

Better economics: supporting adaptation with stakeholder analysis

Across the developing world, decision makers understand the need to adapt to climate change — particularly in agriculture, which supports a large proportion of low-income groups who are especially vulnerable to impacts such as increasing water scarcity or more erratic weather. But policymakers are often less clear about what adaptation action to take. Cost-benefit analyses can provide information on the financial feasibility and economic efficiency of a given policy. But such methods fail to capture the non-monetary benefits of adaptation, which can be even more important than the monetary ones. Ongoing work in Morocco shows how combining cost-benefit analysis with a more participatory stakeholder analysis can support effective decision making by identifying cross-sector benefits, highlighting areas of mutual interest among different stakeholders and more effectively assessing impacts on adaptive capacity.

Policy pointers

- **The most important benefits** from adapting irrigation in Morocco are non-monetary, for farmers and public sector stakeholders alike.
- **Participatory approaches** such as stakeholder analysis can be integrated in cost-benefit analysis to simultaneously demonstrate efficiency as well as non-monetary dimensions of adaptation success.
- **Stakeholder analysis** promotes collaborative decision making by identifying common interests among different stakeholder groups.
- **Identifying cross-sector** benefits from adaptation through stakeholder analysis can support the efficient allocation of financial resources between adaptation and other development objectives.

The adaptation challenge

Morocco, like many developing countries, suffers from changing weather conditions: temperatures are rising and rainfall is decreasing and becoming more erratic. These changes are expected to have significant impacts, not least on the availability of water. Water supplies have already dropped to an all-time low of 11.7 billion cubic metres, creating a deficit of 15 per cent when compared with demand.¹

For a country like Morocco, which relies heavily on agriculture, an increase in water scarcity could prove especially costly. The 1994–95 drought, for example, caused the country's agricultural production to fall by 45 per cent and GDP to fall by nearly 8 per cent.² Increasing water scarcity also means that agriculture will also face more intense competition with other water uses.

Moroccan farmers already face a range of environmental problems including fragile soils and land and water degradation. Now, they increasingly must also cope with farming income losses from erratic rainfall and growing water scarcity caused by climate change. Small-scale farmers are particularly vulnerable. While commercial farmers have technical know-how and financial resources to cope with the adverse impacts on farming

yields, smallholders have minimal adaptive capacity to tackle them.

There is little doubt that Moroccan agriculture will have to adapt to the impacts of climate change that lie ahead. But how do you choose what adaptation action to take? Many developing countries across the world are asking themselves the same question.

Doing good economics

Often, the choice is made based on economic project appraisals that weigh up the costs and benefits of different options in economic terms. Such cost-benefit analyses estimate the financial feasibility and economic efficiency of a given policy, and convert impacts into monetary dimensions that are comparable with competing policy objectives in non-climate change development areas.

But adapting agriculture to climate change also brings many other benefits, which are not captured by these analyses. For example, adaptation projects in the water sector involve benefits that can be measured in monetary terms — such as investments made in dams or irrigation systems — as well as those that cannot, such as improved adaptive capacity through social learning and technological spillover.

Adaptation may benefit some stakeholders more than others

Adaptation in the water sector also has positive spillover effects in other sectors such as health, education and poverty alleviation, particularly for small-scale farmers, who are the most vulnerable to climate change impacts. But adaptation measures such as irrigation may benefit some stakeholders more than others, and in different ways, and may also have unintended negative effects on the environment such as soil salination and waterlogging.

Not accounting for the presence and weight of these 'externalities' in a cost-benefit analysis may result in policymakers underestimating some of the most important benefits and costs of adaptation and their distribution, and choosing less efficient projects.

There have been attempts to try and capture non-market benefits such as reduced vulnerability in monetary terms and feed them into economic project appraisals.³ For example, through survey methods such as contingent valuation or by using values of non-market goods and services estimated in other regions (benefit transfer). But such studies tend to be either data-intensive and costly, or imprecise and unreliable. Indeed, non-monetary benefits from adaptation have neither been consistently nor completely accounted for by cost-benefit methods in the adaptation appraisal literature.

