Climate services in agriculture

Hideki Kanamaru

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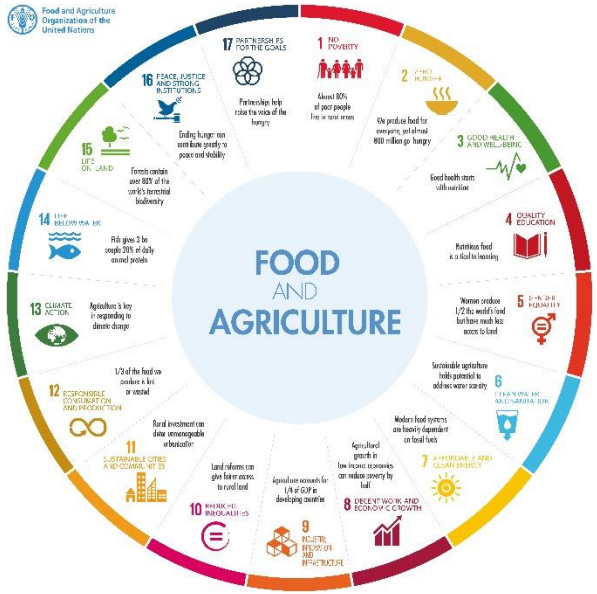
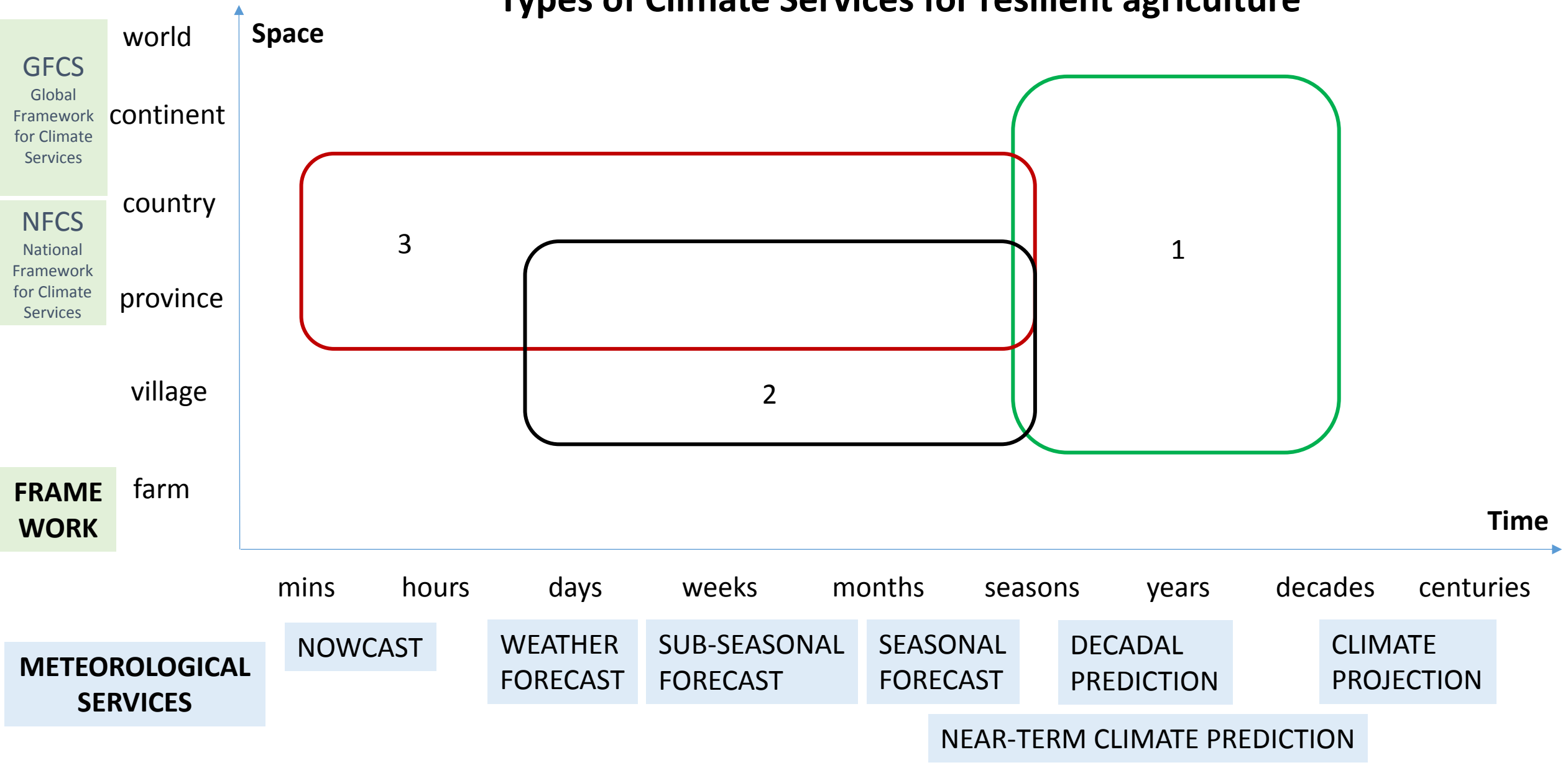


