Methodology, Tools, and Guidelines
on
Forecast-Based Financing (FBF)

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Acronym

ALAGaC/	Administration of Land Affairs, Geodesy, and Cartography
ALAMGaC	Agency for Land Administration and Management, Geodesy, and Cartography
AWS	Automatic Weather Station
5W	Who will do what, where, when, and how
BTS	Base transceiver station
CRVA	climate risk and vulnerability assessment
CSV Excel file	comma-separated values
CAP	Common Alerting Protocol
CBO/CSO	Community-based organizations / Community services organizations
IBFWS	Impact-based Forecast and Warning Services
CRVA	Climate Risk and Vulnerability Assessment
DIMA	National Rangeland Monitoring Database
EM-DAT	Emergency Events Database
DCPC	Data Collection and Processing Center
DTM/DEM	Digital Terrain Models (DTM)/ Digital Elevation Models (DEM)
EAP	early action protocol
EOC	Emergency Operations Center
FAO	Food and Agriculture Organization
AM/FM Radio	Amplitude Modulation/Frequency Modulation
FBF	forecast based Financing
FGD	Focus Group Discussion
GIS	Geographic Information System
GPS	Global Positioning System
HCT	Humanitarian Country Team
HPC	high processing power computing
IBF	impact-based forecasting
ICS	Incidence Command System
ICT	Information and Communication Technology
IFRC	International Federation of Red Cross and Red
IM	Information Management
IP	Internet Protocol
I-NGOs	International /National Non-Governmental Organization
IRIMHE	Information and Research Institute of Meteorology, Hydrology, and Environment
IVR	Interactive Voice Response
KII	Key Informant Interviews
KML/KMZ	Keyhole Markup Language
LEMA	Local Emergency Management Agency
L & D	Loss and Damage
MET	Ministry of Environment and Tourism
MIS	Management Information System
MHEWS	multi-hazard early warning system
MODIS	Moderate Resolution Imaging Spectroradiometer
MoED	Ministry of Economy and Development
MOU	Memorandum of understanding
MoFALI	Ministry of Food, Agriculture and Light Industry

MRCS	Mongolian Red Cross Society
NAMEM	National Agency Meteorology and the Environmental Monitoring
NEC	National Emergency Commission
NEMA	National Emergency Management Agency
NMHS	National Meteorological and Hydrological Services
NOAA	National Oceanic and Atmospheric Administration
ODBC/JDBC	Open Database Connectivity/ Java Database Connectivity
PDNA	post-disaster damage, loss and needs assessment
NSO	National statistics office
PIU	Project Implementation Unit
PSTN	Public switched telephone network
RIMES	Regional Integrated Early Warning System for Africa and Asia
R & D	Research & Development
SMS	Short Message/Messaging Service
SEC	State Emergency Commission
SME	Small and Medium Enterprise
SoD	standing orders on disaster
SOP	Standard Operating Procedures
TWG	Technical Working Group
WCS	Web Coverage Services
WMS	Web Map Service
WFS	Web Feature Service
WPS	Web programming service
UHF	Ultra-high frequency
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations International Children's Emergency Fund
VHF	Very high frequency
WFP	UN World Food Program
WMO	World Meteorological Organization

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1.0 Introduction: FBF

Forecast-based Financing (FBF) is a risk financing mechanism informed by the weather and climate emergencies that are likely to be impending over the high-value elements and having the likelihood of causing Losses and damages(L&D). Beforehand, it needs to be well-informed, anticipated, and immediate actions are undertaken to minimize the L&Ds. The FBF critically depends on precision-level forecasting & early warning, anticipatory early action, and early action protocol (EAP). The FBF process needs to be triggered automatically by the integrated weather warning, alerting, multi-hazard early warning, and Impact-based forecasting(IBF) system being operational at met-agency in the wake of climate extreme weather events that are likely to be impending over the ground based on frequency, intensity, and ripple effects of hazards over the days/weeks/months. Therefore, integrated IBF and FBF system design encompasses ICT/IT system architecture (*informed geospatial tools, IT database of ground level elements, the IT system induced impacts calculation over the medium-high value elements, categorizing elements that are likely to be impacted*) that can automatically estimate anticipatory L & D are likely by the early warning being issues with spatiotemporal scale. The IBF integrated FBF essentially needs to instrumentalize the national disaster management organization (NDMO) at the country level to activate EAP, forecast-based early humanitarian action timely and mobilizing the disaster risk finances e.g, Central Emergency Response Fund, disaster emergency response funds, UN-track funds, national disaster management disaster emergency response funds, etc., for humanitarian response and climate crises to minimize the L & D. However, in the normal circumstances the inclusive risk financing decision-making process can be undertaken based on EAP / forecast based early action for slow-onset multi-hazards are likely to be impending and necessarily ex-ante and ex-post financing for mitigating the climate risks.

The multi-modal risk financing and fiscal mobilization for forecast-based financing, disaster emergency response management, and climate crisis management require informed and evidence-based decision support tools, essentially for quantifiable needs, to be put in place before crises occur. The process is being hindered by the lingering bureaucratic process to conduct much-needed and life-saving humanitarian assistance.

1.1 Rationale: Forecast-based financing (FBF)

Risk-informed local development planning and finance decision-making in normal circumstances entails a concerted effort, which involves the inclusive participation of all relevant stakeholders (including governments and duty-bearers, stakeholders, donors, I-NGOs, sector departments, financial institutions, insurers, credit operators, vulnerable communities, etc.) and a shared consensus. The rollout of climate and disaster risk financing instruments is urgently needed to enable governments and the humanitarian sector to strengthen Safety Nets for the most vulnerable and provide more timely financing and assistance. Compounding hydrometeorological hazards, geological hazards induced by extreme weather events, financial crises, and pandemics, are increasingly challenging governments' abilities to manage climate risks, limiting their ability to effectively respond to climate extremes for boosting the local economy.

Due to global climate perturbation, extreme weather events are impending as the fastest onset with higher intensities & frequencies, and significantly causing loss and damage to the climate frontlines. Improved access to weather information services is now highly demanded by the climate frontlines. Robust observation mechanisms, precision level numerical weather predictions, weather warnings, and multi-hazard early warning systems are indispensable tools for making informed decisions effective at the critical juncture of humanitarian preparedness and response planning at the advent of hazardous impending weather being forecasted over the shortest lead time to prepare for the frontline community for strengthening the withstanding capacity against the impending triggers/hazards that could potentially turn into a disaster and loss and damage are highly likely.

The robust ICT-enabled FBF mechanism is the output of service delivery, which involves multiple and recurring processes in the background. The FBF process is invoked when national meteorological and hydrological services (NMHS) issue impact forecasts (triggers) through impact-based forecast platforms, such as thresholds of impacts, levels of early warnings, special alerts, and calculated anticipatory loss and damage associated with impending hazardous events.

The FBF mechanism enables the humanitarian program cycle to access humanitarian funding for early action informed by the impact-based forecast (IBF) on impending extreme weather effects, impact levels, risks, vulnerabilities, losses, and damages likely to occur. The goal of FBF is to anticipate disasters, prevent their impact whenever possible, and minimize human suffering and losses.

1.2 Development of a centralized dashboard for the FBF decision-making process.

- Centralized informed Dashboard visualizing impending multi-hazards, persistent trends of multi-hazards over the ground already experienced, hazardous weather events, proposed high-value elements (City, township, settlements, built-up installations/infrastructures, basic service delivery installing/facilities, key & Critical service delivery installations/facilities) are likely to be impacted, what are the effective early action protocol (EAP) being required for early preparedness of every extreme event, what are the early action plannings are required for rapidly addressing the crises and finally what would be inclusive risk-finances are being needed for early mobilizing and early preparedness so that impacts level and L & Ds can effectively be minimized.
- IBF integrated FBF can essentially support the NDMO to come up with quick-time-around inclusive and concerted actionable early action planning by the stakeholders(stakeholders, sector departments, other grassroots level state & non-state actors, private sectors, risk-financiers, climate frontlines)._, Sectoral level early action protocol development, humanitarian response planning, and sectoral climate action planning.
- Supporting Hazard/climate crisis-specific, inclusive, and timely response planning and resource mobilization
- Informed IBF/FBF dashboard, Informed tools for Ex-ante and Ex-post financing mechanisms for grand barging with donors/financial institutions, private sectors, propagation of risk-financing policy, planning & advocacy for optimizing the risk-finance mobilization drives at the internal and external level.
- Informed tools for facilitating Grand bargaining with donors about the niche demand and optimal uses of risk finance.
- Informed tools supported mixed-mode & financing co-financing modality for addressing the slow and medium onset climate crisis.
- Optimum use of climate finances for timely disbursement and climate actions

1.3 Objective :

The core elements of FbF to inform weather & climate risk-integrated planning decision supports for the allocation of financial resources are agreed upon in advance, together with the specific forecast threshold(triggers) and allocatable resources for the implementation of early actions. The roles and responsibilities of everyone involved in implementing these actions are defined in the Early Action Protocol (EAP), and Early warning-based early action planning. This ensures full commitment to implementation among the involved stakeholders.

1.4 Overview of FBF

The implementation of the intended FBF mechanism to address the Mongolian disaster emergency management over to comprehensively supporting humanitarian program cycles IBF-driven FBF to inform the scenario setting of what consequences are likely ahead of impending hazards before interacting with the ground. The emergency risk management and critical finance decision-making process depend on the informed tools and the quick-time-around scenario overviews of impending extreme weather events. IBF integrated FBF dashboard intended to support the timely execution of early warning advisory-based on early action, early action planning, contingency planning, disaster emergency preparedness planning and finance mobilization, etc. The evidence-based risk-informed (IBF supplied) decision support tools are essential to mechanize the bureaucratic process for fostering the grand bargains/advocacy with the climate & humanitarian risk financing community for timely mobilization of risk finance to meet the climate crises ahead of impending. Informed tools supported FBF mechanism would be also able to enable stakeholder policy and planning coherence, inclusive-participatory, and self-esteemed multi-stakeholder coordinated participation to risk financing and response to crises.

Day by day climate emergencies are turning to rapid onset patterns and fundamentally the traditional risk management paradigm is gradually becoming ineffective. The new methodology and tools for IBF-informed FBF are intended to meet climate emergencies robustly.

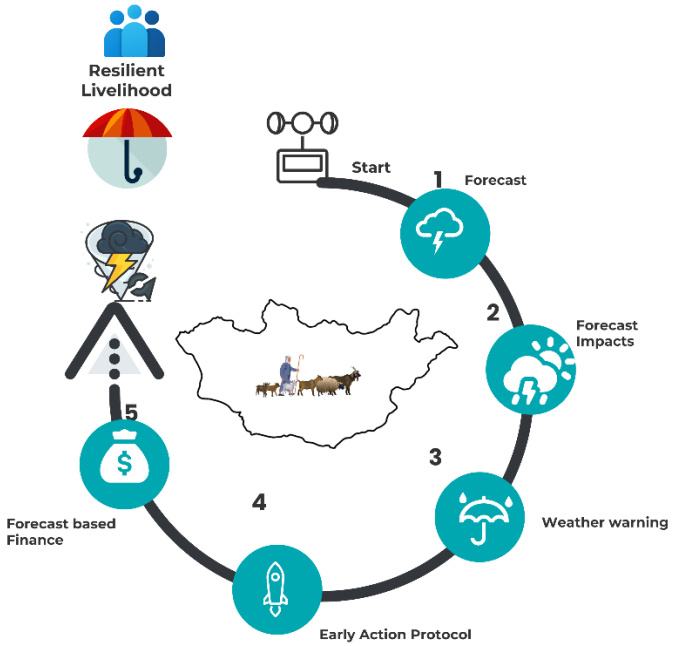


Figure 1: FBF work flow diagram

The traditional climate and multi-hazard risk financing limited to relief and in-kind support mobilization. However, the IBF informed FBF process to be enabled to leverage the financing instruments for the humanitarian community to plan contingencies for preparedness in the advent of impending multi-hazards and post-disaster response planning for the frontline community to be better prepared ahead of forecasted impending hazards likely the loss and damages and to understand the impact level minimizing the L & D.

However, the IBF driven FBF an excellent leverage for the humanitarian program cycle ahead of disaster strikes being always faces critical challenges in terms of number of the population are likely to be impacting, magnitude, the threshold of trails of disasters, assessment and summing up anticipatory L & D , what would be the preparedness for the frontline vulnerable community, forecast-based early action planning, contingency preparation, timely pre-positioning relief items to the doorstep of the vulnerable community, etc., so that loss and damage could be minimized to as lowest as possible.

The dashboard informed IBF can sufficiently meet the humanitarian decision making process with the evidence-based and ICT-driven tools can represent the clear picture of where the extreme and hazardous weather event induced impact thresholds are spanning, and exactly how many elements are likely to be impacted based on forecasted extreme weather thresholds. As a result, the national and local government efforts remain challenged to formulate demand-driven contingency planning for the target group and location, prepositioning emergency relief items (types and amount), cash grants, and in-kind support to be prioritizing and essentially to mobilize the most vulnerable areas and hard to reach areas for better preparedness.

1.5 Rationalizing IFB-driven FBF.

Impact-based forecasting (IBF) is basically an ICT tool driven by an integrated system having the capability for hybrid observation mechanism, multiple ranges and demand-driven weather forecast preparations, analyzing and preparing impact over the forecasted extreme weather events, weather warning, alerting and, multi-hazard early warning system, etc., over to a one-stop solution to whole weather and climate information services value chain. Considering the Mongolian current set of climate regimes and patterns, rapidly changing weather phenomena (from minutes - hourly - diurnally and short-range spanning impacts) the proposed IBF methodology is being designed as a flagship approach for addressing demand-driven climate information services for stakeholders and target groups.

The FbF process is another outset of the whole climate emergency management process in which the system needs to essentially inform the stakeholders about the risk-informed tools and mandate the inclusive financing mechanism being well incorporated with the whole value chain. We understand disaster emergency risk management is such a time-critical response management process that needs to come across over the quick disposal of decision-making process over the

government bureaucratic channel within a short time span otherwise response cannot be mobilized at the point of crisis, effectively and efficiently, and L & D would be the larger extent.

However, integrated IBF & FBF are intended to represent an informed tool driven, evidence-based grand bargaining instrument being intended objectively to drive foster, self-esteemed, empirically fastening the political and bureaucratic decisions making process which would be supportive to address the onset of climate/weather emergencies, and to planning and mobilizing resources for addressing disaster emergencies, so that quick -time-around decisions can be made to save lives, and properties and getting vulnerable sectors & elements well prepared for the impending hazards.

IBF and concurrent FBF are being attempted to remove the planning and decision-making barriers, creating enabling and coherent coordination mechanism that enables access for funding, planning early action, contingencies, and mobilizing resources for risk preparedness at local level.

1.6 IBF driven forecast-based risk financing (FBF) mechanism for Mongolia.

The whole risk financing mechanism to address the climate risk and crises, impeding hazards, and potential disasters are likely to do damage. The perspective of weather extreme and impending multi-hazards in Mongolia are varying. The risk finance instrument should be aligned with the need-based risk management and deliverability for sustaining actions from national to local to the frontline vulnerable community level.

The persistent climate risk and vulnerability patterns over the Mongolian landscape are recurrently varying over the geographical, landscape, landform, landcover, environmental, and hydrometeorological settings. Additionally, the impending hazardous weather events are also heavily spatiotemporally impactful, and while those events are interacting with the ground-level elements the impact levels also vary from place to place. Considering the variability patterns of both the weather system and landscape – a suitable IBF methodology (proposed) and corresponding FBF methodology and informed tools are also intended.

Informing the whole risk management mechanism, Mongolia needs a variety of impact forecasts for tacking both hazardous weather and good weather whatever is impending and interacting over the grounds. An integrated IBF and FBF are instrumentalized and intended to support the whole spectrum of government climate crisis management strategies. The proposed IBF has a multi-faceted capacity to inform government and stakeholders policy and planning desk for supporting risk management planning, strategies, action planning, program and project design, implementation, and monitoring, etc.

The whole IBF partnership and workflow is mandated to support all demand-driven IBF and FBF. The risk information service upgradation and demand are mounting at pace with climate crises.

2.0 Stakeholder Partnership Coordination and Engagement

2.1 Core objective:

1) Ensuring inclusive participation of stakeholders (state, non-state, and development partners) in risk-informed early action protocol development and strategy for forecast-based financing (FBF).
2) Supporting sector ministry & departments in risk-informed intervention development and inclusive budgeting & financing for better preparedness against the impending different onset extreme weather invents and multi-hazards.
3) Establishing an integrated & inclusive financing mechanism being heavily informed by Impact forecast, early warnings (multi-hazards) likely to impend, persisting risk & vulnerabilities, and evidence-based risk financing modality development. Ensure optimized utilization of risk finance by avoiding overarching and duplication of interventions and recurrently giving equal importance to hard-to-reach areas.

