

# Private adaptation of adaptation goods: potential and policy instruments

## Key Messages

- Private adaptation can contribute to societal resilience and development through innovation and technological development, and through investments preventing disruption to economic activities.
- Private adaptation can work best when private actors have a good awareness of climate change issues and when returns on investment occur in the short-term.
- Private actors have few incentives to provide public adaptation goods where those goods do not result in clear private benefits. Public intervention may be necessary for securing the provision of adaptation public benefits.
- Effective policy frameworks for fostering private adaptation are very contextual and can draw on a large range of policy instruments. Their development needs to be grounded in a sequential and adaptive process.

## Context

Much focus in policy emphasises the role of the public sector in delivering adaptation action (Osberghaus et al., 2010). Nevertheless, in liberal economies, private actors strongly influence decision-making in many economic sectors. Private actors are economic agents, i.e. individuals, non-governmental organisations and businesses as varied as manufacturers, landowners, insurances and water service companies.

Private actors can act as drivers for innovation, technological development and the diffusion of adaptation technologies and practices. A more resilient private sector can also protect society from large-scale economic costs. Investment from the private sector in securing production and supply of economic goods and services, taking into account climate extremes and long term climate change risks, can prevent local disruption of economic activity and global risks in economic systems.

### Policy and methodological developments

This following presents general guidance for exploring the scope for private provision of adaptation goods in any decision context. Three assessment steps are proposed:

- To **identify** where there is **scope for private provision of adaptation**
- To **examine** the **scope of public involvement** in fostering private participation
- To **assess** the **potential performance of public instruments** for fostering private adaptation

The first step is to identify where there is scope for private provision of adaptation. This involves examining the benefits of adaptation measures to public and private actors. Table 1 includes examples of adaptation measures potentially resulting in public benefits in key sectors. Public benefits are interpreted in the broad sense, in that benefits that may appear at first mostly private (e.g. re-locating private assets beyond areas at risk) can ultimately have some public benefits (e.g. increased energy security, reduced risk of service supply, reduced costs for the whole economy). The challenge is to identify when (cumulative) private benefit results in a public benefit.

It is important to note that the design, location or extent of an adaptation measure can affect its delivery of public benefits. For example, the uptake of household water saving technologies will only have a noticeable public benefit against water scarcity (i.e. aggregated reduction in water demand) when enough households have adopted those technologies. In other situations, private adaptation may result in negative externalities. For example, flood embankments protecting private farmland in the upland may increase the risk of urban areas being flooded downstream. Avoiding those negative externalities can be seen as a public benefit: an alternative measure to building a flood embankment may be to promote less intensive farming practices upstream to protect urban

areas downstream. Such adaptation measure may then not be optimal for the individual farmers, but beneficial for the public.

**Table 1. Examples of private adaptation measures delivering adaptation goods with public benefit (in brackets: relevant public benefit).**

<b>Sectors</b>	<b>Temperature changes</b>	<b>Storms</b>	<b>Water scarcity and droughts</b>	<b>Flooding</b>	<b>Sea level rise</b>
<b>Agriculture &amp; forestry</b>	Adequate crop selection (food security)	Use of tree shelters and hedgerows (soil erosion control)	Water efficient technologies (water demand reduction)	Reduced impact logging (run-off infiltration)	Natural habitat restoration (wave energy buffer)
<b>Built environment</b>	Cooling systems (reduced risk to human health)	High resistance material for buildings (reduced risk to life)	Greywater reuse (water demand reduction)	Sustainable urban drainage systems (run-off retention)	Raised building foundations (large-scale damage reduction)
<b>Industry</b>	Alternative cooling systems (reduced risk of industrial blackout)	High resistance material for buildings (reduced economic disruption)	Water efficient technologies (water demand reduction)	Re-locating of assets beyond areas at risk (reduced economic disruption)	Re-locating of assets beyond areas at risk (reduced economic disruption)

The second step is to examine the scope of public involvement in fostering private participation. It is assumed that private actors may therefore only deliver adaptation goods where the private benefits of taking action are clear and significant. Table 2 presents potential links between climate-induced risks (e.g. on production systems) and benefits in taking adaptation action. Purely self-interested individuals may take pro-active adaptation action against such risks when the benefits incurred to them outweigh the costs. A farmer for example would build a dyke to protect a shed or a valuable crop, while businesses would buy private insurance or prepare for alternative supply chains (e.g. transport of goods) against extreme weather events.

