The Rationale for DRF in agriculture and choosing the right financing instrument
1 The Rationale for DRF in Agriculture

2 Risk layering and choosing the right financial instrument
   a. Risk Retention Instruments
   b. Risk Transfer Instruments

3 The basics of agriculture insurance

4 Key Takeaways
Why DRF for the rural and agricultural sector?

Rural households and small-scale farmers are disproportionately vulnerable to and affected by risk (natural, climatic, pests & diseases, price) and to climate change:

- **3.4 billion people** (44% of global population) live in rural areas as of 2019.
- **There are 570 million farms**, of which 500 million (88%) own or cultivate farms of <2 Ha (accounting for 12% of land area).
- **Poverty rates** are higher in rural than urban areas.
- **Rural population mainly derive their livelihoods in agriculture** (employment, consumption, and incomes).
- **Food insecurity**: Challenges development of human capacity.
- **Poverty rates** are higher in rural than urban areas.
- **Rural population mainly derive their livelihoods in agriculture** (employment, consumption, and incomes).

Disaster Risk Financing & Insurance Program

World Bank Group
Risks to agriculture and rural livelihoods

Between 2005 and 2015 natural disasters cost US$96 billion in damages or losses to the agricultural and livestock sectors in developing countries. Source: IFAD 2020

Market price risk
- Volatility of prices of agricultural inputs and outputs/products

Production risks
- Droughts, floods, hurricanes, storms, severe rain/hail or frost, extreme heat
- Forest fires, lightning, earthquakes, volcanoes, landslides, etc.
- Locust diseases and invasions

Environmental risks
- Conflicts
- Macroeconomic
- Policy risk e.g. price caps
Risks to agriculture and rural livelihoods affect all of society

**FARMERS, PASTORALISTS, ETC.**
Loss of crop production | reduced consumption and income | death of livestock | loss of livelihoods | distress sales of assets and descent into poverty traps | inability to repay loans | default and impact on future borrowing

**FINANCIAL INSTITUTIONS, VALUE CHAIN ACTORS - INPUT & OUTPUT DEALERS**
Financial institutions: Inability to recover loans. closure of revolving funds, need for recapitalization, etc.
Input dealers and grain purchasers/packer processors face business interruption and closure in extreme drought or flood situations

**GOVERNMENTS**
Widespread food insecurity, rising food prices, social unrest | Dependence on humanitarian assistance | increased national debt | budget volatility due to reallocation to finance disaster relief | Increased costs of food imports
DRF in Agric enables a comprehensive system to manage risk

**INFORMAL MECHANISMS**

- Reduce consumption
- Default on loans
- Remove children from school
- Plan for migration

**MARKET BASED SOLUTION**

- Insurance (indemnity and index)
- Credit guarantee
- Credit
- Contingent or emergency credit
- Risk sharing (input suppliers, wholesalers)

**Risk reduction**

- Crop diversification
- Savings in livestock
- Sharecropping / Using self-help groups
- Water resource management
- Improved seeds
- New technology

**Adaptation finance**

- Financial protection for catastrophic risks
- Financial protection for moderate risks

**Harmful Coping Strategies**

- Risk pooling (peers, family members)
- Labor diversification
- Informal lending

**Financial protection for low risk**

- Financial protection for catastrophic risks
- Financial protection for moderate risks
- Financial protection for low risk
One size does not fit all: households require integrated financial services based on their risk profiles

**Financial instruments**
- Multi Peril Crop Insurance (MPCI)
- Named peril Crop Insurance (NPCI)
- Index Insurance
- Credit (long-term finance and guarantees)
- Savings and Payments
- Micro-Credit

**Target Segmentation**
- **Commercial Farmers**
  - Large Farm units (5Ha; 4% of HHs)
  - Access to credit
  - High levels input use
  - Produce for sale
- **Semi-Commercial Farmers**
  - Medium and small-holder farmers (1-5Ha; 38% of HHs)
  - Some assets
  - Some access to credit
  - Part consumption / part sale
- **Small Subsistence Farmers**
  - Very few assets (< 1Ha; 58% of HHs)
  - Subsistence farming
  - Very vulnerable to climatic shocks
- **Landless households**
  - Very few assets; no land
  - Paid labor
  - Very vulnerable to climatic shocks