2.2 FBF Framework approach:

Addressing the impending multi-hazards (slow onset, medium onset, and rapid onset) risk and vulnerabilities, Mongolia needs a multi-modal risk financing mechanism to address different types of multi-hazards. For the detection of diverse and rapidly changing weather phenomena, an impact forecasting and integrated impact-based forecasting (IBF) methodology is already being proposed. Back-to-back IBF informed FBF intended to inform emergency hazard management agencies, humanitarian actors, and sector departments about how to develop early warning-based early action plans (contingency & preparedness) to act before disasters to minimize the socio-economic costs of impending weather and climate hazards.

Multi-stakeholder, vulnerable sectors, relevant organizations, frontline herders, vulnerable communities, and individuals can make critical decisions to ensure that resources and supplies are in place to take early action and to respond as soon as it is safe to do so. IBF-supported FBF plays an important role in facilitating Red Cross Red Crescent running Forecast-based finance Mobilization, early action planning, and preparedness.

It is however a critical job over the very shortest spanning of a lead-time understandability of the anticipatory impacts, loss & damage, and scalability of impending extreme weather event(s) turning to multi-hazard(s) being just forecasted. IBF-supported FBF can play an important role in overcoming the difficulties relating to the anticipatory estimation of L & D, formulation of early warning-based early actions, detailed early action protocol (EAP), and contingencies for preparedness the forecast-based financing mechanism is essential for mitigating risk and vulnerabilities.

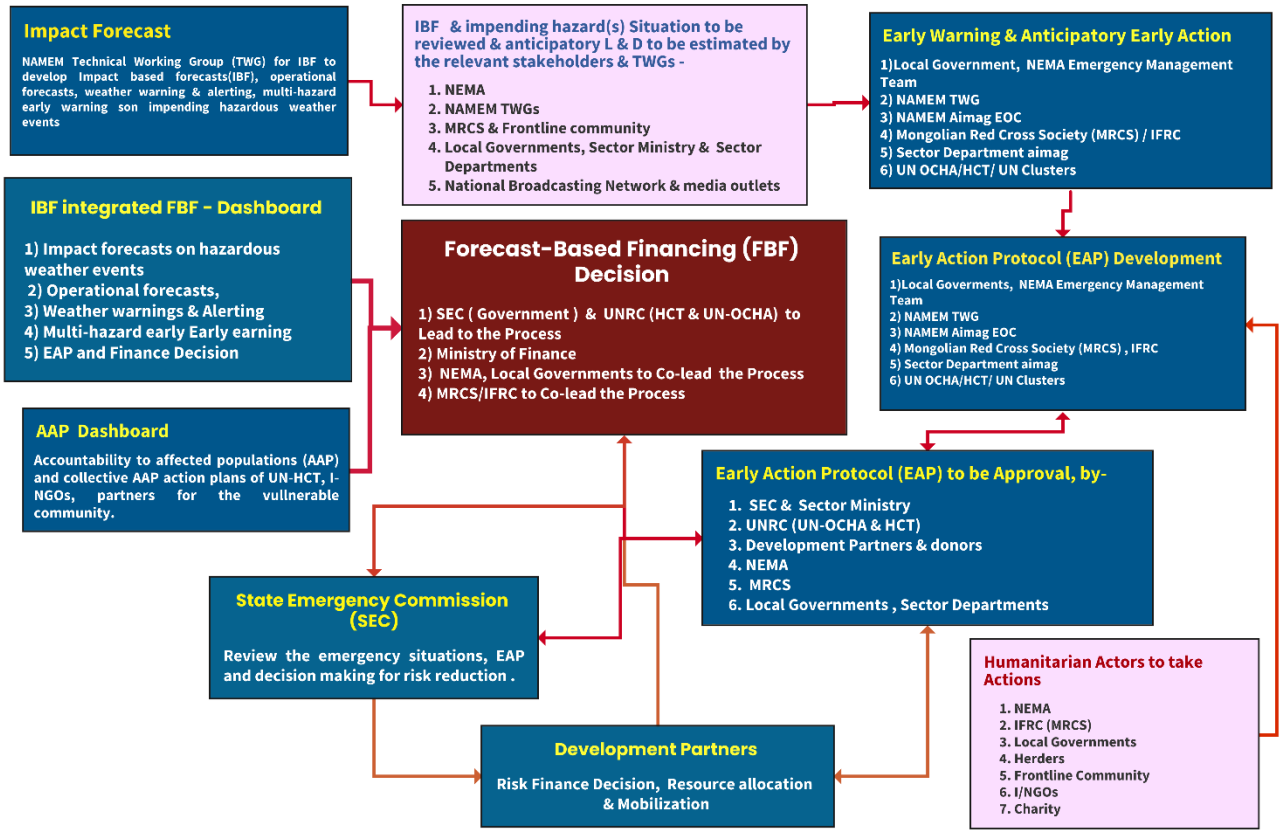


Figure 2: FBF decisions framework - governed by the partnership and functional coordination process (Source: Z M Sajjadul Islam, UNDP-GCF)

2.3 Team composition for the Forecast based financing (FBF) decision and inclusive functional process :

a) Leading the FBF decision making Process :

1) The State Emergency Commission (SEC) of the Prime Minister's Office (PMO)
2) Co-leading the GOM the UN Residence Coordinator (UNRC) with United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Humanitarian Country Team(HCT), UN Clusters (UN Agencies)

b) Other executive members of the decision-making processes;

- Ministries of Finance (MoF), responsibilities for climate change engagement
- Ministry of Food, Agriculture and Light Industry
- Ministry of Environment and Tourism
- Ministry of Economy and Development
- Ministry of Environment and Green Development (MEGD), Economic Development (MED), and
- The central government administration authority responsible for environment and green development (MEGD)
- National Implementing Entity (NIM)
- Inter-disciplinary and inter-sectoral National Climate Committee /NCC/ now led by the MEGD,
- Designed National Authority (DNA) of Planning
- Clean Development Mechanism (CDM) Bureau – MET/NAMA
- Renewable Energy Centre

- **Co-Leading FBF decision making Process:** Cabinet Secretariat and Ministry of Finance and other relevant sector ministries. Following government departments and stakeholders to support the process;

  - National Emergency Management Agency (NEMA) and functional departments - National Center for Emergency and Disaster Relief (NCEDR), the military serves as first responders for earthquakes, wildfires, forest fires, contagious diseases, snow and dust storms, and severe winters.

- Mongolian Red Cross Society (MRCS) on the behalf of International Federation of Red Cross and Red Crescent Societies(IFRC).

c) Early Action Protocol Development :

- Aimag Governor
- Soum Governor
- Local Emergency Management Agency (LEMA) of NEMA at aimag/soum level (NEMA Emergency Management Team)
- UN OCHA/HCT/UN Clusters
- FAO's Early Warning Early Action (EWEA)
- Mongolian Red Cross Society (MRCS) - EOC
- Sector Department at aimag /soum level
- NAMEM IBF designated a Technical Working Group (TWG) at HQ level
- NAMEM Aimag EOC, Local Governments at the local level (Aimag, Soum, Bag)
- Sector Department
- Stakeholders, Value chain Operators, and Logistic Operators at the Local level

d) Early Action Protocol (EAP Pre-Approval) :

- NEMA Emergency Management Team
- NAMEM TWGs
- NAMEM Aimag EOC
- Mongolian Red Cross Society (MRCS) , IFRC
- Sector Department aimag
- UN OCHA/HCT/UN Clusters
- Local Financing intuitions e.g Government Banks, Private Banks(Khan Bank), Small and medium enterprises(SME)

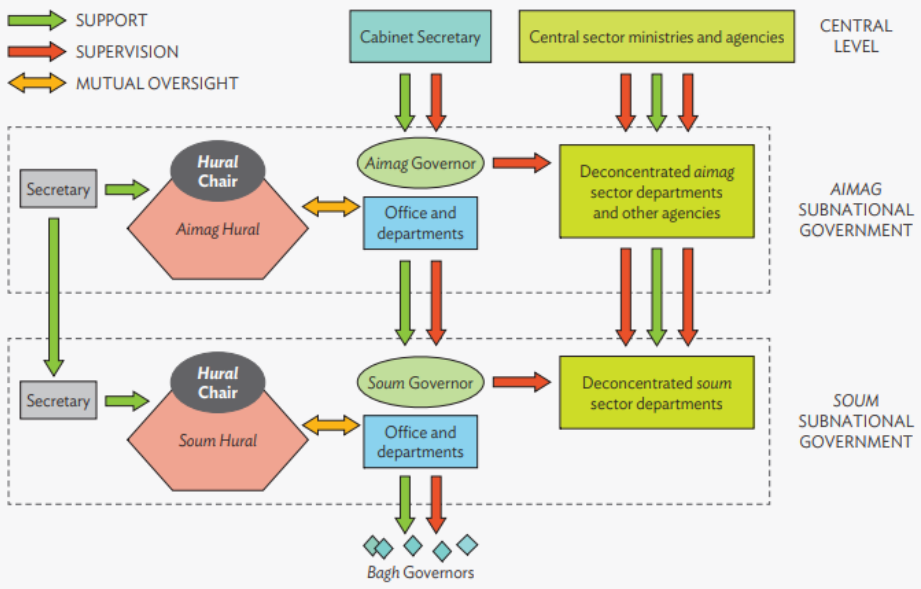


Figure 3: Schematic View of local governments in Mongolia (Source: 2021-August, ADB [1])

e) Formulation of Anticipatory Early Action along with IBF :

- Aimag Governor
- Soum Governor
- Local Emergency Management Agency (LEMA) of NEMA at aimag/soum level (NEMA Emergency Management Team)

[1] https://www.adb.org/sites/default/files/publication/726896/decentralization-governance-economic-development-mongolia.pdf

- UN OCHA/HCT/UN Clusters
- Mongolian Red Cross Society (MRCS) - EOC
- Sector Department at aimag /soum/bag level
- NAMEM IBF designated several technical working Groups (TWG) at the HQ level
- NAMEM Aimag EOC, Local Governments at the local level(Aimag, Soum, Bag)
- Sector Department
- Stakeholders, Value chain Operators, and Logistic Operators at the Local level

f) Review of Impact Forecast on impeding hazardous weather events and consequential situations at the local level:

- NEMA
- MRCS
- NAMEM
- Sector Ministry
- Sector Department
- National Broadcasting network

g) Other partners:

1) Bilateral and multilateral cooperation

- The Ministry of the Russian Federation for Affairs for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters
- Federal Agency for State Reserve, Russian Federation
- Ministry of Emergency Management, People's Republic of China
- China Earthquake Administration
- State Forestry Administration, People's Republic of China
- Ministry of Interior and Safety, Republic of Korea
- National Fire Agency, Republic of Korea
- State Committee of Emergency and Disaster Management of the Democratic People's Republic of Korea
- General Directorate for Civil Defense and Crises Management, French Republic
- Directorate for Disaster Management, Republic of Hungary
- Ministry of Emergency Situation, Republic of Kyrgyzstan
- Ministry of Internal Affairs of the Republic of Kazakhstan
- Other potential partners

2) Other International Organizations.

- International Civil Defense Organization (ICDO)
- Asian Disaster Reduction Center (ADRC)
- Asian Disaster Preparedness Center (ADPC)
- RIMES
- International Fire Chiefs' Association of Asia (IFCAA)
- World Bank (WB)
- Asian Development Bank (ADB)
- Mercy Corps
- World Vision (WV)
- Save the Children
- Japan International Cooperation Agency (JICA)
- Korea International Cooperation Agency (KOICA)
- Turkish International Cooperation Agency (TICA)
- Swiss Agency for Development and Cooperation (SDC)
- United States Agency for International Development (USAID)
- Other potential partners/donors

2.4 Functions of leading partners for the FBF Process

1) Functional Responsibilities of Partners (slow- medium onset hazards) :

- State Emergency Commission (SEC) to review IBF - early action plan (EAP) in the corresponding budget, organize policy/strategy dialogue with donors, UNRC (HCT & Clusters) for advocacy for finances of impending impactful hazards.
- Formulate policy/strategy for the sectors vulnerable to slow onset but largely impactful hazards (e.g. droughts, prolonged winter hazards, waters stress and desertification, deforestation, degradation of pasture biomass/rangeland, etc.).
- Formulation of risk-informed local development planning and budgeting and resource mobilization strategies for meeting financial demands from internal and external sources.
- Developing standing orders on disaster(SOD) and defining activities (5W – who will do what, where, when how) of all stakeholders/actors under SEC and NEMA disaster emergency management stakeholders
- Formulation Standard operating procedure (SoP) of operationalizing FBF framework and disaster preparedness
- Formulate climate risk-informed inclusive planning and budgeting for the local governments and strategy for the resource mobilizations (Internal & External).

2) Functional Responsibilities on the occurrence of rapid onset hazards and induced disaster.

- Review forecasts, early action protocol (EAP) and plans, anticipatory early actions, and quick approval of EAP.
- Formulate disaster emergency preparedness and response plan(informed by IBF & FBF tools)
- Formulate local governments (aimag, soum, bag) wise SOD, and SOP for better functioning humanitarian actions.

3) Mandating partners /stakeholders to project and scheme designing according to policy, plans, SOD, SOP

The purpose outlines of standing orders on Disaster (SOD) is basically to mandate the roles and responsibilities of DRM structured and participated stakeholders/sectors/actors, and their activities, during the normal time, during disaster onset. SOP (5W – who will do what, where, when how) of all stakeholders/actors to work coordinately for optimization of DRM activities.

4) Develop FBF framework/SOP - based on the following stages of disaster management cycles at aimag level.

a) Mandating & accountability of local stakeholders for disaster preparedness planning, budgeting, and resource mobilization strategy at Aimag, Soum, Bag level

- Review the sector (livestock) risk-repository database, and risk atlas and conduct a comprehensive pre-disaster need assessment, identify the potential risk areas, elements at risk, anticipatory loss, and damages are likely over the lead-time of the high-impact forecast being issues with IBF.
- Review local government's Disaster Risk Management (DRM) plans on slow, medium, and rapid onset multi-hazard events, review corresponding resources to mobilize and funding gaps for mitigating different onset hazards.

b) **Mandating & accountability of local stakeholders during a disaster emergency**

- Collaborate with humanitarian actors and develop situation reports & maps (daily). Anticipatory estimation of L & D of the day, immediate humanitarian needs by communicating with herders, vulnerable groups, and sector departments, and estimate immediate needs (cash/in-kind/logistic support) for saving lives and assets.

c) Supporting Post-disaster rehabilitation :

- Conducting detailed situation reporting of loss & damages of the sectors, herders, vulnerable communities etc., who have lost their livestock, assets, damages physical & financial assets, standing agricultural crops, etc., and advocacy for financing.

3.0 Risk Finance Planning & decision-making dashboard

The Mongolian climate risks and vulnerabilities are seasonably diverse, extreme, uncertain and rapid onset. In the normal circumstances the critical Muli hazard /disaster/climate risk financing decision making mechanism runs through the time-consuming process through the governmental channel without having informed dashboard based e.g. ICT database driven, evidence-based (GIS map), stakeholder concerted, inclusive, and participatory local process. The risk financing partners mostly conduct processes independently and make decisions individually. The integrated IBF & FBF Dashboard-based mechanism is an excellent tool for quick onset/timely decisions, which supports mainstreaming the whole risk assessment, impact forecasting, and corresponding risk financing mechanism in an integrated and informed manner.

Doing so the coherent approach for coordination, information exchange, and decision-making process are designed in such a way that the inclusive participation of state, and non-state actors, partners, financing instruments, project developers, sector ministries and departments, local governments actors/stakeholders, and vulnerable communities are ensured.

The design aspect of the IBF & FBF process will substantially reduce the 'operational frictions', overlapping, overarching, repetition of funding, and inclusively intervene in all corners of Mongolia so no one is left behind.

The inputs for developing informed tools for informing the dashboard would be the summarized information of every component of IBF and the corresponding FBF process so that an at-a-glance impending & existing risk can be assessed, scenarios can be visualized, action plans and protocol to be concerted to bridge the gaps.

FBF and the critical process can be scientifically determined by informed tools, early warning, EAP, early actions, etc., to timely decide when, where, how much, how resources are to be mobilized, and how funds are to be released to the climate front-line for undertaking actions.