Types of Climate Services for resilient agriculture



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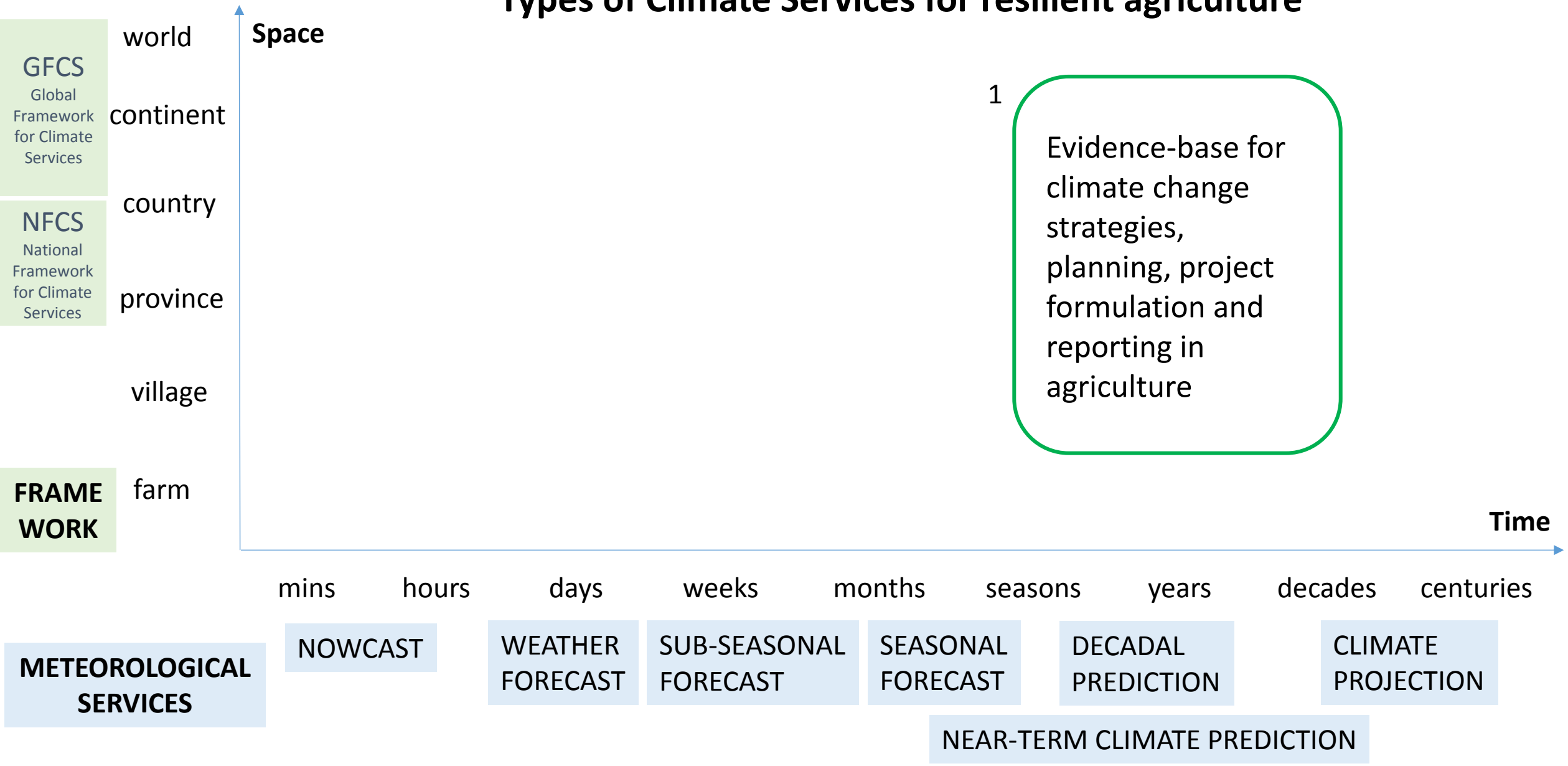


