Building Financial Resilience against Flood Risk in Developing Countries – Shifting from Crisis Responder to Risk Manager

Olivier Mahul
Global Lead and Program Manager
Disaster Risk Financing & Insurance Program
World Bank

Disaster Risk Financing and Insurance Program
A joint program between WBG and GFDRR

DRFIP development objective to increase financial resilience of the countries through minimizing the cost and optimizing the timing of meeting post-disaster funding. To achieve this objective, DRFIP provides the countries with Analytical & Advisory Services, Financial Services and Convening Services on Disaster Risk Finance.

Governments
DRF for Rapid Response Financing
DRF for Budget Protection
DRF for Resilient Livelihood
DRF for Agriculture
DRF for Property Cat Insurance

The Poorest
DRF Analytics for Informed Financial Decision Making

Farmers and Herders

Homeowners and SMEs
DRF KM and Global Partnerships
DRFIP – Operational Engagement Worldwide

DRFIP is active in more than 50 countries

**THE PHILIPPINES**
- DRFI Strategy, Local Disaster Resilience Insurance Fund, sovereign risk transfer

**COLOMBIA**
- DRFI Strategy, insurance of public assets and concessions

**KENYA**
- Crop and livestock insurance

**UGANDA**
- Disaster risk finance component for social protection fund

**VIETNAM**
- DRM Fund, insurance of public assets, property cat risk insurance

**MYANMAR**
- DRFI strategy regional cat risk pooling

**SERBIA**
- DRFI strategy DRM Fund

**MOROCCO**
- Property cat risk insurance program

**MEXICO**
- DRM fund FONDEN, catastrophe bond

**CCRF**
- Caribbean Catastrophe Risk Insurance Facility

**MOZAMBIQUE**
- Crop insurance

**Africa**

**Disaster Risk Financing and Insurance Program**

Strong partnerships with GFDRR and donor partners

**DRF for MIDDLE INCOME COUNTRIES**
- Support Middle-income countries to become proactive risk managers to meet the cost of disasters and climate shocks

**DRF for AFRICA**
- Support African countries to manage the financial impact from disasters as part of building their overall resilience to climate and disaster shocks

**DRF for RESILIENT LIVELIHOODS**
- Support governments to integrate social protection schemes in their DRM strategy to offer rapid and timely assistance to vulnerable households affected by shocks

**DRF for GLOBAL POLICY, KNOWLEDGE & TRAINING**
- Leverage the WBGs convening power to invest in policy advice and knowledge management to support policy reforms and financial instruments

**DRF for SMALL ISLAND STATES**
- Support SIDS to strengthen their financial resilience as part of the broader disaster risk management and climate change adaptation agenda

**DRF for ASIA**
- Support Asian countries to manage the financial impact from disasters as part of building their overall resilience to climate and disaster shocks

**DRF for AGRICULTURE**
- Support countries to implement sustainable, cost-effective public-private partnerships in agricultural insurance as part of broader agricultural risk management

**DRF for ANALYTICS**
- Provide governments with the information and tools to make informed financial decisions on managing disaster and climate risks
Integrated Approach to Flood Risk Management

**WHAT?**
*Prevent exposure to new risk*
*Reduce existing risk*
*Prepare for next shock*
*Arrange financial protection*

**HOW?**
*Mainstream climate resilient risk-informed economic growth, building codes & spatial planning*
*Retrofit/climate proof critical assets & protective infrastructure*
*Invest in early warning systems, contingency plans, shelters, & evacuation routes*
*Assess contingent liabilities; set up budget appropriation and execution; structure ex ante & ex post financial instruments; develop domestic insurance markets*
*Build Back Better, Mitigate Residual Risk*
*Support rapid and sustainable recovery*

**DISASTER RISK FINANCING AND INSURANCE PROGRAM (DRFIP)**

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Disaster Risk Finance Operational Framework