**Social Safety-Net Programs:** Government purchases insurance on behalf of pre identified producers

**Financial instruments**

**Target Segmentation**
1. The Rationale for DRF in Agriculture
2. Risk layering and choosing the right financial instrument
   a. Risk Retention Instruments
   b. Risk Transfer Instruments
3. The basics of agriculture insurance
4. Key Takeaways
Cost efficiency requires combining different instruments based on risk profile & policy priorities

### SHOCK IMPACT

<table>
<thead>
<tr>
<th>FREQUENCY</th>
<th>SEVERITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

### RISK PROFILE

- **Low**
- **Moderate**
- **High/catastrophic**

### RISK LAYERING STRATEGY

#### FINANCING INSTRUMENT

- **Market-Based Instruments**
  - Insurance
  - Derivatives
  - Cat Bonds

- **Contingent financing**
  - Credit
  - Grants
  - Reserve Funds
  - Grain reserves

- **Budgetary instruments**
  - Contingency Budget
  - Reallocation
  - Emergency Tax

Humanitarian Assistance (uncertain)
An effective DRF strategy aims to match financial instruments to specific needs

Robust DRF instruments match needs based on the identified *risk profile* and *policy priorities*, considering the differences in characteristics of financial instruments.

**CRITERIA**

- **Amount available:** How much funding is available from this instrument?
- **Cost of capital:** What costs (real and opportunity) are associated with this instrument?
- **Mobilization speed:** How quickly are funds available after a shock?
- **Reliability:** How predictable is the amount and timing of this instrument?
- **Requirements:** What data and arrangements are required for operationalization?
Risk Retention Instruments

**SHOCK IMPACT**

- **High/catastrophic**
- **Moderate**
- **Low**

**RISK PROFILE**

- Humanitarian Assistance (uncertain)

**RISK LAYERING STRATEGY**

**FINANCING INSTRUMENT**

- **Market-Based Instruments**
  - Insurance, Derivatives, Cat Bonds

- **Contingent financing**
  - Credit, Grants, Reserve Funds, Grain reserves

- **Budgetary instruments**
  - Contingency Budget, Reallocation, Supplementary budget, Emergency Tax
Budget reallocations

Government agencies and line ministries may request budget reallocations to use some of their existing budget lines for disaster response or modify the issued allocations.

Advantages

- Can often be the first source of funding available to government for emergency relief
- Can be available for all kinds of disasters or emergency events

Disadvantages

- Reduces the spending planned for development priorities
- Potentially very high opportunity cost
- There is a limit to how much of the budget can be reallocated
- Unreliable subject to the timing of the disaster relative to the annual budget cycle
- May be hard to monitor and account for
The key questions when reallocating budget

- Power to reallocate without approval of Legislative Assembly?
- What is the threshold?
- Control and transparency mechanism
  - Expenditure tracking
  - Flexibility without compromising transparency
- Is there alternative funding?
- Are there any clauses that override the tax rules in the event of a disaster?
Contingency or Reserve Fund

A Fund held either off-budget with a pre-allocated amount or on-budget as a contingency budget allocation with specific operational rules, or a dedicated management institution or government agency with a fiduciary responsibility.

**Advantages**
- Improves timeliness, funds immediately available
- Rapid response enables faster recovery and minimizes longer-term impact of disasters
- Improve transparency and accountability regarding public expenditures
- Reduce dependency on emergency borrowing
- Can enable inter-agency coordination for readiness, recovery, and risk transfer

**Disadvantages**
- Opportunity cost if reserves retained
- Require processes, systems, and resource capability to ensure funds are distributed efficiently and transparently
  Can be mismanaged
- Requires careful fiscal management and modeling to ensure size of fund corresponds to exposure/liability
The key questions when establishing a contingency or reserve Fund

Legal basis and institutional arrangement

The type and scope of the Fund

Financing sources

Key requirements to ensure that resources are available at the right time with predictability

