than petroleum in these countries, it is likely that this will not be the case indefinitely. Communities growing *Jatropha* solely for biofuel would be unlikely to profit from its sale at this juncture. In Tanzania, the price of *Jatropha* oil is still above that of diesel fuel, and in Mali the market for *Jatropha* oil is as yet too thin. However, that notwithstanding, the local and global benefits are poised to increase in the future in form of rehabilitated lands and access to biofuel and other products.

By establishing pilot demonstration projects with graduated benefits, local community projects serve as an example to inform policy and become ‘laboratories’ of innovation. Local community biofuel projects in Ghana have led to the creation of a committee to develop a government liquid biofuel policy, which is mandated to facilitate the incorporation of fuels from *Jatropha* and other oilseeds into the Ghanaian transport sector. These projects lay a framework for the mitigation of climate change in the future, while supporting local environmental goods and promoting sustainable livelihoods in the meantime.

Lesson 3:
A policy and institutional focus is a winning strategy.

SGP funding is modest. While it can leverage significant co-financing, it is generally not sufficient to fund the large-scale infrastructural needs required for sustainable transport projects. Therefore, many of the most successful local community projects have sought to inform policy dialogue and to create enabling environments for progressive technologies and practices, while providing lessons and reference points to steer public and private sector support away from policies that compound existing problems.

In Pune, India, this approach has been quite successful; the advocacy activities of local civil society organizations have helped to shift municipal transport funding away from increasing numbers of roads and highways towards BRT and pedestrian and cycling infrastructure (Case Study 2). In Chiang Mai, Thailand, another community organization worked with the municipal government to develop a plan to re-allocate a portion of its transport funds towards NMT infrastructure (Case Study 6).

In other places, demonstration projects were implemented to highlight lack of enabling policy as an approach to informing policy dialogue and institutional change. In Sri Lanka and Nepal, electric vehicles were a novel technology and faced numerous business-climate and policy barriers (Case Studies 1 and 3). By bringing in demonstration vehicles, securing their registration, and demonstrating their viability, both projects removed the business uncertainty and the policy barriers that prevented more widespread implementation. In Sri Lanka—largely thanks to SGP’s community-supported project—the EV sector is growing rapidly and is quickly becoming a viable commercial activity.

Lesson 4:
Community initiatives can serve as venture capital.

For small, community-scale demonstration projects, SGP funding and co-financing can act as venture capital, providing the initial pool of funds to start a project that will then generate income to ensure its sustainability. Many communities with which SGP works do not have the means to provide required seed funding; others do not have access to credit. However, at the country level, many governments do not want to risk development funds to test various approaches or practices. In some cases, there is simply too much risk for a business or a government to invest significant capital; a business may consider the profit margin too small to be interested. With SGP support, community programmes can demonstrate the financial viability or applicability of an innovative approach, or important lessons from untested yet potentially beneficial actions that meet community, business and government priorities.

In Egypt and Kyrgyzstan, SGP funded two different approaches to facilitating NMT among people for whom bicycles were unaffordable. In Egypt, a bicycle credit scheme was established, with interest income purchasing more bicycles to be sold by the scheme (Case Study 8). In Kyrgyzstan, SGP funding purchased a fleet of bicycles, to be hired out to people in a rental station, with income going to bicycle maintenance and replacement. In Vilnius, Lithuania, SGP funding demonstrated the viability of a business model that is now being emulated by others, with the city investing in infrastructure to support the sector (Case Study 5).

Lesson 5:

Leveraged social capital enhances a project's effectiveness.

Funding for community projects along with partner co-financing remove a number of barriers to the implementation and success of sustainable transport projects. However, much of the success of the projects would not have been achieved without significant inputs of social capital. *Social capital* refers to the mobilization of people and their networks around a common cause. It can take the form of use of influence, use of local knowledge, donated labour, or simple expressions of public support.

Public support and advocacy are important parts of social capital. In Pune, the grantee assembled a network of influential local, national, and international leaders on transport issues, and received their cooperation in municipal transport advocacy. This dramatically increased the effectiveness of the grantee's activities. In Pune, Chiang Mai, Lithuania, and Poland, cycling projects and activities were all supported by large cycle rallies to popularize the routes and show mass public support.

The use of local knowledge can have significant impact. In the Malian *Jatropha* project, one woman in each village volunteered to serve as a village focal point for *Jatropha* upscaling, allowing people from neighbouring areas to benefit from collaboration among the grantee, researchers from the University of Mali, and villagers (Case Study 9). In cycle route planning in Poland and Lithuania, several grantees assembled teams with representatives from the municipality, local NGOs, and community-based organizations to implement pieces of projects, using their local knowledge to ensure effective project design and implementation.

Lastly, social capital can be in the form of donated labour. In the Tanzania *Jatropha* project, women's groups did the work of establishing the seedlings for distribution (Case Study 9), while in Egypt the grantee's network of local charitable organizations and *zakat* committees engaged in the actual work of managing the bicycle credit and distribution operations (Case Study 8).