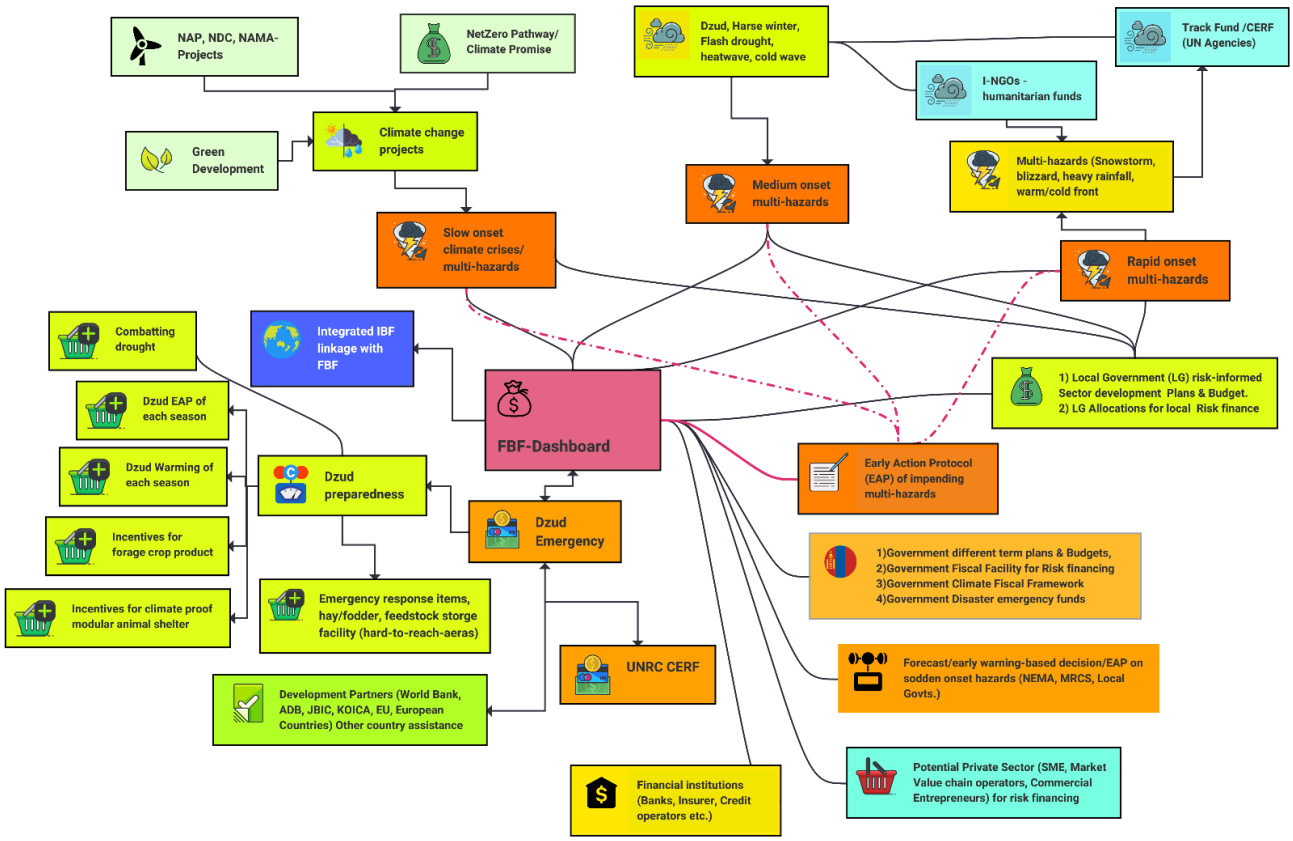


Figure 2: integrated and inclusive, risk-informed risk-financing decision-making dashboard (Source: Z M Sajjadul Islam, UNDP-GCF)

The dashboard and FBF online information management system support effective EAP planning, developing impending multi-hazard and disaster contingencies for the sectors, allocations can be determined, funds to timely disbursed, and anticipatory actions can be undertaken automatically before disaster strikes.

This dashboard would establish risk communication strategy for the fastest decision-making and action planning, reliable and effective risk-based planning, potential risk, and damage costs can be reduced by acting early coordinated and accurate measures such as mobilizing emergency relief suppliers, pre-positioning emergency crisis responses, lifesaving items a result of loss and damage could be reduced when dealing with rapid onset hazards. The intended benefits are the followings;

- Support inclusive and participatory local-level response planning and risk financing.
- Stakeholder, frontlines vulnerable community engagement to the planning and decision-making process
- Quick decision-making for the anticipatory loss and damage scenarios settings, EAP at the local level
- Mobilization of Inclusive risk-finance from different sources (potential donors, private sectors, local entrepreneurs, value chain operators, charities, NGOs, SME, Insurer, Credit operators, Sector value chain operators, market promoters, local economy)
- Identify the potential Sources of finances(internal/external)
- Grand bargaining and advocacy capacity for optimal level risk finance mobilization
- Stakeholders agreed and concerted planning and decision-making for averting climate crises.
- Top-down and bottom-up functionalities in risk assessment, early warnings, loss and damage estimation, EAP, etc.

3.1 IBF Driven FBF decision-making mechanism

The overall macro ,micro, mesoscale weather phenomena and climate change impact induced extreme and hazardous rapid onset operational weather conditions, and consequential impacts are impeding as high-impact phenomena over the landscape. Essentially FBF mechanism is intended not only to address the forecasted immediate extreme weather conditions likely to be causing the humanitarian disasters but also to the whole paradigm of the forecast-based weather/climate risk financing of Mongolia.

Admittedly climate change induced most hazardous weather conditions and extreme weather events now highly intensified spatiotemporal phenomena and even impacts are impending in hourly, and diurnally, which means that every given single hour and diurnally the weather conditions are impending as hazardous. Mongolian microclimatic disturbances are growing day by day in which Mongolia experiencing 4 seasons in a single day! Which contributes to a loss of lives and properties. The remedies and readiness lie with inclusive, ICT driven informed, and inclusive risk-informed climate information services for inclusive decision making.

Diagnose what are the entry level strategies for informed planning and budgeting to address spatiotemporal weather & climate-related hazards and crises being adapted by the actors. The broad-based rapidly Early Decision and Early Action protocol-based action planning and inclusive financing for getting the humanitarian frontline well prepared the averting extreme crises is now a strategic issue, how do we address the crises and uncertainties?

Climate Risk Informed Decision-making methodology for the different onset of hazardous weather events climate change impacts uncertainties depends on concerted efforts in a timely manner. Which would be leveraging to resource mobility to address weather and climate uncertainties. The ICT dashboard driven emergency risk financing endow the coherent and consistent approach for dealing with anticipated impacts, necessary emergency planning, and inclusive financing for the climate crisis.

3.2 Dashboard based tailormade informed tools for integrated early action planning (EAP) and risk financing

Mongolian government formulated several long-term national climate disaster risk reductions plans and policies, green development plans . The Government of Mongolia(GOM) formulated the country's long-term development strategy

Vision 2050[2] . The first phase is to be implemented in 2020-2030, the second from 2031 to 2040, and the third and last one between 2041 and 2050.). In 2015, the government approved the National Programme of Community Participatory Disaster Risk Reduction. The aim of this programme is to involve the population at a community level in reducing disaster risks by enhancing their knowledge, providing education and training, promoting safe living culture, and strengthening resilience to climate change. In 2016, the Mongolian Sustainable Development Vision 2030 was established to create the national capacity. NEMA developed the Mid-Term Strategy to Implement the Sendai Framework for Disaster Risk Reduction in Mongolia (2017-2030). This strategy aims to reduce disaster risks with preventative measures through mitigation and preparedness.

FBF Dashboard based tailormade informed tools required for policy, planning , designing, Implementation and localization of the following programme at the national and local level;

1) Tailormade IBF informed tools for Supporting Mid-term Plans/Policy/Strategies relating to climate crisis

Mid-term Plans/Policy/Strategy	Tailormade IBF informed tools to support integrated IBF & FBF process	FBF dashboard-driven supports
Implementing of National Adaptation Plan (NAP), planning , localization. The National Action Programme on Climate Change.	• Riks informed GIS maps & repository, hydrometeorological information services on the following areas ; ○ Riks informed GIS maps and repository sustainable pasture management, vulnerable ecology. ○ Riks informed GIS maps and repository on irrigated cropland, reduce soil water loss and decrease soil carbon emissions ○ Riks informed GIS maps and repository on availability of ○ Water resources through protection of runoff formation zones and their native ecosystems in river basins. ○ Riks informed GIS maps and repository - reservoirs for glacier, melt water harvesting; ○ Riks informed GIS maps & repository, hydrometeorological information services on drainage and river streams and flows ○ Riks informed GIS maps and repository on Forest resource ○ Riks informed GIS maps & repository, hydrometeorological information services on NAP localization project design the areas/sites selection, project implantation are potential for implantation (ecosystem-based adaptation, nature based solution, water security, disaster risk reduction, forest degradation and deforestation etc)	• Demande-driven operational IBF for the priority sector to support FBF process • Impact forecasts for sectors • Early warning for the NAP elements and NAP related climate vulnerable sectors • Climate information services and tailor-made informed tools for the sectors • National level, local level Sector specific adaptation programme planning, project design, inclusive budgeting and implementation • The dashboard-based risk financing decision making instrument to support National, aimag government to mobilize risk finances targeting the prioritized actions • Engaging key stakeholders in risk financing decision making process • Support government planning desk in designing low regret, no regret , win - in adaptation measures, nature based solutions, locally led solutions etc. • Integrated IBF interfaced a robust climate information service, weather warning, alerting and multi-hazard early warning system . • Coherent planning solution for the NAP process • Tailormade information services for NAP cost-benefit analysis and appraisal of priority adaptation options • Tailormade information services for assessing financial needs for long-term adaptation plan.

[2] https://legalinfo.mn/mn/detail/15406

Mid-term Plans/Policy/Strategy	Tailormade IBF informed tools to support integrated IBF & FBF process	FBF dashboard-driven supports
		• Tailormade information services for developing a strategy for mobilizing funding resources for adaptation. • Designing a monitoring and evaluation framework for the NAP process • Establishing monitoring and reviewing system for the NAP process.
• Nationally Determining Conditions (NDC) implementation, Localization • NDC tracking	•Tailormade risk-informed tools for risk financing relating to NDC implementation , related policy, action plan, programme /including., Partnership Plan/Provide knowledge and expertise on required NDC-related projects, programme, Prepare guidelines, training materials, reports, and assessments. •Support for building a database, sharing information raising public awareness, etc. interfacing with the website to communicate broader information on Mongolia's NDC. • Stakeholder engagement, enabling interactive Partnership Plan with space to share collaborative and inclusive actions for design, develop project summaries, documentation and progress updates, space to share similar information on climate-related projects being implemented at the national and provincial levels, beyond the scope of the Partnership Plan •Repository for climate-relevant policies and resources, including national and international sources	•FBF dashboard-based tailormade risk-informed tools to support Information repository on the NDC target data, and relevant Climate data, Login FBF website where government bodies, implementing partners and donors can share information and coordinate on their NDC activities in Mongolia. •IBF integrated FBF platform for NDC activity data sharing, storing to Support Coordination: activity& stakeholders' mapping through Partnership Plan, Implementation tracking & monitoring
Anchoring government risk financing instruments	Anchoring government planning, budgeting and financing functionaries and related government information portals (E-Mongolia) with FBF information dashboard for rapid decision support during disaster emergency resource mobilizations.	**Dashboard on Public risk finance management System** • Risk-informed tools for climate change policies and public finance management, fiscal policies. • Rapid action Planning and budgeting to respond to sudden onset weather extreme events /disasters • Ensure the accountability to affected populations (AAP) and collective AAP action plans being implemented by the UN-HCT/I-NGOs and tracking their activities over the dashboard driven task management and M & E • Aligning climate change trust funds (government, donors, entrepreneurs, banks and financial institutes) with risk mitigation interventions • Integrated resource mobilization for adaptation and mitigation, nature based solution (adaptation and mitigation), Ecology-based adaptations, Locally led solution etc.

Mid-term Plans/Policy/Strategy	Tailormade IBF informed tools to support integrated IBF & FBF process	FBF dashboard-driven supports
Building disaster-resilient infrastructure	Riks informed GIS maps & repository, hydrometeorological information services for planning, designing and site selection for Building disaster-resilient infrastructure and basic utility services across where necessary.	Disaster-resilient infrastructure is taken into account in the implementation of the Sendai framework in Mongolia, but there is no evidence that climate change adaptation and disaster risk reduction are being explicitly considered in infrastructure development policy documents. An integrated IBF and FBF are intended to support the process.
• Policy and strategy support for developing Green fiscal framework. • Informed tools for country's long-term development strategy Vision 2050 • Dashboard based informed tools for Bank and financial institutions for planning and budgeting NetZero programme and interventions. • Informed tools for Climate risk and sustainable finance • Informed planning for the bankable climate actions • Informed tools for the regulatory financing body for policy decommission.	Riks informed GIS maps & repository, hydrometeorological information services for risk-informed policy planning, programming , project & Scheme designing and inclusive budgeting support.	Integrated IBF and Dashboard on FbF system for supporting long term planning and strategies
• Integrated IBF Informed tools and multi-hazard early warning system for full-scale implementation of Sendai Framework for Disaster Risk Reduction in Mongolia (2017-2030).	• Riks informed GIS maps & repository, hydrometeorological information services , IBF, weather warning, alerting, weather watch, advisory, operational forecasts and multi-hazard early warning system for the climate frontlines, vulnerable sectors, high-value elements, development sectors etc., for complementing Mongolian government commitment on the full-scale implementation of Sendai Framework for Disaster Risk Reduction in Mongolia (2017-2030).	IBF integrated FBF dashboard would be an excellent piece of informed tools for supporting quick decisions, EAP, contingency, preposition relief and lifesaving items to hart-to-reach aeras before extreme weather events and multi-hazards are to be impending and responding to the situation with inclusive, engagement and participatory mannered.

Source : Government Planning Documents [3]

2) Supporting Index-based weather insurance : Sectoral Development, Weather Index-Based Crop Insurance Scheme (WIBCIS)

- Selection of climate proof sectoral activities, crop seedling/sapling , necessary tailormade risks information services / operational IBF , crisis mitigating timely and appropriately developing early action plan (EAP), climate adaptive practices, and boosting sectoral productivity.
- Design Weather Index-Based Crop Insurance Schemes (WIBCIS) , select climate-proofing varieties, climate tolerant agriculture and sustainable agricultural practices, and livestock husbandry and value chain

[3] www.cabinet.gov.mn , https://www.unescap.org/sites/default/d8files/event-documents/Mongolia%20-%20Climate%20Change%20and%20Disaster%20Risk%20Profile.pdf , https://www.adaptation-undp.org/mongolia-achieves-milestone-national-adaptation-planning , https://cabinet.gov.mn/wp-content/uploads/2050_VISION_LONG-TERM-DEVELOPMENT-POLICY.pdf

3) Supporting National Agricultural Insurance Scheme:

- To develop a robust and simple method to adopt weather index-based crop insurance widely across Mongolia for risk mitigation in crop-related activities.
- Review and adopt best insurance practices from private and government agencies.
- Design improved methods for piloting the new schemes and scale-up based on learnings from the pilots.
- Develop and adopt effective monitoring and learning mechanisms.

4) Supporting Index-based insurance: Weather index-based insurance

- Create a value proposition for the insured and offer insurance as part of a wider package of services;
- Build the capacity and ownership of implementing stakeholders;
- Increase client awareness of index insurance products;
- Access to international risk transfer markets;

5) Supporting existing Climate Fiscal Frameworks :

- informed FBF tools so support CFF to provide principles and tools for climate fiscal policy-making, Implementation and localization of NAP , NDC , NAMA , green development commitments.
- Supporting disaster management planning and budgeting frameworks
- National /central government planning and budgeting for risk-informed development
- Climate change budgetary framework
- IBF, FBF Dashboard driven and stakeholder engaged Local Climate fiscal framework (local governments)
- Local government risk-informed development planning and budgeting system.

6) Informed FBF tools for supporting policy, advocacy on risk financing

Fundamentally weather and climate emergency risk financing depends on informed plans on what early actions are to be considered for the risk financing and amount of internal and external financial inclusion to troubleshoot the much-needed climate change induced risk mitigation.

- FBF informed tools for Optimally uses of climate finances to conduct interventions.
- Optimal mobilization of financial resources is needed to address climate change mitigation and adaptation.
- Supporting the Mongolian government to adopt the normative framework provided by UNFCCC - funding should be balanced in allocation between adaptation and mitigation, be committed in the context of transparency on implementation, and should be scaled-up, new and additional, predictable and adequate.
- Supporting government for grand bargaining & advocacy for risk financing
- FBF informed tools to support the planning and implementation of Green Climate Fund (GCF) projects.