The activation mechanism

Develop guidelines for fund expenditures (eligible expenditures)

Procedures for awarding contracts
## International experience of Disaster Funds

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of Creation</th>
<th>Support for emergencies</th>
<th>Support for reconstruction</th>
<th>With subsidy from the national government</th>
<th>Regional governments support the fund</th>
<th>Risk transfer schemes</th>
<th>Insurance as a distribution channel</th>
<th>Support Agriculture/rural households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia</td>
<td>2012</td>
<td>✓</td>
<td>✓</td>
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<td>Costa Rica</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Spain</td>
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<tr>
<td>US FEMA</td>
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<td>Mexico</td>
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<td>Mozambique</td>
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<td>New Zealand</td>
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<tr>
<td>Panama</td>
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<tr>
<td>Peru</td>
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<td>Türkiye</td>
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</tbody>
</table>

Notes: *National Disaster Risk Management Fund is unregulated. The Adaptation Fund (Fondo de Adaptación), covering El Niño and La Niña impacts and floods. **Fonds national de gestion des risques en agriculture for uninsurable crop losses due to natural hazards or disease outbreak. ***Drought Fund passed in 2021.
Grain reserves can provide a first line of defense against food insecurity

**Problem statement**

- In a **food emergency**, governments are often **pressured** to take actions
- **Total reliance** on private storage can result in food insecurity due to **lack of access** and **lack of affordability** for the most vulnerable

**Solution**

A strategic grain reserve for meeting future domestic or international needs

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**Different levels of grain reserves**

- **International Stocks**: International reserves to provide for natural disasters, i.e.;
  - ASEAN Emergency Rice Reserve
  - SAARC Food Security Reserve
  - West Africa Regional Grain Reserve

- **Central Stock**: Adjusting supply & demand, and providing for natural disasters

- **Temporary Stock**: Grains purchased under minimum price program*

- **Local Stocks**: Stabilize local grain markets and provide for natural disasters

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Source: International Grain Reserves (Wright, 2009), OECD China’s Grain Reserves, price support and import policies (2020)

Note: *Case of China
Grain reserves under a food security strategy can be managed commercially

SWITZERLAND: EXAMPLE OF PRIVATE SECTOR ENGAGEMENT IN FOOD SECURITY GRAIN RESERVE PROGRAM

Source: McKinsey & Co. - Building a food security strategy for Japan in an age of global competition
Contingency Financing

Pre-arranged loan or credit facility approved prior to the disaster, and funds released immediately after the triggering event - typically the declaration of a state of national disaster

### Advantages

- Funds can be released very quickly after a disaster - usually within 48 hours
- The grant or loan is on the same concessional terms as other financing offered by the relevant funder
- Usually have a ‘soft trigger’, allowing the country to draw down from the facility for any kind of disaster or emergency

### Disadvantages

- Uses part of the allocation of funds from the funder that offers the facility (e.g. IDA allocation).
- Usually includes a fee to establish the facility
- Often prior conditions must be met e.g. macro economic stability
Conditional lines of credit allow governments to access funding at competitive borrowing rates immediately after the disaster to meet emergency needs.

**Key features of WB contingency credit: CAT DDO**

- Cover a wide range of shocks: disasters, public health crises, etc.
- Act as a fiscal buffer pending the mobilization of additional resources (reconstruction loans, etc.)
- Can be used as a complement to insurance
- Encourage proactive disaster risk management; DRM plan is a precondition for eligibility
The CRW ERF supports early responses to slower-onset crises identified as having the potential to escalate into major crises. The ERF comprises US$1 bn of the CRW’s US$2.5 bn for Disease outbreak and Food insecurity crisis.

