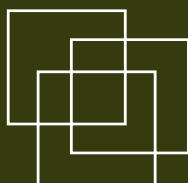




International
Labour
Organization

Local Investments for Climate Change Adaptation: In Brief

Green Jobs through Green Works



Local Investments for Climate Change Adaptation



region will be affected by climate change in different ways. Climate change will impact on their water supplies, flood risks, health, crop yields, livelihoods, living conditions and transport. Both urban and rural areas will be hit.

The climate is changing

The climate is changing. Higher temperatures are behind these changes. Some areas are experiencing longer and more pronounced droughts, while other areas receive more intense storms and increased flooding. Some hard hit areas are suffering from both: droughts and floods. The affected communities need to adapt to the environmental, economic and social implications of these climate variations.

The poor will suffer the most

In developing countries it is likely that the poor will suffer the most from the changing weather patterns. This is unfair as the poor have been the least responsible for the global warming which contributes to climate change. People in different parts of the Asia Pacific

Communities need to adapt

People will adapt through changing their habitats, behaviour and livelihood activities. Although communities have always been exposed and had to adapt to climatic conditions, new plans, programmes and projects to reduce the impacts of climate change need to be conceptualized, formulated, implemented and sustained. International and national efforts to mitigate climate change and its impact should be inclusive of poorer communities and help them to adapt to the new living and working conditions.

An adaptation strategy

The development of local infrastructure and public works play a major part in adaptation to climate change. There are three main areas for adaptation, including:

- Irrigation and water and land resource management in rural areas to address the variability and intensity of water supply and improve the quality of existing land. This includes community forestation.
- Flood control, drainage and water conservation structures both in rural and urban areas to deal with the variability and frequency of water availability.
- Rural transport improvement and maintenance to ensure that transport networks can withstand the increased level of rainfall and flooding.

The ILO has demonstrated a range of tools that can be used in the planning, preparation and implementation of such works. Guidelines and training manuals have been developed for capacity building and implementation. Activities traditionally take place within the context of rural development, urban low-income settlement upgrading and crisis response. Now there is a need to place this work in the context of climate change adaptation.



Climate Change Adaptation and Community Forestry

Forests in Asia Pacific

Forests are among the region's most important natural resources, providing industry with materials, communities with livelihoods, and plants and animals with habitat. They contribute to water supply, protect soils and fisheries, protect against floods and drought, and absorb carbon and other pollutants. They support bio-diversity and provide a space for recreation. They are economically important, providing livelihood opportunities for many people in Asia Pacific, including indigenous peoples who are often fully dependent on forests.

Climate change and forests

Increased rainfall intensities, flash flooding, illegal logging and deforestation are factors in forest degradation. Changes in temperature will impact on forests as well. The net impact of climate change on forests is a complex process, depending on many different factors. The role of communities in reducing the impact is fundamentally important. They must be encouraged to stop unsustainable forest practices and replace these practices with long-term sustainable alternative livelihoods.

Adaptation through community forestry

Community based forestry and tree planting may help communities to adapt to the impacts of climate change. The range of species and crops used could be broadened to increase opportunities to generate income. Tree planting can also mitigate the impacts of, and provide protection from, extreme environmental events such as flooding, landslides, and fires. Trees reduce the negative impacts of climatic events through a range of means. For instance, trees reduce erosion by stabilizing soils and shielding soils from wind and water erosion. They also increase the capacity of forests to hold moisture in the soil and reduce the water run-off rate. Trees can be planted to provide flood protection, which in many cases offer equal or superior protection when compared to high cost man-made erosion

control structures. Trees and the shade they provide can help other crops and domestic animals to thrive in areas where they would not otherwise thrive. Moreover, trees and forests are key instruments for mitigating climate change as they absorb and lock away carbon dioxide and other pollutants.