7) Climate finance readiness

- Dashboard based integrated IBF & FBF informed tools to support government strategic climate risk management planning, Alignment of Climate fiscal framework, and budgetary provision for risk financing
- Anchoring IBF integrated FBF dashboard with cabinet secretaries, local government planning, and budgeting system for facilitating government different terms development planning and budgeting so that, risk financing decision-making board have the status quo of government development plans and budgets
- FBF stakeholders to advise the government about the re-alignment of annual/five-year development plans, fiscal plans, and budgetary process for risk-informed development planning, the allocatable budget segment for ex-ante and ex-post climate risk financing, financial top-up for ongoing climate risk mitigating schemes
- Advisory to central government cabinet secretariat for climate risk consideration over the rural and urban physical infrastructure development
- Advisory to central government cabinet secretariat Accessing IBF and FBF dashboard to review how many local (aimag, soum, bag) level sector & sectoral elements(annexure 1), livelihood assets, basin infrastructures & services, value chain operations, high-value elements(aimag, soum, bag center, and basic infrastructures & services) are falling to climate risks, exposures, and vulnerabilities. Ranking the risks and prioritization for the including annual development programe to mitigate highly prioritized climate risks at the local level
- Anchoring and accessing to environmental information center (EIC) database with the IBF dashboard and reviewing how many enterprises, industries, open-mining, local heating systems, and small /independent coal-fired power plants are causes of greenhouse gas emissions.

- Conduct assessment of wind resource potentials of the whole country, setup wind-monitoring stations (also using weather station anemometer) for mapping the wind regime of the country. Develop wind power resources potential atlas and supporting government energy & power sector in formulating a policy and financing approach to promote wind power,
- Conduct assessment of drought and desertification, develop atlas, support government planning desk for undertaking green development, social afforestation, agro-forestry, cover cropping for soil-health improvements for combatting desertification and agricultural extension.
- Supporting government and development of green, low-emission, NetZero climate-resilient development strategies
- Anchoring IFB-integrated FBF dashboard with NEMA disaster risk management program(DRM) for supporting informed DRM planning and budgeting process.
- FBF informed advisory services to cabinet secretaries, and local governments to review what UN agencies, I-NGOs, and private sectors are doing regarding climate actions, DRM activities, sectoral development etc, by liking those partners with FBF dashboard for constantly reviewing the 4/5W database for avoiding duplicity, optical uses of risks finances, appropriate project/scheme selection at the local level. The FBF dashboard facilitates the following risk financing mechanisms;

a) Financial Planning :
- Assess needs and priorities, and identify barriers to investment
- Identify policy-mix and sources of financing

b) Accessing Finance(internal , External):
- Directly access finance
- Blend and combine finance
- Formulate project, program, and sector-wide approaches accessing finance

c) **Delivering Finance**
- Implement and execute project, program, sector-wide approaches
- Build local supply of expertise and skills
- Coordinate implementation

d) Monitor, Report & Verify
- Monitor, report, and verify flows
- Allocation of Performance-based climate resilient grants for the local level stakeholders

8) Decision support for Adaptation Financing:

IBF supported State-of-the-art ICT empowered tools for risk screening, impact based meteorological information services, MIS-driven risk interpretation process , and quick time around tools for informing early action planning.

- From the aimag, soum, bag level assessed climate risk and vulnerabilities with the database repository and risk atlas the planning desk to determine the appropriate areas and appropriate adaptation projects/schemes to be viable for implementation at the local level.
- Develop geographic and climate zone based CRVA and determining adaptation options.
- Mapping all hydrological, environmental, ecological resource regions, floodplains, arable agricultural lands for agricultural cropping, forage cropping, and other adaption projects, local ecology-based adaptation options.
- From the local government's conducted CRVA, identify how many adaptations schemes would be appropriate based on local resources
- From CRVA identify how many agricultural adaptation schemes are viable for implementation based on local .resources and ecology'
- Supporting the holistic initiative to combat drought & desertification: IBF and FBF informed tools for supporting the planning process, project and scheme selection (social afforestation, agroforestry, ecology-based pasture development) , and intervention design for combatting drought & desertification.

9) FBF Informed tools to support green development pathways :

The Climate Resilience Pathway is structured around delivering the overall vision and through three outcomes: resilient people and livelihoods; resilient businesses and economies; and resilient environmental systems. Under this, five main impact areas have been identified that require immediate action to put climate risk at the heart of decision-making with increased availability and quality of finance invested for a range of interventions at the local level.

- Climate risk and vulnerability assessments, discloser and monitoring
- IBF integrated Early warning systems and FBF-informed tools for early action.
- Multi-hazards preparedness and contingency planning, Emergency response
- Climate risk governance & capacity building at central, sectoral and local governments level
- Nature-based solutions to reduce risk across the sector.
- Climate-proofing infrastructure and services
- Risk transfer – insurance and social protection
- Sharing knowledge and best practice on climate risk management.
- Facilitating the volume, quality, and access to public and private finances

10) Advisory support for Public risk finance management:

- Anchoring FBF dashboard with Finance Ministry MIS system for supporting government risk-financing planning process with dashboard-based informed tools.
- FBF integrated informed tools for facilitating the development of financial resilience policies and best practices risk finance decisions making process development.
- FBF advisory to cabinet secretariat and Ministry of Finance in size of budget and finances are equitably and essentially allocate for addressing burning climate crises.
- FBF advisory for equitable budgeting for ex-ante & ex-post project financing for achieving climate action goals

11) Facilitating the coordination mechanism and accountability to affected populations (AAP) for risk finance management:

- FBF dashboard expected to provide sufficient information for UN-HCT/I-NGOs, stat & non-state stakeholders for implementation of humanitarian interventions under the accountability to affected populations (AAP) and collective AAP action plans being implemented. Anchoring AAP dashboard to support the action plans and activities over dashboard-driven AAP management and M & E.

4.0 Forecast based Financing (FBF) Process

Global climate perturbation rapidly impacting regional and local climates and impending hazardous events characterizing more rapid-onset. The landlocked Mongolian climate and weather system the most diverse, extreme, and varied spatiotemporal (hourly/diurnally) which hardest hits the livelihood sector. Mongolia needs to be graduating from traditional weather forecast to an integrated impact forecasting, warning, alerting, and multi-hazard early warning system. The most vulnerable sectors are agriculture & livestock, water, agroecology and soil, pasture and biomass, tourism, environment & forest, transport and communication, and urban settlements.

However, in this given precarious weather system and the multidimensional onset of hydrometeorological hazardous conditions and recurrent predictability a demand-driven IBF platform and corresponding FBF need to develop and operate. The IBF supported FBF's ability to provide informed tools for mechanizing the risk-financing process for Mongolia so that vulnerable sectors and elements are well prepared for coping with the climate crises.

The traditional modality of humanitarian context-specific pre-disaster preparedness-centric financing (cash, in-kind) supports for getting the most vulnerable community prepared for the whole paradox of climate crises.

The broader spectrum of the Mongolian climate risk paradox is highly multi-dimensional and need inclusive participation of the climate frontline community, stakeholders, government, state and non-state actors, banking sector, green development programming authority, financiers, credit operators, insurer, etc., from risk assessment to intervention design and financial inclusion to the whole climate crisis value chain process. To address the challenges of the risk financing instrument being mechanized as meeting the demand-driven risk financing service deliveries from specialized weather and climate information services deliveries, advisories for the sector, and elements.

An ICT-driven integrated IBF-based weather and climate risk-information services intended as primary inputs for devising a well concerted FBF process and inclusive participated(stakeholders) an integrated forecast-based early action planning and corresponding financing strategies. The new integrated IBF and corresponding FBF methodology are intended to function multi-dimensionally and coherently so that every weather/climate-induced critical response are well addressed. The dashboard-based informed tools can readily be accessed, and a quick-time-around integrated decision can be made from ICT system dashboard. The dashboard-driven online FBF decision support system to be able to facilitate the sectoral climate risk finances and the system will be able to provide a tangible solution to the climate risk financing decision-making process.

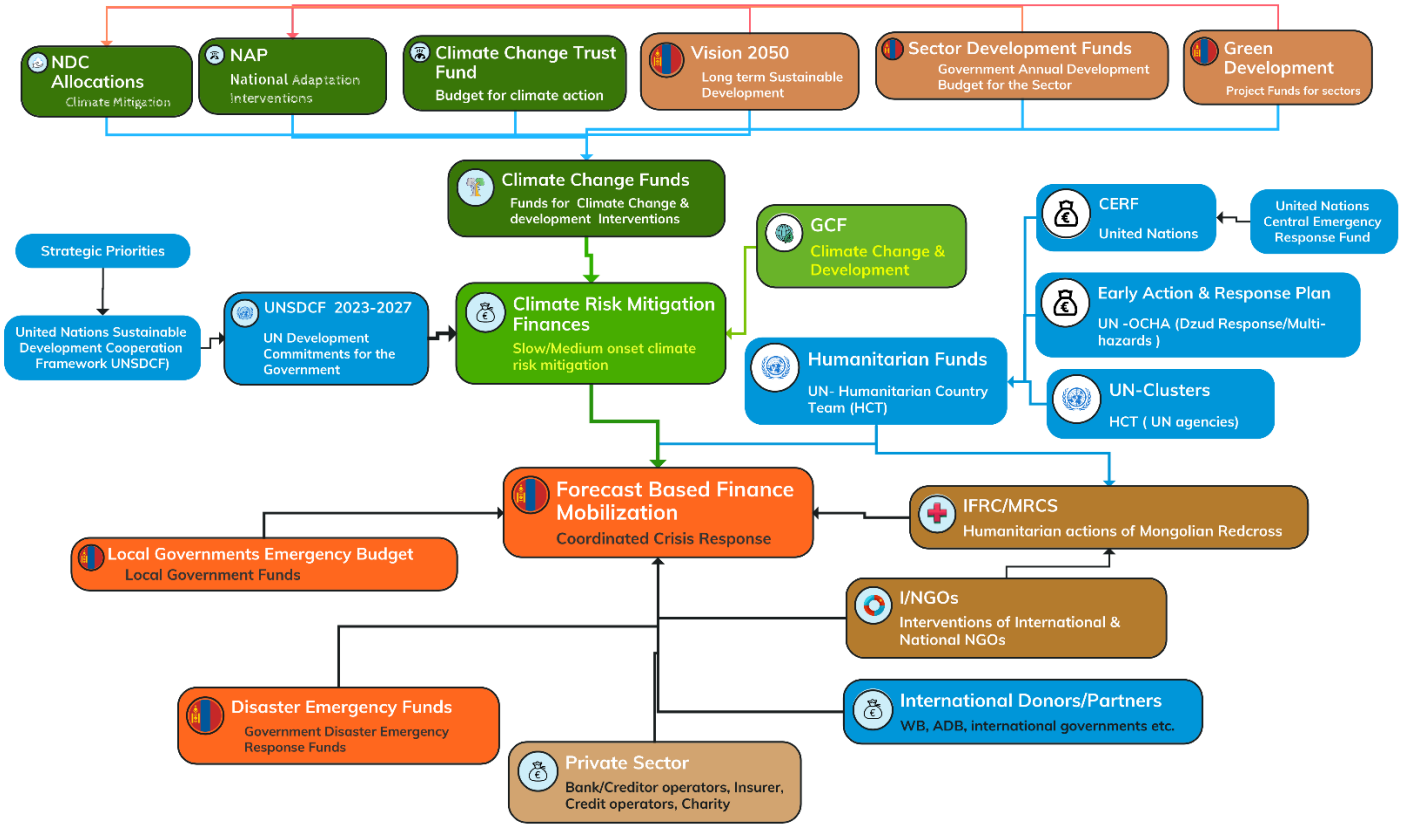


Figure 4: Coordinated Crisis response financing mechanism(Source: Z M Sajjadul Islam, UNDP-GCF).

4.1 FBF framework approach

1) The methodology and approaches of FBF are intended instrumentalized in such a way that it would be able to bridge the information and decision-supporting tools barrier gaps and inform a multi-dimensional and inclusive risk financing mechanism to mobilize finances before the climate crises are likely to impending over the ground.
2) Strategize IBF-supported FBF informed dashboard for comprehensive informed risk reduction action planning and budgeting and risk finance mobilization decision making.
3) Partnership approach for enabling actors/stakeholders (state, non-state) on evidence-based strong advocacy and bargaining power for mobilizing finances for the impactful of impending extreme and hazardous weather events are likely to do the loss and damages of the frontline vulnerable community, sector & elements, critical infrastructures, and basic services.
4) IBF integrated FBF platform to interplay amongst the stakeholders, risk financiers, the humanitarian community, Humanitarian Country Team (HCT), and sector departments with giving an anticipatory and presumptive impression about the possible loss and damages are likely over the types of elements at the last mile.
5) Impact-based forecast (IBF) driven FBF tools, early action planning, developing/mounting contingencies and corresponding allocatable amount of risk finances targeting the size of responses, type of response, target vulnerable group, etc., are required for the instrumentalizing humanitarian program & response cycle and people in need.
6) Informed tools for building partnership and consensus of humanitarian response in a 5W manner.
7) Nexus building for stronger humanitarian partners, stakeholders, actors, and public-private partnerships for on disaster risk financing, risk /vulnerable-centric international cooperation to support disaster preparedness and prevention. FBF play an important role by harnessing the full potential of government fiscal mobilization and supporting their national capacities in disaster risk management and in improving the social, health, and economic well-being of individuals, communities, and countries.
8) Flagging recurrently occurrence and indicative climate risk drivers, triggers for addressing and mechanizing risk financing within integrated IBF & FBF system.
9) Methodological, tools, and capacity enhancement approach of IBF-driven strategy for disaster risk management.
10) Optimization of coherence of resource allocation based on demand-driven contingencies for hazard preparedness.
11) Enhance government capacity for grand bargaining, policy & advocacy for mobilization of climate risk finances, developing coordination and partnership mechanisms from pre-disaster preparedness to post-disaster response,

rehabilitation, and building-back-better mechanisms. Enhance resilient capacity by timely mobilizing risk finances, resources, and implementation of interventions.

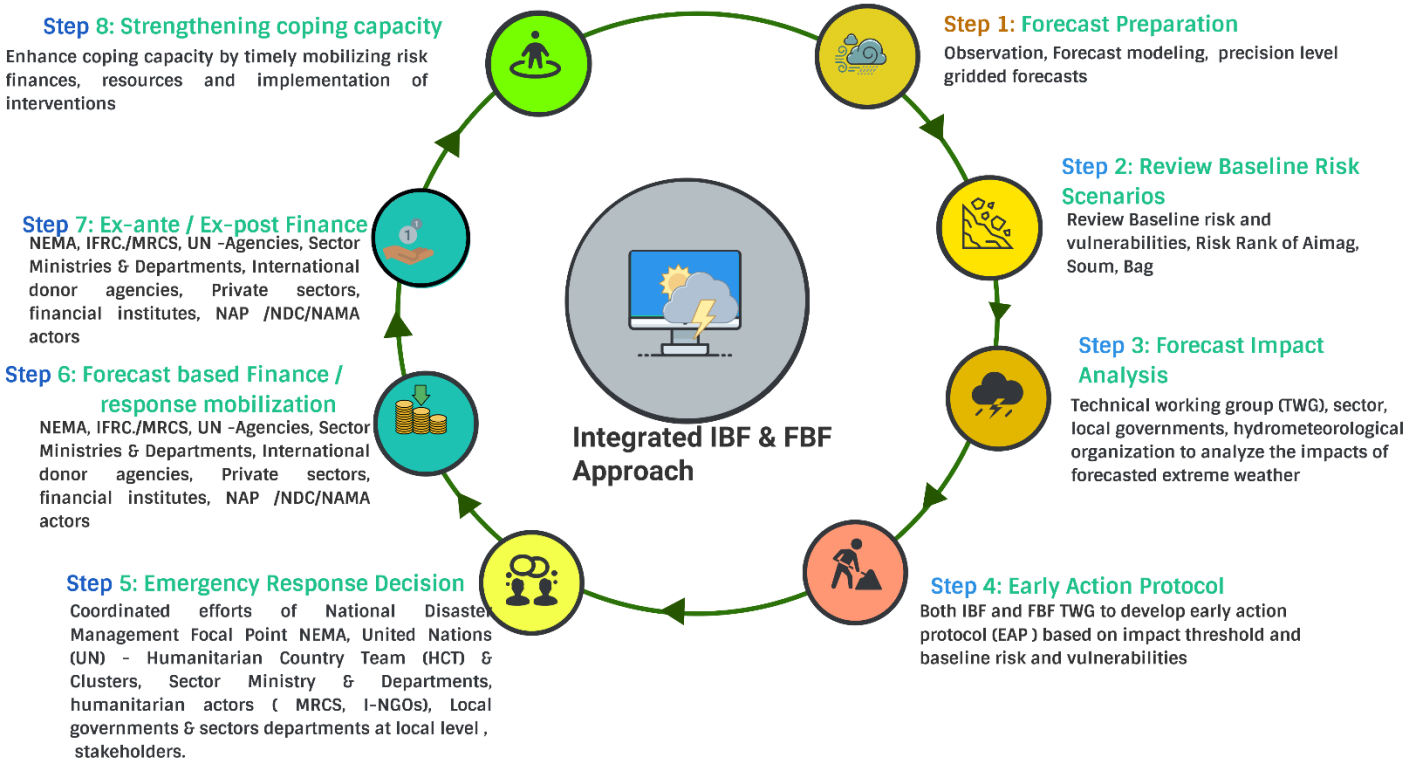


Figure 5: Integrated IFB and FBF approach (Source: Z M Sajjadul Islam, UNDP-GCF)

4.2 IBF integrated FBF for removing barriers on meteorological information services and informed tools:

- Deploying integrated IBF, multi-hazard early warning systems and alerting (CAP) to robustly inform the humanitarian program cycle, vulnerable sector departments, local government actors/stakeholders, etc., so that it can inform stakeholders about the type of response (finances, relief, in-kind support, etc) and resources are essentially required to mobilize over to the hotspot on the ahead extreme weather events induced multi-hazards are likely to impend.
- Tools and evidence-based support for inclusively planning SOD, SOP (5W) for optimization of interventions, optimal utilization of humanitarian responses, avoiding repetition, overlapping, and ensuring every area are intervened.
- Integrated IBF platform to support the sector/department wise Information management Systems (IMS) to anchor with IBF risk repository (Risk and vulnerability ranks of the elements, sectors, administrative areas e.g bag, soum, aimag), and back-to-back stakeholder accessing to up-to-date impact forecasts, situation updates on current loss and damage types & figures, people in needs (PIN), etc., a clear picture of the situation and immediate requirements of resources to mobilize.
- The robust implementation of IBF and corresponding FBF for diagnosing, predicting, warning, and alerting different onset & type weather phenomena, transforming to muti-hazard conditions, and disaster incidence would be an easy job.
- Structured and robust ICT system for quality IBF production, informed FBF tools for averting multi-hazard induced disaster risk and climate crises, etc., and for developing robust intervention planning, inclusive budgeting, action planning, project implementation, M & E, and result reporting.

