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Building an Evidence Base on Private Sector Engagement in Financing Climate Change Adaptation

Report prepared for EBRD

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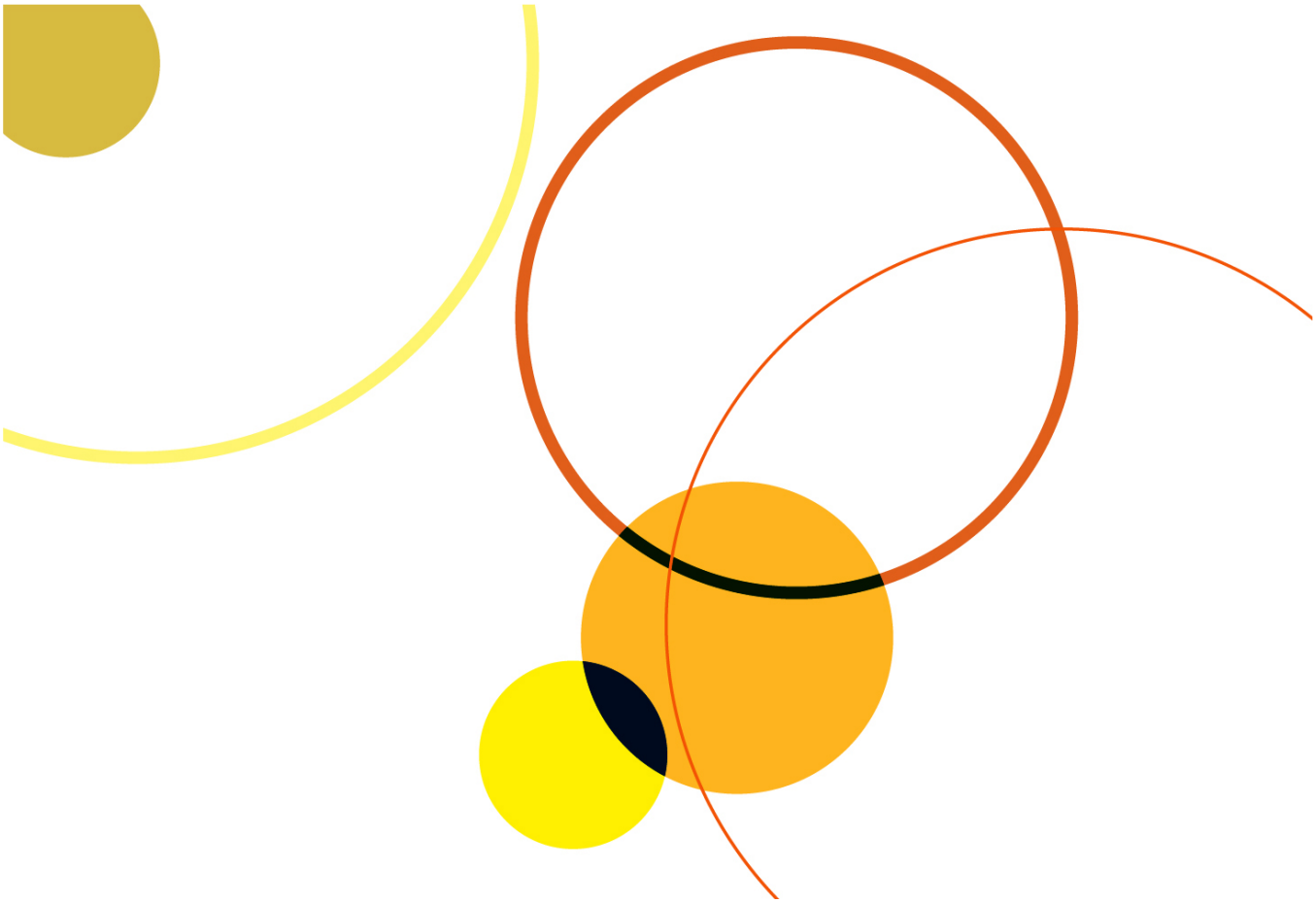

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Executive Summary

This report documents and draws lessons from multilateral development bank (MDB) activity on private sector adaptation to strengthen the evidence base in this so far under-researched area. The private sector is key to addressing the challenge of adaptation to climate change. This is widely recognised and the major climate finance mechanisms such as the Climate Investment Funds (CIF) and Green Climate Fund (GCF) are developing private sector adaptation programmes. However, the factual evidence on which the debate draws, and on which the design of these new programmes is based, is very weak. The purpose of this report is to strengthen this evidence base.

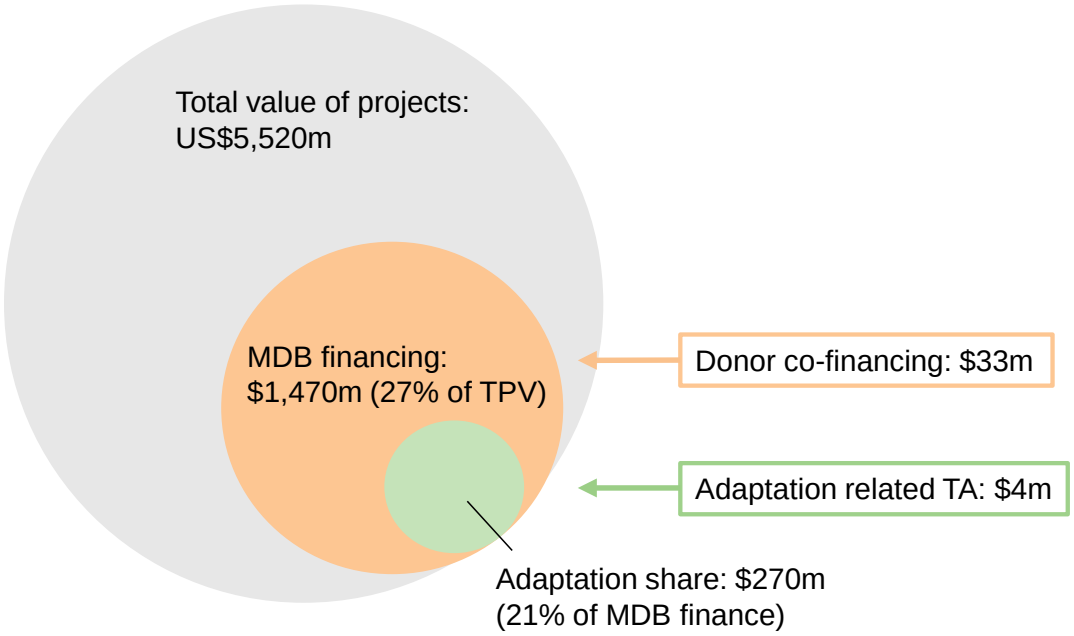
The experience of MDBs with private sector adaptation allows drawing preliminary conclusions on some of the key issues in the adaptation finance debate. They include questions of (i) targeting and financial leverage; (ii) the geographical distribution of private sector adaptation finance; (iii) the role of donor co-financing, which may take the form of capital expenditure (CAPEX) grants, and concessional loans; (iv) the role of technical assistance (TA); and (v) ways to enhance the impact of MDB operations in private sector adaptation finance.

The evidence base

MDB private sector adaptation finance in 2013–14 equalled US$270 million, which made a total of $1.5 billion of MDB investment more climate-resilient. Between 1 January 2013 and 31 December 2014, MDB finance was supported by $33 million of donor co-financing, consisting of CAPEX grant and concessional loan resources. A total of $4 million of TA was associated with the adaptation component of the projects.

The EBRD provided most private sector adaptation finance, followed by the EIB, IDB and IFC. The EBRD provided $162 million of private sector adaptation finance for 18 projects. The EIB provided $84 million of private sector adaptation finance for four projects. The IDB provided $14 million of private sector adaptation finance for three projects and IFC provided $9 million private sector adaptation finance for one project.

Figure 1. **In 2013–14 a total of $270 million of MDB private sector adaptation finance made $1.5 billion of MDB finance more climate-resilient**



Note: *TPV = total project value, MDB = multilateral development bank, TA = technical assistance*

Source: *Vivid Economics*

Lessons on targeting and financial leverage

Private sector adaptation finance is highly leveraged. Over the period 2013–14, the MDBs provided $270 million of private sector adaptation finance. These funds were sufficient to make $1.5 billion of MDB finance more climate-resilient. The total project value of MDB investments with adaptation components was $5.5 billion. The result was achieved with the support of $33 million of donor co-financing and $4 million of adaptation-related TA. While action needs to be scaled up, this suggests that MDB interventions can be effective in mobilising private capital and supporting climate resilience.

The sector focus of MDBs is broadly consistent with known adaptation priorities. Currently the MDB portfolio is focused on infrastructure, water and agribusiness. This corresponds fairly well with identified adaptation priorities, although it probably also reflects the convenience of adding adaptation components to these projects under existing processes, as much as a deliberate attempt to address these priorities. Infrastructure, including water infrastructure, is a priority because current investments lock in vulnerability profiles for the long term. Infrastructure adaptation also accounts for the lion's share of cost in estimates of adaptation needs. Agribusiness investments are attractive because they offer potential win–win opportunities – that is, a combination of climate change and other benefits.

Lessons on the geographical distribution of projects

Over 80 per cent of MDB 2013–14 private sector adaptation finance was delivered in middle-income countries. Private sector adaptation finance reached clients located mainly in Europe, Central Asia, North Africa and the Middle East. This in part reflects the particularly active role that the EBRD has taken in private sector adaptation financing, but also the fact that countries in those regions tend to have relatively stronger private sectors, and therefore more bankable opportunities. Most of the adaptation investments reviewed in this study were in highly competitive sectors or involved long-lived assets associated with sizeable CAPEX. Such investments may imply relatively larger and more creditworthy private sector partners, which are more likely to be found in middle-income countries. Notably, the only investment in a low-income country – a hydropower rehabilitation project in Tajikistan – required significant donor co-financing in the form of concessional loan and CAPEX grant resources.

Lessons on the role of donor co-financing

Donor co-financing has played a modest role to date, but may provide an opportunity for the expansion of MDB private sector adaptation financing activities. Evidence suggests that the potential for using donor co-financing to scale up private sector adaptation finance has not yet been fully exploited. For example, during 2013–14 only two MDB adaptation projects benefited from donor co-financing in the form of concessional loans and CAPEX grant resources. While this shows that MDBs can deliver some private sector adaptation finance without donor support, it also indicates that there may be considerable scope for scaling up private sector adaptation finance through targeted donor support for adaptation investments. This could include approaches that integrate MDB finance, donor co-financing and commercial co-financing.

Lessons on the role of TA

Technical assistance (TA) is an important facilitator of private sector adaptation finance. Most TA has been targeted at clients: many clients had to be convinced of the materiality of adaptation to their investment through resource audits, feasibility studies and other TA tools. A second type of TA could be explored further: technical assistance and policy dialogue to improve the regulatory environment, for example on building codes and planning rules. Impending regulatory constraints have been marked drivers of private sector adaptation finance. Accordingly, there may also be further opportunities for TA that informs market participants about opportunities and potential future compliance costs, such as market studies.

Lessons on MDB effectiveness

Origination processes for private sector adaptation deals are still under development. As the private sector adaptation portfolio of MDBs is growing, the institutions are starting to mainstream climate change across their banking teams as well as their operations and processes, for example through making adaptation explicit in country and sector strategies. Simple management tools such as an adaptation screening note can be helpful in enhancing MDB internal origination mechanisms. It was striking to see how such procedural changes have improved both the efficiency and documentation of the adaptation due diligence at the EBRD in particular. Monitoring and recording of private sector adaptation finance projects is also crucial to

establish a full evidence base around private sector needs, and which MDB practices and approaches are the most effective in addressing these.

Because adaptation projects take, on average, longer to prepare than other projects, opportunities in fast-moving investment operations may be more difficult to exploit. The origination processes, associated TA and generally extended project lead times imply that adaptation finance is more readily developed in investments that have inherently longer project preparation times. Internal teams with responsibility for climate finance have more time to identify and support the development of adaptation components within such projects. This tends to favour, for example, infrastructure projects such as water supplies. An important challenge for MDBs therefore is to better understand the adaptation potential in fast-moving operations and to develop project-level approaches and tools that realise this potential.

1 Introduction

Global decision-makers recognise that the private sector is key to addressing the challenge of adaptation to climate change and must be engaged to facilitate and deliver adaptation measures. While governments have an important role to play, the responsibility for dealing with climate risks will usually rest with private businesses and households. They have to start preparing for climate change now. This is particularly pertinent in developing countries and emerging economies, where the effects of climate change will be significant and investment in long-lived assets that lock in climate vulnerabilities is surging (The Global Commission on the Economy and Climate, 2014).