Local resource-based methods

ILO projects have shown that the planting of trees may have many benefits, including improved nutrition and income generation through the planting of food crops, cash crops and fuel wood, among others. Community forestry groups can collect seeds, operate community nurseries, plant seedlings and monitor reforestation in existing forest areas. Where new forests are planted, the production, planting and monitoring of seedlings, offers ideal opportunities for the use of community contracting and other local resource-based approaches. Communities can be empowered to organise themselves to carry out tree planting activities. Communities can plant mangroves along the seashore to limit the impact of increased storms, plant trees along roads and footpaths, plant suitable grasses and other plants along embankments as part of bioengineering activities to stabilise slopes



Climate Change Adaptation and Rural Transport



Connectivity in Asia Pacific

Effective connections are essential for enabling local transport networks. Roads, paths, bridges and waterways need to link people with markets and services, such as education and health clinics. Fields and plantations must be accessible for farmers and producers and agricultural produce must be able to be transported from the field to the market.

Climate change and rural transport

The effect of climate change will lead to roads and paths being flooded more frequently. This will impact on mobility and on accessibility to goods and services. Roads in flat areas are most at risk from simple flooding, whilst roads in mountainous areas are more at risk of damage from the actions of

rapidly flowing water in the drains and in cross streams. Both see communities becoming cut off and journeys taking much longer. At the very least this leads to problems in transporting crops to markets and delivering agricultural inputs to villages. It will also lead to fewer visits being made by clinic staff to

all sections of the community and to increased absenteeism from school. Even the collection of safe drinking water and fuelwood can become more difficult.

Adaptation through improving rural transport

The raising of roads and paths is a straight forward solution to the problem - provided that thought is given to sufficient culverts, channels and other drains that permit the water to drain away. The planning and design of new rural roads and paths must also take into account future rainfall and flood levels. Where possible, consideration should be given to combining transport and flood control benefits from a raised road embankment. Where a new raised path is being built it may be sensible to pave it to protect it from heavy rain so that bicycles

and motorcycles can use it in all weathers. The building of new footbridges along such raised paths will be important and is within the capacity of communities provided they receive technical support. In deltas and some other areas, including large lakes, the use of boats is a key part of the local transport network. The building of new, higher and stronger jetties can enable communities to adapt to their particular climate change challenges.

Local resource-based approaches

The local resource-based method emphasises the use of local capacities throughout the whole process of the transport infrastructure development. The approach applies not only to the use of local labour and materials, but also to local level planning, the use of local contractors and community groups for implementation of infrastructure works. Moreover local communities can be encouraged to make use of simple means of transport based on bicycles, motor cycles and single axle tractors. The local resource-based approach has been applied, with support from the ILO, in several countries in the region. Experience shows that these approaches provide social and environmental benefits while reducing the cost of road rehabilitation and maintenance.

Climate Change Adaptation and Flood Protection

Flooding in Asia Pacific

People have lived on flood plains since the earliest times and periodic flooding has been a fact of life for many in the region. With increasing population pressures and urbanization, people no longer have the option of moving out of the way of rising flood waters. Flood protection measures, such as dykes and river wall protection, have become common alongside rivers. Not all are well designed or built.

Climate change and flooding

Climate change has already led to greater peak flows of water in rivers. The situation will get worse. If an earth dyke is overtopped there is always the danger of a rapid catastrophic breach and collapse, which can result in considerable loss of life. Even low level, non-catastrophic, flooding impacts on urban and rural living conditions, health, livelihoods and transport. In urban informal “slum” settlements, where natural drainage has often been blocked, it makes life

miserable and unhealthy. Water related diseases become a major problem. In rural areas schools, clinics and markets in adjacent villages can become inaccessible. It also becomes much harder to reach the nearest all weather road.

Rising sea levels are another challenge in low-lying areas. Occasional inundation during high winds and tides leads to salinization of the land and of groundwater.

Adaptation through flood protection

The construction of new infrastructure can mitigate climate change related flooding. Dykes and floodwalls built alongside the river can address flooding at a given point. There are many examples of where this has been done successfully. Certain types of trees can also be planted at strategic points to provide low cost flood protection. A key issue in the development of new or improved flood protection works is that the scheme must not simply move the problem further downstream and subsequently lead to the flooding of areas that had not previously flooded. New schemes must also be designed to be fail-safe, so



that overtopping does not lead to collapse, but to the controlled flooding of an area already identified as suitable. Building sea dykes can help to mitigate the impact of such rises, although in many areas they are not a long-term solution.