**Key features of CRW ERF**
- Finances early response to slow-onset crisis before progression catastrophe
- Incentivize resilience-building, funds linked to crisis-preparedness efforts
- Reduce overall response costs, by mobilizing early response and mitigating crisis impacts

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**ERF Technical assessment**
evidence of an emerging/potential food security crisis

**Eligibility Note and Approvals**
Verification of crisis and assess amount of funding needed

**Approval and Prep Plan**
Conditional on Food Security Crisis Preparedness Plan within 3 to 6 months
Risk Transfer Instruments

**SHOCK IMPACT**

- **High/catastrophic**
- **Moderate**
- **Low**

**RISK PROFILE**

- Humanitarian Assistance (uncertain)

**FREQUENCY**

- Severity
- Contingent financing
  - Credit, Grants, Reserve Funds, Grain reserves
- Budgetary instruments
  - Reallocation, Emergency Tax

**RISK LAYERING STRATEGY**

- Market-Based Instruments
  - Insurance, Derivatives, Cat Bonds

**FINANCING INSTRUMENT**
Market-based risk transfer solutions

Includes insurance, catastrophe bonds, weather derivatives and swaps. Provided by insurance companies, reinsurance companies and risk pools and the catastrophe market.

**Advantages**

- Ensures funding is available to replace assets or prevent loss of assets or restore losses in revenue
- Can cover the reinstatement of key service delivery
- Enhances financial planning as part of a comprehensive protection strategy covering both immediate relief and longer-term recovery
- Enables rapid payments for certain types of risk transfer (parametric insurance, hybrid)
- Transfer unmanageable risk to a more efficient risk manager

**Disadvantages**

- Can be very costly for low severity, high frequency risks
- Requires good data regarding the characteristics of the asset to be insured/ indices to be used (to be representative and accessible)
- Often requires prioritization of which assets to be insured given budget constraints
- Can be slow to pay out with potential disputes with insurers over the value of a claim for some risk transfer products (indemnity insurance)
Fill in the table

You have 5-10 minutes

<table>
<thead>
<tr>
<th>DRF Criteria</th>
<th>Budget reallocations</th>
<th>Contingency or Reserve Fund</th>
<th>Contingent credit for budget support or CRW ERF for food insecurity crisis</th>
<th>Market-based risk transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount available</td>
<td></td>
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<td></td>
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<tr>
<td>Cost of capital</td>
<td></td>
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<tr>
<td>Mobilization speed</td>
<td></td>
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</tr>
<tr>
<td>Reliability</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Requirements</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
1. The Rationale for DRF in Agriculture

2. Risk layering and choosing the right financial instrument
   a. Risk Retention Instruments
   b. Risk Transfer Instruments

3. Basics of agriculture insurance

4. Key Takeaways
What risks can agricultural insurance cover?

**Market risks:** Prices
Market risks are rarely covered by insurance markets

**Institutional, political and policy risks**
Institutional, political and geopolitical risks are typically not covered.

**Production risks:** Natural, Climatic Biological
Production risks are the main objective of agricultural insurance

Source: Institut Boulder pour la microfinance
Agricultural insurance is one tool for managing risk, not eliminating it

1. Insurance is just one of the many risk management tools available to low-income households.

2. Risk assessment should determine whether insurance is the most appropriate tool.

3. Savings and credit are more flexible but typically offer less protection.

4. Agricultural insurance provides cover for low frequency and medium to high intensity losses.
### Level of insurance implementation depends on policy objectives

<table>
<thead>
<tr>
<th>Type of Insurance</th>
<th>Who is Policyholder</th>
<th>Needs met/ Objectives</th>
<th>Mechanisms of the solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macro</strong></td>
<td>Government Development Humanitarian</td>
<td>Protect national budget Social protection Food security</td>
<td>Farmer → premium → payout → Risk pool</td>
</tr>
<tr>
<td></td>
<td>Financial institutions Agricultural enterprises</td>
<td>Increase supply of credit Protect loan portfolios Business continuity Provide recovery lending Improve risk management</td>
<td>Farmer → premium → payout → Non-financial Intermediaries → payout</td>
</tr>
<tr>
<td><strong>Meso</strong></td>
<td>Farmers Farmer organizations</td>
<td>Protect livelihoods &amp; increase investments in productivity Improve risk management</td>
<td>Farmer → premium → payout → Insurer</td>
</tr>
<tr>
<td><strong>Micro</strong></td>
<td>Government or development organization</td>
<td>Social protection Food security</td>
<td>Internal use of payouts to mitigate portfolio risks, which supports farmers indirectly</td>
</tr>
</tbody>
</table>