Accordingly, the major climate finance mechanisms are developing dedicated programmes to promote private sector investment in adaptation measures. These initiatives include the Climate Investment Funds' (CIF) PPCR Private Sector Competitive Set-Aside, and the Private Sector Facility that is being developed by the Green Climate Fund (GCF). Notable initiatives by the United Nations Framework Convention on Climate Change (UNFCCC) include the Private Sector Initiative's database of adaptation case studies, and the Non-state Actor Zone for Climate Action database (UNFCCC, 2014).

Despite these efforts, detailed empirical evidence on existing private sector adaptation finance is lacking – a gap that this study aims to fill. Private sector adaptation finance, its drivers and the activities that are being rolled out are poorly understood. This report seeks to address this gap by assessing private sector adaptation finance delivered in 2013 and 2014 by the multilateral development banks (MDBs). Private sector adaptation finance is defined as the component of MDB investment in the private sector that relates to making the investment more climate-resilient. In some cases, this is investment in an activity such as a credit line of a bank, or product development by a technology company that makes the business of final adaptation finance beneficiaries more climate-resilient. The MDBs aligned their monitoring and reporting methodology for climate finance and have presented headline figures in their annual 'Joint Report on Climate Finance' since 2011 (Group of Multilateral Development Banks, 2014). A breakdown of private sector adaptation finance has been reported since 2013. Complementing the Joint Report, this report presents a set of descriptive statistics and findings from qualitative research through interviews and document review to reach a more robust understanding of current practice. It also draws lessons from experience to date.

This report is a snapshot in time: private sector adaptation and MDB financing of it are evolving. The reported projects and volumes are representative for 2013–14 only. As the frequency and intensity of climatic impacts increase, the private sector is likely to engage in more adaptation activity. The current snapshot has a relatively pronounced focus on EBRD practice, reflecting the overrepresentation of its private sector adaptation projects in the current MDB private sector adaptation finance portfolio, reporting 18 out of 26 projects. It is likely that future iterations of this report will present a more balanced focus on activities across a larger number of MDBs.

There is more private sector adaptation activity than businesses and MDBs are given credit for. Private firms adapt to climate risks in many ways, including as part of standard risk management, and may not necessarily label their activities as adaptation-related. However, adaptation is likely to require further

dedicated action specifically aimed at climate change risks. Like their clients, MDB banking teams are continuing to improve their capacity to identify adaptation opportunities in projects. Many opportunities are still being missed, but at the same time much climate risk management (for example, that relating to current weather risk) goes unrecorded. The projects analysed in this report are likely to represent only a sub-set of the full MDB private sector adaptation finance portfolio.

The report is structured as follows. Section 2 presents evidence from MDB practice over the period 2013—14, reporting relevant detail on its private sector adaptation finance portfolio, origination mechanisms and adaptation finance monitoring tools. Section 3 includes an analysis of clients' drivers and adaptation finance barriers.

2 Evidence from MDB practice

This section presents an analysis of data provided by MDBs on their 2013–14 portfolio of private sector adaptation finance projects. The focus is on investments made by MDBs in the form of loans and equity products in 2013–14. The data was recorded by sending structured questionnaires to the MDBs and enriched through interviews. The team interviewed key MDB banking staff to further unpick some of the origination mechanisms and project drivers and barriers.

This section is structured as follows. Section 2.1 presents a portfolio overview that captures some of the key details of the investments made by MDBs. This data is broken down by geography in section 2.1.1, and by targeted sectors, climate risks and financed technologies in section 2.1.2. Section 2.1.3 looks at the use of donor co-financing. Section 2.1.4 presents detail on technical assistance that was provided – both related and unrelated to investments in 2013–14. Section 2.1.4 presents some additional detail on the instruments provided, loan tenors, lead times of deal development, and borrower size. Section 2.2 analyses private sector adaptation project origination mechanisms and monitoring tools that were used by the MDBs.

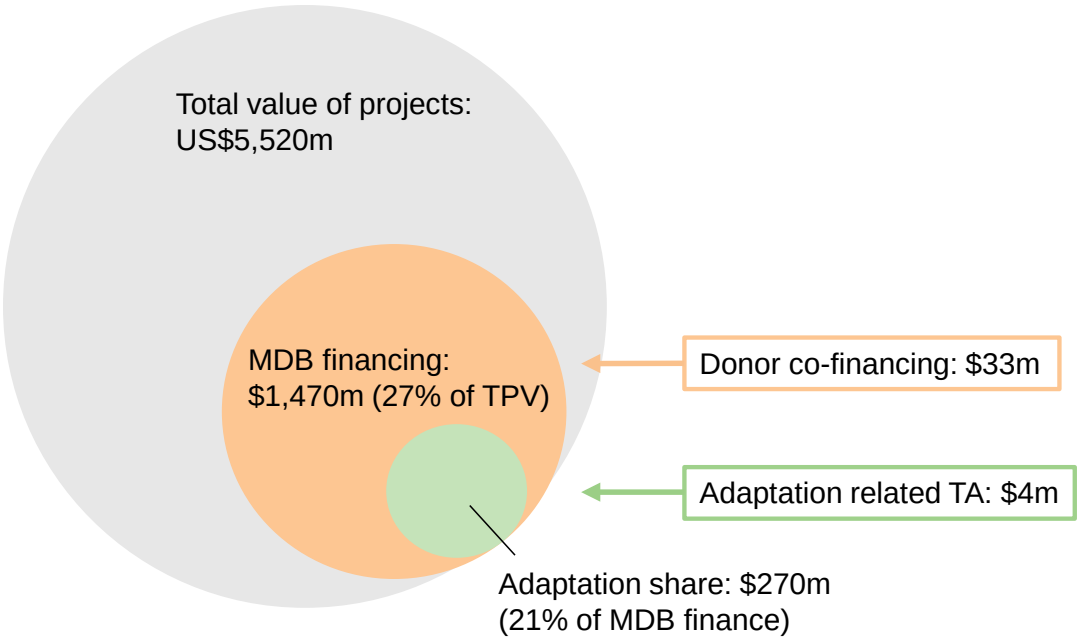
2.1 Portfolio overview

MDB private sector adaptation finance in 2013–14 equalled US$270 million, which made a total of $1.5 billion of MDB investment more climate-resilient. As shown in Figure 2, private sector adaptation finance equalled $270 million in 2013–14. This was part of $1.5 billion of MDB financing in these projects. The total value of the projects with an adaptation component was $5.5 billion. A total of 26 private sector adaptation projects were signed or approved by MDB boards in 2013–14. MDB finance was supported by $33 million of donor co-financing and $4 million of technical assistance (TA) associated directly with the private sector component of the project.

The EBRD provided most private sector adaptation finance, followed by the EIB, IDB and IFC. Breaking down the MDB finance and adaptation components shows that:

- the EBRD provided $162 million of private sector adaptation finance for 18 projects, which made $870 million of investment more climate-resilient;
- the EIB provided $84 million of private sector adaptation finance for four projects, which made $576 million of investment more climate-resilient;
- the IDB provided $14 million of private sector adaptation finance for three projects which were classified as 100 per cent adaptation finance; and
- the IFC provided $9 million private sector adaptation finance for one project.

Figure 2. **Over the period 2013–14, $270 million of MDB private sector adaptation finance made 26 investment projects with a total value of $5.5 billion more climate-resilient**



Note: *TA figures relate to investments signed in 2013–14. Additional TA of $3.6m reported over the period by the IDB is not included in this chart, as it did not relate to investments signed in 2013–14. See Table 1 for more detail.*

Source: *Vivid Economics*

Table 1 presents a breakdown of all 26 private sector adaptation finance projects presented in this report. The projects have been anonymised, as some of the presented data is confidential. The sector classification follows the MDB Joint Report methodology (see Table 2). The adaptation technology categories were created specifically for this study. The data on total project value, MDB finance share, MDB adaptation finance share, donor co-financing and TA were obtained through a data request directed at the MDBs, complemented with analysis of project documentation and interviews with MDB staff. Donor co-financing includes capital expenditure (CAPEX) grants and loans provided with concessional terms, such as extended tenors. The reported TA refers to TA associated directly with the adaptation component, for example feasibility studies and capacity-building programmes that have a specific adaptation focus. TA that is not linked to the adaptation component is not reported.

Table 1. **A detailed overview of the 2013–14 MDB private sector adaptation finance portfolio**

Bank, year	Project activity	Country	Sector*	Adaptation technology	TPV (MDB finance share), $m	MDB adaptation finance, $m	Donor co-financing, $m**	Adaptation TA: type of TA (value, $k)***
EBRD 2013	Seed production	Ukraine	A&ER	More efficient irrigation	59 (8)	1.0		
	Oilseed processing	Romania	A&ER	Dry process	319 (52)	8.0		
	Sugar production, trade and other agriculture	Serbia	A&ER	More efficient irrigation	65 (65)	32.0		

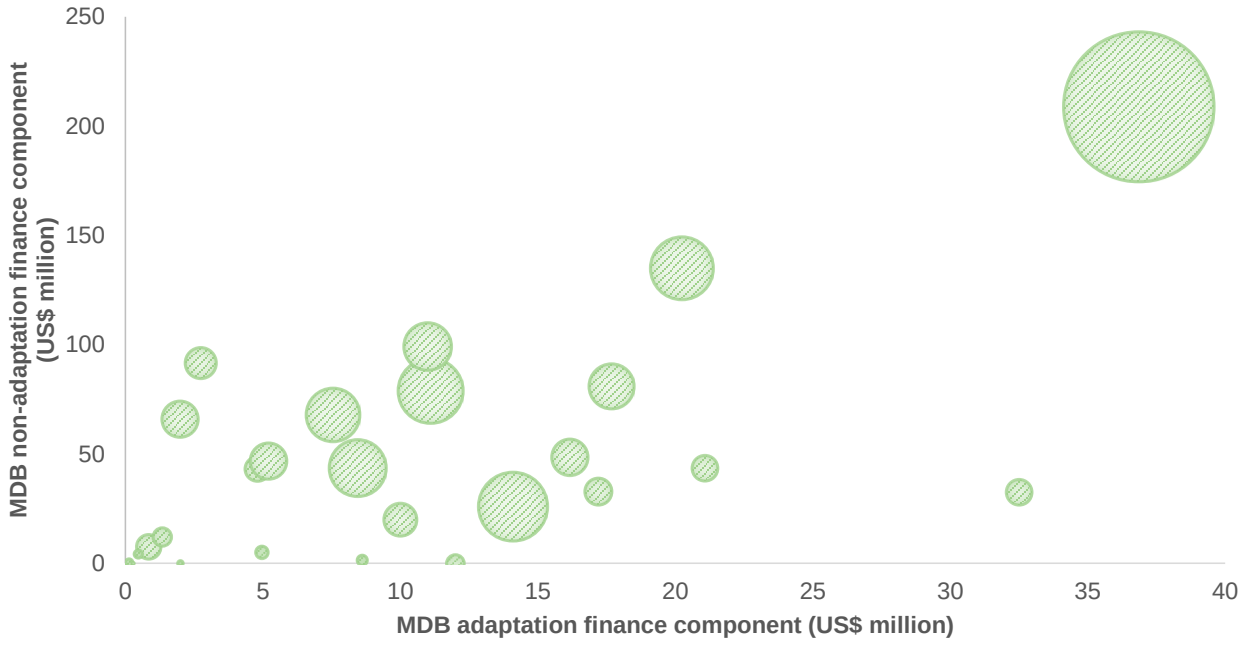
Bank, year	Project activity	Country	Sector*	Adaptation technology	TPV (MDB finance share), $m	MDB adaptation finance, $m	Donor co-financing, $m**	Adaptation TA: type of TA (value, $k)***
	Juice production	Morocco	A&ER	Water-efficient technologies	6.0 (5)	0.5		RA (26)
	Real estate development	Jordan	E,T,OBE&I	More energy- and water-efficient cooling system	282 (75)	8.0		RA (63)
	Grain and poultry production	Ukraine	A&ER	More efficient crop management	94 (94)	3.0		
	Dairy products and juices	Egypt	A&ER	Water-efficient technologies	128 (68)	2.0		RA (65)
	Wastewater and water supply	Kazakhstan	W&WWS	Leak prevention, treatment and demand-side measures	33 (13)	1.0		FS (347)
	Municipal services	Regional (Western Balkans)	W&WWS	Leak-prevention, treatment and demand-side measures	130 (52)	5.0		FS (488), CB (750)
EBRD 2014	Coal briquettes production	Mongolia	I, EI,M&T	Water recycling/reuse	15 (10)	5.0		RA (75)
	Hydropower	Georgia	E,T,OBE&I	Additional water reservoirs	416 (90)	11.0		
	Energy services company	Jordan	W&WWS	Leak-prevention, treatment and demand-side measures	6.0 (0.4)	0.1		
	Oil and gas production	Kazakhstan	I, EI,M&T	Water recycling/reuse	200 (99)	18.0		
	District heating and cooling	Jordan	E,T,OBE&I	More energy- and water-efficient cooling system	106 (30)	10.0		
	Resource efficiency credit line	Turkey	FI	Water-efficient technologies	65 (65)	21.0		MS (88), CB (121)
	Harbour expansion	Poland	C&RI	Higher port quay	467 (40)	14.0		CCRA (45)
	Residential buildings credit line	Turkey	FI	Water-efficient technologies	60 (48)	5.0	12 (DCF)	MS (88), CB (168)
	Hydropower	Tajikistan	E,T,OBE&I	Hydropower turbine and dam safety upgrade	71 (50)	17.0	11 (CG), 10 (DCF)	FS (736), CB(955)
EIB 2014	Fruit tree plantation	Moldova	A&ER	More efficient irrigation	388 (155)	20.0		
	Rural development	Romania	A&ER	Flood and erosion management	2,215 (246)	37.0		
	Grain elevators	Ukraine	A&ER	Improved grain elevators and silos	129 (65)	16.0		
	Agri-food production	Ukraine	A&ER	Improved grain elevators and silos	222 (110)	11.0		
IDB 2013	Adaptation in agriculture	Nicaragua	A&ER	More efficient crop management	0.4 (0.3)	0.3		CB****
	MSME climate resilience	Regional	A&ER	More efficient crop management	3.0 (2)	2.0		
IDB 2014	Coffee plantation renovation	Nicaragua	A&ER	More efficient crop management	30 (12)	12.0		
IFC 2013	Non-GMO crop improvement	Israel	A&ER	Agricultural crop resilience	10 (10)	9.0		
Grand total					*5,520 (1,470)*	*270*	*33*	*4,015*