**Table 2. Opportunities for adaptation in the private sector. Adapted from SCCIP (2010)**

<b>Type of risk</b>	<b>Description of risk</b>	<b>Private adaptation option</b>	<b>Private benefits</b>
<b>Production risks</b>	Changes in type, quality and quantity of primary products	Development of alternative supply sources (e.g. development of new crop variety)	Reducing risk of supply scarcity, responding to future regulatory changes, and securing competitive advantage
<b>Logistical risks</b>	Disruptions and damages to operations, transportation, infrastructure, and products (e.g. damages to rail network)	Redundancy and flexibility in supply chains and business operations (e.g. alternative trade routes)	Reducing losses during extreme events, enhancing trust in company, and attract investment
<b>Financial risks</b>	Climate vulnerable investments, customer default, loss of value	Diversification of portfolio and activities (e.g. alternative income sources, investment in climate proofed projects)	Reducing vulnerability to future environmental and financial shocks

Private provision of adaptation should occur when market failure is minimal: private actors have good awareness of climate; there is a clear private benefit in taking action; and benefits materialise in the short term. The degree of public involvement in supporting private adaptation should be dependent on considering (i) how it helps maximise welfare of individuals and groups disproportionately impacted by climate change impacts and adaptation, or (ii) how it helps maximise public benefits.

It is important to note that the level of public involvement depends on broader political and social dimensions. For example, different political ideologies and worldviews may support or challenge public intervention for supporting private action. Public provision may be acceptable where fair and equitable distribution of costs and benefits between social actors and groups is of key importance, and actors believe that the state has a role in re-distributing these costs and benefits. There are also challenges with incentivising greater private adaptation, such as the moral hazard with shifting public responsibilities in adaptation to private entities.

The third step is the examination of possible public policy instruments (Table 3).

Awareness-raising aims to foster adaptation by informing and encouraging private actors in understanding, assessing and managing climate change risks. Information is produced and disseminated, but no enforcement mechanism is required. For policy-makers therefore, the challenge when designing awareness-raising programmes is to select adaptation actions that clearly benefit private actors, but that ultimately result in public benefits.

Regulations put legal requirements on societal actors to take specific adaptation action without financial support or compensation. Regulations may be particularly justified when a private action has strong negative externalities on societies' adaptation level. Regulations may be used to ensure specific performance standards in some private markets or to ensure private investments are climate proofed (e.g. building codes).

Public-Private-Partnerships (PPPs) include a class of contractual instruments between public and private actors that enhance the ability of the public sector to provide public services thanks to the involvement of the private sector. For the private sector, PPPs represents opportunities to secure long-term business opportunities in adaptation while minimising financial risks. Many forms of PPPs exist depending on the degree of control by the public sector over strategic decisions and on the specific responsibilities of public and private sectors over the construction, operation and maintenance of the infrastructure.

**Table 3. Advantages and disadvantages of policy instruments for fostering private adaptation**

<b>Policy instrument</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Awareness-raising</b>	Can contribute to bridge the information gap on climate change impacts and the benefits of taking pro-active action; low transaction costs	Will result in private adaptation only if private benefits are clear
<b>Regulations</b>	Can open new business opportunities through setting common performance requirements	Can face significant non-compliance issues and entail high costs for monitoring and enforcement. Legitimacy undermined by large uncertainties pertaining to climate change adaptation
<b>Public-Private Partnership</b>	Can help leverage private sector investment to deliver resilient infrastructures and enhance performance under changing climatic conditions	Complex instruments which requires adequate regulatory oversight
<b>Subsidies</b>	Can secure provision of non-market benefits	Potential for moral hazard when used to prevent negative externalities. Rely on voluntary uptake, which may not be efficient in fostering large-scale uptake
<b>Taxes</b>	Wide applicability and can foster large-scale adaptation	Can receive strong social opposition

<b>Insurances</b>	Can mitigate large-scale risks. Help communicate to private actors new risks associated with climate change	Mainly to mitigate potential losses of private actors rather than directly securing public benefits
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Subsidies are payments from public bodies to private actors with the objective of incentivising specific technological or behavioural change. They are relevant the delivery of public adaptation goods by private actors is not rewarded by the market (e.g. financial gain) or society (e.g. reputational gain). Subsidies may also be used to prevent specific private practices that result in loosing adaptation goods (i.e. negative externalities). Taxes are also compulsory payments, but applied by a fiscal authority onto private actors for encouraging uptake of specific practices or technologies. In adaptation, taxes can increase the short term costs of taking non-resilient behaviours. A land use tax on sealed soil area could provide an incentive for avoiding further sealing (which would exacerbate flood risk downstream). In addition, taxes can create demand, and therefore business opportunities, for adaptation products or services.