5.2 Lessons on Upscaling, Replicating, and Mainstreaming

Because local community projects are small, it is important to stimulate the process of upscaling, replicating, and mainstreaming in order to maximize their impacts. At the same time, many project benefits are worthwhile irrespective of their role in mitigating climate change. Expanding the benefits of project interventions happens through replication, upscaling, and mainstreaming, and gives them far greater value than would be had from simple one-off projects. Within the transport sector, these three project expansion modes may operate differently from the same modes in other sectors. The case studies and project review illustrate various experiences of upscaling, replication, and mainstreaming, permitting tentative observations about potentials for future action.

Viewed from a distance, the processes of upscaling, replication, and mainstreaming represent parts of the same larger process of project expansion. Closer up, however, it becomes important to analyze them separately to extract lessons about how benefits from demonstration projects can be implemented at larger scales. *Upscaling* is a vertical project expansion, increasing the scope of the project or its component. *Replication* is a horizontal project expansion, spreading the same practice in new places. *Mainstreaming* is the process of incorporating the full project or sub-components into national or local development priorities, strategies, or planning processes.

Lesson 6:

Initiating partnerships with relevant government authorities early in the project spurs the process of mainstreaming.

Local community project experiences demonstrate how project expansion in the transport sector is different from expansion in other sectors. Many transport policy advocacy projects approach mainstreaming first, to create a pilot to be scaled up later. To achieve that objective, partnership with relevant and appropriate public institutions is initiated at early stages of project implementation.

Because transport is often highly regulated and is provided by the public sector as a public good, the traditional model of moving from a pilot project through to upscaling, replicating, and mainstreaming phases may apply less than in other sectors. In some cases, such as advocacy for BRT and dedicated cycle routes in Pune, piloting is impossible until some elements of sustainable transport have already been mainstreamed—one cannot have a BRT system until one plans for BRT policy (Case Study 2). Therefore, the Pune project focused on policy advocacy, using examples from other cities around the world and working with the municipality. The pilot BRT system in turn will act as a pilot project for city authorities, which could then be scaled up and replicated after proving successful, opening the way for mainstreaming at city level.

In Ghana, a small local community Jatropha project worked with women's groups to produce cosmetics and small amounts of fuel for milling engines. This was replicated by another project on a larger scale in a different region of the country, with emphasis on biofuel production at scales more relevant to the transport sector. Partnerships with relevant government agencies were created from the beginning of the projects. The combination of these projects, plus the networking efforts of some project proponents, led to the creation of a national biofuel policy committee, charged with making recommendations for mainstreaming biofuel in the Ghanaian transport sector.

While mainstreaming has proceeded in the orderly fashion described above in some cases, in others it has happened early in the expansion process as a way to remove policy barriers rather than as a way to conclude and perpetuate a successful project, as in the Lithuania bicycle transport-based business models.

Lesson 7:

Public-private civil society partnerships enhance and sustain replication and upscaling of local community projects.

Replication and upscaling have been a major feature of local community sustainable transport projects across various thematic sectors. In Mali, the grantee has been working with communities to establish Jatropha plantations and markets for several years now, and the featured project itself replicated previous projects, with the additional focus on supply chains for motor vehicles. Through the participatory project design, a village focal point has been established in each village to diffuse acquired Jatropha knowledge to neighbouring people thus setting up an informal institution for replication. The private sector is playing a great role in the process by commercializing components of the supply chain (Case Study 9).

Local community projects in Poland and Lithuania have replicated successful bicycle transport projects in different areas some connected with ecotourism and others connected with commuter transport. While the private sector is working with non-governmental organizations to drive the process, the government or local authorities are creating the enabling environments for replication and upscaling to happen. This process results in ongoing learning on the best ways to approach non-motorized transport in the region, and especially in the case of Lithuania has led to the formulation of enabling policies at municipal and national levels. Similar approaches have been used with different sorts of projects in Egypt and Kyrgyzstan, with Egypt funding different bicycle access projects through micro credit and Kyrgyzstan supporting bicycle rental stations.

Upscaling of SGP projects has largely happened through the private sector, especially once the public sector has created the right institutional structures or policy. In many cases, small local community demonstration projects have provided successful business models. In Vilnius, Lithuania, the ecotourism project pioneered and removed barriers from pedicab businesses opening the way for several private entrepreneurs to follow suit (Case Study 5). In Sri Lanka, a small demonstration and policy advocacy project around electric vehicles spurred interest by two established companies and one start-up, all of which are investing heavily in the sector (Case Study 1). Scaling up has been most apparent with the private sector, with different businesses using different technical approaches to increase market share.

5.3 Conclusion

Trends in local community sustainable transport projects vary by region. This reflects common responses to common problems, as well as accumulated knowledge and habit by the NGO community in particular contexts. However, communities may also have much to learn from one another across regions. Successful community sustainable transportation projects have a number of factors in common, as this publication has attempted to show. Many of the themes and approaches used in some places could complement others. While caution should be exercised not to blindly import exogenous models without consideration of local factors, problems in many regions are similar, and opportunities may be as well. Especially in the context of sustainable transport, it is crucial to develop projects that have strong potential for expansion whether *vertical, horizontal, or systemic*. Similarly, public, private, and civil society partnerships are important for two reasons:

- so many sustainable transport projects have such strong returns to scale, and
- the phenomenon of path dependency in the transport sector so visible in the explosion of motorization around the world, where the tendency has been to simply follow existing models can be made to work for the environment and for people, rather than against it.

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