Local resource-based methods

The construction of dykes and sea dykes, storm drainage, river training and bank protection, channel improvement, flood refuges and the raising of homes and even whole villages are solutions that are suited to local resource based approaches. Community-based planning must be used to identify what is the problem and what are possible solutions in a particular location. The use of local resource based approaches including community contracting, the use of gabions, labour-based techniques for the construction of dykes and other embankments are all well suited to these situations.



Climate Change and Soil and Water Conservation

Erosion and water availability in Asia Pacific

Loss of soil through erosion is one of the most prominent forms of soil degradation in the region and leads to declining agricultural productivity and reduced livelihood opportunities. It can be caused by the action of water and wind, as well as deforestation and poor land management practices.

Water availability is essential for agricultural production. For rain-fed agriculture this requires that water is stored in the soil and made available to the crop. Water availability in the soil depends on rainfall. It is also affected by the amount of water that is stored and the proportion of rainfall that is lost as overland runoff.

Climate change, erosion and water shortages

Climate change is expected to significantly increase soil erosion in many parts of the region, mainly due to more intensive rainfall and higher runoff. Water availability will equally be affected. Although mean annual rainfall is expected to increase in many regions, this will generally be due to more

intensive rain that occurs at less frequent intervals. The result will see a larger portion of rainfall lost as runoff and the overall volume of water infiltrating the soil and becoming available for crops as soil moisture or groundwater reduced. At the same time, drought periods are expected to become more severe and longer in duration, making rain-fed crop production more dependent on moisture stored in the soil and groundwater. Increasing temperatures will also result in higher water demands by the crops, leading to even higher water stress and higher vulnerability to crop failure.