Note: ** Abbreviation of MDB sector classification. ** DCF = donor co-financing, CG = CAPEX grant. *** RA = resource audit, FS = feasibility study, MS = market study, CB = capacity building, CCRA = climate change resilience assessment. The adaptation component of pre-signing TA is estimated at 100 per cent; the adaptation component of post-signing TA is estimated at the same pro rata as the adaptation component of the overall MDB financing. **** This IDB project included a capacity-building element with an unknown value.*

Source: *Vivid Economics*

Adaptation investments tend to increase with overall project size, suggesting that adaptation measures are an integral part of MDB-financed project activities. Figure 3 charts MDB private sector adaptation finance on the horizontal axis against MDB non-adaptation finance on the vertical axis and total project volume represented by the bubble sizes. Although we did not establish statistical significance, there is a positive correlation between the size of the total MDB investment and the adaptation finance component. The large bubble in the top-right corner is the EIB's rural development project in Romania, which can be considered an outlier (see Box 1). There appears to be a weaker but still observable correlation between total project value and the size of the adaptation finance component. It appears that making MDB private sector finance climate-resilient does not incur a fixed cost. Instead, the larger the project, the more finance is needed to make it climate-resilient. This is in accordance with the fact that adaptation measures are generally entrenched in project activity and not a matter of a quick and simple add-on.

Figure 3. **Projects with a larger MDB non-adaptation finance component generally have larger adaptation finance components**



Note: *Bubble size represents total project value. The large bubble in the top-right corner is the EIB rural development project in Romania, which can be considered an outlier.*

Source: *Vivid Economics*

Box 1. **The EIB's EU co-financing of a Romanian rural development programme targeting the private sector: large-scale investment projects and their adaptation components**

In 2014 the EIB extended a large loan facility of $246 million to finance priority projects under the Romanian Rural Development Programme. The Programme is managed by the Ministry of Agriculture and Rural Development. The total project value in 2014, in which the EIB investment represents the share of European Union co-financing, was $1,970 million. Beneficiaries of the programme include small-scale farmers and forest holdings.

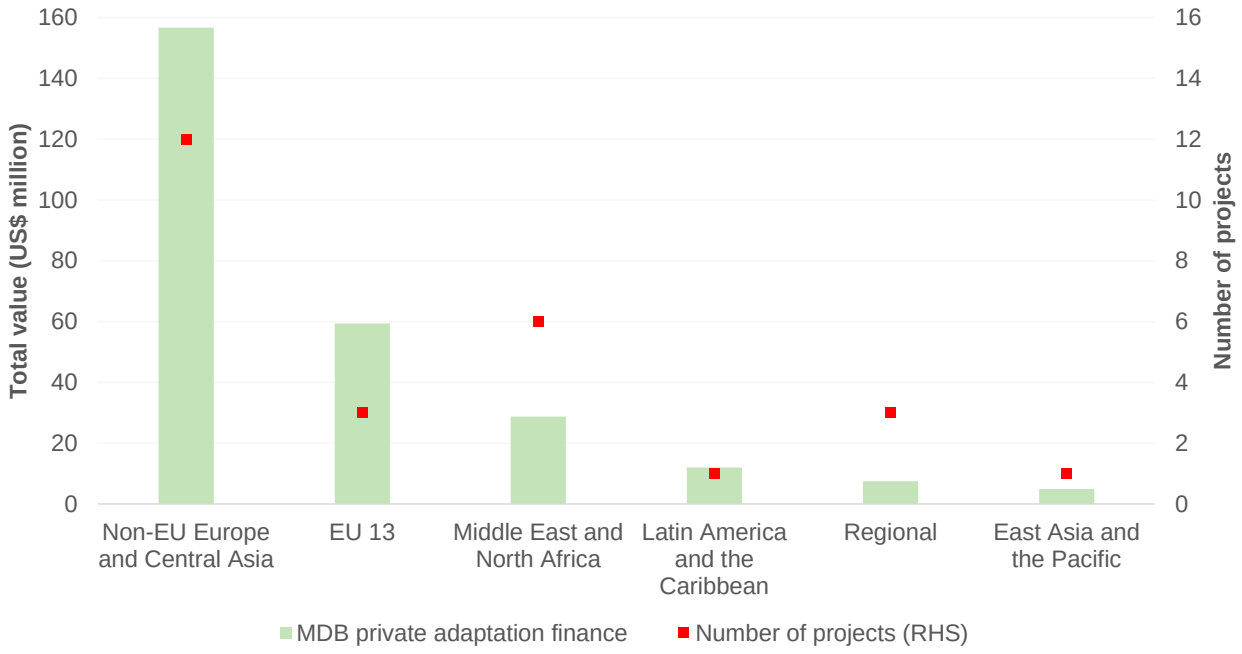
The EIB loan will support selected environmentally- and forestry-oriented activities. The activities to be financed include small-scale agricultural infrastructure to reduce pollution, improvements in energy efficiency and increased use of renewable energy; improved forest management and protection; afforestation; erosion and flood control measures; and development of rural tourism (European Investment Bank, 2014).

The EIB estimated the adaptation component of the loan to be about 15 per cent, or $52 million of its total loan facility. The bank cites improved forest management on 2,400 forest holdings, with erosion mitigation measures on 60,000 hectares and flood mitigation on 40,000 hectares, as well as post-flood repair contributions in 100 communes, as the main adaptation-related activities. These activities are associated with a range of adaptation benefits related to addressing the frequency and magnitude of spring floods and summer droughts that have been rising over the last 16 years, leading to increases in forest fires and flood damage. The bank estimates that around 15 per cent of its loan will flow to these activities.

2.1.1 Geographies

Most MDB private sector adaptation finance in 2013–14 has gone to Non-EU Europe and Central Asia, which is unsurprising given the relatively stronger enabling environment for private sector activity in this region. This can be seen from Figure 4, which breaks down MDB private sector adaptation finance volume and the number of projects by the regions defined in the MDB Joint Report. Large recipients in the Non-EU Europe and Central Asia region include Serbia, Turkey and Ukraine. The EU 13 was another major beneficiary, with projects in Romania and Poland. This may be the consequence of a biased sample, with 22 out of 26 projects reported by the EBRD and EIB. Another explanation is that transition countries in Central and Eastern Europe and the former USSR are highly vulnerable to climate change impacts and, in addition, have a relatively more developed private sector with a stronger enabling environment – arguably a determining factor in absorptive capacity for private sector adaptation finance. The average private sector adaptation finance volume per project in the two top regions is significantly higher than elsewhere, which further substantiates the point that transition economies may have a higher absorptive capacity for private sector adaptation finance.

Figure 4. **The Non-EU Europe and Central Asia region is the largest beneficiary of MDB private sector adaptation finance in 2013–14**

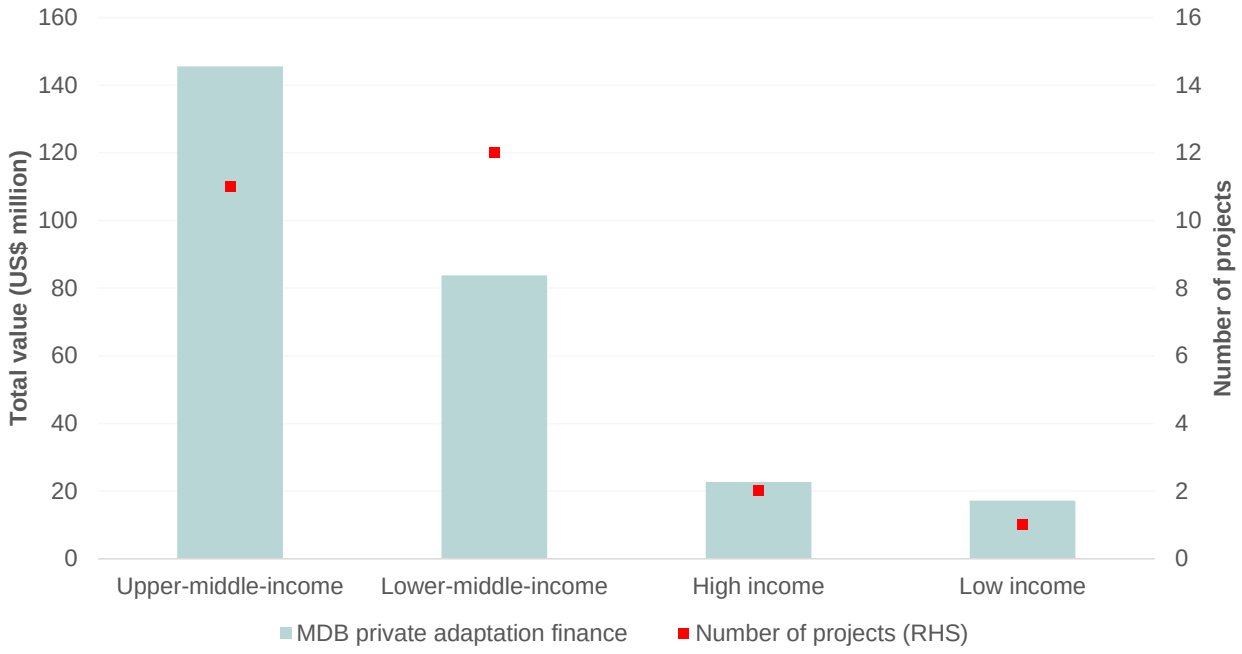


Note: *RHS = right-hand side.*

Source: *Vivid Economics*

The breakdown of recipient geographies by income category further corroborates this picture, showing that over 80 per cent of private sector adaptation finance was delivered in middle-income countries. Figure 5 presents a breakdown of private sector adaptation finance flows and number of projects by income category. The emerging picture is that middle-income countries are heavily overrepresented in the MDB private sector adaptation finance portfolio over 2013–14, and upper-middle-income countries particularly so. Low- and high-income countries received only $40 million of MDB private sector adaptation finance, less than a fifth of the total. More than half of the total MDB private sector adaptation finance flows to upper-middle-income countries. As discussed above, this finding may be largely attributable to the stronger enabling environment for private sector activity and higher absorptive capacity for private sector adaptation finance in middle-income countries than lower-income countries.