- **Government** sets the payout rules to individual farmers.
- **Financial institutions** and **Insurers** may use payouts internally to mitigate portfolio risks, which supports farmers indirectly.
A wide range of agricultural insurance products meet different needs

<table>
<thead>
<tr>
<th>Sector</th>
<th>Indemnity-based</th>
<th>Index-based</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop and forestry</td>
<td>Named-peril Crop Ins. (NPCI) - hail + allied</td>
<td>Weather-Index Insurance (WII), based on Ground Weather Stations</td>
<td>Greenhouse (crops + buildings)</td>
</tr>
<tr>
<td></td>
<td>Multi-peril Crop Ins. (MPCI) All natural, climatic and biological</td>
<td>Weather-Index Insurance (WII), based on Remote Sensing/Satellite Indexes</td>
<td>Forestry Insurance (Fire/wind, allied perils)</td>
</tr>
<tr>
<td></td>
<td>Crop Revenue Insurance (CRI) - loss of yield &amp; price</td>
<td>Crop Area Yield Index Insurance (AYII)</td>
<td>Plantation/ Tree Fruit Insurance (Fire/wind, allied perils)</td>
</tr>
<tr>
<td></td>
<td>Specialist covers (e.g. Aggregate Production shortfall cover)</td>
<td>Other (e.g. specialist Flood Index insurance)</td>
<td></td>
</tr>
<tr>
<td>Livestock and fisheries</td>
<td>Named-peril Accident &amp; Mortality</td>
<td>Mortality Index-based livestock Insurance (M-IBLI)</td>
<td>Aquaculture Insurance (fin fish) (Named-Peril and All Risks)</td>
</tr>
<tr>
<td></td>
<td>All Risks Mortality including diseases</td>
<td>Index-Based livestock Insurance (IBLI)</td>
<td>Aquaculture (shellfish) (Named-peril and All Risks)</td>
</tr>
<tr>
<td></td>
<td>Epidemic disease/ Business Interruption</td>
<td>Pasture or Forage Index or Satellite Index (NDVI for loss of pasture)</td>
<td>Bee Insurance</td>
</tr>
<tr>
<td></td>
<td>Bloodstock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Indemnity and index-based insurance

<table>
<thead>
<tr>
<th>Feature</th>
<th>Indemnity insurance</th>
<th>Index insurance: Payments are based on an indicator/parameter as a proxy for the actual loss or damage.</th>
<th>Parametric insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Payment speed</strong></td>
<td>Can be very slow due to claims process</td>
<td>Rapid payments (less than two weeks) possible</td>
<td></td>
</tr>
<tr>
<td><strong>Claims handling costs</strong></td>
<td>Higher due to claims settlement process.</td>
<td>Lower - no claims settlement process.</td>
<td></td>
</tr>
<tr>
<td><strong>Transparency of claims</strong></td>
<td>Claim amounts can be disputed, loss adjustment process is also imperfect and may not be well understood.</td>
<td>Claim amounts are predefined and the calculation process is transparent</td>
<td></td>
</tr>
<tr>
<td><strong>Policy customization</strong></td>
<td>Products and policy wordings are typically standardized</td>
<td>Highly personalizable through parameters chosen by the insured</td>
<td></td>
</tr>
</tbody>
</table>

#### Indemnity insurance

- Payment is based on the measured loss or damage.

#### Index insurance:

- Payments are based on an indicator/parameter as a proxy for the actual loss or damage.
Indemnity insurance (especially MPCI) is often unsuitable for small scale farmers

<table>
<thead>
<tr>
<th>Pre-conditions required for indemnity-based crop insurance</th>
<th>Issues facing provision of indemnity-based crop insurance in developing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield or loss/damage data</td>
<td>• Historical time-series <strong>crop yield data is usually not available</strong> at individual farmer level</td>
</tr>
<tr>
<td>Costs and practicality of in-field inspections and loss adjustment</td>
<td>• Small farm size, dispersed rural populations means <strong>high cost of loss assessment</strong></td>
</tr>
<tr>
<td>Operational capacity of insurers</td>
<td>• Insurers are often not involved in rural sectors and suffer from <strong>asymmetric information</strong></td>
</tr>
<tr>
<td></td>
<td>• MPCI programs are exposed to <strong>adverse selection and moral hazard</strong></td>
</tr>
<tr>
<td>Costs of insuring farm yields</td>
<td>• MPCI offers all risk loss of yield protection, but it is far more expensive to administer for smallholders than index-based insurance</td>
</tr>
</tbody>
</table>
## If indemnity insurance is not feasible, can index insurance fill the gap?