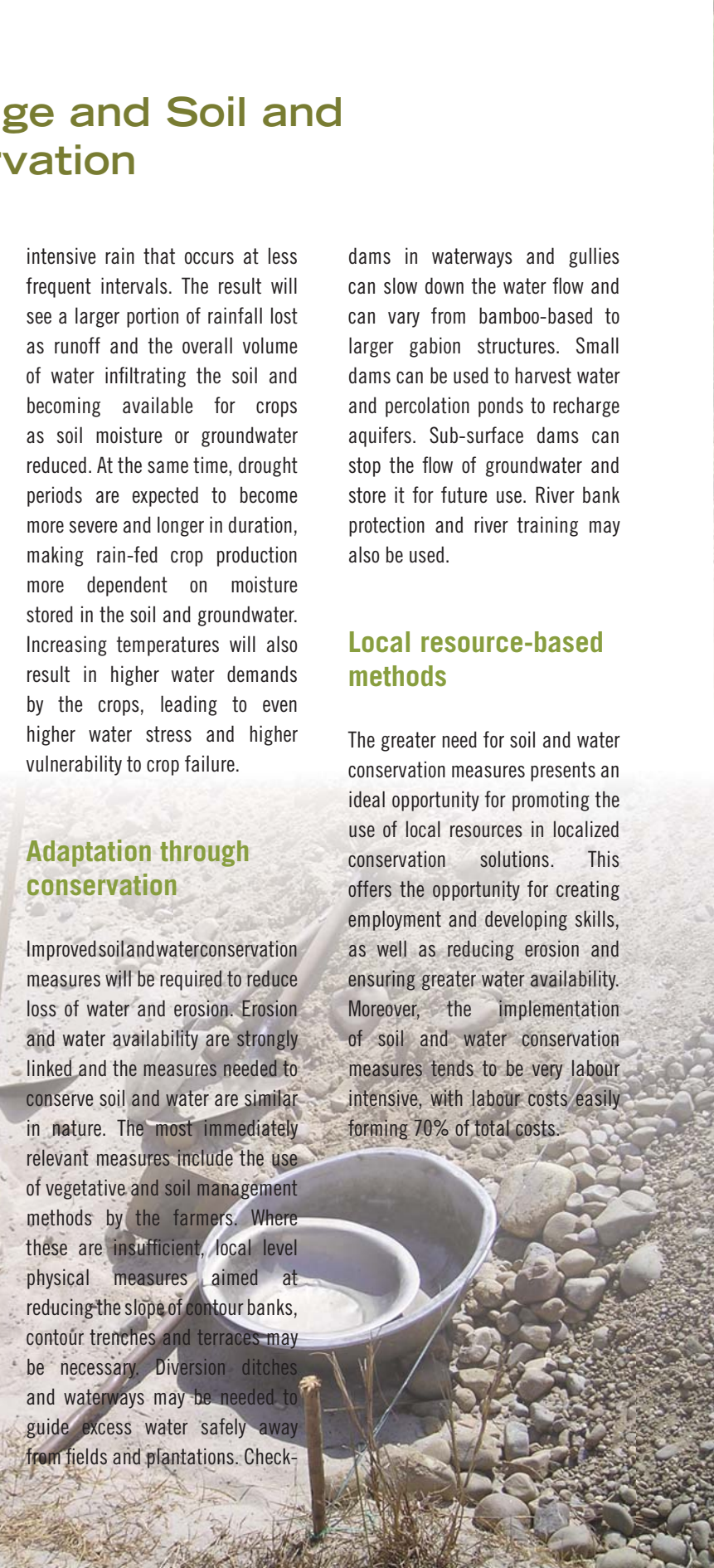
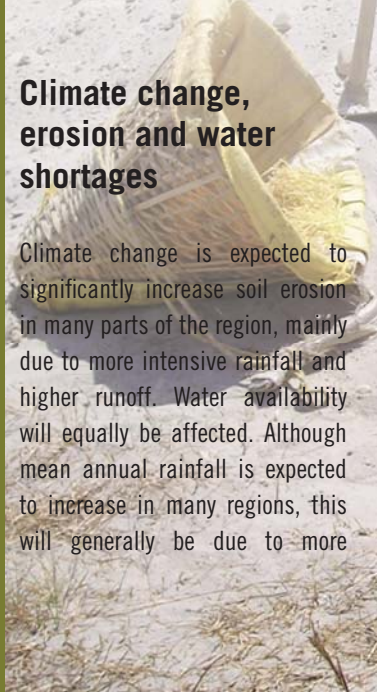
Adaptation through conservation

Improved soil and water conservation measures will be required to reduce loss of water and erosion. Erosion and water availability are strongly linked and the measures needed to conserve soil and water are similar in nature. The most immediately relevant measures include the use of vegetative and soil management methods by the farmers. Where these are insufficient, local level physical measures aimed at reducing the slope of contour banks, contour trenches and terraces may be necessary. Diversion ditches and waterways may be needed to guide excess water safely away from fields and plantations. Check-

dams in waterways and gullies can slow down the water flow and can vary from bamboo-based to larger gabion structures. Small dams can be used to harvest water and percolation ponds to recharge aquifers. Sub-surface dams can stop the flow of groundwater and store it for future use. River bank protection and river training may also be used.

Local resource-based methods

The greater need for soil and water conservation measures presents an ideal opportunity for promoting the use of local resources in localized conservation solutions. This offers the opportunity for creating employment and developing skills, as well as reducing erosion and ensuring greater water availability. Moreover, the implementation of soil and water conservation measures tends to be very labour intensive, with labour costs easily forming 70% of total costs.



Climate Change Adaptation and Irrigation

Irrigation in Asia and Pacific

Irrigation, the controlled application of water to arable land, is important for all countries in Asia Pacific. With 60% of the population relying on agriculture for their livelihoods, irrigation has a direct impact on the lives of many of the poorest in the region. 34% of the land in the region is already irrigated. However, failure to deal effectively with the new challenges of climate change may lead to increased hunger and even famine.