Figure 5. **Middle-income countries received more than 80 per cent of MDB private adaptation finance in 2013–14**



Note: *RHS = right-hand side. Income categories are as defined by the World Bank.*

Source: *Vivid Economics*

2.1.2 Sectors, risks and technologies

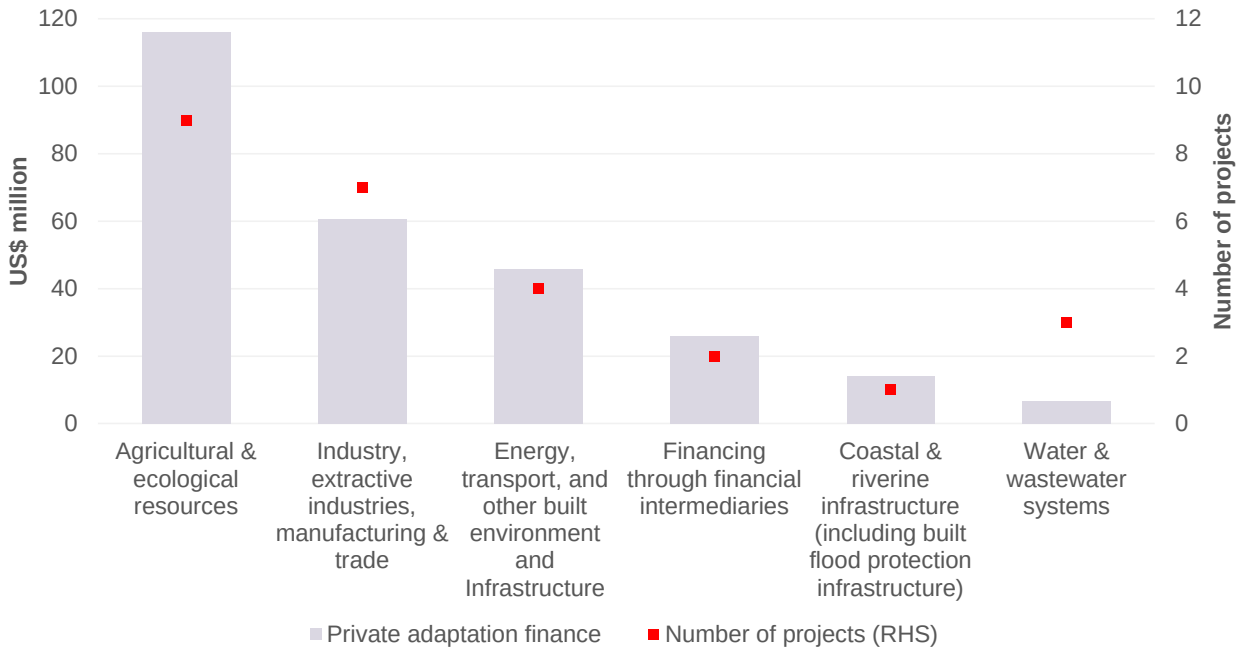
Adaptation finance currently flows mainly to agricultural and ecological resources, followed by the industry, extractive industries, manufacturing and trade sector. Figure 6 presents the breakdown of MDB private sector adaptation finance volume and project count by sector. Table 2 presents the sector grouping as applied by the Joint Report on MDB Climate Finance.

The largest beneficiary of MDB private sector adaptation finance, the agricultural and ecological resources sector, received adaptation funding of $116 million over 2013–14. Nine out of 26 investment projects were in this sector, spanning a wide range of activities across the MDB regions. The high number of projects in the sector is in accordance with the portfolio concentration in regions that are highly vulnerable to projected increases in droughts and increased desertification due to water demand, including Central Asia and North Africa (IPCC, 2014). This is a major threat to activities that the MDBs are supporting. Examples include the EBRD's 2013 seed production project in Ukraine, where a $1 million improvement in irrigation machinery was funded to improve the drought resilience of its client's activities. Similarly, in the same year in Serbia, the EBRD financed a $32 million upgrade of irrigation equipment to improve the resilience of sugar beet production to drought. The EIB addressed increased water scarcity in the sector through projects including a fruit tree plantation in Moldova, to which $20 million was allocated for improved seedling production and new intensive plantations with drip irrigation systems. The IDB also has a number of projects in the sector that address increased water scarcity and heat stress, including a regional facility for building climate resilience in micro, small and medium-sized enterprises ($2 million of adaptation finance), and a green microfinance for adaptation programme in Nicaragua ($280,000 of adaptation finance). Both

programmes seek to improve the climate resilience of the agricultural sector by introducing technologies for improved crop management.

With seven projects receiving $61 million of private sector adaptation finance, the industry, extractive industries, manufacturing and trade sector is another major private sector adaptation finance recipient. This sector includes some major food-processing projects, such as two EIB financing packages in Ukraine receiving a total of $27 million private sector adaptation finance. The adaptation finance is extended for new grain elevators and silos that improve grain and oilseed storage capacity and quality. This reduces post-harvest losses and increases capacity to make the most of good years in order to mitigate variability and the impact of extreme weather events. The EBRD in 2013 funded water-efficiency measures in dairy and juice-production facilities in Egypt and Morocco, where the cumulative adaptation component was estimated at $2.5 million.

Figure 6. **The agricultural and ecological resources sector is the main beneficiary of private sector adaptation finance**



Note: *RHS = right-hand side.*

Source: *Vivid Economics*

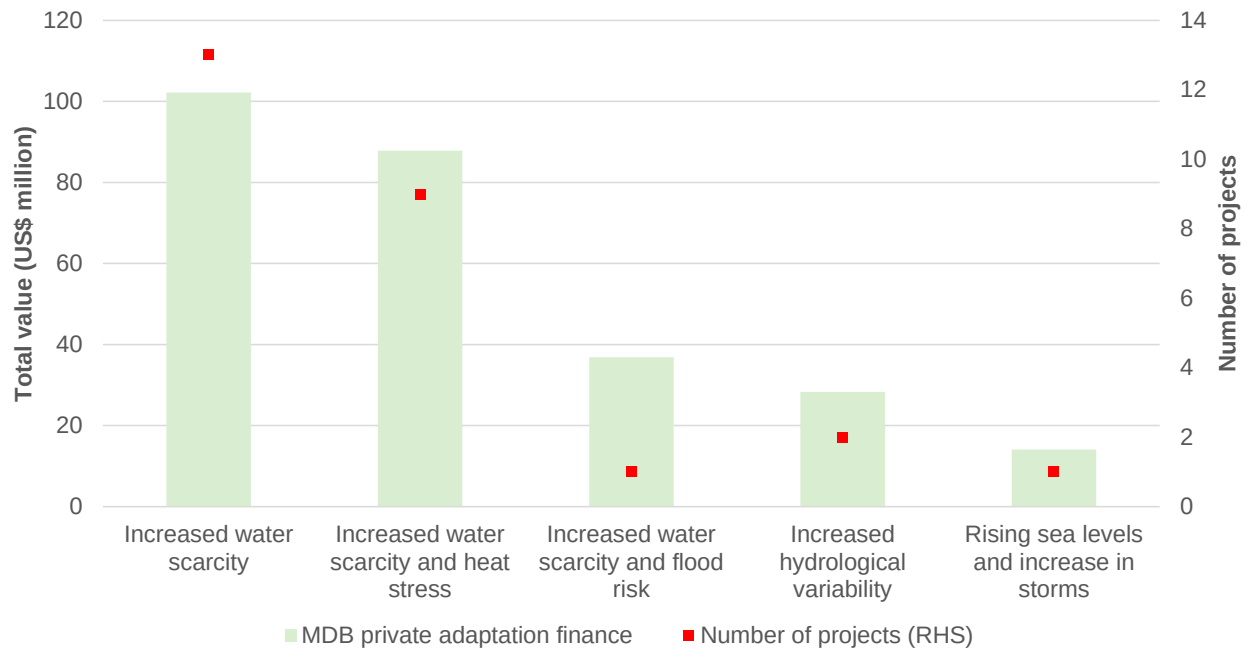
Table 2. **Adaptation sectors and examples of specific sub-sectors**

Sectors grouping	Examples of specific sub-sectors
Water & Wastewater Systems	Water supplies
	Wastewater infrastructure
	Water resources management not included under 'Other'
Agricultural & Ecological Resources	Primary agriculture and food production
	Agricultural irrigation
	Forestry
	Livestock production
	Fishing
	Ecosystems (including ecosystem-based flood protection measures)
Industry, Extractive Industries, Manufacturing and Trade	Manufacturing
	Food-processing, distribution and retail
	Trade
	Extractive industries (oil, gas, mining, etc)
Coastal and Riverine Infrastructure (including built flood protection infrastructure)	
Energy, Transport, and other Built Environment and Infrastructure	Construction
	Transport
	Urban development
	Tourism
	Waste management
	Energy generation (including renewables)
	Energy transmission & distribution
Institutional Capacity	Technical services or other professional support to beneficiary organisations
	ICT hardware and software to beneficiary organisations
Cross Sectors and Other	Financial services (banking, insurance)
	Human capacity (education, health)
	Disaster risk management
	Cross-sector policy and regulation

Source: *Group of Multilateral Development Banks (2014)*

Reflecting the large share of agriculture projects, increased water scarcity is the most commonly cited main risk addressed with private sector adaptation finance, either in isolation or in combination with other risks such as heat stress. Figure 7 presents a breakdown of the main climate risks cited for projects and the associated flows of finance to the categories. A total of $102 million flowed to projects where MDBs reported a risk of increased water scarcity as the main motivator of investment in an adaptation component. Projects where combinations of water scarcity, heat stress and flood risk (which are often interrelated) were cited as the main motivator for private sector adaptation finance are also attracting significant funding; and to a lesser extent increased hydrological variability, and rising sea levels and increases in storms. This is in accordance with the significant share of the agricultural and ecological resources sector in the MDB private sector adaptation finance portfolio.

Figure 7. **Increased water scarcity is the main climate risk addressed in private sector adaptation projects**

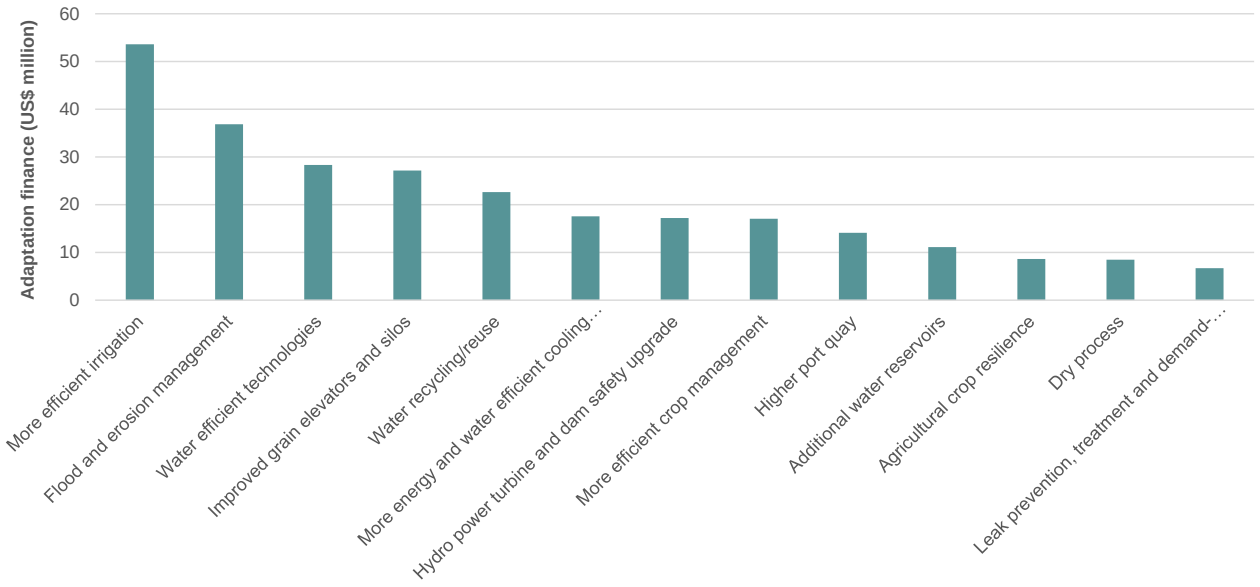


Note: *RHS = right-hand side.*

Source: *Vivid Economics*

The 26 investment projects can be classified as hard adaptation activities, with soft adaptation activities taking place as part of TA packages. As shown in Figure 8, all investments were 'hard', or material, measures. These include investing in upgraded equipment or infrastructure, changing building designs, and using climate-change specific research or forecasting models to supplement conventional risk-management activities. For example, the EBRD in 2014 extended a loan to a real estate developer in Jordan with a $10 million adaptation component earmarked for installing more water-efficient air coolers in a large district heating and cooling plant, to address the risk of increased water scarcity and heat stress. More generally, the type of technologies observed in the portfolio is in accordance with the climate change risks that were identified in the projects. 'Soft', or non-material, measures include changing a regulatory framework, using conventional business continuity or emergency preparedness plans, transferring risk through insurance policies, or conducting a climate vulnerability assessment (Crawford & Seidel, 2013; Hertin, Berkhout, Gann, & Barlow, 2003). All the 26 private sector investment projects appear to be firmly in the hard category, although, as further elaborated in section 2.1.4, these projects are often associated with TA that can be classified as soft adaptation measures.