An index insurance contract is based on data and not on losses measured in the field.

**Example indexes:** rainfall, temperature, area yield, pasture

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Overcomes major problems of indemnity (moral hazard, adverse selection)</td>
<td>- <strong>Basis risk</strong> – potential mismatch between actual losses and payout</td>
</tr>
<tr>
<td>- Objective and transparent</td>
<td>- High development costs - products need to be specifically tailored to each location and crop</td>
</tr>
<tr>
<td>- Simplified claims process</td>
<td>- Limited quantity and quality of on-the-ground weather and yield data</td>
</tr>
<tr>
<td>- Improved access to insurance to benefit smallholders</td>
<td>- May be complicated and hard for partners and farmers to understand</td>
</tr>
</tbody>
</table>

Source: Boulder Institute for Microfinance
AYII aims to provide more comprehensive cover at a lower cost than MPCI and with less basis risk than WII

<table>
<thead>
<tr>
<th>Multi-peril Crop Insurance</th>
<th>Farm</th>
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</thead>
<tbody>
<tr>
<td>Payouts based on farm-level loss assessment</td>
<td></td>
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<tr>
<td>Insures against all perils</td>
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<table>
<thead>
<tr>
<th>Area-Yield Index Insurance</th>
<th>Village</th>
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<tbody>
<tr>
<td>Based on average losses at an area level</td>
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<tr>
<td>Can cover multiple natural, climate, and biological risks</td>
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<td>Losses determined through crop-cutting experiments (CCEs)</td>
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<tr>
<td>More suited to small farmer conditions than MPCI</td>
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<tr>
<td>CCEs costly, time-consuming, and subject to moral hazard</td>
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<tr>
<th>Weather Index Insurance</th>
<th>Village</th>
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<tr>
<td>Based on weather parameters (such as rainfall, temperature, or soil moisture) correlated with crop loss</td>
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<tr>
<td>Typically covers single, weather-related peril</td>
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IBLI can provide coverage for either asset protection or asset replacement

- Insures against livestock accident and mortality due to a variety named perils, usually not disease
- Payout based on the death of livestock determined through a farm-level loss assessment
- To replace lost livestock
- Only for closed livestock systems that meet husbandry requirements
- Requires animal identification, livestock registration and pre-inspection

- Based on the weather or vegetation index
- Insures against loss of pasture due to weather conditions
- Mostly for asset protection (Kenya, Ethiopia, Somalia, Zambia).
- Asset replacement in Mongolia
- Suited for pastoralists or agro-pastoralists
1. The Rationale for DRF in Agriculture
2. Risk layering and choosing the right financial instrument
   a. Risk Retention Instruments
   b. Risk Transfer Instruments
3. Basics of agriculture insurance
4. Key Takeaways
6 Key takeaways

1. Cost efficiency requires combining different instruments based on risk profile & appetite as well as need and characteristics of instruments.

2. All financial instruments have costs (direct and indirect) and require trade-offs.

3. One size does not fit all: households require integrated financial services based on their risk profiles.

4. Agricultural insurance is one tool for managing risk, not eliminating it.

5. The impact of agricultural insurance and index insurance highly depends on product quality and implementation.

6. Overall, a range of studies show that index insurance helps enable resilience through: Reducing negative coping, smoothing income, increasing productive investments, increasing access to credit.
Thank You

- Eswatini
- Ethiopia
- Kenya
- Lesotho
- Namibia
- Rwanda
- Somalia
- South Africa
- Uganda
- Zambia
- Zimbabwe