1. Evidence-base for climate change strategies, planning, project formulation and reporting in agriculture

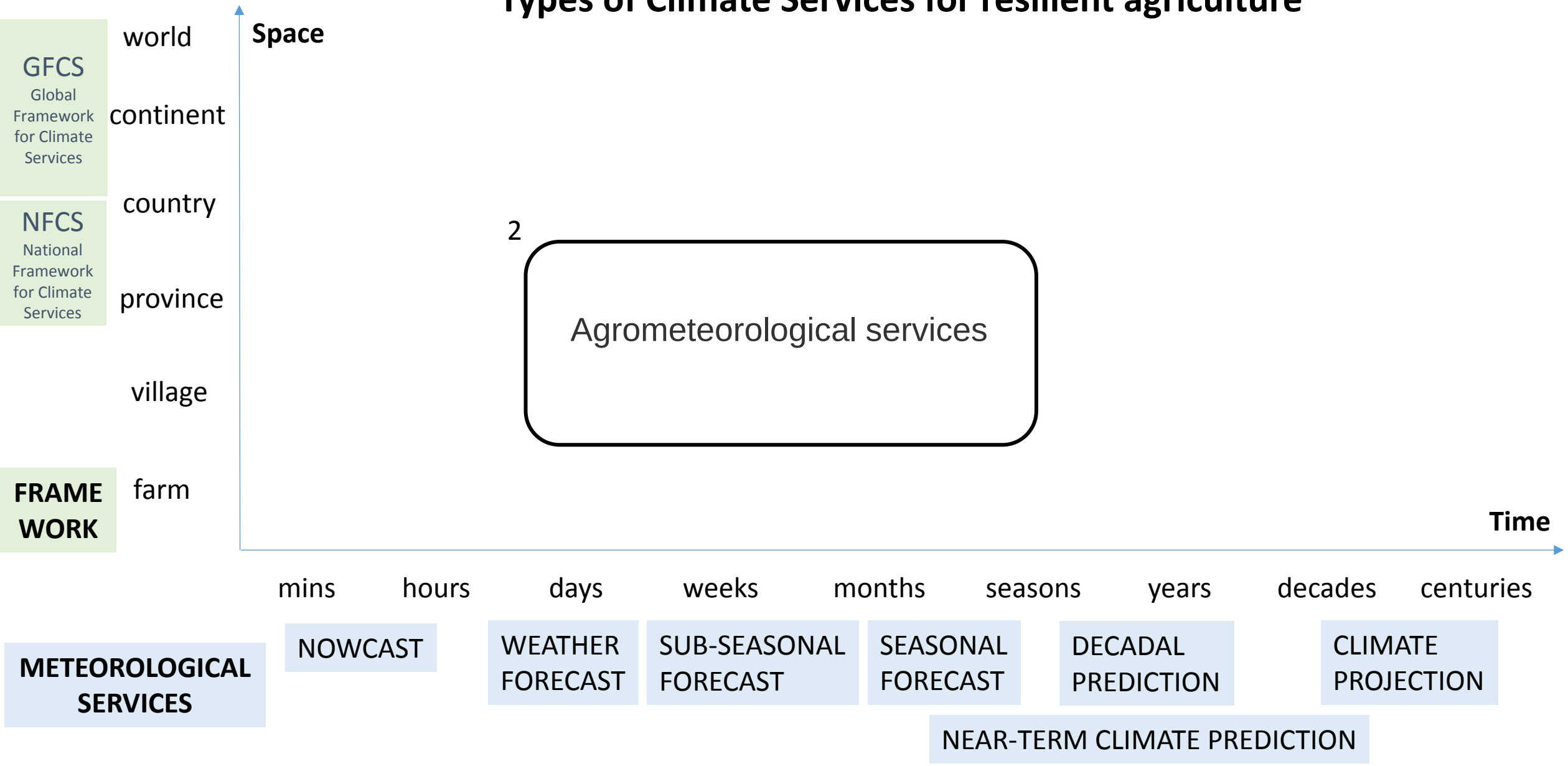
- On longer time scale, and deals with the food system's evolving vulnerability to climate change
- Understanding climate risks and vulnerability
- Assessing climate suitability of agri-food systems

- Inform climate change and agriculture strategies, planning
- Climate rationale for programme/project development
- Provide information for enhanced monitoring and reporting

1. Agriculture climate services (1. Long-term evidence-base) - examples

- Agro-Ecological Zoning
- MOSAICC – Modelling System for Agricultural Impacts of Climate Change
- CAVA - Platform for analyzing and visualizing risks and vulnerability of agriculture to climate change
- HiHi geospatial platform
- Foresight Modeling (IFPRI IMPACT model)
- Tools to assess climate-smartness of crops/technologies – quantification of benefits (biophysical; economic)
- Assess changing risks of plant pests and disease (geographically; transboundary; epidemiology/pathology) under CC