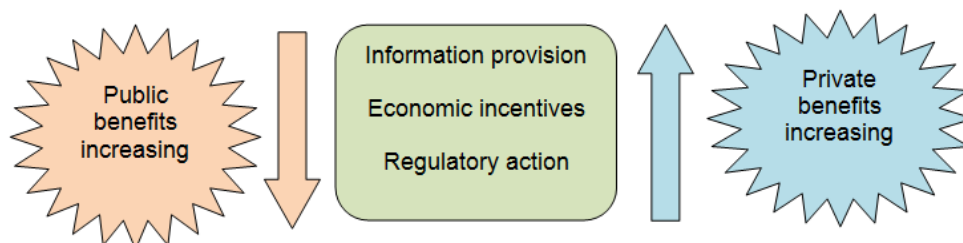
Insurances are economic instruments that are put in place before a disaster, and share and pool risks in order to create entitlement to compensation after a disaster (Bräuningner et al., 2011). The main focus of insurances is to help the insured body cope with private losses due to exceptional events, and, as such, they mainly result in private benefits. However the use of insurance can help spread large-scale risks, thereby increasing the resilience not only of individual actors but whole regions, countries or sectors.

#### Main implications and recommendations

Private adaptation measures can be considered as contributing to different degrees to societal resilience and development. Public intervention may be necessary, and justified, for securing the provision of adaptation public benefits. One may think of a “ladder” of increased regulatory control as more public benefits are expected at the expense of private benefits (Figure 1).

Public involvement may be minimal (e.g. awareness-raising, small grants for capital investment) if there is the potential for high levels of private benefits in taking adaptation action, for instance when adaptation leads to avoiding business disruptions against extreme events. Economic incentives or regulatory action may be necessary where adaptation measures mostly deliver public benefits and no or few private benefits, or act against private interests. Policy mixes may help overcome the comparative disadvantage of different policy instruments.

Given the local and regional nature of adaptation, policy frameworks for fostering private adaptation are likely to be very contextual. Their development and implementation needs to be grounded in a sequential and adaptive process, which considers the particularities of the local institutional environment, and environmental, social and economic issues and priorities.



**Figure 1. Ladder of policy instrumentation for private adaptation**

## **Exploring the potential for private adaptation in two local projects: the Vtlava and Bilbao case studies**

The potential for private adaptation was explored in two ECONADAPT case studies on flood protection under climate change. In the Vtlava case study (Czech Republic), adaptation measures consisted of earth dikes, reinforced concrete walls and mobile barriers. Avoided damages identified include reduced loss to infrastructure such as roads and agriculture. In the Bilbao case study (Spain), the main adaptation measures to coastal flooding was the opening of the a channel and the raising of the nearby land. Avoided damages include reduced damage to cultural heritage, the rail network and private property. A total of 389,654 m<sup>2</sup> divided in 208 urban plots owned by 59 different institutions, private entities and owners could become developed.

Measures proposed in both case studies offered benefits for the private sector in terms of reduced production risks (e.g. from loss of crops) and logistical risks (e.g. reducing losses due to traffic disruptions). In theory thus, the private sector could contribute to the implementation of flood protection measures, through e.g. financing, implementing measures, providing land, etc thereby reducing financial and logistical costs incurred by the public sector.

Overall, public bodies have not sought strong private involvement. Other adaptation measures with more emphasis in private involvement could have been considered in the two case studies, for example increased preparedness by households and businesses and farmers' modification to agricultural practices to reduce field run-off. In the Vtlava case, the local administrations were financing and delivering the proposed measures. No options were investigated through user-based financing (where beneficiaries of the flood protection measures were charged for their completion and maintenance). In Bilbao, public authorities financed and delivered the opening of the channel. However, some private involvement was realised through the financing of the land raising by five property owners of the protected area.

### **Bibliography**

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Osberghaus, D., Dannenberg, A., Mennel, T., Sturm, B. (2010), The role of the government in adaptation to climate change. *Environment and planning. C, Government & policy*, 28(5), 834.

### **Further Information**

[Distributional objectives and non-monetary metrics: Private provision of public adaptation goods \[pdf\]](#)

[The economic appraisal of adaptation investments under uncertainties \[pdf\]](#)

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