Figure 8. **Most private sector adaptation finance is invested in technologies that improve resilience to droughts and enhance water use efficiency**



Note: *The last category is 'leak prevention, treatment and demand-side management'*

Source: *Vivid Economics*

2.1.3 Donor co-financing

Two out of 26 projects received donor co-financing in the form of CAPEX grant and concessional loan resources. A residential buildings credit line in Turkey received a concessional loan of $12 million. A hydropower rehabilitation project in Tajikistan, the only low-income country in the MDB 2013–14 private sector adaptation finance portfolio, received a concessional loan of $10 million and an $11 million CAPEX grant. Both projects were reported by the EBRD and all concessional finance was provided by the CIF.

The EBRD's residential buildings credit line in Turkey provides an example of how donor co-financing and MDB investments can be deployed in tandem to achieve adaptation benefits. The $48 million EBRD project with a Turkish bank received a concessional loan of $12 million from the CIF. Alongside the climate change mitigation benefits, which were the main driver of the project and of the CIF contribution, the EBRD reported an adaptation component of $5 million, assuming that about 10 per cent of the on-lending finances water-efficient technologies in residential buildings to address increasing water stress in the country. The project will, aside from credit, offer support free of charge to help prospective borrowers identify and develop projects and prepare successful loan applications. This capacity building activity is funded by the EU and the CIF.

Donor co-financing played an important role in realising the EBRD's hydropower rehabilitation project in Tajikistan. Whilst the EBRD provided $50 million, the project also received $21 million of concessional finance from the CIF. Roughly half was provided as a $10 million concessional loan, for which the tenor was extended to 40 years, compared with a tenor of 15 years on the EBRD portion. The other half consisted of an $11 million CAPEX grant. The development of the project further benefited from substantial

donor contributions towards TA. Box 2 details the background of the project and the concessional finance provided.

Box 2. **Hydropower rehabilitation in Tajikistan: donor co-financing as a key factor enabling private sector adaptation finance**

Tajikistan, a small low-income country in Central Asia, is heavily dependent on hydropower for its electricity, implying that it is sensitive to hydrological variability as a result of climate change. Experts foresee that climate change will significantly affect hydropower. Earlier spring snow-melts, increased winter flooding and reduced summer flows have serious implications for power generation capacity, management of peak supply and peak demand, and dam safety and extreme events.

A $50m EBRD loan supported the rehabilitation of a 126MW hydropower plant located in Northern Tajikistan that supplies electricity to 500,000 people. The project integrates climate-resilience information into the design of the upgrade by modelling future hydrology outcomes under a range of climate change scenarios. The hydropower plant upgrade was optimised so that it offers the best economic return and greater dam safety across the range of climatic conditions projected for the project site.

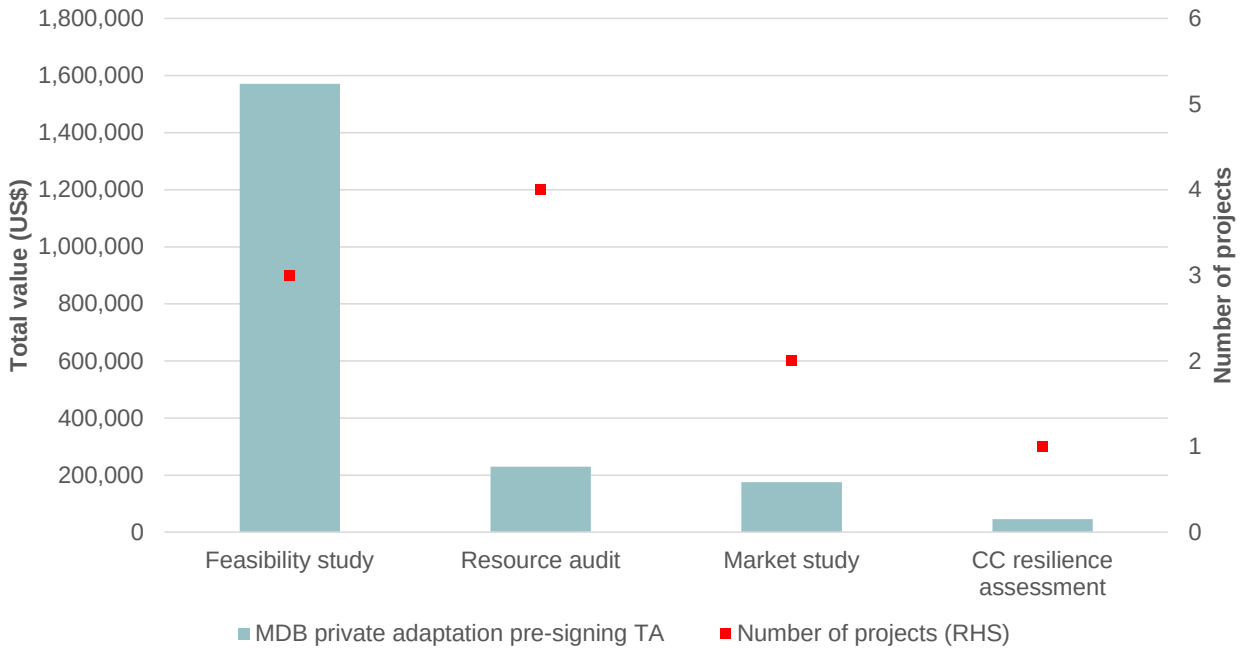
The success of the project, which is relatively large-scale and in a challenging institutional environment, crucially hinged on TA and donor co-financing provided by development partners. The CIF provided a $300,000 grant for a preparatory phase in 2010–12 (which is not reported in Table 1 as it is not directly related to the final investment in 2014). In 2012, Austria provided a $736,000 grant to undertake the feasibility study. The EBRD loan was complemented by a $10 million concessional loan and $11 million CAPEX grant from the CIF, which was reportedly a crucial element of the deal to make an investment of this type affordable in the challenging investment context. The UK Department for International Development provided $955,000 for TA in the implementation and sustainable continuation of operations. This consisted of an extensive programme of TA for institutional capacity building alongside the investment, including strengthening Tajik data-management capabilities and building collaborative links with international researchers and engineers.

2.1.4 Technical assistance

TA worth $4 million was associated with the adaptation components of the 26 MDB investment projects. This section scrutinises pre-signing and post-signing adaptation-related TA and its funding sources. Pre-signing TA includes feasibility studies, due diligence and other assessments before an investment deal is signed or approved by an MDB board. Post-signing TA includes capacity building and consultancy support for clients after the investment has been signed. Section 2.2 explains how TA is used as an origination tool for private sector adaptation finance by MDBs, and section 3 looks at its role as a driver of private sector adaptation finance and in addressing barriers to uptake of private sector adaptation finance. The current section primarily presents the empirical evidence on its use.

The pre-signing TA financing volume was dominated by feasibility studies, mostly financed by the EBRD's Special Shareholder Fund. As can be seen from Figure 9, seven out of 11 projects that received pre-signing TA were supported by feasibility studies and resource audits, which are detailed in Box 3. Three projects, the EBRD's hydropower project in Georgia, its regional municipal services project, and its hydropower rehabilitation project in Tajikistan, received a total of $1.57 million for feasibility studies. These were financed by the EBRD's Shareholder Special Fund (the Bank's multi-donor fund established to complement existing funding sources for projects, alongside contributions from donors), except in the case of the Tajikistan project, in which the Austrian Donor Trust Fund financed the feasibility study. Four projects received TA for a resource audit. These included the EBRD's 2013 juice-production project in Morocco, the real estate development project in Jordan, and the dairy products and juices project in Egypt. The resource audits were financed by the EU Neighbourhood Investment Facility (NIF). The fourth resource audit was carried out as part of the 2014 coal briquettes project in Mongolia and was financed by the Government of Japan. The EBRD's two credit lines with Turkish banks in 2014 benefited from a pre-signing market study (see Box 5), and its 2014 harbour expansion project in Poland from a climate change resilience assessment (Box 9). Most pre-signing TA is concentrated in the energy, transport, and other built environment and infrastructure; and water and wastewater systems sectors.

Figure 9. **Feasibility studies received the largest share of pre-signing TA finance**



Note: *CC = climate change, RHS = right-hand side.*

Source: *Vivid Economics*

Box 3. **The EBRD frequently applies pre-signing feasibility studies and resource audits in private sector adaptation finance deals**

Two of the most frequently deployed pieces of TA in the MDB private sector adaptation finance portfolio are the EBRD's feasibility studies and resource audits. The associated TA comprises the following activities:

- **Feasibility studies:** feasibility studies comprise assessment of the potential of a project and the proposed investment components for the short and long term. The EBRD's approach directly incorporates climate resilience into the investment design. This typically entails an assessment of projected climate conditions over the anticipated lifespan of the asset in question, which allows the investment design and evaluation of the project to be based on future projections instead of historical climate records.
- **Resource efficiency audits:** under its Sustainable Resource Initiative, the EBRD has established a resource auditing methodology, through which the resource efficiency performance of companies is assessed and sustainable investments are identified. Initially developed with a focus on energy, in recent years the target has expanded, and now also covers water, waste and materials. The methodology is based on a standardised approach and includes a benchmark analysis, a risk assessment, a capital investment appraisal and an implementation plan. Specialised consultants are commissioned to carry out the audit, which includes visits to clients' premises and the analysis of management practices (in the use of resources), and sometimes the creation of corporate social responsibility strategies. If a project has been identified as climate-sensitive, projected climate conditions over the lifespan of the project's assets are taken into account for the audit. The aim of the approach for the EBRD and the client is to assess the technical and economic feasibility of resource-efficiency measures and to prioritise them according to their economic potential. Activities are carried out in close collaboration with the client, from the identification to the implementation phase.

The EBRD spent most post-signing TA on capacity-building activities. It spent a total of $1.8 million on post-signing capacity building activities and $168,000 on consultancy services. The EBRD's 2013 municipal services project, channelling finance through commercial banks for infrastructure investments in the Western Balkans, received $750,000 of adaptation-related capacity building financed by the Austrian Donor Trust Fund for advice to both participating banks and borrowers on water-resilience measures in the municipal infrastructure sector. The two credit lines in Turkey reported by EBRD in 2014 received post-signing TA in the form of capacity-building and consultancy support, financed by the EBRD Special Shareholder Fund ($121,000) and a combination of the CIF and EU IPA (at a total of $168,000), respectively (see Box 5). The EBRD 2014 hydropower project in Tajikistan (Box 2) received capacity-building support worth $955,000 from the UK Department for International Development.

In 2013–14, the MDBs undertook further adaptation-related TA which cannot be directly linked to any private sector adaptation investments. This refers to pre-singing TA that is likely to generate private sector adaptation projects in the near future. For instance, IDB's TA provision is likely to be valuable and result in more private sector adaptation finance in future, as interviewees frequently cite TA as a main driver

of private sector adaptation activity (see section 3.1.1). For instance, the IDB is very active as a provider of TA for micro, small and medium-sized enterprises to build resilience in the primary agriculture sector in Latin America. It reported a total of $3.4 million of TA grants across seven projects, reaching a large and diverse group of enterprises in the agricultural and ecological resources sector with training programmes, institutional capacity-building and awareness-raising initiatives. Another example of TA provided by the IDB is a $315,000 project identifying the risks and opportunities arising as a result of the impacts of climate change for a major port project in Mexico. A Climate Change Adaptation Plan will evaluate the risks and opportunities as a result of the possible impacts of climate change in order to identify and, as appropriate, adopt the necessary actions to reduce the medium- and long-term risks for the entire port complex. Interviewees cite similar barriers to adopting the recommended adaptation investments in this project as those prevailing in the EBRD's port expansion project in Poland (as further elucidated in Box 9), where the costs of an increase in the height of a quay wall presented a significant hurdle.