**Assess Risks**
*Assess and quantify financial risk exposure to natural disasters*

**Reduce Financial Risk**
*Reduce public contingent liability integration into national risk management*
*Reduce insurance and public investments*
*Reduce domestic private catastrophe risk transfer mechanisms*

**Secure Funding**
*Integrate disaster risk into fiscal and budget management systems*
*Integrate disaster risk into national risk management and public financial management*
*Leverage post-disaster budget recovery mechanisms*
*Integrate post-disaster risk management and national risk management programs*

**Execute and Monitor Funding**
*Integrate risk transfer mechanisms for pre-disaster assistance, handling and monitoring of funds*
*Leverage market-based risk transfer solutions*
*Leverage post-disaster financial assistance*

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**FINANCIAL PROTECTION AGAINST NATURAL DISASTERS**

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**DISASTER RISK FINANCING AND INSURANCE PROGRAM (DRFIP)**

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Optimal flood risk management

- Financial Protection **complements**, but does **not replace**, risk reduction and prevention measures

Cost-efficient risk reduction and prevention
Cost-efficient financial protection for residual risk
Maximum bearable loss

Disaster risk financing and insurance can help design strategies that

(i) Minimize the cost of financing
(ii) Optimize the timing of financing
Optimal investment in risk reduction
Where to allocate your next $?

R*: optimal level of risk reduction

\[ C'(R^*) / -L'(R^*) = P'[L(R^*)] \]

Marginal cost/marginal benefit of risk reduction = marginal cost of (residual) risk financing
Questions for discussion

• What is the optimal investment allocation between flood risk reduction and flood risk financing?
• What are the (institutional, technical, operational) challenges faced by emerging countries in the financial management of flood risk?
• What is the role of the private sector in supporting the development of financial solutions for floods?
• What lessons/experience can be shared with OECD countries?

Agenda of the session

• Moderator
  – Olivier Mahul, Global Leader and Program Manager, Word Bank
• Panelists
  – Mr Andres Ricardo Quevedo Caro, Head of Risk Management, MoF, Colombia
  – Ms Daw Ni Ni Tan, Director, Treasury Department, MoF, Myanmar
  – Mr Marko Blagojevic, Director, Public Investment Management Office, Serbia
  – Mr Bui Thanh Hai, Deputy Director, Insurance Supervision Division, MoF, Vietnam
Ministry of Finance and Public Credit

Republic of Colombia

FISCAL VULNERABILITY AND DISASTER RISK MANAGEMENT STRATEGY IN COLOMBIA
Agenda

2. Financing strategy – Risk transfer instruments

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### Damages and losses of low, moderate and high intensity events (1970 – 2000)

<table>
<thead>
<tr>
<th>Classification of the Intensity</th>
<th>Disasters</th>
<th>Deaths</th>
<th>Destroyed (D) or Affect (A) dwellings</th>
<th>Affected Population</th>
<th>Economical Loss (Millions USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High intensity Events</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsunami in the Nariño coast (1979)</td>
<td>672</td>
<td>3,081 (D)</td>
<td>2,119 (A)</td>
<td>1,011</td>
<td>22</td>
</tr>
<tr>
<td>Popayán Earthquake (1983)</td>
<td>300</td>
<td>2,470 (D)</td>
<td>11,722 (A)</td>
<td>20,000</td>
<td>489</td>
</tr>
<tr>
<td>Ruiz Volcano eruption and Armero Destruction due to landslide (1985)</td>
<td>Between 23,500 and 28,000</td>
<td>4,700 (D)</td>
<td>5,150 (A)</td>
<td>200,000</td>
<td>319</td>
</tr>
<tr>
<td>Earthquake and avalanche in the Cauca - Páez River (1994)</td>
<td>1,100</td>
<td>No available</td>
<td>8,000</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>Eje Cafetero Earthquake (1999)</td>
<td>1,186</td>
<td>35,949 (D)</td>
<td>165,336</td>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>28,258</td>
<td>46,209 (D)</td>
<td>62,143 (A)</td>
<td>395,347</td>
<td>3040</td>
</tr>
<tr>
<td><strong>Low and medium intensity Events</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulation of slides, floods and other phenomena (1970 - 2000)</td>
<td>9,954</td>
<td>89,337 (D)</td>
<td>185,365 (A)</td>
<td>14,8 millions</td>
<td>2881</td>
</tr>
<tr>
<td><strong>TOTAL AMOUNT</strong></td>
<td>38,212</td>
<td>135,537 (D)</td>
<td>15,195,347 (A)</td>
<td>5921</td>
<td></td>
</tr>
</tbody>
</table>