Types of Climate Services for resilient agriculture

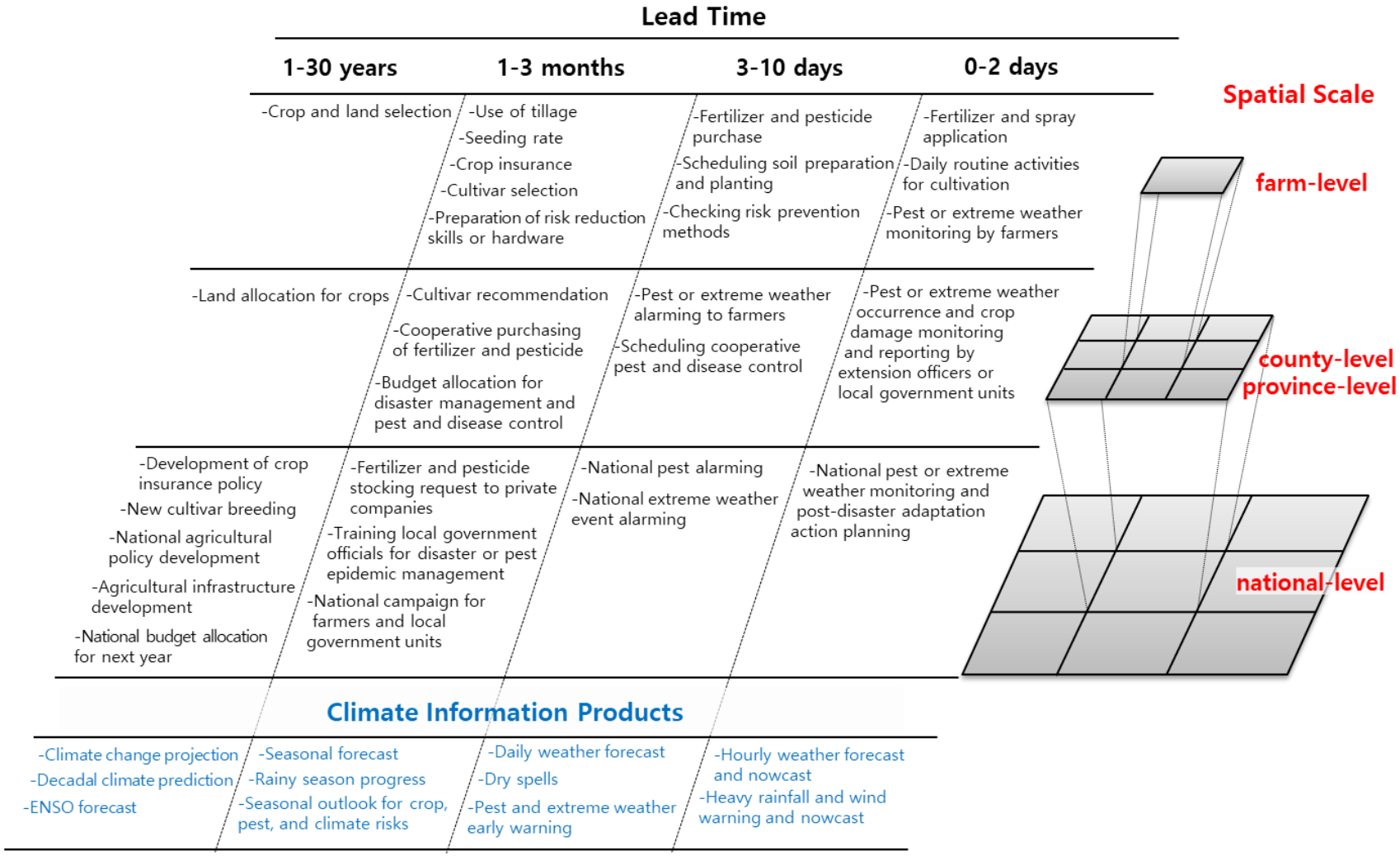


2. Agrometeorological services

- On shorter time scale, and aids farmers with their everyday decision making
- Operational, and regular production/dissemination
- Focus on last-mile delivery and uptake of farm advisories by farmers, as well as quality of information

- FAO regional programme on agromet services
  - Nepal, Bhutan, Cambodia, Samoa
  - Farming advisories and pest/disease alerts based on weather monitoring and forecasts
  - Lessons were summarized from the four countries, plus Lao PDR and Bangladesh

Agricultural decisions based on temporal and spatial scales of climate information products



Four critical contents of agromet bulletin

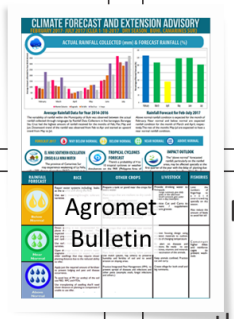
Four critical contents of agromet bulletin

Past and present meteorological conditions

- Weather and climate observation for daily, weekly, or monthly
- Climatology of agriculturally relevant weather variables such as temperature, precipitation, relative humidity, sunshine hours, etc.
- Historical (past and present) records of extreme weather and climate conditions

Past and present agrometeorological conditions

- The state and the phase of development of agricultural crops, pest and disease, and farm animals
- The state of agricultural drought, flooding, or other dangerous agro-climatic conditions
- Observed agricultural impacts of the past and present meteorological conditions



Expected meteorological conditions

- Weather forecasts for the next 24 hours, 5 days, or 10 days
- Climate forecasts for the next months, years, or for the entire cropping season
- Predictability (skill) of the forecasts
- Forecasts for extreme weather and climate conditions

Expected agrometeorological conditions

- Possible effects of expected weather and climate conditions on cultivated crops and on farm animals at different stages of development and on their yields
- Advisories about agricultural practices and measures to adapt to expected meteorological conditions

Department of Agriculture, Ministry of Agriculture & Forests

Royal Government of Bhutan

Agromet Advisory Bulletin

Weather Outlook and Advisory

Forecast for Pentad [16-20 Dec]

Dzongkhag	**WANGDUEPHODRANG**
Accumulated Rainfall	Expected accumluated rainfall for pentad 16-20 Dec 2019 is 6.71 mm. The spell is expected to be mostly Dry
Temperature Forecast	Expected variation in this pentad 16-20 Dec 2019 is likely to from maximum temperature of 7.70 deg.C to minimum temperature 1.04 deg.C

Agroclimatic Variables for the pentad 16-20 Dec

Accumulated Rainfall	Soil Moisture	PET	Spell Type	Rainy Days	Humidity
6.71 mm					
Above Normal	deficit	2.41	Dry	2 Days	79.64%

Forecast for Pentad [21-25 Dec]

Accumulated Rainfall	Expected accumluated rainfall for pentad 21-25 Dec 2019 is 9.34 mm. The spell is expected to be mostly Dry
Temperature Forecast	Expected variation in this pentad 21-25 Dec 2019 is likely to from maximum temperature of 6.94 deg.C to minimum temperature 1.97 deg.C

Agroclimatic Variables for the pentad 21-25 Dec

Accumulated Rainfall	Soil Moisture	PET	Spell Type	Rainy Days	Humidity
9.34 mm					
Above Normal	deficit	1.97	Dry	2 Days	89.07%

Month outlook of January

FORECAST NOT AVAILABLE, WILL BE UPDATED ON 9TH OF December

Seasonal Outlook of Jan|Feb|Mar

FORECAST NOT AVAILABLE, WILL BE UPDATED ON 9TH OF December

Previous Month outlook of December

Previous Seasonal Outlook of Dec|Jan|Feb

कृषि-मौसम सल्लाह बुलेटिन

[Agro-met Advisory Bulletin (AAB)]