2.1.5 Instruments, tenors, lead times, borrower size

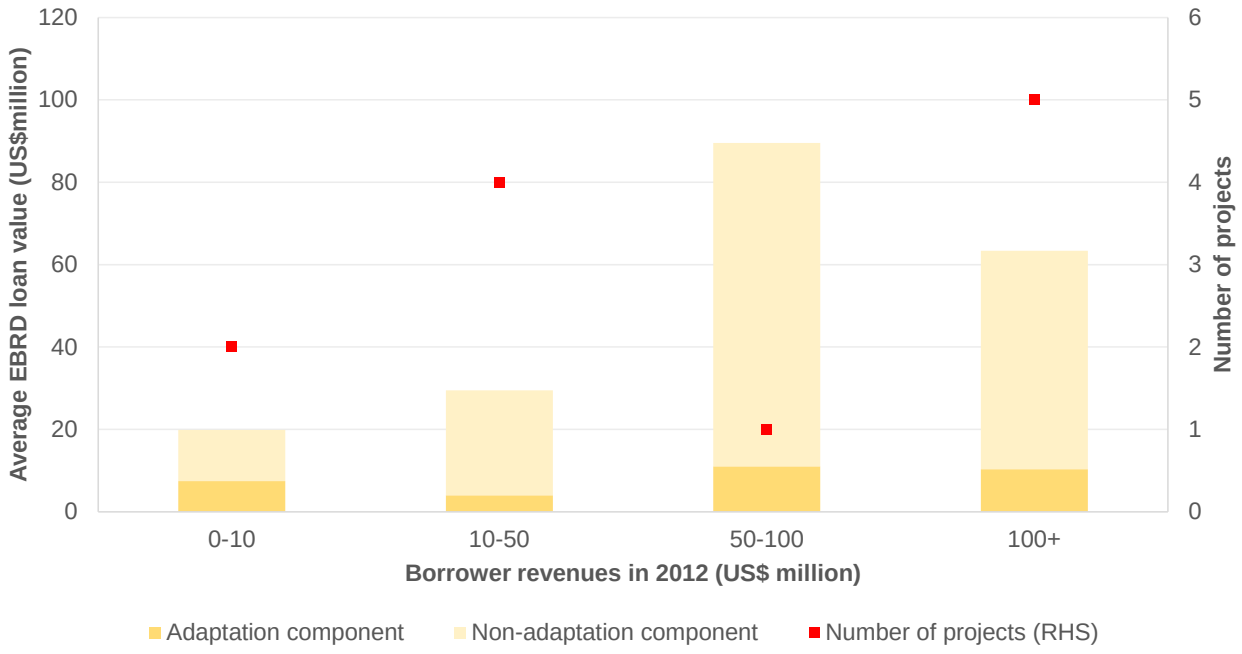
Over 90 per cent of MDB financing with an adaptation component consisted of debt products, with the remainder consisting of equity investments. The only equity investments were the EBRD's 2013 $65 million primary agriculture and sugar production project in Serbia, its $52 million investment in a regional facility for investment in municipal infrastructure in the Western Balkans in the same year, and the IFC's 2013 $10 million investment in an Israeli company developing non-GMO improved castor seeds for the Kazakh market (Box 7). In the EBRD portfolio, which represents around half of the total MDB portfolio, the debt products are mostly senior secured loans, but also comprise unsecured loans and mezzanine facilities. As the entire EBRD portfolio, including all of its projects over the same period, consisted of 88 per cent debt and 12 per cent equity, it can be concluded that the financing products offered for adaptation do not differ markedly from MDB's standard suite of products.

Private sector adaptation finance projects have longer lead times and tenors, which may reflect the fact that at a value of $48 million, the average private sector adaptation project is almost twice the size of the average EBRD investment of $25 million across the entire portfolio. This is likely to be due to the fact that adaptation investments are mostly associated with relatively long-lived, capital-intensive assets. It is therefore unsurprising that data gathered from the sample of 18 EBRD private sector adaptation projects shows that the average loan tenor is eight years, a year more than the portfolio average of seven years over the same period. Consistent with this, projects with adaptation components take longer to prepare. The average lead time before signing a deal is 334 days for EBRD and EIB private sector adaptation finance projects. For the sub-set of 18 EBRD projects, the average lead time was 280 days – significantly longer than the EBRD's portfolio average of 210 days. We did not ascertain whether these differences are statistically significant.

There is an equal distribution of borrower size, with some underrepresentation of small firms; larger firms tend to borrow more. Data on borrower revenues in 2012 that was gathered from a selection of 12 EBRD projects for which the information was available is presented in Figure 10. The revenue size of borrowers is fairly equally distributed. The largest group of borrowers – five – had revenues in excess of $ 100 million per annum. These were mainly agribusiness conglomerates. For example, a grain and poultry producer in Ukraine reported $1.4 billion in revenues in 2012 and borrowed $94 million from the EBRD, of

which $3m was earmarked for investment in irrigation equipment to improve resilience of maize and other cereal production to drought. There is some underrepresentation of borrowers with revenues of less than $10 million, but there were four projects with borrowers that reported revenues of $10–50 million. The observed distribution is no surprise. Although small firms are far more ubiquitous in EBRD target regions than large firms, the adaptation investments reviewed within the scope of this study tended to involve long-lived assets that require large CAPEX, which is generally made by larger firms. However, evidence of how private sector adaptation finance can benefit smaller private entities was provided by the EBRD's residential credit line in Turkey, which channels finance for water-efficient technologies to private households and commercial buildings.

Figure 10. **There is a fairly equal distribution of borrower size, and larger firms tend to borrow more**



Source: *Vivid Economics*

2.2 Project origination mechanisms and monitoring tools

Origination of private sector adaptation projects can be driven by clients and MDBs through a variety of mechanisms. Interviewees cited client-driven origination – where a client comes to an MDB with an explicit adaptation finance need – only once as the primary origination mechanism. The other 25 projects were originated by the MDBs. The project that was primarily client-driven was the Inter-American Development Bank's $280,000 green microfinance project in Nicaragua (see Box 4).

Box 4. **The IDB's adaptation-targeted microfinance programme in Nicaragua provides an example of client-driven project origination**

The IDB runs a green microfinance programme through which it is funding adaptation activities in the Nicaraguan agriculture sector. In 2013 it approved a financing package of $280,000 to support the main lender to smallholder farmers in Nicaragua. The funds are earmarked to reduce the vulnerability to climate change for both the institution and its clients through a new green financial product that will combine TA for adaptation measures in agriculture with a credit line to finance required investments for these adaptation measures. The project expects to provide and maintain stable levels of income to 300 smallholder farmer clients in the western and central regions of Nicaragua, cushioning the effects of climate change. A reduced vulnerability of its clients in rural areas will also benefit the institution as it is likely to improve the client institution's risk profile.

The institution in Nicaragua was competitively selected from a set of applicants to the regional programme that were seeking to access adaptation-related support. The IDB deployed a tender process to competitively select microfinance institutions that would be supported with TA and a credit line for increased use of green finance instruments to either (i) increase the access to clean or efficient energy; or (ii) to assist in adaptation to climate change. Interviewees at the IDB indicated that there were many applicants, all of which had come to the Bank with an explicit need for private sector adaptation finance, citing the threat of climate impacts to their smallholder clients as a motivation to seek access to adaptation-related credit lines. As such, this project provides an example of client-driven private sector adaptation finance.

A complete typology of MDB-driven origination mechanisms was developed for the EBRD. Interviews with key staff in the EBRD's climate change team enabled the identification of a number of mechanisms through which the EBRD originates private sector adaptation projects. The different mechanisms include:

- **Adaptation screening tool.** This is a simple tool used to identify projects with adaptation potential at the concept review stage. As mainstreaming adaptation into MDB operations is an ongoing process, the banks might not always be aware of the adaptation potential in specific projects. At the EBRD, a screening tool indicates potential and the need to incorporate adaptation considerations into the planned investment. This leads the EBRD's energy efficiency and climate change team to step in and work with the banker and the client in identifying the risks and developing solutions to improve the climate resilience of the investment.
- **Technical assistance.** An adaptation project can be originated through the application of TA. This can be either pre- or post-signing TA:
    - pre-signing TA, such as resource audits and feasibility studies, can identify the adaptation potential of a project, which leads to origination of the adaptation component. This can also involve sector-specific engagement strategies, such as practical guidance for project teams on understanding and managing the implications of sea-level rise and associated impacts, which may then lead the project team to consider investment in an adaptation component;

  - post-signing TA usually involves capacity building with client teams. This can be used as an origination tool, as the promise of a capacity-building programme may lead a client to consider investing in an adaptation component.

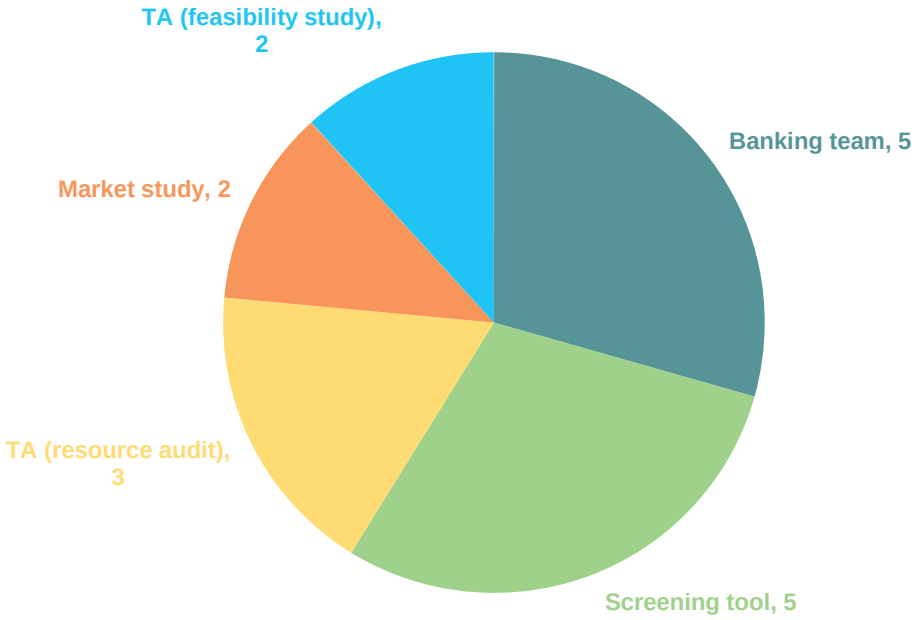
– **Adaptation market study.** This is a methodology for identifying financing priorities for supporting private-sector action on climate change adaptation, which may lead banking teams to consider and pursue deals that fill gaps in the market for private sector adaptation investments.

– **Banking teams.** As awareness of clients' adaptation needs rises within MDBs, for example through MDB country and sector strategies and contact between staff in different teams, banking teams identify adaptation opportunities without the help of the above-mentioned tools. These can be centralised banking teams, but also country teams or dedicated climate change teams.

For most EBRD projects, banking teams and the EBRD's screening tool are cited as the main origination mechanisms, as shown in Figure 11. Interviewees cite the increased inclusion of climate change as a major theme in country and sector strategies – which are used as strategic guiding documents for investment decisions – as an important factor underlying the banking teams' increased proclivity to put adaptation on their clients' agendas. For example, the adaptation opportunity in the project involving an improvement of water efficiency in a coal briquette production line in Mongolia was identified by the EBRD's country office, where the team had familiarised itself with the climate change section in the country strategy. This type of climate mainstreaming across MDB teams appears to be a valuable factor in private sector adaptation finance origination. An equivalent number of adaptation projects was not identified by a banking team or as part of a specific TA activity, but was picked up by the screening tool at the portfolio management level. Resource audits and feasibility studies also appear to be successful tools for origination, as they make the client aware of the potential costs of climate change impacts and the associated benefits of adaptation investments. Market studies in Turkey led to the development of two credit lines that delivered adaptation finance, serving as a tool for banking teams to draw attention to the associated market opportunity for the client banks.

In most cases these origination mechanisms have worked in conjunction rather than isolation. The origination mechanisms are not mutually exclusive but rather complement each other: for example, a client may initially identify a potential adaptation need but will not convert this into an investment decision until it has been identified as an adaptation opportunity by a banking team, and TA has a more complete business case for the investment. The EBRD's two 2014 credit lines with Turkish banks are a good example of projects where a market study, banking team awareness of adaptation opportunities and post-signing TA packages led to origination, as discussed in Box 5.