When converting non-monetary benefits from adaptation into a comparable measure, there is also a lack of methods that convert all impacts into a dimension that is consistent across impacts and studies. Alternative methods are needed to complement economic project appraisals and provide a more complete and multidisciplinary picture of adaptation impacts that can better inform policymaking.

One option is to combine traditional cost-benefit analyses with a stakeholder analysis, which evaluates

policy impacts that accrue to each stakeholder group separately and represents a more participatory and effective approach to weighing up the pros and cons of adaptation options (see Stakeholder analysis).

The distribution of costs and benefits among different stakeholder groups is particularly important to adaptation in water because water is managed and used by different stakeholders for a wide range of domestic, agricultural, industrial, tourism and other purposes and its management typically includes the interests and participation of multiple stakeholder groups.

Lack of information on the priorities of, and impacts on, these different groups could result in the interests of less influential, low-income or politically inactive groups, such as smallholders and the environment, being excluded from decision-making processes. And while conflicting interests might discourage stakeholders from participating in adaptation, coordinating interests between stakeholder groups is necessary to ensure efficient decisions.

Who's a stakeholder?

In Morocco, stakeholder analysis is proving valuable in guiding the implementation of the Green Morocco Plan in the agricultural Tadla region.

The Green Morocco Plan is a government initiative to turn the agricultural sector into the engine of economic development over the next decade and provide a triple win for smallholders: food security, adaptation to climate change and sustainable growth. In Tadla, which has an area of 97,100 hectares, the plan includes piloting a drip irrigation scheme. This scheme, which started in 2011, is implemented as a collective participatory process through water users associations — at least 70 per cent of an association's members must agree to participate before the scheme is implemented on the ground. The pilot in Tadla will inform later implementation in other regions.

Farmers in the Tadla region have long relied on irrigation to grow their crops, but have historically used flood irrigation. Converting to drip irrigation here is in line with the country's development goals for the agricultural sector, but it is also a response to increasing water scarcity in the region.

In this case, there are a large number of stakeholder groups (see Figure). Farmers are stakeholders because water availability and use directly affect agricultural incomes.

The national government is a stakeholder because it funds and facilitates the conversion to drip irrigation through the Green Morocco Plan. Individual government agencies are stakeholders too, including the Water Basin Agency, which regulates water allocation between sectors at a basin level, and the Regional Office of Agricultural Development in Tadla (ORMVAT), which is the regional executive of the Green Morocco Plan and

Stakeholder analysis

A stakeholder analysis evaluates how policies or decisions impact different stakeholder groups separately. Explicitly considering multiple stakeholder interests allows areas of mutual interest to be identified, which may serve as a basis for cooperation between different stakeholders. For example, to find potential areas of compromise within stakeholder negotiations and promote participation in adaptation.

By considering the distributional impacts of an adaptation policy, stakeholder analysis also enables decision makers to more effectively balance trade-offs between different objectives. For example, sectors that feel positive spillover effects of adaptation can be integrated into policymaking to take into account impacts on development. This helps maximise the efficiency of resource allocation across adaptation and other development goals, especially for those adaptation actions that seem to have limited short-term or financial benefits but have significant non-monetary benefits. Some may have large monetary benefits, but accruing to only a small stakeholder group.

is responsible for managing water use in agriculture in Tadla.

The private sector — although not present in this specific case — is another potential stakeholder in adaptation policies in the water sector. Suppliers of adaptation infrastructure benefit financially from large infrastructural projects, and can also provide technical expertise in policymaking.

Even the environment — whose interests could be represented by the Ministry of Environment — is a stakeholder in adaptation in the water sector. In the case of Morocco, a technological innovation for adaptation — drip irrigation — is enhancing the sustainability of groundwater reserves. By increasing the availability of surface water, drip irrigation will alleviate pressure on alternative agricultural water sources. As a result, groundwater resources will increase in quality and quantity, enhancing the sustainability of regional water tables.

In other cases, adaptation might be detrimental to the environment. For example, to adapt to falling lake levels and fish stocks in Lake Chilwa, Malawi, fishermen have begun hunting birds and doing craftwork with lake reeds to supplement their incomes⁴. Exploitation of these natural resources puts pressure on the lake's ecosystem services and biodiversity.