नेपाल कृषि अनुसन्धान परिषद्, राष्ट्रिय कृषि वातावरण अनुसन्धान केन्द्रद्वारा
जल तथा मौसम विज्ञान विभागसँगको सहकार्यमा जारी

वर्ष-६, अंक-२७ **अवधिः ३० असोज- ६ कार्तिक, २०७७** **३० असोज, २०७७**

मौसमी सारांशः

- साताको सुरु र मध्यमा बागमती प्रदेश र लुम्बिनी प्रदेशमा छिटपुट देखि हल्का वर्षाको सम्भावना छ। साताको मध्यमा गण्डकी प्रदेशका धौरै स्थानमा तथा साताको अन्त्यमा प्रदेश नं १ र प्रदेश नं २ मा हल्का वर्षाको सम्भावना छ।
- हिमाली भू-भागहरुमा अधिकतम र न्यूनतम तापक्रममा हल्का गिरावट आउने, पहाडी भू-भागहरुमा न्यूनतम तापक्रममा हल्का गिरावट आउने र अधिकतम तापक्रममा उल्लेखनिय परिवर्तन नहुने तथा तराई भू-भागमा अधिकतम र न्यूनतम तापक्रममा उल्लेखनिय परिवर्तन नहुने सम्भावना छ।
- सुदूर पश्चिम प्रदेश, कर्णाली प्रदेश र लुम्बिनी प्रदेशको पश्चिमका केहि भू-भागबाट असोज १५ गते नै मनसुन बहिर्गमन भइसकेकोमा असोज ३० देखि देशको सम्पूर्ण भू-भागबाट यस वर्षको मनसुन बहिर्गमन भएको छ।

कृषि सारांशः

- मौसमको अनुकुलता हेरि पाकिसकेको धानलाई भित्र्याउनुहोस्। धानको बीउ छनौटको लागि एकनासले पाकेका, रोग नलागेका पुष्ट बाला संकलन गरेर चुटानी गरि ३-४ घाममा सुकाएर सेल्फोस राखी खायन धानबाट अलगगै भण्डारण गर्नुहोस्।
- जिरो टिलेज प्रविधिबाट गहुँ खेती गर्दा परम्परागत तरिका भन्दा १५-२५% बढी उत्पादन लिन सकिने भएकोले यो प्रविधिबाट गहुँ खेती गर्नुहोस्।
- गहुँबालीमा सिन्दुरे रोगको प्रकोप कम गर्न पहाडमा कार्तिक १ देखि २५ गते भित्र र तराईमा मंसिर १ देखि २५ गते भित्र गहुँ छरिसक्नुहोस्। पहाडका लागि सिन्दुरे रोग अवरोधी बीउहरू स्वर्गद्वारी, मुनाल, च्याखुरा तथा तराईका लागि बागगंगा, बि.एल. ४३४१, एन.एल. ९७१, आदित्य जातका बीउ उपचार गरेर मात्र छर्नुहोस्।
- तराईमा आलु लगाउने समय भएकोले भण्डारणबाट निकालि रायोसँग टुसा उम्रिएका, रोग तथा कीराको संक्रमण नभएका सिफारिस गरिएका खुमल उपहार, खुमल उज्वल, खुमल लक्ष्मी, खुमल राती-२, कुफ्रि सिन्दुरी, आइ.पी.वाइ.-८, डेजिरे, कार्डिनल मध्ये उपलब्ध जातहरुको गुणस्तरिय बीउ मौसमको अवस्था हेरि रोप्नुहोस्।
- हिउँदे तरकारीहरुको नर्सरी च्याङ तथार गर्दा जरुरी खनजोत गरि १ भाग फर्मालिन ५० भाग पानीमा घोली जमिन भिज्नेगरि हालेर प्लास्टिकले ७ दिनसम्म ढाकि माटो उल्टाई पल्टाई गर्नुहोस्।
- बेर्ना सारेको १५-२० दिन भएको तरकारी बालीहरुको बोट वरिपरि रिङ बनाई १०-१५ ग्राम युरिया प्रति बोटको दरले टपड्रेस गर्नुहोस्।
- गोलभेंडामा डढुवा रोगको प्रकोप कम भए मेन्कोजेब २.५ ग्राम र बढि भए क्लिक्सिल एम.जेड. को घुल्तो २ ग्राम प्रति लिटर पानीमा घोलेर बोट भिज्नेगरि स्प्रे गर्नुहोस्।
- यस समयमा केरामा गवारो कीरा देखिएमा बगैंचाको सर-सफाई गर्ने, घारि काटिसकेपछिका ठुटाहरुलाई नष्ट गर्ने वा बोटको कापमा वा गुबोमा कार्बोफ्युरान ५-७ ग्राम राख्नुहोस्।
- स्याउ टिपिसकेपछि पनि बोटमा कत्ले कीराको प्रकोप रहिरहने हुँदा यसको व्यवस्थापनको लागि खनिज तेल (सर्वो) १० देखी १५ एम.एल. प्रति लिटर पानीमा मिसाई कीरा लागेको स्थानमा भिज्नेगरि सात-सात दिनको अन्तरालमा तीनपटक छर्कनुहोस्।
- चाइपर्को बेलामा आयात हुने खसी, बोका, भेडा, च्याङ्ग्रा घरेलु बथानमा मिसाउनुभन्दा पहिले कम्तीमा सात दिनसम्म अलगै राख्नुहोस्। साथै आफ्ना घरमा पालिएका खसी, बोका, भेडा, च्याङ्ग्राहरुमा पिपिआर/खोरेत विरुद्ध खोप लगाउनुहोस्।
- भर्खर जन्मेका बाच्छा-बाच्छीहरुमा पिंक आई संक्रमणका लागि अनुकुल वातावरण भएकोले यो रोग देखापरेमा १% बोरिक एसिडको झोल बनाई तीन-तीन घण्टाको फरकमा आँखा सफा गरिदिनुहोस्।
- बाच्छाको मोओला लागेमा ५% पोभीडन आयोडिन वा १% कपर सल्फेट वा २% बोरिक एसिडको झोल वा १% पोटासको घोलले मुख सफा गर्नुहोस्।
- तापक्रम बदलाबाट माछालाई हुनसक्ने तनाव कम गर्न विहान ४-६ बजेसम्म ०.७५ के.भि.ए. क्षमताको वायुयन्त्र प्रति हेक्टर जलाशयमा प्रयोग गर्नुहोस् साथै दैनिक दिने दानामा दिन बिराई भिटामीन सी ०.५ ग्राम प्रति के.जी. दरले थप गरि दिनुहोस्।
- मध्यपहाड र तराईमा हिउँदे घाँसहरु- बर्सिम (मेस्कावी, बरदान, गिजी, बि.एल २२, यु.पी.बी. १०३ आदि जातहरु), जै, भेच, केराउ, टियोसेन्टी (मकै चरी), बाजरा आदि लगाउन शुरु गर्नुहोस्।
- कृषि र पशु सम्बन्धी जिज्ञासाको लागि पैसा नलाग्ने नार्कको फोन नम्बर-११३५ मा हरेक सोमबार दिउसो २ देखि ४ बजे सम्म फोन गर्नुहोस्।
- कृषि-मौसम सल्लाह बुलेटिन नेपाल टेलिभिजनको NTV NEWS Channel बाट प्रत्येक शनिबार बेलुका ८ बजेको समाचार पछि प्रसारण हुने गर्दछ। यसको पुनः प्रसारण आईतबार बिहान ७ बजेको समाचारपछि पनि हेर्न सकिन्छ।