Climate change and irrigation

Climate change will lead to higher average temperatures in the region. Some areas will experience higher rainfall, whilst others will experience lower rainfall with longer periods of drought. In both situations rainfall is likely to be much more intense, leading to a greater proportion of precipitation lost as runoff. Higher evapo-transpiration and lower soil moisture levels are likely to lead to a greater demand for irrigation water. With changes in weather patterns and rainfall, agricultural yields are likely to fall. To reduce the risk of

harvest failure more areas will need to be cultivated and irrigated. Overall irrigation requirements are expected to increase by 15% by 2020. The increase in variability of precipitation will necessitate the extension of irrigation into areas that have relied on rain-fed irrigation in the past. Irrigation is not the only use of water and the increase in demand for water from other sectors will lead to increased water stress in certain areas.



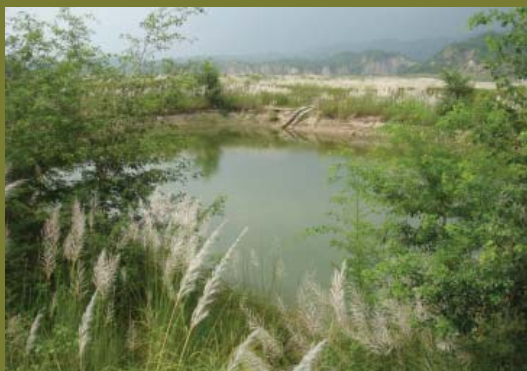
Adaptation through irrigation

There will be an overall need for expansion of irrigation, both in terms of large new systems and also in terms of small systems where land that was exclusively rain-fed can receive irrigation during drought. Improved storage, such as small dams, ponds and groundwater recharge within existing systems, will be critically important so that the rainwater that does fall can be

retained for later use. Improving the retention capacity is important for reducing run-off. Irrigation systems need to be adapted so that they are less susceptible to damage from flooding. Improved irrigation efficiency is essential for reducing losses in various parts of the system. This can be achieved by improvements to parts of the infrastructure and also through improvements to irrigation methods in the fields. Better systems management and farmer education are an essential part of this.

Local resource-based methods

Farmers' water user associations are often in the best position to know how trends water supply have been changing - even if they lack a scientific understanding of it. Integrated planning that takes into account all water uses should build on this local knowledge. The building of small dams and reservoirs can follow the principles of local resource-based approaches developed and promoted by ILO. Construction and rehabilitation of canals are suitable for introducing labour-based methods, using community contracting and small contractors to complete the works.



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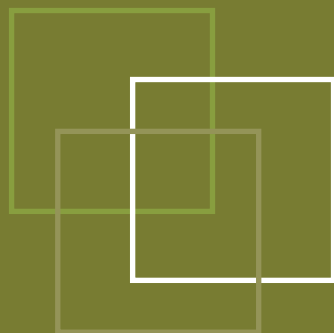
Where communities live there is infrastructure and how this infrastructure is developed, maintained and used has important implications for climate change mitigation and adaptation.

'Local investments for climate change adaptation' provides a guide for the identification, design and implementation of interventions in support of climate change adaptation at the local level. It promotes a local resource-based approach for infrastructure development, which adds value by using environmentally-friendly methods for constructing and maintaining assets, while providing employment opportunities and enhancing the capacity of governments, contractors and communities.

'Local investments for climate change adaptation' provides practical solutions for helping to build more resilient communities, with focus given to:

- Irrigation and water and land resource management in rural areas to address the variability and intensity of water supply and improve the quality of existing land. This includes community forestation.
- Flood control, drainage and water conservation structures both in rural and urban areas to deal with the variability and frequency of water availability.
- Rural transport improvement and maintenance to ensure that transport networks can withstand the increased level of rainfall and flooding.

The effects of the changing climate are already felt around the world. Helping affected communities and especially poor communities to adapt to these changing weather patterns now is necessary to reduce future impacts on their livelihoods and living conditions.



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