4.3 IBF integrated FBF approach for DRR

1. Integrated IBF & corresponding FBF tools for mainstreaming climate risk financing, humanitarian response planning for better progress, and response addressing multi-hazards.
2. Mainstreaming evidence-based and risk-informed bottom-up (bag level to aimag and central level) and top-down development planning for DRR, CCA, and resilient interventions.

3. Informing humanitarian program cycle, climate risk management program cycles, and climate and multi-hazard risk financiers about the immediate humanitarian needs, priorities, and resource mobilization for enabling coping capacity of the frontline community, sectors, and elements.
4. Develop integrated partnership development in risk-financing, stakeholder engagement with the humanitarian actions, sector preparedness, and localization of NAP, NDC, green development and NAMA with win-win contributing (development and resilience building).
5. Exclusively support the formulation of policy, strategies, project design, action planning, inclusive financing, and budgeting framework. Enabling service delivery capacity to identify needs and priorities and recognize barriers, screening policy mix, and sources of financing, including the private sector.
6. Enhance stakeholders' capacity to access finance, blend and combine finance on a public-private partnership basis.
7. Optimization of risk-financing mechanism over better management, audit, and monitoring competencies, the harmonizing capacity of performance-based grant mobilizations for the better performer(stakeholders including vulnerable herders and community).

4.4 FBF risk consideration approach & Readiness for Climate Risk Finance Mobilization

IFB & corresponding FBF strategy supports the governments and stakeholders in getting ready with pieces of advice strategies, informed tools for plannings for harmonizing for preparedness for impending hazards and disasters, CCA & resilience building Finance. For risk & investment prioritization, and optimization purposes we need informed tools on different sets of risks and vulnerabilities and how to prioritize actions. The following diagram shows the bottom-up approach of selecting risk drivers for the prioritization of risks for financing and interventions.

1) Forecast-based risk Consideration Process & financing modality:

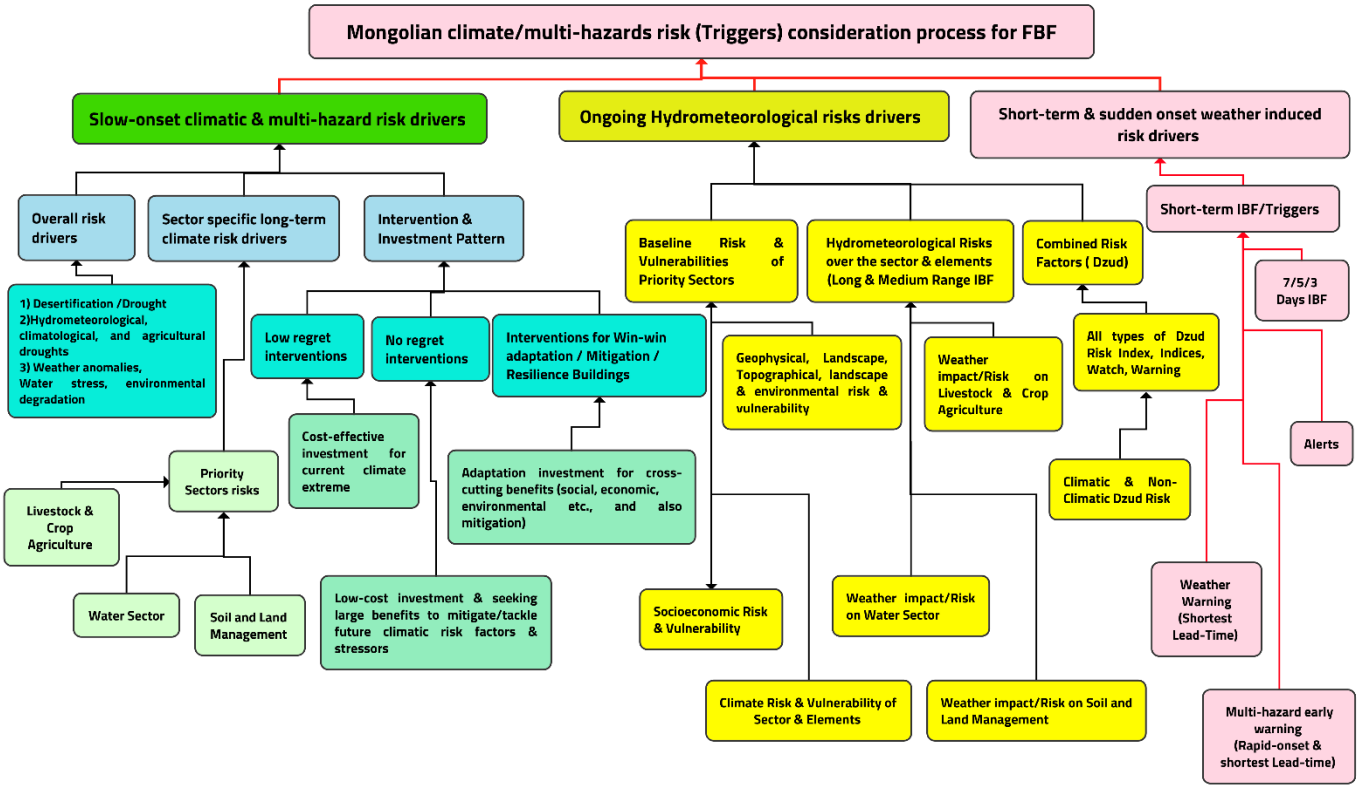


Figure 6 : Forecast based risk Consideration Process & financing modality(Source: Z M Sajjadul Islam, UNDP-GCF)

The methodological approach for determining the climate crises for ex-ante and ex-post financing modality. The risk financing paradigm splits into three segments: a) Financing for preparedness for impending sudden onset extreme weather events and hazards, b) medium onset hazards, and c) slow onset hazards. The Green and yellow shaded sector

intervention and finances can be met by ex-ante financing modality, and Pink color shaded impending sudden onset hazardous weather-induced risk and warnings for the elements can be met by ex-post financing modality.

a) Arranging Ex-ante financing :

- Ex-ante (Latin term) intervention "before the event," and it refers to the estimated return on investment. For example, addressing the combined dzud factors, we need to invest in better preparedness and resilience building by investing for incentivizing herders/farmers the forage crop cultivation, irrigation facilities for reducing migration and overgrazing, climate-proof and modular animal shelters and hay storage facilities to combat severe extreme dzud events.
- Installation of Water access points for the herders for reducing migration to access drinking water for the animals.
- Ex-ante finances for sustainable crop agriculture, agroforestry for food security, green shed structures for round-year agriculture, and green development.
- Infrastructure development for rainwater harvesting and retention, artificial irrigation/drip irrigation for cover cropping for soil health improvements, and drainage facilities for irrigation.
- Investment in upgrading to hybrid weather observations for improving weather prediction, and assessment of the risk of high-value elements(urban settlements, agricultural lands, fodder crop areas, industry/mining areas, etc.)
- Agro-forestry, social forestry development, cover cropping for soil health improvements, homestead based agriculture development
- -Improvement of crop-agricultural and livestock value chain
- Improvement of surface water management, water harvesting and retention

c) Mobilization of the Ex-post financing:

This financing functions to mobilize finances while impending hazardous events are being forecasted and necessary preparedness can be undertaken early to minimize the L & D. Ex-post finances need to be timely mobilized while the impending rapid onset disasters are being forecast at precision level with IBF tools and anticipatory loss and damage is predicted timely and letting humanitarian actors a lead time for preparedness and response.

IBF integrated FBF dashboard to be designed to alert weather emergencies such as convective heavy rainfall, heavy rainfall, severe flash floods, snowstorms, tornadoes, thunderstorms, cold/warm-front induced sudden onset storms, etc., are likely to be impending, anticipatory loss & damage are being estimated, in this situation, ex-post financing mobilization in-time would be imperative for the preparedness the climate frontline community and reducing the huge human and livestock tolls.

Ex-post financing for emergency management.

- Track-fund allocations for mobilizing soon after the disaster happens for operationalizing the emergency response and rehabilitation.
- Emergency supplies for lifesaving.

5.0 Methodology for Developing Early Action Protocol (EAP)

Early action protocol (EAP) is required to define the real-time impact of the forecasts (for different onset), a critical lead-time for informing more nimble and timely decisions on preventative action. Developing an EAP is the most critical job in which a lot of indicators and factors are needed for EAP workstream development. To reduce the impact of these extreme events of cold waves/snowfall on the population, the Early Action Protocol was first time used for forecast-based financing to support herder families in the high Andes region of Peru.

The EAP foresees a timely and effective implementation of early actions as soon as weather forecasts are combined with other risk datasets and indicates a high probability of hazardous events are likely to impend and severely impact people, their assets, and their livelihoods.

The simplified Early Action Protocol (EAP) articulates a multi-stakeholder plan to trigger early actions in advance of a weather or non-weather-related hazard. The typical EAP articulates how to utilize the disaster emergency fast-track fund/budget to deal with impending hazards and can meet purposes, to serve as a plan for the early actions (*when action will take place, what actions will be undertaken, and how much funding will be needed*) and outlined action plans for pre-agreed funding from forecast-based action for supporting disaster emergency relief operations.

The simplified EAP is an additional ex-ante funding mechanism for humanitarian stakeholders to complement the existing funding mechanisms including the 'longer term' EAPs (i.e., five years) and 'shorter term' DREF for imminent events(i.e., 1 to 4 months). The simplified EAP does not aim to replace the full EAP but would rather become a complementary 'medium term' (i.e., two years) funding alternative.

An IBF integrated Forecast-based Financing (FBF) remains the most complete methodology to conduct anticipatory action planning and capacity strengthening. It is the robust methodology developed for mobilizing the Disaster Response Emergency Fund (DREF) to innovate and introduce more flexible approaches to conduct early actions.

5.1 Define types of EAP and Functions:

The given context of climate change's impact, weather regime, nature of impending extreme weather events, hazardous weather events turning to multi-hazards and multi-hazard induced disaster and landscape vulnerabilities, etc., encompasses wider anomalies, reiterative, recurrent, incremental, short-lived, and different onset natures. Considering the nature of impending types of weather events, the EAP varies accordingly.

a) EAP for addressing rapid onset extreme weather events (Convective heavy rainfall, flash flooding, thunderstorm, snowstorm, warm front, cold front, damaging winds, etc.) Lead time: 15 minutes to an hour(s)

Considerations :

- **Impact-based Forecast (IBF):** A short lead-time to detect impending rapid onset weather conditions by running a statistical & dynamical downscaling model, customized nowcasting algorithm (programmed model) for tracking & predicting particular hazardous events, preparing operational IBF, special weather warning, alerts (for hotspot), preparing warnings to formulate preliminary early actions,
- **IBF** : The primary IBF tools to delineate the impact areas of the extent disseminated through the IBF geospatial platform soon after the forecast is issued.
    - Extremely high -Magenta-coded alerts
    - Very high- red coded alerts,
    - Moderate to high - orange coded alerts,
    - Medium to moderate - yellow coded alerts
- **Integrated IBF & FBF :** Active quick onset weather warning by using national broadcast media, and in the web-based geospatial platform with warning /watch maps so that the issues can be disseminated to the remote vulnerable areas (over electric mass media), frontlines to early warned about the impending hazards, and undertake preparedness, pre-positioning response items over the lead-time from 15 minutes to an hour(s)

- **IBF/FBF technical partners to define early actions:** How to respond in a short lead-time before impeding, how to capture live news/events/weather conditions by using IBF hybrid(crowdsource) observation system.
- **Who will be the primary responder according to SoD and SOP** : EOC of aimag to remain alerted for providing updates, Local governments to engage stakeholders with defined 5W SOP and deploying and activating team for emergency supports (Local government field level technical experts/actors, herders, community, disaster emergency management volunteers)
- **Integrated IBF & FBF :**Where will be the service trigger points, pre-positioning the relief items , What type of response is required with background checking of similar earlier events.
- **IFB immediate functionaries:** quickly assess the level of the impact with spatiotemporal level, immediately assuming the anticipatory L & D, propose actions, organize live radio shows for timely and wider dissemination, capturing event situations, ongoing L & D figures (so that post-disaster trauma, L & D can be well captured, planed and enough evidence for developing EAP for a flash appeal.
- **SEC / UN-HCT to timely propagate** flash-appeal based on scalability, intensity, and extendibility, damaging pattern prepared by the IBF and FBF team.
- **Early warning-based early action plans** – so that disaster emergency funding is timely and effectively utilized.
- **IBF & FBF team to develop event situation report** over the ongoing events. Geospatial IBF platform to capture live actions, L & D figures, picture/video of from the ground, the live radio show from assessing impact so quickly, and event situation reporting (aimag EOC) on the fly.

d) **EAP for medium onset and combined weather** factors for example extreme cold temperature, Severe winter conditions, strong winds, damaging winds, season-specific incidence of dzud, flash-drought) lead-time (6-12 hours to daily/weekly)

Considerations:

- **IBF Preparations:** Statistical and dynamical downscaling Model analysis, detect impending extreme weather conditions by running forecasting model, conducting dynamical downscaling for tracking & predicting hazardous events, operational forecasts on watch and warning.
- **Disseminate IBF:** Prepare combined IBF forecasts from multiple sources, e.g. NWP analytics, down-scale models, high-resolution gridded forecasts, routinely issued operational forecasts for the vulnerable sectors/high-value elements, etc.
- **The delineating impact area of the extent with the geospatial platform** soon after the forecast is issued anticipatory calculations and estimates the level of the impact by analyzing elements falling under each threshold.
    - Extremely high -Magenta-coded alerts
    - Very high- red coded alerts,
    - Moderate to high - orange coded alerts,
    - Medium to moderate - yellow coded alerts
- IBF & FBF: Activate weather warnings dissemination protocol by using national broadcast media(Radio/TV), the web-based geospatial platform with warning /watch maps so that the issues can be disseminated to the remote vulnerable areas (over electric mass media) undertake preparedness, pre-positioning response items early over the lead-time.
- IBF/FBF technical partners to define early actions: How to respond early over the lead-time before hazard impend, how to capture live news/events/weather conditions by using the IBF hybrid(crowdsource) observation system.
- Who will be the primary responder according to SoD and SOP: EOC of aimag to remain alerted for providing updates, Local governments to engage stakeholders with defined 5W SOP and deploying and activating team for emergency supports (Local government field level technical experts/actors, herders, community, disaster emergency management volunteers)
- IBF/FBF: What type of response will be required to respond to the situation: Defining contingency for the whole preparedness and response.
- Develop sector-specific contingency plan: Sector departments to prepare their contingency plan by using IBF risk repository informed tools, risk atlas, sectoral information management system, defining risk raking of the elements, estimating finances required for the preparedness, response, etc.
- SEC / UN-HCT to timely propagate flash-appeal for the funds based on scalability, intensity, and extendibility, the damaging pattern of impending hazards forecasted by the IBF and FBF team.
- Early warning-based early action plans – so that disaster emergency funding is timely and effectively utilized.