Agromet Advisory Bulletin for Dhaka District

Agro-Meteorological Information Systems Development Project
Component-C of BWCSRP
Department of Agricultural Extension

Date: 13rd September 2020 **Bulletin No. 180**	**Agromet Advisory Bulletin for Dhaka District (13th September to 17th September 2020)**

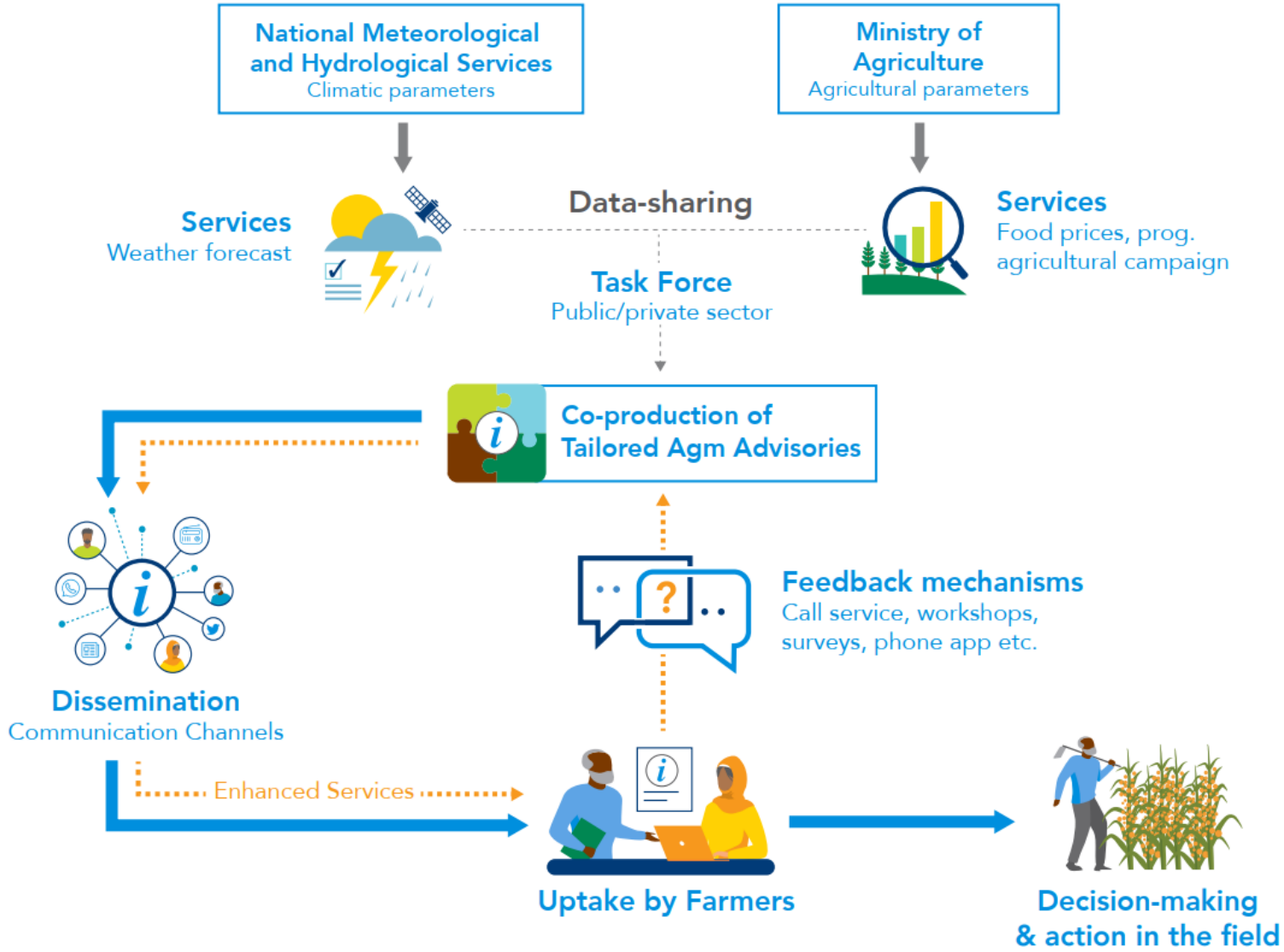
Weather Conditions for last four days (09th September to 12th September 2020)