Figure 11. **The most frequently cited primary origination mechanisms at the EBRD are identification by banking teams and through its screening tool**



Note: *Numbers represent the number of projects for each origination mechanism. Only projects for which information is available are included.*

Source: *Vivid Economics*

Box 5. **Two EBRD credit lines with Turkish banks illustrate how multiple origination mechanisms can work in tandem in the origination of private sector adaptation finance projects**

The EBRD and IFC commissioned a market study in Turkey that included a section on resource efficiency challenges. The market study looked primarily at water and waste management, where it indicated that climate change adaptation challenges are ubiquitous across sectors. The study noted that *'the regulatory landscape for water and waste is changing so rapidly that most businesses have low awareness of the new regulations and their implications for their operations*' (EBRD & IFC, 2013). The study notes that while there is extensive support and policy dialogue with the public sector, there is a lack of support and financing for private sector compliance. It therefore identified *'an urgent need for transformative engagement with the Turkish banking sector to raise awareness and provide innovative financial products, which in turn will be able to raise awareness of the wider business community'*. The results of the market study led local EBRD banking teams to find projects with banks that could channel credit lines to enable Turkish businesses to adapt to climate change and comply with impending regulation.

In 2014, projects were agreed with two banks to channel both funding and TA for climate-resilient technologies in the Turkish private sector. One bank is set to deploy $21 million out of a $65 million credit line towards water-efficient technologies for industry. The other bank created a credit line that included $5 million for water-efficient technology in the residential sector, out of a total EBRD package of $40 million.

The credit lines are complemented by donor co-financing and post-signing TA. The residential water efficiency credit line received $12 million of donor co-financing from the CIF (see section 2.1.3). It also received a $170,000 draw-down facility for further consultancy support in the implementation of the adaptation activities, financed by the CIF (16 per cent) and EU Instrument for Pre-Accession Assistance (IPA) fund. The bank targeting water-efficient technology in industry received a $120,000 TA package focusing on technical capacity building for on-lending to adaptation activities.

Origination in these cases took the form of identification of an opportunity through a market study, a proactive local banking team taking these findings out to the market, and post-signing TA as an add-on to fully develop the adaptation component. This is a clear example of multiple origination mechanisms working together. Identification of an opportunity without a banking team to take it forward and reach out to local banks would arguably not have led to a similar take-up of the credit lines. In addition, the post-signing TA made the credit lines workable for the bank – again, without this offering, the banks may have been reluctant to engage in activities that are highly technical in nature and far removed from current practice in Turkish residential and industrial sectors. These examples demonstrate that behavioural barriers to the take-up of adaptation measures (see section 3.1.2) may require the interaction of multiple origination mechanisms.

3 Evidence on client drivers and barriers

This section presents evidence on drivers of, and barriers to, private sector adaptation finance. Section 3.1.1 provides evidence on drivers of private sector adaptation finance in the MDB portfolio. Section 3.1.2 provides evidence of barriers to private sector adaptation finance uptake.

3.1.1 Drivers of private sector adaptation finance

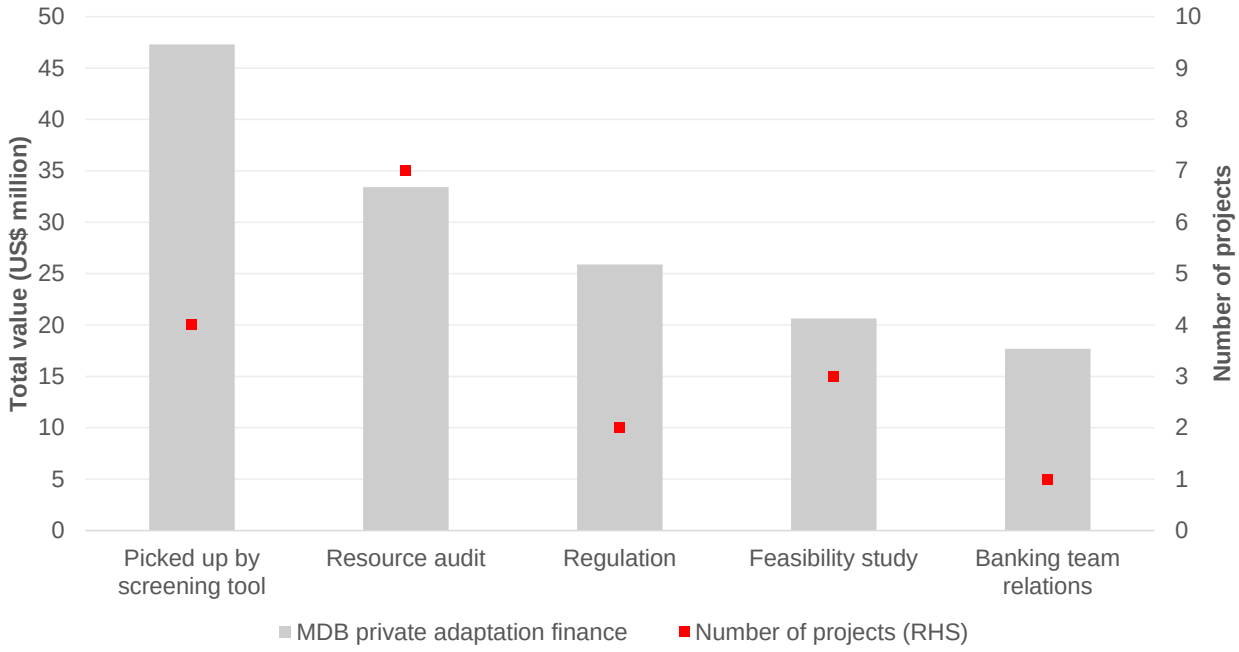
The MDB private sector adaptation finance portfolio appears to be dominated by anticipatory 'no regret' adaptation activities. The MDB portfolio is dominated by investment in technologies that aim to improve clients' operations, such as technologies that improve resilience to droughts and enhance water-use efficiency (see Figure 8). These are predominantly measures that both improve the firm's finances and make it more resilient to climate change. As such they can be classified as no regret measures. A clear example of a no regret activity would be an improvement in water efficiency in manufacturing processes, such as in the EBRD's oilseed-processing project in Romania and the juice-production facility in Morocco. In both cases, the adaptation measure is a sensible business decision both in the short term, as it reduces costs associated with a scarce natural resource input, and in the longer term when climate impacts become more pronounced. Furthermore, rather than reactive adaptation, which includes responses to climate-related events such as flooding as they occur (Smit, Burton, Klein, & Wandel, 2009), the MDB-financed private sector adaptation activities can generally be classified as anticipatory adaptation activities, which include measures that reduce or avoid adverse climate impacts and those aimed at seizing opportunities (Agrawala, Carraro, Kingsmill, Lanzi, & Prudent-Richard, 2013; Carbon Disclosure Project, 2010).

In the current MDB private sector adaptation finance portfolio, the EBRD's harbour expansion project in Poland appears to be the only project that falls into the 'purposeful' adaptation measures category. Purposeful activities have a specific adaptation objective and entail significant investment in technology and infrastructure adjustments that do not necessarily yield a short-term return (as opposed to no regret activities), mostly in sectors with long-lived assets (Agrawala et al., 2013). An example is port infrastructure that needs specific and significant investment to make it resilient to future sea level rise, such as the EBRD's harbour expansion project in Poland. The project involves increasing the height of a quay wall as part of the harbour expansion and is more fully described in Box 9.

The predominance of no regret activities is unsurprising given the competitive forces that determine private sector clients' investment decisions. Firms and their owners are often primarily concerned with maximising returns in the short-to-medium term in a competitive context. In many cases this implies that purposeful investments, with uncertain long-term returns and limited benefits in the short term, are less attractive. Previous studies tend to confirm this emerging picture. Agrawala et al. (2013) analyse 16 company case studies and data from the Carbon Disclosure Project. They find that adaptation measures in anticipation of future climate impacts more frequently fall into the category of no regret adaptation activities, rather than purposeful adaptation activities.

Even though adaptation activities are mainly of the no regret type, clients often appear to require some hand-holding or a push in the form of TA or regulation. Figure 12 presents an analysis of drivers of private sector adaptation finance in a sample of 17 EBRD projects, identified through a series of interviews. It shows that increased awareness as a result of TA provided by the EBRD, in the form of feasibility studies and resource audits, is cited as the most common driver of the decision to invest in adaptation measures. This is a relatively soft type of investor engagement that falls into the category of reputational, corporate citizenship, stakeholder and investor pressures identified in previous literature on private sector adaptation investment drivers: companies may face pressure from stakeholders including banks, investors, insurers, civil society organisations, governments and customers to address climate risks (Crawford & Seidel, 2013). Instead of using voting rights (in equity projects) or loan covenants (for debt), the EBRD prefers TA to move clients to take climate change into account.

Figure 12. **For EBRD projects, TA, such as resource audits and feasibility studies, is most often cited as the primary driver of investment in adaptation measures**



Note: *See section 2.2 for more information on the EBRD's adaptation screening tool.*

Source: *Vivid Economics*

Impending regulation is reported to play a key role in two projects, but may be a complementary driver in other projects in EBRD countries. Interviewees reported that clients are often concerned about future regulation and may be motivated to pre-empt rather than respond to regulation, or benefit from associated emerging investment opportunities. Water and wastewater regulations are expected to become increasingly stringent in Turkey, where the government seeks to comply with the European Commission directive governing the sector in the EU. This has increased interest for on-lending for adaptation-related investments in the banking sector, where the two projects for which regulation was cited as the main driver took place. Notably, the two EBRD credit lines in Turkey were originated through a market study that was

jointly commissioned and managed by the EBRD and IFC (see section 2.2 and Box 5). This may indicate that such studies can serve to communicate the opportunity inherent in impending regulation to prospective clients.

The observed anticipation of regulation by clients may herald a more general trend in drivers of private sector adaptation finance. As elucidated in Box 6 there are significant gaps in water policy frameworks in EBRD countries, which may give rise to firms investing in water and wastewater measures in anticipation of emerging regulation as countries (most evidently at present Turkey and Kazakhstan) seek to catch up with best practice water policy around the world. For other projects, regulation was cited as a secondary driver. In Kazakhstan, a client reportedly cited plans for water and green economy policies as a motivating factor for investing in a water treatment plant to minimise use of water in its activities. The discussion around adaptation investment as part of the EBRD's harbour expansion project in Poland also took place in the context of discussions around future policies for addressing the risk of sea level rise, both at the national and EU level. This is consistent with previous findings that regulatory and legal intervention may encourage or require adaptation action by businesses. In the UK, water supply companies are required to develop 25-year plans that take climate change into account in water supply assumptions (Wilby & Vaughan, 2011). Other regulatory action that can drive adaptation includes financial disclosure rules on climate change impacts; building regulations (e.g. on property-level flood protection); and the public provision of scientific information, models and tools (Agrawala et al., 2013; United Nations Global Compact, 2012).

Box 6. **Water policies in EBRD countries**

Water policy frameworks that establish water markets or pricing schemes can improve climate change adaptation, but are currently weak in most countries. In many countries it is conceivable that the projected increase in climate-induced water demand, coupled with a decrease in supply, requires adaptation. They have often instituted structures for water pricing in the domestic and agricultural sectors. However, prices are generally unevenly applied, collection rates are low, metering is rarely implemented, and pricing is often based on annual rather than usage-based fees. Barriers to water markets and pricing are omnipresent, including a lack of property rights, limits to transferability, legal and physical infrastructures, institutional shortcomings, and poor policy design.

An analysis of water policy in EBRD countries confirms this picture, indicating that many flaws in water policy remain. Table 3 presents an overview of regulatory performance in the water sector across six dimensions in 11 EBRD countries. The six dimensions are components of strong water policy:

- an overarching water policy framework that includes provisions for full cost recovery of water supply;
- tariffs that are near cost-recovery levels (including CAPEX, operating and maintenance costs);
- a lack of cross-subsidies between different sectors through uneven tariffs;
- an independent regulatory authority for tariff-setting;
- private sector participation facilitated by a legal framework for competition, such as concession laws and regulations related to municipal services; and
- metering of water consumption at customer sites.

At present, there are significant gaps in water policy frameworks across EBRD countries. Of the countries that have adopted an overarching water policy framework, more than half are facing significant implementation and enforcement issues. Tariffs do not cover the costs of supply, except in Ukraine. Most countries still have strong cross-subsidisation between sectors. Of those countries that have established an independent regulatory authority, most experience heavy political interference or do not have any tariff-setting powers at all. Around half the countries have private sector representation in the water sector and around half have widespread meter-based water billing.