- IBF & FBF team to develop event situation report over the ongoing events(Geospatial IBF platform to capture live actions, L & D figures, picture/video of from the ground, the live radio show from assessing impact so quickly and event situation reporting (aimag EOC) on the fly.

e) **EAP for slow onset(prolonged) and combined weather** factors, for example, droughts(meteorological, hydrological, agricultural) and desertification, season-specific dzuds and combined dzud, degradation of soil health, etc., Lead-time (monthly, seasonal, yearly, 10-30 years)

Considerations:

- IBF Preparations:
  - 1) Develop a standard operating system(SOP) and organize a team(s) dealing with the whole observed datasets. For example, data calibration assimilation, the process of datasets from hybrid (robust observation mechanism) observation systems (with station observed datasets). The team prepares, customizes, and outlook products on a daily, weekly, decadal, bi-monthly, monthly, seasonal, and yearly basis. Prepares indicators/indices, and modeling (statistical) for analyzing every parameter, and prepares a comprehensive outlook with every parameter distribution over GIS maps.
  - 2) This repository essentially being required for the IBF & FBF team, SEC, and other key stakeholders can access Mongolian weather patterns, climate patterns, trends of every weather event, customized observed outlook for the sectors, high-value elements, livestock and livelihoods, and value chain operators.
  - 3) This huge repository is essential for the sector and element-specific risk, exposure, vulnerability assessment, forecast verification, and re-analysis of the forecast model.
  - 4) This repository widely supports the assessment of multi-hazard risks.
  - 5) A complete set of a weather information repository, maps, and informed tools heavily input device for the multi-sectoral planning; a) NAP sectors sustainable agricultural planning crop agriculture planning, livestock husbandry planning, integrated water resource management, sustainable soil & land management, sustainable environmental planning, biomass/pasture, sustainable rangeland management, forest management, drought, and desertification management), b) informed tools for NAP sector planning and localization, NDC planning and localization (solar PV project, wind power generations, biomass power, mini,/micro/large hydro projects, NetZero programming, GHG reduction.
  - Develop algorithms, indicators, and indices and run the model for analyzing hazards, trends, recurrent phenomena, etc.
  - Prepare long-range forecasts n hazards and trends.
- IBF: Prepare combined sector-specific IBF watch, and warning advisories for sectoral preparedness. Develop EAP for reducing risk and vulnerabilities.
- The delineating impact area of the extent with the geospatial platform after the forecast is issued calculates and estimates the level of the impact by analyzing elements falling under each threshold.
  - High impact- red coded alerts,
  - Moderate - orange coded alerts,
  - Low/medium impact - yellow coded alerts
- IBF & FBF: Activate weather warnings dissemination protocol by using the web-based geospatial platform with warning /watch / advisory maps so that the issues can be disseminated to the target audiences for informed planning and budgeting process.
- Define the stakeholders, and actors mandated by SoD and SOP: EOC of aimag develops IBF GIS maps on aimag, soum, bag.
- IBF/FBF: To develop EAP with defining contingency for the sector preparedness, adaptation, and resilience building.
- Early warning-based early action plans – so that disaster emergency funding is timely and effectively utilized.
- IBF & FBF team to develop event situation reports over the ongoing events(Geospatial IBF platform to capture live actions, L & D figures, picture/video of from the ground, the live radio show from assessing impact so quickly and event situation reporting (aimag EOC).

5.2 Team composition for developing EAP and early warning based early actions :

The EAP responsibilities are entrusted to the experts of both the IBF and FBF team, the figure below shows the composition.

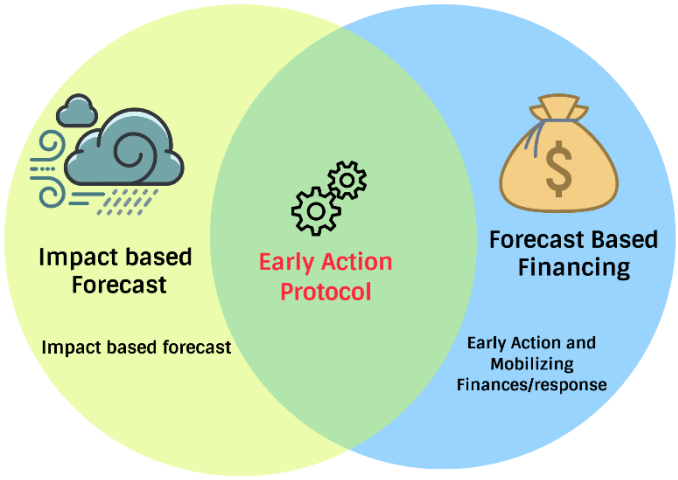


Figure 7: The operational strategy –EAP implementation.

h) Designated Stakeholders for EAP implementation :

- Aimag Governor
- Soum Governor
- Local Emergency Management Agency (LEMA) of NEMA at aimag/soum level (NEMA Emergency Management Team)
- UN OCHA/HCT/UN Clusters
- Mongolian Red Cross Society (MRCS) - EOC
- Sector Department at aimag /soum level
- NAMEM IBF designated the Technical Working Groups (TWG) at HQ level
- NAMEM Aimag EOC, Local Governments at the local level(Aimag, Soum, Bag)
- Sector Department
- Stakeholders, Value chain Operators, and Logistic Operators at the Local level

5.3 Steps of Developing EAP

Step 1: Complete risk Baseline risk and vulnerability analysis.

- Develop a detailed repository of elements, sectors, livelihoods, livestock herding area-wise risk, vulnerability, exposure, and sensitivity risk ranking.(Articulated in IFB methodology)
- Identify the major hazards with ranking in terms of L & D, tolls, frequency, intensity, and magnitude.
- Detailed atlas (bag, soum, aimag) with indicators and Selection of hazards are recurrent (dzud, drought, floods, snowstorm, etc.). Risk, vulnerability, exposure, sensitivity Analysis of the priority sectors (livestock and crop agriculture, water, land & soil). Detailed atlas preparation(Physical, geographical, socioeconomic, and, copping capacity) :
- Develop Standard Operating Procedures (Sop) on humanitarian risk management, and climate risk management for local governments.
- Develop Standing orders on disaster (SoD), actors/stakeholders for managing disaster emergencies at the local level.
- Review Risk-informed LDP & budgeting of local governments, ongoing interventions
- Review Value chain operations of the service sectors

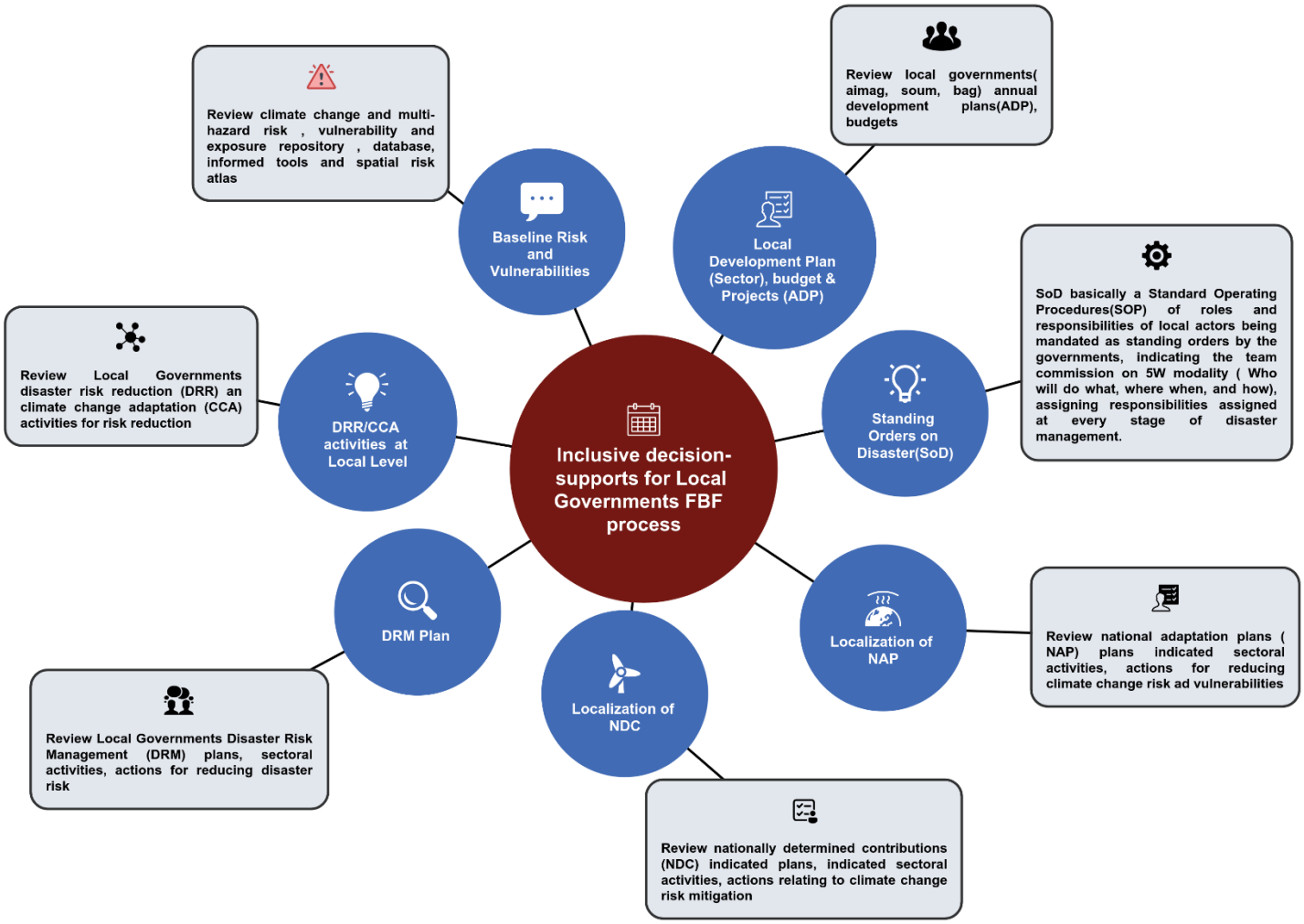


Figure 8: Local Government FBF decision support system (Source: Z M Sajjadul Islam, UNDP-GCF)

Step 2: Review impact forecasts / different-term operational Forecasts (IBF)

Review the IBF and analyze the risk of impending hazards, where it will be likely, and how many elements are likely to impact with a lead time of 12 or 24 hours. Estimate impacts over the elements falling under the severity of thresholds, calculate risk with impending nature, and persistent risk and vulnerabilities.

Step 3: Define impact level by the impending extreme weather events induced hazard(s)

- From the above menu summarize the Risk ranking of the elements and define the intervention type
- Duration of support required.

Step 3 : Analyze the IBF anticipatory advisory on loss and damage.

This is the teamwork of IBF TWG over the geospatial platform (sitting at their desk) and analysis of forecast impacts. However, this is the primary input for the EAP to have a precision level IBF and anticipatory L & D scenario.

The hypothesis of impact estimation;

Impact estimation = Overlay Impact forecast color-coded threshold of impending extreme weather events over the geographical areas + calculate Baseline physical elements (Annexure 1 of IBF) and their Risk & Vulnerability Ranks +

Calculate socioeconomic Risk & Vulnerability and Ranks – coping capacity = estimated risk and vulnerability elements, geographical areas, and severity

Step 4: Develop anticipatory L & D scenario :

d) Based on the hypotheses, calculate a checklist of impacts level, and severity index for the elements likely to be impacted, and damaged. A detailed checklist of how many elements is at very high, high, moderate & low risks, vulnerable, exposed, sensitive to hazards, etc.
e) Based on the software, an Excel sheet calculate the detailed L & D scenarios
f) Calculating financial, and physical loss & Damage and the size of investment is required for preparedness and withstanding capacity, reducing risk, vulnerability, exposure, and sensitivity.

Table : elements impact analysis.

Elements	Extremely high risk (Magenta alerted areas) (% or number)	Very High risk (Red alerted areas) (% or number)	Medium Risk (Orange alerted areas) (% or number)	Low Risk (yellow alerted areas) (% or number)	Exposed	Vulnerable	L & D area likely (% or number)	Death tolls are likely (% or number)

Step 5: Develop a Contingency Plan

- Formulation of SOP with 5W activities
- Required resources for saving lives and properties.
- Detailing people in need (PIN) and priorities intervention for the high-risk ranking elements
- Rapid Funding mechanisms and probable sources to meet ,e.g., internal (local governments, central government) and external.
- Risk-based intervention allocation etc.

Step 6: Select early actions

Based on the category, type, impeding nature(Raid onset, medium onset, slow onset), intensity, magnitude, scalability, and duration to dissipate, the EAP team needs to develop early action plans for the whole cycle of risk management. Prepare risk category-wise investment menu, types of intervention (cash, in-kind, logistic, relief, etc) to be required for, executing group/stakeholders/partners of 5W action plan modality, etc.

Step 7: Define the intervention process

- Define intervention based on the threshold and impact intensity of the impending extreme weather events. Following the 5W process for involving the actors.
- Define activities, budgets, and probable funding sources.
- Develop M&E plan while intervention is triggered to capture the progress to date.

Step 8: Event situation reporting.

Defining event situation reporting process, and guidelines of utilizing IBF crowdsource networking and risk communication tools for updating situations with pictures, videos textual reporting, etc. so that IBF and FBF partners can get the updates through online integrated IBF and FBF platform.

Step 9: EAP approval and designation for risk finances

The whole IBF and FBF process is intended to implement over the online integrated web portals & geospatial platforms for functioning the automated process. The FBF process leaders, co-leaders, key stakeholders, and local governments to jointly organize a consultation process online for reviewing, commenting, and finalization of the EAP and inclusive risk finance readily available to mobilize and additional finances required to implement to emergency humanitarian program for getting font-line better prepared for the impending hazards.

Step 10: Define activities on how to conduct constant Monitoring forecasts and conduct humanitarian actions accordingly

The functional humanitarian focal agencies (NEMA, MRCS, HCT, UN clusters, I-NGOs) are to be guided by the EAP and conduct humanitarian action accordingly. After EAP is approved and all the agreements are in place, ensure that the relevant stakeholders are ready to activate, preposition the relief /items for distribution, carry out necessary training, and ensure financial and logistical arrangements are in place and roles and responsibilities are well understood by the actors engaged.

Define the monitoring & evaluation process of the forecast updates (IBF and operational IBF, warning, watch, alerts), which would be functioned by the IBF and FBF platform.

Step 11: Revise/re-submit FBF risk financing proposal.

The FBF focal points, and key stakeholders to review EAP by organizing an online consultation process, the draft EAP would be uploaded to IBF & FBF online platform for the re-validation and approval of a quick-time-around process starting the humanitarian program.