Diverse benefits

A preliminary stakeholder analysis in Tadla, led by IIED,⁵ between August and October 2011 revealed that for each of the stakeholders in the Moroccan case, there are many different benefits — both monetary and not — associated with converting to drip irrigation.

Each stakeholder group was directly asked to identify and describe the benefits and costs accruing to them. Across all groups, stakeholders usually identified costs in financial terms. But benefits were expressed in monetary as well as non-monetary terms. A ranking exercise provided a semi-quantitative account of non-monetary impacts, directly asking stakeholders to assess the relative importance of these compared with pre-estimated monetary costs and benefits.

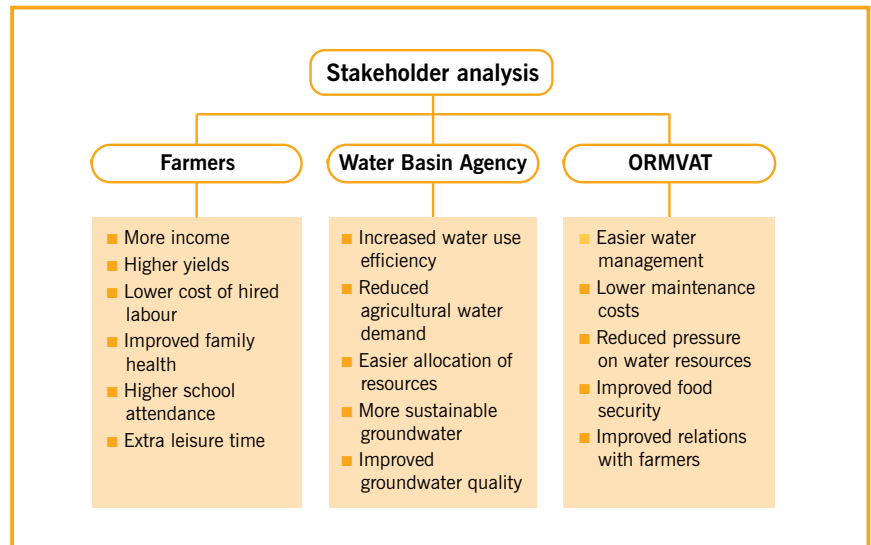
Specific benefits of converting to drip irrigation were found to vary across stakeholder groups (see Figure).

Farmers reported that drip irrigation has increased yields, reduced the cost of hired labour and boosted incomes. Many — particularly among smallholders — also reported non-monetary benefits in health and education as a result of spending less time working in the fields.

Access to irrigation water used to be tightly regulated, with farmers only able to access water at allocated times, sometimes during the night. Drip irrigation is much more flexible, eliminating the detrimental health impacts of irrigating at inconvenient times.

The new system, which is automated, is also much

Figure. Benefits identified by different stakeholders in the switch to drip irrigation in the Tadla region, Morocco.



less labour-intensive. Small-scale farmers reported that, under drip irrigation, young family members began attending school, while old family members were better looked after during the extra leisure time gained.

Large-scale farmers also reported an increase in leisure time. But the ranking exercise showed that while smallholders, who do their own labour, put more value on extra leisure time compared with monetary benefits, the opposite is true for large-scale farmers, who mostly hire labour for their operations.

Across all farmers increasing incomes was among the most important benefits of converting to drip irrigation. But, surprisingly, non-monetary benefits in health and education were often considered even more vital, especially by small-scale farmers.

For the two public sector agencies involved in the stakeholder analysis, non-monetary benefits were also extremely important. The agricultural sector consumes 80 per cent of all surface water in Tadla and efficiently allocating scarce water resources has become a politically difficult task. For the Water Basin Agency, which is in charge of this task, the most important benefit of drip irrigation is that, through improved water use efficiency, it will reduce agricultural water demand and make it easier to allocate water among different sectors.

ORMVAT similarly identified easier regional water management as the most important benefit of switching to drip irrigation, saying that it expected the move to provide a solution to the deteriorating water deficiency problem in the area and alleviate political issues caused by water shortages.

Both the Water Basin Agency and ORMVAT acknowledged environmental benefits, in terms of reduced pressure on groundwater resources, which are expected to improve in quality and become more sustainable. ORMVAT also recognised as important

benefits lower maintenance costs, enhanced food security and improved relations with farmers.