Source: CONPES 3318 / 2004
Landslides and flood risks had the most important impact between 1970 and 2011.


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**Economic losses of last Colombian La Niña phenomenon**

- The meteorological phenomenon that has generated greater losses in the country's history. Direct losses have been estimated in more than 3.6 million dollars and impacted all sectors of the country.

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>Economic Losses (Million USD)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwellings</td>
<td>1,556.20</td>
<td>43.7</td>
</tr>
<tr>
<td>Social services</td>
<td>397.24</td>
<td>11.1</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>1,355.08</td>
<td>38.0</td>
</tr>
<tr>
<td>Productive (agricultural, commerce, tourism)</td>
<td>256.13</td>
<td>7.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3,566.67</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Ministry of Finance (2012)  
Fiscal Management to Minimize Disaster Risk by natural events  
*TRM 31 Dec 2015 ($3.149.47)
Frequency and Intensity of El Niño and La Niña phenomenon have grown during the last decade.


Investment Projects of the Adaptation Fund

Aimed for recovery, construction and reconstruction of areas affected by the phenomenon “La Niña” (without reconstruction of vulnerability conditions)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Macro-Projects</th>
<th>Total Target</th>
<th>Investment (USD$Million)</th>
<th>Compriso. (USD$Million)</th>
<th>% Compriso.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gramalote</td>
<td>Construction And provision of preventive IPS Aqueduct Management property issues</td>
<td>52.1</td>
<td>11.4</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project Economic recovery - specialty coffees urban - Road design and aqueduct Social management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>La Mojana</td>
<td>Technical Coordinating Geometric and topographic - Raee POCT Hydrodynamics - Modeling Defining structural and non-structural interventions</td>
<td>160.5</td>
<td>14.9</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Jarillón de Cali</td>
<td>Management Studies Threats - Studies Of essential infrastructure - Studies Implementation of essential infrastructure</td>
<td>261.3</td>
<td>41.0</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rio Fonce</td>
<td>Studies - Designs and interventions across Flow regulation for flood control</td>
<td>319.1</td>
<td>13.7</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Canal del Dique</td>
<td>Studies - Designs and interventions across Flow regulation for flood control</td>
<td>4,8</td>
<td>0.32</td>
<td>9%</td>
<td></td>
</tr>
</tbody>
</table>

Subtotal

Source: FA 2015 septiembre 30 de 2015  
*TRM 31 Dec 2015 ($3.149,47)
The Ministry of Finance (2013) identified three priority policy objectives for the management of contingent liabilities arising from disasters:

(i) Identification and understanding of fiscal risk due to the occurrence of disasters;
(ii) Implementation of innovative financial instruments;
(iii) Catastrophic risk insurance of public assets.

International Financial instruments that allow risk transfer:
1. CAT SWAP
2. Catastrophic bond (CAT Bond).
3. Searching financial instruments for hydrometeorological events. Requires information for advancing in designing and for taking informed decisions.