Weather Parameters	09.09.20	10.09.20	11.09.20	12.09.20	Range
Rainfall (mm)	16.0	2.0	8.0	0.0	0.0-16.0 (26.0)
Maximum Temperature (° C)	34.1	31.5	32.8	34.4	31.5-34.4
Minimum Temperature (° C)	27.2	26.8	26.5	26.5	26.5-27.2
Relative Humidity (%)	62.0-97.0	77.0-93.0	69.0-96.0	62.0-90.0	62-97
Wind Speed (km/h)	1.9	1.9	3.7	1.9	1.85-3.7
Cloud Amount (Okta)	8	7	6	7	6-8
Wind Direction	South/South-westerly	South/South-westerly	South/South-westerly	South/South-westerly	South/South-westerly

Weather forecast as per Bangladesh Meteorological Department for the next 5 days (13th September to 17th September 2020)

Weather Parameters	Range
Rainfall (mm)	0.0-11.3 (23.9)
Maximum Temperature (° C)	32.2-33.3
Minimum Temperature (° C)	25.4-26.2
Relative Humidity (%)	79.0-92.0
Wind Speed (Km/h)	2.5-3.8
Cloud status	Partly Cloudy Sky
Wind Direction	South/South-westerly

Effective agromet service value chain for farmers and agricultural end-users



Lessons and recommendations (selected) -1

- More financial and technical resources are needed
  - To address insufficient network of weather stations,
  - more observation of agrometeorological variables, and
  - to improve weather/climate forecasts (appropriate temporal and spatial scales, essential weather variables, enough accuracy)

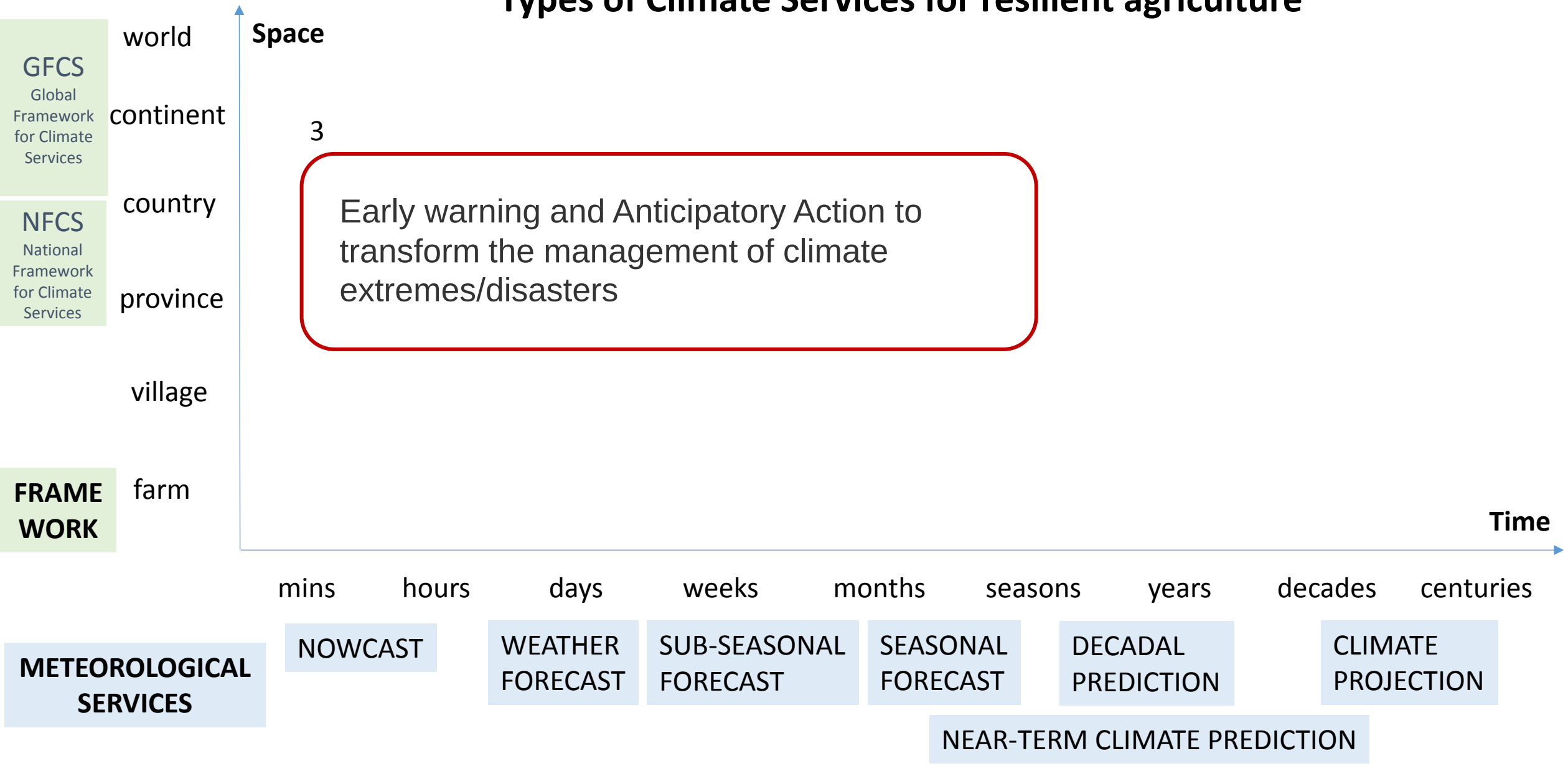
- Tailored information products need to be identified, developed and validated
  - Strengthen collaboration between the government entities of agriculture and meteorology
  - Establish Inter-disciplinary technical working group which will co-produce agrometeorological information and advisories