Added value

Using a stakeholder analysis to evaluate adaptation policies offers a more complete picture of impacts than economic analysis alone. Moreover, ranking all realised benefits enables policymakers to assess non-monetary benefits to stakeholders on the same scale as monetary ones.

In Morocco, the most important benefits of adaptation — for both private and public stakeholder groups — were found to be non-monetary. Adding a stakeholder analysis to the evaluation of adaptation policy here added to the economic insights from a cost-benefit analysis in three important ways.

Highlighting cross-sector benefits. The stakeholder analysis identified positive spillover impacts of adaptation on other development objectives, such as health and education. The switch to drip irrigation is also helping include smallholders in the development of the agricultural sector, a major objective in the Green Morocco Plan. The government bears the full cost of equipment for the drip irrigation system for farmers with less than five hectares of land. This financial support opens the door for many more smallholders to participate in the scheme, which would otherwise be too expensive for small-scale farmers. All farmers are also given technical support to operate and maintain the equipment and fertilise under the Green Morocco Plan. Knowing the cross-sector benefits of individual projects could improve the efficiency of adaptation funding, and provide a mechanism for pooling financial resources for adaptation policies.

Identifying areas of mutual interest. The stakeholder analysis in Morocco also revealed overlapping interests between public and private stakeholders. For example, increased water use efficiency, which benefits public stakeholders by enabling easier allocation of water; and benefits the private sector through farming income and health improvements. These common interests can form a basis for cooperation and collaborative decision making among stakeholders.

Under the Green Morocco Plan, such collaboration has already been achieved. The decision to switch to drip irrigation can only be made if at least 70 per

cent of farmers agree to it. Smallholders may own a disproportionately small area of farmland in Tadla but they far outnumber commercial farmers, which means that unless a substantial number of them choose to participate, the switch to drip irrigation won't happen. Because of that, the scheme not only builds adaptive capacity, but also represents smallholders' interests.

Stakeholder analyses could similarly support the integration of public and private sector interests in switching to drip irrigation in other regions of Morocco, as well as in implementing alternative adaptation policies in the water sector.

Assessing adaptive capacity. The stakeholder analysis identified how non-monetary benefits of adaptation help reduce vulnerability among farmers. Besides improvements in health and education, non-monetary benefits were more control over crop yields and extra free time to pursue non-agricultural activities that complement farming income. Both of these help farmers to diversify their assets and reduce their vulnerability to the negative impacts of extreme and unpredictable weather conditions on agriculture.

There is little doubt that using a stakeholder analysis and ranking exercise to measure the development and adaptation success of Morocco's move to drip irrigation in Tadla has provided important insights on the distributional costs and benefits that would not have emerged from an economic evaluation alone. In particular, it has highlighted the relative importance of non-monetary benefits that might otherwise have been grossly underestimated.

But stakeholder analysis does not attempt to inform on financial feasibility. Methods such as the contingent ranking exercise used in Morocco can only estimate the magnitude of non-monetary benefits if information on the monetary benefits to the same stakeholders is already available. That is, if it is used to complement, rather than replace, economic cost-benefit analyses.

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Notes

- ¹ Green Morocco Plan. 2011. *Place de l'économie d'eau en irrigation dans la stratégie du Plan Maroc Vert - Séminaire sur les défis de la reconversion collective à l'irrigation localisée au Maroc: quelle démarche et quelles perspectives?* Ministry of Agriculture and Maritime Fisheries, Rabat ■ ² World Bank. 2011. *Integrating climate change in the implementation of the Plan Maroc Vert project, Morocco. Project appraisal document.* Middle East and North Africa Region Agriculture & Rural Development Unit, World Bank, Washington DC. ■ ³ Loomis, J. *et al.* 2000. Measuring the total economic value of restoring ecosystem services in an impaired river basin: results from a contingent valuation survey. *Ecological Economics*. 33 103–117 ■ ⁴ Lunduka, R. Personal comment to author. 2011 August ■ ⁵ See www.iied.org/sustainable-markets/key-issues/environmental-economics/economics-climate-change-adaptation-water-sec