Financing strategy – Risk transfer instruments
I. Profile of Myanmar

II. Potential Hazards in Myanmar

III. National Disaster Management Policy

IV. Allocation of the Union Government for Disaster in 2015

V. World Bank’s Assistance for Disaster
I. PROFILE OF MYANMAR

- located in South-east Asia
- 1930 km coastline with the Bay of Bengal and Andaman sea.
- three seasons in Myanmar
- over 135 ethnic
- population- about 54 millions

II. Potential Hazards in Myanmar

- Fire
- Flood
- Cyclone
- Earthquake
- Tsunami
- Landslide
- Drought
Flood & Other Natural Disasters Profile

Economic Losses and Social Impact from Flood

<table>
<thead>
<tr>
<th>Date</th>
<th>Disaster Type</th>
<th>No. people affected</th>
<th>Total damage (US$ mil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>Flood</td>
<td>359,976</td>
<td>80</td>
</tr>
<tr>
<td>1994</td>
<td>Storm</td>
<td>64,970</td>
<td>10</td>
</tr>
<tr>
<td>1997</td>
<td>Flood</td>
<td>137,418</td>
<td>-</td>
</tr>
<tr>
<td>2004</td>
<td>Earthquake</td>
<td>15,700</td>
<td>500</td>
</tr>
<tr>
<td>2007</td>
<td>Flood</td>
<td>166,664</td>
<td>-</td>
</tr>
<tr>
<td>2008</td>
<td>Storm</td>
<td>2,420,000</td>
<td>4,000</td>
</tr>
<tr>
<td>2010</td>
<td>Landslide</td>
<td>145,000</td>
<td>-</td>
</tr>
<tr>
<td>2010</td>
<td>Storm</td>
<td>260,049</td>
<td>57</td>
</tr>
<tr>
<td>2011</td>
<td>Earthquake</td>
<td>21,277</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>Earthquake</td>
<td>1,486</td>
<td>1</td>
</tr>
<tr>
<td>2012</td>
<td>Flood</td>
<td>85,000</td>
<td>-</td>
</tr>
<tr>
<td>2013</td>
<td>Flood</td>
<td>73,300</td>
<td>-</td>
</tr>
<tr>
<td>2014</td>
<td>Flood</td>
<td>40,000</td>
<td>-</td>
</tr>
<tr>
<td>2015</td>
<td>Flood</td>
<td>1,616,761</td>
<td>1,670</td>
</tr>
</tbody>
</table>

2015 Flood:
- 1,676,086 people were displaced from their homes
- 132 people died
- 38,954 houses were totally damaged

III. National Disaster Management Policy

1. Creating better opportunities boosting the country’s socio-economic.
2. Managing the disaster as minimize risk as possible.
3. Enhancing response activities to reduce the impact of disaster.
4. Enhancing the spirit of self-reliance of the victims of disaster to stand on themselves in long term recovery independently.
5. Giving Psycho-social support to the people who suffered disaster.
National Disaster Preparedness Central Committee
Chairman: Vice President

Sub-Committee Chairman
Information
Emergency Communication
Initial assessment & Emergency
Supply
Damage and loss confirmation
Development
Transport and Route Clearance
Mitigation & Establishing of
Emergency Shelter
Health care
Security
Dy Minister, Information
Dy Minister, Communication and Technology
Dy Minister, Commerce
Dy Minister, National Planning and Economic
Dy Minister, Rail Transport
Dy Minister, MSWRR
Dy Minister, Health
Dy Minister, Home Affairs

VI. Allocation of the Union Government for Disaster in 2015-2016

- Reserved Fund (up to 17-11-2015)
  - Being the Expenditure for force majeure natural disaster
  - Special case (must be incurred within the fiscal year)
  - Where transfer of budget head cannot be effected (or) don’t transfer (or) no allotment by existing law

(Kyats in million)

- The Ministry of Border Affairs 6,216.69
- The Ministry of Agriculture and Irrigation 14,078.91
- The Ministry of Livestock, Fishery and Rural Development 3,065.90
- The Ministry of Transport 641.85
- The Ministry of Education 2,302.74
- The Ministry of Construction 25,561.66
- Kachin state 35.22
- Kaya state 2,059.71