Where water policy is impending, the EBRD has been able to extend loans for water-efficient technologies. Notably in Turkey, where a new overarching water law will soon be approved by Parliament to comply with the EU Water Framework Directive, the EBRD is working with a bank on a credit line dedicated to improved water-efficiency technologies. Interviewees at the EBRD suggest that the impending regulation has been a key factor in the bank's decision to set up its resource-efficiency credit line programmes. This suggests that policy, as a driver of adaptation investment decisions, could be a promising target for TA with a view to sourcing further private sector adaptation finance deals.

Table 3. **There are significant gaps in water policy frameworks across EBRD countries**

Country	Water policy framework	Cost-recovery tariffs	Limited cross-subsidisation	Regulatory authority	Private sector participation	Metering incidence
Egypt	X	X	✓	✓*	✓	X
Georgia	X	X	X	✓*	X	X
Jordan	X	X	X	X	✓	✓
Kazakhstan	✓*	✓*	X	✓*	✓	✓
Mongolia	✓*	X	✓	✓*	X	X
Morocco	✓	✓	X	X	✓	✓
Poland	✓	✓*	X	X	✓	✓
Romania	✓*	X	X	✓*	X	✓
Serbia	✓	X	X	X	X	X
Turkey	X**	X	X	X	✓	X
Ukraine	✓*	✓	X	✓	X	X

Note: ** The legislative basis is present, but significant implementation and enforcement issues remain. ** New legislation is currently awaiting final approval in Parliament.*

Source: *Vivid Economics based on EBRD data and internal research*

In four projects the potential adaptation component was picked up through the portfolio screening tool. This led the EBRD's energy efficiency and climate change team to follow up and, together with the banker and the client, identify the respective climate risk along with solutions to make the investment more climate-resilient.

Outside of the EBRD sample, market opportunities were cited as the main driver for one project, relating to the development of castor seed with improved climate change resilience. The IFC financed improved castor seed research, development and demonstration (RD&D) and market development activities of an Israeli firm, as elaborated in Box 7. The investment was an equity product and was earmarked specifically to enable the firm to benefit from an opportunity associated with selling castor seeds that are more resilient to climate change to the vulnerable agriculture sector in Kazakhstan. As highlighted in previous work, companies may respond to changes in demand for products and services and seize opportunities related to climate change (Agrawala et al., 2013; Beermann, 2011). Sectors that are cited as primary beneficiaries of climate change include agriculture, as in the IFC project, but also advisory services, water utilities and insurance. Companies in these sectors may seek to act on climate change to create a competitive advantage.

Box 7. **The IFC's investment in seed technology for the market in Kazakhstan shows how market opportunities can drive private sector adaptation finance**

In 2013 the IFC invested $10 million in an Israeli agricultural technology firm through an equity round of financing. The company developed an innovative non-genetically modified organisms (GMO) technology platform to breed crops with dramatically improved productivity and resource-use efficiencies. It had organised previous rounds of financing and at the time was majority-owned by major global venture capital firms. It sought to raise $50 million in a Series C equity round of financing towards expansion of its R&D and commercial activities – specifically the development of a new type of larger, more drought-resilient castor seed for the agricultural sector in Kazakhstan.

The IFC reported $8.6 million of the equity investment as adaptation-related. This was the share of the equity investment earmarked for development of the castor seed and activities to bring it to market. The IFC reports four major development impacts as a result of the investment, including adaptation benefits (International Finance Corporation, 2013):

- increasing agricultural yields which will result in increased land-use efficiency;
- developing seed alternatives that are adapted to climate extremes in emerging markets;
- creating a non-GMO product that requires fewer regulatory hurdles and thus can benefit smaller markets, including smallholder farmers in less developed countries; and
- promoting the development of sustainable industrial oils and thereby reduce greenhouse gas emissions.

This IFC investment shows that companies that identify specific adaptation-related market opportunities can lead to private sector adaptation finance projects. The investment originated from a deliberate round of equity financing for the development of a product with adaptation benefits. Although this type of market-opportunity driven private sector adaptation finance is currently rare in the MDB portfolio, increasing climate impacts and associated market opportunities may give rise to more projects of this type in future.

In sum, an analysis of the MDB portfolio yields evidence of a wide variety of (often interacting) private adaptation finance drivers at play, with an important role for TA provided by MDBs. Most MDB private sector adaptation finance targets anticipatory 'no regret' activities that improve the firms' financial baselines and, as a co-benefit, improves their resilience to future climate impacts. Nonetheless, businesses often need a push to actually implement these activities. This push can come in the form of increased awareness of regulation that implies an increase in future compliance costs, for example as a result of internal policy monitoring or external MDB engagement. It can also be a piece of TA, such as a feasibility study or resource audit, that clearly communicates the short-term benefits associated with a no regret adaptation activity that the business may not have been aware of, as well as the long-term cost implications of climate change. As such, the MDBs can be seen as successful brokers of information related to adaptation activities and enablers of adaptation investment by the private sector through leveraging their existing

networks, their ability to offer services beyond financial products, and experience in realising transitional impacts.

3.1.2 Barriers to private sector adaptation finance

Barriers to private sector adaptation finance are omnipresent and have regularly been reported to play a role in the development of MDB private sector adaptation projects. By design, this study is limited in the extent to which it can provide evidence of barriers to private sector adaptation finance, as it focuses on signed investments over the study period that are, by definition, success stories. However, in some cases there were barriers that needed to be overcome along the way. This section focuses on barriers faced by the MDBs and clients that were ultimately overcome – at least to some extent – and resulted in a private sector adaptation finance project. This can provide lessons about, and insights into, the type of barriers that are likely to prevail more widely. A conceptual framework for thinking about barriers to private sector adaptation finance based on existing literature is provided in Box 8, which is then used to frame the subsequent discussion around barriers observed in the MDB portfolio.

Box 8. **A conceptual framework for thinking about barriers to private sector adaptation finance**

Studies of adaptation behaviour reveal an abundance of institutional, policy and market barriers (Fankhauser & Soare, 2012; Kolk & Pinkse, 2005; National Round Table on the Environment and the Economy, 2012). These can be grouped into three broad categories (Fankhauser & Soare, 2012):

- **Shortcomings in the institutional and regulatory environment.** Regulatory barriers include, for example, the design of water abstraction licences, water price subsidies, limited water metering, and deficiencies in the design or implementation of building codes and planning regimes. Network externalities may create cascading risks in the provision of infrastructure services (e.g. the interruption of power supply during extreme weather events). Institutional competition, layered bureaucracy and entrenched rules and traditions can hamper the ability of organisations to respond to changing circumstances.
- **Market failures, both generic and particular to adaptation.** There may be asymmetric information between the buyer and seller about the risk profile of a property. There may be issues of moral hazard related to insurance cover. Path dependence may affect the choice between protection and relocation in historical settlements. There may be externalities, or a lack of coordination, between upriver and downriver communities.
- **Behavioural and information barriers.** Adaptation suffers from a general lack of awareness and institutional capacity, which means that climate risks are undermanaged. More profoundly, complex, long-term adaptation decisions may be affected by well-known cognitive barriers that lead to inertia, procrastination and implicitly high discount rates.

Interviewees cite behavioural and information barriers as a common hindrance to increased private sector adaptation finance. The IDB develops credit lines coupled with TA for microfinance institutions, earmarked for on-lending to activities in the area of climate change. Eligible microfinance institutions can opt for on-lending for energy investments or adaptation activities. Whereas initially the institutions preferred to focus on supporting energy projects, over the 2013–14 period these institutions shifted their preference to

the provision of adaptation finance and TA. Interviewees cited an increased awareness of the benefits of adaptation, as a result of increased adverse impacts on the microfinance institutions' clientele, as the main piece of information that triggered this shift to adaptation finance. Another example is the EBRD's harbour expansion project in Poland, as discussed in Box 9, where the bank's TA with an assessment of the risks of sea level rise and increases in storms indicated that a higher quay was needed. However, the client did not implement all the recommendations that were made as part of the assessment, possibly due to a lack of appreciation of the impacts of climate change on its finances in future and/or high implicit or explicit discount rates. In this case, the deployment of donor co-financing might have moved the client to consider the implementation of more robust adaptation measures. The long time horizons in climate-proofing infrastructure investments also appear to be a particularly challenging barrier to further adaptation finance in this sector.

Box 9. **The EBRD's harbour expansion project in Poland provides an example of behavioural barriers to take-up of adaptation measures**

The EBRD contributed $40 million to a $467 million harbour expansion project in Poland, in which the $14 million adaptation component required the client to be convinced by a climate change resilience assessment. The EBRD's banking team responsible for structuring the deal came to the E2C2 team for support before the earliest document in the bank's project cycle, a Concept Review Memorandum, was filed. EBRD flagged sea level rise and extreme weather events as a key risk factor in the project, which led the bank to commission an explicit climate change resilience assessment, the adaptation component of which was valued at $15,000.

Whereas it was easy to persuade the client to accept a climate change resilience assessment, acceptance of the investment implications was more challenging. The client appeared sensitive to the EBRD's messages about emerging EU policies around port infrastructure and measures to protect against sea level rise, which may be adopted by Poland in future. This led it to agree to a resilience assessment of the expansion plan. However, an agreement to invest in a higher quay wall was difficult to reach as the client was very concerned with the associated costs, which it felt might be unnecessary due to the long time horizon and uncertainty around sea level rise and extreme weather events. In the end, a compromise was reached in which the client agreed to increase the quay wall to some, but not the full, extent that the feasibility study indicated might be necessary. This is a clear example of behavioural barriers in the form of high implicit discount rates that may keep clients from taking up adaptation measures.

There was no donor co-financing involved in this project, but interviewees noted that, in this case, donor co-financing could have been helpful in pushing the client over the line. Donor co-financing can serve to dampen the cost implications of private sector adaptation investment in the short term, which may have been a useful tool in persuading the client in Poland to implement the full package of adaptation measures as indicated in the resilience assessment.

A lack of regulatory incentives is another barrier that interviewees observed in the MDB portfolio. For example, many countries still lack a strong regulatory framework to increase water-use efficiency, as explained for a selection of EBRD countries in Box 6. Low, uneven tariffs and ensuing cross-subsidisation between sectors implies that economic actors lack incentives to invest in technology that improves climate resilience. This suggests that there may be an opportunity for MDBs and other organisations to engage with policy-makers to stimulate private sector adaptation finance. The IFC's 'Enabling Environment for Private Sector Adaptation' addresses barriers by providing guidance on implementable and simple solutions for adaptation (Box 10). MDBs may also raise awareness of market opportunities and compliance costs associated with impending regulation among its private sector clientele. An example of this is provided by the EBRD and IFC market study that led to two adaptation-related credit lines in Turkey. The market study was used by its banking teams to inform banks about the opportunity associated with impending regulation around water efficiency (see Box 5).

Box 10. **The IFC's Enabling Environment for Private Sector Adaptation: addressing barriers to private sector adaptation**

The IFC's Enabling Environment for Private Sector Adaptation programme addresses barriers to private sector adaptation. The programme prioritises barriers to private sector adaptation in five key areas that can be addressed at the national policy level (Stenek, Amado, & Greenall, 2013):

- data and information;
- institutional arrangements;
- policies;
- economic incentives,; and
- communication, technology and knowledge.

The programme suggests specific interventions in these areas that are capable of promoting private sector adaptation. The programme emphasises the expected economic, social and environmental returns of the suggested solutions. Outputs include measures, indicators and examples to inform private sector organisations and policy-makers about where conditions for adaptation investment are favourable and what specific improvements can enhance a country's environment for attracting private investment in climate change adaptation.

The IFC further develops best practices in assessing climate risks and adaptation strategies for specific projects. This allows the bank to help its clients understand the implications of climate change for their businesses. The programme aims to fill a gap resulting from a lack of baseline information, methodologies and tools for taking climate change into account in business planning. An example is a climate risk and adaptation strategy assessment that the IFC carried out for a paper mill in Pakistan. The study assessed risks related to wheat yields, power production from an on-site steam turbine and boiler, groundwater resources, a wastewater treatment plant, the pulp and paper industry generally, and community and social issues across several climate scenarios. The analysis assessed the potential financial impact of climate change in these areas and recommended changes in risk management practices (International Finance Corporation, 2010).

In sum, barriers to adaptation activities were found to play a role in the MDB private sector adaptation finance portfolio and the evidence indicates that the MDBs may have a role in addressing these barriers. Behaviour and information barriers may be addressed with TA. Donor co-financing may play a role if implicit discount rates are high. MDBs can further work to promote adaptation-related regulation or provide the private sector with information around market opportunities and compliance cost implications associated with impending regulation.

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