5.4 Developing EAP for managing season-specific and combined dzud risks

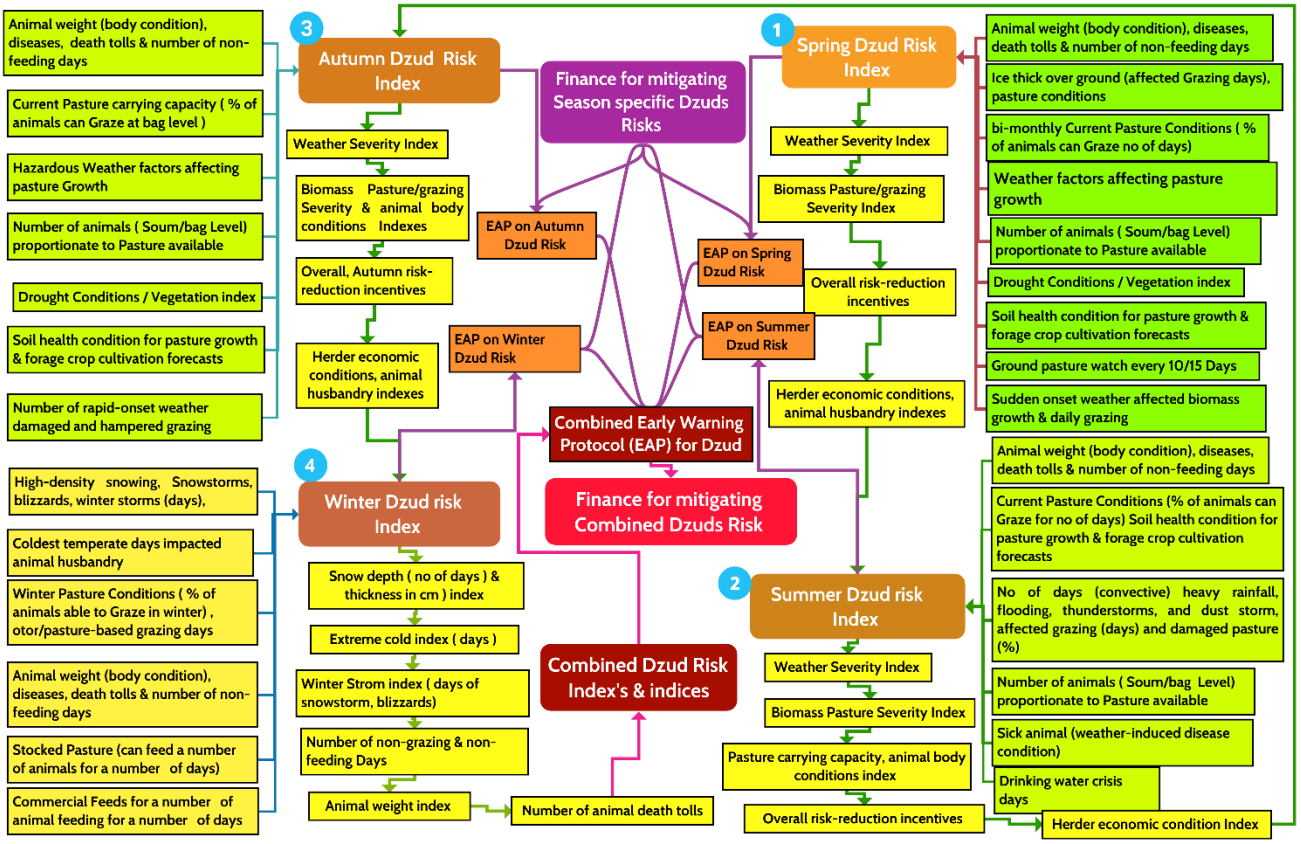


Figure 8: EAP for dzuds to enhance resilient capacity by timely mobilizing risk finances, resources, and implementation of interventions (Source: Z M Sajjadul Islam, UNDP-GCF)

6.0 Early Warning and Early Action for the rapid onset events

The precision level impact forecasting of rapid onset extreme weather events (snowstorms, blizzards, convective early rainfall, thunderstorms, cold and warm front induced storms) is a challenging job, but this is the most urgent and prioritized issue for the timely prediction of Mongolian sudden onset hazardous events. In the IBF observation system proposed a hybrid system so that those events could be well detected and forecasted.

The IBF & FBF online platform needs to be established to timely forecast and estimation of the impacts before developing an early warning-based early action plan.

6.1 Early Warning and Early Action :

Step 1: Analyzing the colored coded threshold impacts snowstorms, blizzards, convective heavy rainfalls, thunderstorms, hailstorms, flash flooding to the urban settlements, and cold and warm front induced storm, we need to consider at least 3 provinces are falling under high-risk areas and at least 20% areas under red alerts.

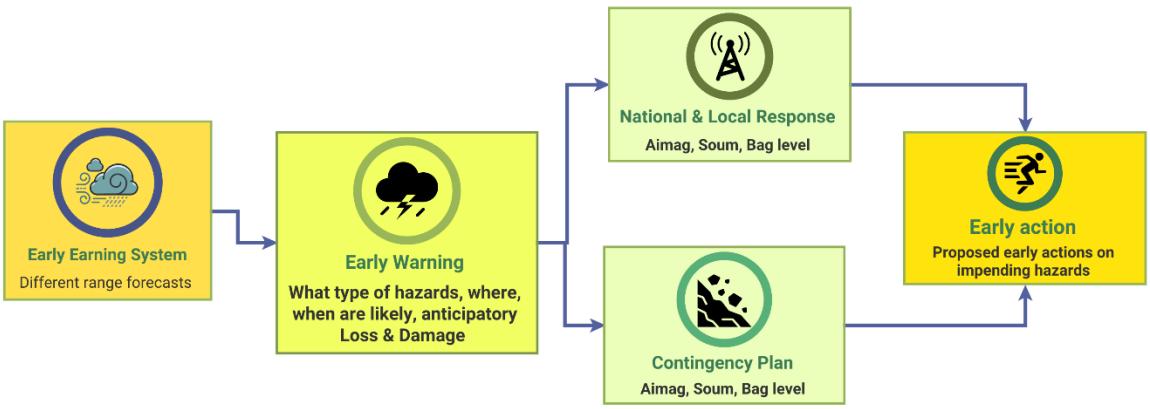
Step 2: Conduct an anticipatory estimation of the elements that are likely to do the damage, death tolls of humans, and animals are highly likely.

Step 3: Develop immediate and early action plans for saving lives and properties.

Step 4: Prioritize FBF actions and instantly develop contingency and a 5W plan for the immediately starting interventions.

Step 5: Design a response plan with the components that need to be in place to deliver appropriate early actions based on a timely early warning.

The below diagram shows the linear workflow of an early warning-based early action plan which is to be led by national and/or local governments, where humanitarian and development partners come together to provide the necessary support capacity building. The components are:



6.2 Developing Forecast based early Action :

Menu of the triggers Showing forecasts of different timelines and their probability levels

Triggers/IBF	Forecast lead-time	Very High probability	Medium to high probability	Low to Medium Probability	Early warning based early action and developing EAP
Extreme winter conditions	7-15 Days 0-7 Days 0-5 Days	• Extreme cold temperature	Severe snowstorm	• Snowstorm • Winter storm	Early Action development for emergency

	0-3 Days	• High-density snowfall			preparedness and response planning
Damaging winds	0-7 Days 0-5 Days 0-3 Days	• ….m/s wind speed	….m/s wind speed	• ….m/s wind speed	Early Action development for emergency preparedness and response planning
Convective weather conditions	0-1 hour 0-6 hours 6-12 hours	• Severe thunderstorm • Danger level : Very heavy rainfall (> 70mm/hr) • Rainfall watch >50mm in 1 hr >70mm in 3 hr >90mm in 6 hr >110mm in 24 hr	• Heavy rainfall exceedance (30-70mm/hr) • Rainfall watch 30mm-40mm in 1 hr 40mm-50mm in 3 hr 50mm-60mm in 6 hr 70mm-80mm in 12 hr 80mm-90mm in 24 hr	• Rainfall exceedance (10-20mm/hr)	Immediate warning, operationalizing humanitarian action for saving lives and properties
Cold front	0-1hour 0-6 hours 6-12 hours	Severely Damaging Cold Strom	Moderately Damaging Cold Strom	Low-level Damaging Cold Strom	Immediate warning, operationalizing humanitarian action for saving lives and properties
Cold rain	0-1hour 0-6 hours 6-12 hours	Severely Damaging Cold rain	Moderately Damaging Cold rain	Low-level Damaging Cold rain	Immediate warning, operationalizing humanitarian action for saving lives and properties

6.3 Anticipatory Actions for Copping the Rapid Onset Hazards.

Forecast/trigger	Anticipatory actions to be carried out	Actors /stakeholders	Type of response
Very High probability of Extremely coldest temperate & Snowstorms	Early action plan on preparedness and Contingencies	Local Government Administration	Immediate warning, operationalizing humanitarian action for saving lives and properties
	Humanitarian country team (HCT)/ OCHA to review the impact forecasts and thresholds, review anticipatory early action plan(from FBF platform) and determine the allocation of CERF for preparedness and response.	HCT NEMA	
	Assessment of Government other shareholders, state/non-state actors, MRCS/IFRC, I-NGOs, CBO, CSO, sector department, etc., available stocks based on the FBF database, sectoral resources, 5W database etc	NEMA/LEMA MRCS Sector Department	
	Review the aggregate Dzud risk level and what level of the risk of turning to impending disaster by reviewing the Dzud watch & warning system, proposed web portals https://dzud.ibf.gov.mn / www.fbf.gov.mn / www.fbf.weather.com	NEMA/LEMA NAMEM MRCS Sector Department	
	Identify the emergency relief and response package and initial priority action based on the 5W dashboard of the FBF platform	NEMA/LEMA MRCS Sector Department	

Forecast/trigger	Anticipatory actions to be carried out	Actors /stakeholders	Type of response
	Prepare Agency specific contingency, preparedness, and response plan from the FBF platform	NEMA/LEMA MRCS Sector Department	

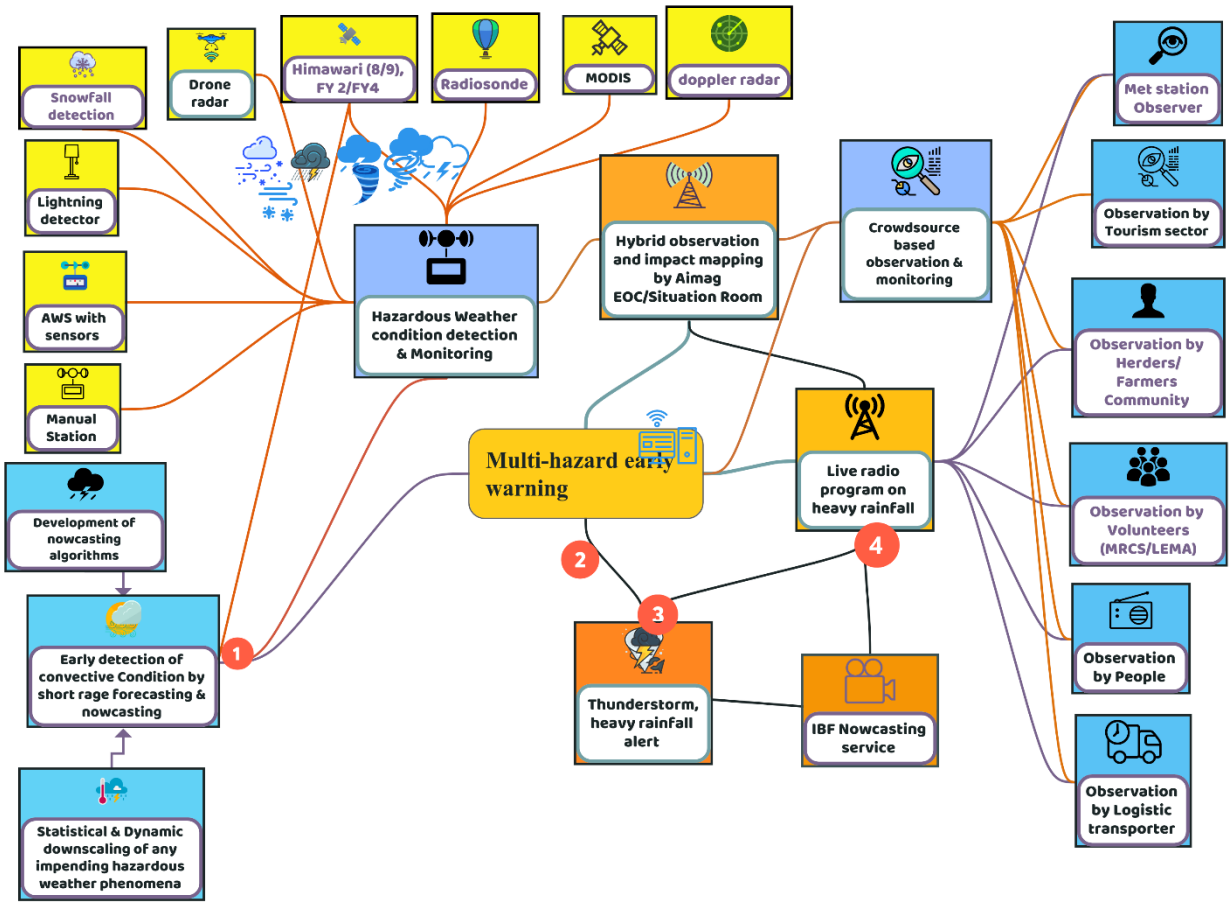


Figure 9: Rapid onset hazardous events earning system under the IBF process to inform the FBF actions (Source: Z M Sajjadul Islam, UNDP-GCF)

7.0 FBF strategy development for the vulnerable sectors

7.1 : IBF integrated informed FBF tool supporting long-term planning

Mid-term Plans/Policy/Strategy	Informed tools to be supplied by IBF	The informed decision for FBF
The National Action Programme on Climate Change (2011).	1) Sector-specific climate risk-informed tools e.g. Risk atlas, the database of the Climate Risk and Vulnerability (CRV) tools 2) Annual climatology of Mongolia(Observed data) 3) Annual weather outlook	• Informed tools to provide the way forward for adaptation, and mitigation decision-making. • FBF advisory/strategy for the sector based on the operational IBF
First National Action Plan - 2014-2016 Second National Action Plan - 2016-2018 Third National Action Plan – 2018-2020/2019-2021 A (NAP 4th working group) Action Plan for 2020-2024	1) Weather risk atlas, 2) Multi-hazard risk atlas, 3) Climate Risk and Vulnerability repository database, Aimag, Soum level GIS maps on the CRV 4) indicators and targets for monitoring and evaluation 5) Annual climatology of Mongolia(Observed data) 6) Annual weather outlook	Sector-specific FBF advisory/strategy for the sector- based on monthly, seasonal, yearly outlook, sector-level operational forecasts, etc.
GHG mitigations actions are the Sustainable Development Vision 2030 (2016), the	• Air quality forecast • Location of mining and industries and GHG/air quality data recorded by NAMEM	
State Policy on Food and Agriculture (2016),	• Crop agriculture sector-specific Climate Risk and Vulnerability repository database, Aimag, Soum level GIS maps on the CRV. • Operational forecast for crop Agriculture, food security, livestock, duzd	Sector-specific FBF advisory/strategy different types of IBF
State Policy on Forest (2015), the	Climate risk data and atlas for measuring forest risk	Financing strategy for the sustainable Forest management
State Policy on Energy (2015), Mid-Term National Programme to Develop the State Policy on Energy for 2018 – 2023	1) Solar irradiance, radiation data 2) Location-specific sunshine days 3) Total precipitation days, spatiotemporal precipitation data, and the cumulative amount of precipitation(mm) on the day, week, decadal, monthly, seasonal, and yearly for measuring hydrological potentials for power generation 4) Wind speed data and geographical distribution of wind speed for supporting wind power programme	Sector-specific FBF advisory/strategy for harnessing renewable resources
Green Development Policy (2014), National Adaptation Plan (NAP) process	Good weather forecast and impact analysis for the green development sector and sub-sectors • Observed sunshine days, and solar irradiance data for harmonizing solar energy (PV electrification) • Observed wind data for wind resource mapping, wind energy program • Observed accumulation of precipitation time-series data for integrated water resource management, hydropower project	IBF tools for the developing Strategy/way forward for the financing of projects/schemes for achieving green development.

Mid-term Plans/Policy/Strategy	Informed tools to be supplied by IBF	The informed decision for FBF
	• Wind speed data and geographical distribution of wind speed for supporting wind power program • Soil moisture, soil health, soil thawing, icing over the soil, etc. data for soil sector planning, crop agriculture, pasture condition, rangeland health data(types of otor pasture, planting type, etc., for agriculture and livestock sector planning.	
National Program on Waste Management Improvement (2014)	Greenhouse gas emission data	• Financing strategy for the NetZero development, GHG reduction, NDC localization • Project/scheme design and implementation
NDC State Policy on Energy (2015);	• Observed sunshine days, and solar irradiance data for harmonizing solar energy (PV electrification) • Observed wind data for wind resource mapping, wind energy program • Observed accumulation of precipitation time-series data for integrated water resource management, hydropower project • Seasonal outlook for informing planning paradigm of harnessing sustainable emery	• Financing strategy for the NetZero strategy development, GHG reduction, NDC localization • Project/scheme design and implementation
The National Action Plan to Combat Desertification,	1) Drought watches Mongolia, advisory and anticipatory action plan for combat desertification. 2) Weather indicators for the agriculture, hydrological, and meteorological drought in Mongolia 3) SPEI indicators, drought indices 4) Develop appropriate weather parameters, indicators, index, and indices for measuring desertification. 5) Operational Forecast on pasture biomass condition	• Financing strategy based on the different range impact forecast on spatiotemporal resolution. • FBF for X-ante/x-post financing strategies for sustainable pasture management
The National Biodiversity Action Plan,	• Weather indicators for the agriculture, hydrological, and meteorological drought in Mongolia • SPEI indicators, drought indices • Develop appropriate weather parameters, indicators, index, and indices for measuring desertification.	

Source: Government Planning Documents [4]

IBF and FBF tools to inform government policy planning, strategy development, and project design process.

- Government planning desk to access IBF and FBF tools for getting informed about persistent risks and vulnerabilities while developing risk-informed sectoral development plans and budgets annually.
- Access IBF and corresponding FBF through the online platform for support SEC, NEMA, and sector departments for EAP planning, providing informed decisions for different onset hazard risk financing.