Con:
### Allocation of the Union Government for Disaster in 2015-2016

(Kyats in million)

- Sagaing Region 4,761.3096
- Bago Region 1,682.6825
- Magway Region 6,234.530
- Mandalay Region 10,487.524
- Rakhaing state 1,500.000
- Yangon Region 452.400
- Ayeyarwaddy Region 1,345.000

Total 80,426.1458

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### V. The World Bank’s Assistance for Disaster

- 5 percent of the undisbursed amount under IDA 17
- Operations Manual
- The National Disaster Fund Trustee Committee
  - Chair (The Deputy Minister of Finance)
  - Representative (President Office)
  - Director General (General Administration Department)
  - Director General (Ministry of National Planning and Economic Development)
  - Director (Ministry of Foreign Affair)
  - Director (Attorney General Organization)
  - Secretary (The Relief and Resettlement Department)
  - Director General (The Ministry of Social Welfare, Relief and Resettlement)
  - Director General (Treasury Department)
Contingent Emergency Response Implementation Plan (CERIP)

- The Ministry of Agriculture and Irrigation
- The Ministry of Health
- The Ministry of Livestock, Fishery and Rural Development
- The Ministry of Education
- The Ministry of Construction

Thank You
Building Financial Resilience to Flood in Serbia

Marko Blagojevic
Director, Government of Serbia Public Investment Management Office (formerly Office for Reconstruction and Flood Relief)

Flood Profile

- Floods 2014 affected 119 municipalities (out of 165) and 22% of total population
- More than 30 municipalities sustained extensive damage
- 57 lives were lost
- 32,000 families were forced out of their homes
- Production of electricity decreased by 25%, due to the flooding of an open-pit coal mine, a key source of lignite-based power generation
- The disaster caused a recession in the Serbian economy
  - GDP fell by 1.8% in 2014, instead of growing by 0.5% as was previously projected
- Total disaster effects (damages and losses) 4.8% of GDP (EUR 1.7 billion)
- Total needs for recovery and reconstruction estimated at EUR 1.35 billion
- Estimates are based on the Post Disaster Needs Assessment implemented by the Government of Serbia with the assistance of the WB, UN and EU
Government Response

No adequate system was in place to respond to overwhelming needs in a coordinated fashion

Office for Reconstruction and Flood Relief was established in the midst of floods as an operative (not political) national authority for relief and recovery

Drafting a new set of rules, law and bylaws

Government Response

KEY RESPONSIBILITIES OF THE OFFICE FOR RECONSTRUCTION AND FLOOD RELIEF:

- **Data** collection, processing and verification
- **Drafting** of National Recovery Programs by sectors (including detailed information on damages, proposed measures and cost estimates)
- **Fundraising** (Office as the key focal point for donors and lenders)
- **Coordination** of aid disbursement
- **Supervision of implementation** (including public procurement)
- **Approval of payments**
- **Ensuring transparency** through reporting (to the Government, general public and donors)
Government Response

Over the past two years Serbia and its partners invested considerable resources into the recovery of:

- Damaged and destroyed houses
- Flood protection infrastructure
- Transport infrastructure
- Public buildings
- Power production and distribution facilities
- Critical local infrastructure
- Agriculture
- SMEs

Over the past two years Serbia and its partners invested considerable resources into the recovery of:

FINANCING OF 2014 FLOOD RELIEF AND RECONSTRUCTION

- In May 2014, Government established the Office for Reconstruction and Flood Relief
  - Office played a central role in coordination of aid and financing, reconstruction and rehabilitation
- In July 2014 an international donors’ conference was organized for Serbia and Bosnia and Herzegovina
  - Largest donor was EU (through its Solidarity Fund and IPA)
- In October 2014 Serbia and the World Bank signed a €227.5 million loan: Floods Emergency Recovery Project
- In December 2014 the Parliament passed a supplementary budget for 2014 (7 months after the disaster)
  - A funding gap of over €830 still remains unbridged

Government budget: 4.2, 0%
Individual donations—government-executed: 41.6, 3%
Bilateral international donations: 39.5, 3%
International borrowing: 227.5, 17%
EU funds: 192.6, 14%
Private foundations: 9.0, 1%
Funding gap: 831.6, 62%
Financing of 2014 Flood Relief and Reconstruction

- Government aid of over 40 million EUR provided to 20,929 families.
- 5 million EUR provided to 2006 SMEs as cash grants.
- Aid packages for over 26,000 agricultural households in 29 municipalities affected by floods (saplings, animals, animal feed, equipment etc.)
- Cattle breeders financed from the national budget with full replacement value for almost 5000 farm animals and farmers for 16,000 hectares.
- Reconstruction of:
  - energy sector: mines, power generation and distribution facilities
  - transport infrastructure
  - 111 public buildings
  - 109 projects of local infrastructure

Key achievements

- More efficient use of limited resources
- Doing more with less
- Enhanced credibility in the recovery process
- Enhanced confidence in the process among general public
- Increased readiness among donors to provide (additional) support
Current Risk Layering in Serbia

<table>
<thead>
<tr>
<th>Disaster risk</th>
<th>Financing source available</th>
<th>Amount of funds available</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-risk layer (e.g., major floods,</td>
<td>Donor assistance</td>
<td>Unpredictable and unreliable (e.g., in 2014 the total commitment was €235 million, often in</td>
</tr>
<tr>
<td>major earthquakes)</td>
<td></td>
<td>kind</td>
</tr>
<tr>
<td></td>
<td>Emergency borrowing</td>
<td>Unpredictable (e.g., €227.5 million drawn from World Bank for 2014 floods emergency recovery)</td>
</tr>
<tr>
<td>Medium-risk layer (e.g., regional floods, minor earthquakes)</td>
<td>Contingent financing</td>
<td>Not currently available ($100 million CAT DDO is in early preparation)</td>
</tr>
<tr>
<td>Low-risk layer (e.g., localized floods,</td>
<td>Budget funds: Permanent Budgetary Reserve</td>
<td>€17,000 (originally budgeted, increased one-off by 2014 supplementary budget to almost €20 million)</td>
</tr>
<tr>
<td>droughts, landslides)</td>
<td>Budget funds: Compensation for Damage Caused by the Natural Disasters (account 484)</td>
<td>€700,000 (originally budgeted, increased one-off by 2014 supplementary budget to approximately €1.5 million)</td>
</tr>
<tr>
<td></td>
<td>Budget reallocation</td>
<td>Unclear (10% of each appropriation available immediately; higher if supplementary budget is passed)</td>
</tr>
<tr>
<td></td>
<td>Catastrophe insurance</td>
<td>Very low because of low penetration (€16.9 million paid out for 2014 floods)</td>
</tr>
</tbody>
</table>

Serbia DRFI Country Note: Key Findings

- No disaster risk financing strategy currently in place
- Number of instruments available is limited
- Government currently relies largely on ex-post instruments:
  - budget reallocation
  - emergency borrowing
  - donor financing
- Current financing available insufficient even to cover recurrent losses:
  - significant resource gap identified
Key Challenges

- Budget System does not allow for the accumulation of resources over a multiyear period
- Cash accounting principle
  - all the funds not spent during one year elapse at its end and therefore cannot be rolled over to the next period and accumulated
- Lack of fiscal space from ongoing fiscal consolidation efforts pursued by the Government
  - high competition for financing resources
  - difficult to set aside considerable amounts of budgetary resources for contingencies

Next steps

- Preparation of a catastrophe deferred drawdown option (Cat DDO) with support of World Bank
- Promotion of catastrophe insurance for individuals and activities for boosting private insurance sales under way
- Analysis of various budget protection mechanisms with Europa RE ongoing (national and local level)