[4] www.cabinet.gov.mn , https://www.unescap.org/sites/default/d8files/event-documents/Mongolia%20-%20Climate%20Change%20and%20Disaster%20Risk%20Profile.pdf , https://www.adaptation-undp.org/mongolia-achieves-milestone-national-adaptation-planning, https://cabinet.gov.mn/wp-content/uploads/2050_VISION_LONG-TERM-DEVELOPMENT-POLICY.pdf

Table: Inputs by the sector departments for EAP and action planning for the FBF process.

Analyze components of Forecast-based Financing (FbF)	**FBF Advisories**	**Stakeholders**
Thresholds of Impact Forecasts	• Access the IBF platform and analyze the loss and damage of the sector. • Advise development for the Early Action Protocol (EAP) and outline action for the sector preparedness and finance allocation process.	Priority sector department
Planning anticipatory actions and guides for Early Action Protocols (EAPs)	•Based on the category of warnings and threshold intensity already issued with IBF for predicting extreme weather events(e.g. dzud), contribute to developing sector-specific early action plans based on the level of the thresholds of the high-impacts •Propose financing modality and types (Cash-based Early Actions, cash for livestock preparedness management, sustaining herder livelihood during extreme dzud, and-in-kind supports, logistic supports, emergency relief items) responses to mobilize soon after an early warning issued •Provide advisories and actions for saving livestock from cold injury and emergency fodder stockpiling, etc, and emergency response mobilizations. •Provide advisories, and strategies for saving the standing crops and emergency response mobilizations. •Provide advisories for flood risk management, EAP and action plans, risk financing strategy, etc. •Provide forecast-based advisories, and actions for the livestock, crop agriculture, water, soil, and land management sectors	
Developing Early Action Protocols (EAPs)	• Guidance for developing the Early Action Protocol • Analyze the key components (trigger, early action, emergency funds) and guide EAP/ • Provide guidance over the stakeholder's roles and responsibilities for formulating quick actions based on early warning. • Guidance for national entities can potentially finance early recovery. • Guidance on how to conduct a forecast-based risk analysis for the sector and select impending hazards to address.	Priority sector department
Financing mechanism	Guidance on what are the existing financing mechanisms before undertaking the rapid actions during disaster emergency forecasts with IBF, what are those potential entities/stakeholders (state, non-state actors, private sectors)	Priority sector department
Level of Stakeholders Engagement	Following guidelines; • How local governments are responding to FBF-based emergency response, recovery, and rehabilitation? • Any disaster management committee disaster at the Local level (Aimag, Soum, Bag)? • Proposed activities under the standing disasters (SoD) on the disaster at Aimag, Soum, Bag level • Local-level coordination mechanism • How to access input support services during emergencies • Access to the Value chain of emergency product storage and market access is given to remote herders /smallholder farmers	Priority sector department

Analyze components of Forecast-based Financing (FbF)	FBF Advisories	Stakeholders
Set up a FbF program during the rehabilitation phase	Provide the following advisories. • Level of linkage IBF and FBF to Social Protection, Vulnerable sectoral development, and Other Income generating activities(IGA) • Promoting climate-adaptive and resilient SME/Private sectors • How IBF/FBF supports local climate-resilient development planning for the last tier of local governments. • Creating climate adaptive and resilient market opportunities for the remote headers and smallholder farmers /headers • The level of promotion youth entrepreneurs • The level of promoting private sectors at the local level for boosting GDP from agricultural sectors • How to promote sustainable smallholders' subsistence farming • How to promote agro-forestry and afforestation • How to contribute to combatting desertification? • How contributing to climate-resilient planning of vulnerable sectors • How to contributing to NAP and NDC localization • How contributing nature-based solution to climate change	Priority sector department

7.2 IBF & FBF for tools for supporting National and Local Government risk-informed Development planning (aimag, soum, bag)

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
Ministry of Food, Agriculture, and Light Industry (MoFALI)	Agriculture	•Sustainable crop Production	• E-platform[5], • Statistical data on crop type	• Operational Impact forecasts for the crop type, time-series advisory on impact level, weather information services for loss and damage (L & D) of yields based on impending hazards of short-term impact forecast, Decadal – (two weeks) medium-range impact forecast and long-term outlook/IBF (monthly, seasonal etc.) • IBF for the high-value elements	IBF advisory, early action plan, early warning early action for information the financial planning and resource mobilization for preparedness and adaptation capacity of the of crops against impeding hazards being forecasted.
MoFALI	Agriculture	•Agriculture Irrigation Infrastructure development (agriculture and livestock)	• E-platform, • Statistical data • Administration of Land Affairs, Geodesy and Cartography (ALAGAC) geospatial land use coverage file /database on the waterbody, river, wetland irrigation deep tube well	Prepare operational forecast for the crop agriculture and livestock husbandry with advisory and warning for water resources required.	Prepare FBF advisory/contingency etc., based on the impact forecasts/triggers, the threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc. for strengthening preparedness for the impending hazards events.
MoFALI	Livestock	•Implement programs such as “State Policy towards Herders”, “Mongolian Herder” and “Increase Livestock”.	• E-platform, • Statistical data • Livestock Department Database[6] (Livestock, population, grazing areas • Livestock management and registration system[7] [8] • Herd database[9]	Prepare short-term operational forecast/ Impact forecast for the crop agriculture and livestock husbandry with advisory and warning , alerting for the elements of livestock sector/husbandry.	Prepare FBF advisory/contingency etc., based on the impact forecasts/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning -

[5] https://e-mongolia.mn/home
[6] https://mn-prism-mng.web.app
[7] https://nlis-2.mofa.gov.mn/login
[8] https://livestock.mofa.gov.mn/login
[9] https://herd.mofa.gov.mn/login

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
			• Database[10] on hay stock, Grass stock, Feed stock, cash savings, Price of Grass, Poverty coverage areas (province) , no of people with disabilities, no of single-parent elderly households(province), No of household with few livestock) • Livestock breeding database [11] • Rangeland /biomass health monitor	1) IBF operational forecast on Extreme Cold temperature, cold rain, snowstorm, high density snow, convective thunderstorm,/heavy rainfall/floods/water logging, dust/haze storm for the livestock 2) Operational forecast for the rapidly developing weather conditions (cold front, convective thunderstorm, damaging winds, dust storm etc. for the livestock . 3) Good weather advisory for the livestock and sector 4) Special weather watch/advisory/warning 5) Multi-hazard early warning	early action etc. for strengthening preparedness for the impending hazards events.
MoFALI	Livestock	•Reduce pasture deterioration and desertification through creation of the legal environment for pasture usage, protection and improvement.	• Database[12] on hay stock, Grass stock, Feed stock, cash savings, Price of Grass, Poverty coverage areas (province) , no of people with disabilities, no of single-parent elderly households(province), No of household with few livestock) • Rangeland health monitoring database • Biomass /vegetations index analytical GIS map and database of Agrometeorology	• Advisory/watch /warning on deviation of Pasture Vegetation, NDVI, Drought news (VHI) , Snow cover %, 10 days minimum temp, temp 10days average, precipitating in more than 10 days (mm) • Agrometeorology division and remote sensing research division (IRIMHE) having GIS analytics risk low resolution risk analysis. • Dzud risk map /monthly GIS maps / briefing • Monthly weather outlook, • 5days forecast(IBF)	Prepare FBF advisory/contingency etc., based on the impact forecasts/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc. for strengthening preparedness for the impending hazards events.

[10] http://fodder.mofa.gov.mn
[11] https://muz.gov.mn
[12] http://fodder.mofa.gov.mn

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
MoFALI	Livestock	•Sustainable livestock management(product value chain development, incentives, market access,	• Livestock management and registration system[13] [14] • Herd database[15] • Database[16] on hay stock, Grass stock, Feed stock, cash savings, Price of Grass, Poverty coverage areas (province) , no of people with disabilities, no of single-parent elderly households(province), No of household with few livestock) • Livestock breeding database [17] Rangeland /biomass health monitor	• IBF on extreme weather events • Operational forecasts for the livestock husbandry value chain	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Livestock	•Protect livestock from natural and climatic risks, ensure preparedness, create fodder reserves in soums, and establish a fodder storage network for herders.	• Database[18] on hay stock, Grass stock, Feed stock, cash savings, Price of Grass, Poverty coverage areas (province) , no of people with disabilities, no of single-parent elderly households(province), No of household with few livestock) • Livestock breeding database [19] Rangeland /biomass health monitor	• IBF/advisories/ anticipatory action planning on extreme weather events • Operational forecasts for the livestock husbandry value chain	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Livestock/Crop-Agriculture	•Food Production (Value chain development of livestock and agriculture outputs)	• Local government MIS on public utilities, Market place, enterprise, • E-platform, • Statistical data on Agricultural outputs • Livestock Department Database[20] (Livestock, population, grazing areas • Livestock management and registration system[21] [22]	• Operational forecasts, IBF advisory / watch / waring of the hazardous weather events over the forage crop cultivation , high growth grass cultivation (Napier), pasture status, carrying capacity, degradation etc.,	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Agriculture	•Small holder entrepreneurship development	• Credit facility , • invectives, and • market accessibility	Operational forecasts, IBF advisory / watch / waring of the	FBF planning based on IBF-/triggers,

[13] https://nlis-2.mofa.gov.mn/login
[14] https://livestock.mofa.gov.mn/login
[15] https://herd.mofa.gov.mn/login
[16] http://fodder.mofa.gov.mn
[17] https://muz.gov.mn
[18] http://fodder.mofa.gov.mn
[19] https://muz.gov.mn
[20] https://mn-prism-mng.web.app ,
[21] https://nlis-2.mofa.gov.mn/login
[22] https://livestock.mofa.gov.mn/login

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
		• SME for improving agricultural output value chain		hazardous weather over the crop-agricultural value chain	threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Agriculture	•Green development programme /projects for low emission	•MET database on environmental management[23] •Land cover map •Land use map/database (ALAGAC)		
MoFALI	Livestock/ Agriculture	Development of sustainable crop production, enhance the sector productivity and competitiveness by increasing export and processing capacity, crop rotation and fodder production	• Land use map/database (ALAGAC) •Land cover map	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the crop-agricultural cycle	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Livestock/ Agriculture	Irrigation Infrastructure development (construction of wells, increase, protect, rehabilitate, and sustain pastures, improve livestock quality and productivity, protect livestock gene pool, introduce biotechnological breakthroughs, promote intensive livestock sector and implement "Mongolian Livestock - II" program	• Land use map/database (ALAGAC) • Water resource database of Hydrological research division	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the livestock husbandry	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI		breeding of endangered species of animals and plants and create their reserves for use		Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the livestock husbabdry	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Livestock/ Agriculture	Combat dust storms and desertification	Haze /Dust forecast by IRIMHE	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the livestock husbandry	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan,

[23] https://eic.mn

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
					early warning - early action etc.
MoFALI	Livestock/ Agriculture	Climate-resilient livestock herding management and products value chain development	• E-platform, • Statistical data • Livestock Department Database (Livestock, population, grazing areas • Livestock management and registration system • Herd database • Database on hay stock, Grass stock, Feed stock, cash savings, Price of Grass, Poverty coverage areas (province) , no of people with disabilities, no of single-parent elderly households(province), No of household with few livestock) • Livestock breeding database [24] Rangeland /biomass health monitor	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the livestock husbandry	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MoFALI	Livestock/ Agriculture	Small-scale herder resource management	• Statistical data • Livestock Department Database[25] (Livestock, population, grazing areas • Livestock management and registration system[26] [27] • Herd database[28] • Database[29] on hay stock, Grass stock, Feed stock, cash savings, Price of Grass, Poverty coverage areas (province) , no of people with disabilities, no of single-parent elderly households(province), No of household with few livestock) • Livestock breeding database [30] • Rangeland /biomass health monitor	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the livestock husbandry	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
Ministry of Environment, Tourism and Green Development (MET)	Water sector development	Construct new and renovate existing irrigation systems based upon hydro survey and research and promote the	• Land use map/database (ALAGAC) • Water resource database of Hydrological research division	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the Water sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D ,

[24] https://muz.gov.mn
[25] https://mn-prism-mng.web.app
[26] https://nlis-2.mofa.gov.mn/login
[27] https://livestock.mofa.gov.mn/login
[28] https://herd.mofa.gov.mn/login
[29] http://fodder.mofa.gov.mn
[30] https://muz.gov.mn

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
		introduction of advanced irrigation techniques and technologies and increase annually the size of irrigated land.			early action plan, early warning - early action etc.
MET	Water sector development	Integrated management of water resources	• Land use map/database (ALAGAC) • Water resource database of Hydrological research division	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the Water sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MET	Water sector development	Rainwater harvesting and water retention for agriculture and livestock	Baseline climatic rainfall max/min data and impact map	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the Water sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MET	Water sector development	Assessment of risk and vulnerable induced by the changing climate and extreme weather impacts on waterbody	Develop an integrated National Geo-database, introduce e-system and provide responsive public services.	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the Water sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MET	Soil	National action Plan to Combat Desertification	Climate change and extreme weather impacts on water resources	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the Soil sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MET	Soil	Reduce soil pollution in ger districts and tourism regions through implementation of "Eco Toilet" program	•WASH structures geolocation and database	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the WASH sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
MET	Environment	•Improve eco- tourism	•MET database on environmental management •Land cover map •Land use map/database (ALAGAC)	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the WASH sector development	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan,

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
					early warning - early action etc.
MET	Green development	• Environmental protection and tourism development • Green development policy, planning, green economy • Eco-tourism development.	•MET database on environmental management[31] •Land cover map •Land use map/database (ALAGAC)	Operational forecasts, IBF advisory / watch / waring of the hazardous weather over the Environmental protection and tourism development	
MET		Tapping environmentally friendly Renewable resources potentials	•MET database on environmental management[32] •Land cover map •Land use map/database (ALAGAC) •Natural resources database (water, biomass, hydro resource potentials for micro hydro power generation •Baseline climatic mean on maximum wind speed regime for wind power generation, water pumping windmill •Baseline climatic mean on maximum sunshine days, solar irradiance data for harnessing solar energy (PV, thermal) • Solar PV based surface water irrigation for agriculture, livestock and drinking water supply.	Operational forecasts, IBF advisory / watch / waring of tappable renewable resources	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
Agency for Land administration, Management, Geodesy and Cartography	Urban Land Use and Spatial Planning	• Improve the legal environment for land management and urban development and classify city Rankings • Sustainable Urban development Management • Urban land use management • Improving urban utility services (water supply, sewage network	•Land use map/database (ALAGAC)	Operational forecasts, IBF advisory / watch / waring for the Urban Land Use and Spatial Planning	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.

[31] https://eic.mn
[32] https://eic.mn

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
Agency for Land administration, Management, Geodesy and Cartography	Sustainable urban development	Urban Flood Management (flood ditches, storm water and groundwater drainage systems in stages)	•Land use map/database (ALAGAC) •Aimage wise urban planning map •Hydrological database •NEMA flood risk database •NAMEM hydrological forecasts	Operational forecasts, IBF advisory / watch / waring for the convective weather condition, thunderstorm, heavy rainfall, lightning, flash flood, river floods , water logging etc	FBF planning based on IBF-/triggers, threshold of impacts, anticipatory L & D , early action plan, early warning - early action etc.
Local Government	Regional, Local and Rural Development Planning[33]	• Implement a nationwide decentralization policy. • Update the regional development concept and create a foundation for developing green production with economic diversification, specialization and combination and joining the regional economic integration.		IBF advisory / watch / waring Climate outlook for the sector	FBF strategy for the sector Proposed climate services for planning and budget allocation.
Local Government	Aimag Government functions	• A main medium-term development guidelines, policies, and planning; • The General Local Development Fund(Formula-Based)		IBF advisory / watch / waring Climate outlook for the sector	FBF strategy for the sector Proposed climate services for planning and budget allocation.
Local Government	Aimag Government functions	• Use, possession, disposal, and oversight of aimag property aimag budget, its planning, execution, reporting, and oversight • Planning, distribution of aimag local development fund, and the formation, spending, reporting, and oversight of other funds • Aimag food, agriculture, and production programs, and oversight in their implementation • Aimag small and medium enterprise		IBF advisory / watch / waring Climate outlook for the sector	FBF strategy for the sector Proposed climate services for planning and budget allocation.

[33] Approval of the Action Plan of the Government of Mongolia for 2020-2024. https://cabinet.gov.mn/wp-content/uploads/2020-2024_-ActionPlan_GOM_Eng_Edited_OE-2.pdf

Sector Ministry	Sector / Sub-Sector	Activities/Projects/ schemes being planned for the current fiscal year	Governments (national & local governments) are maintaining Databases/Repositories to support the planning process.	IBF tools for risk-informed sectoral planning	Forecast-based financing (FBF) tools
		development fund management; • Aimag tourism policy and management • Hazardous and industrial waste management • Planning, operation, and oversight of communication of utility services (electricity, and heat distribution networks, fresh water, sewage lines, and sewage drainage facilities, flood dams, canals, and related facilities)			