Lessons and recommendations (selected) - 2

- More attention to “last mile” requires
  - participatory approach,
  - effective feedback mechanism,
  - enhanced use of ICT,
  - engagement of private sector, and
  - training on the ground (extensions, farmer field school)

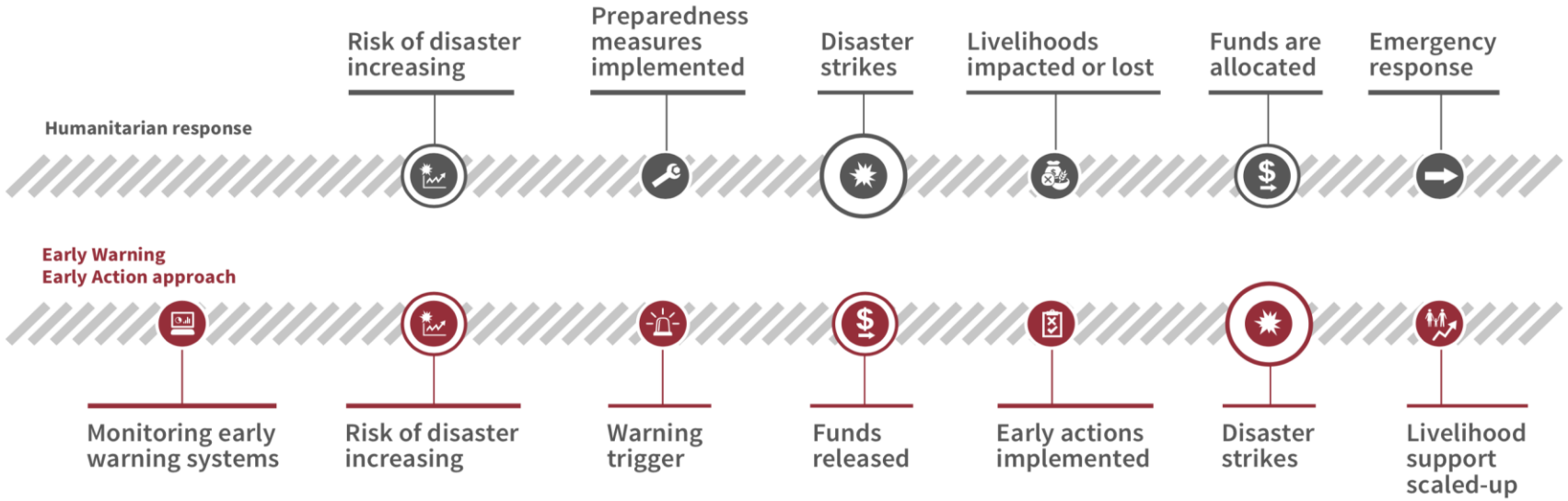
- Monitoring and evaluation
  - cost-benefit analysis
  - for future investments

Types of Climate Services for resilient agriculture



3. Early warning and Anticipatory Action to transform the management of climate extremes/disasters

- A wide range of time scales from seasons to minutes depending on climatic hazard, and assists government and other actors with anticipatory actions.
- Ahead of extreme weather events (e.g. drought, flood, typhoon) and other disasters (pest and disease)
- Monitoring and prioritize risks, based on agreed indicators, and trigger early/anticipatory actions; Impact-based forecasting
- Beyond agriculture – disaster authorities, and humanitarian actors; Use of global and regional and transboundary data/information sharing to strengthen forecast and early warning (e.g. desert locusts, transboundary water)



Key elements of EWEA

- Risk prioritization based on VRA, key livelihoods, vulnerable groups
- Pre-defined and agreed indicators and thresholds
- Early Action Plan with pre-defined funds and institutional roles
- EW trigger release of funds and EA implementation before disaster strike

80% probability of below normal rainfall and drought conditions in the next 3 months

150% increase in the number of dry days and verifiable signs of crop and livestock water stress

150% increase in the number of days with low soil moisture levels (compared to long term average) and higher evapotranspiration rates

Farms plant early of tolerant crop varieties

Livestock protection measures

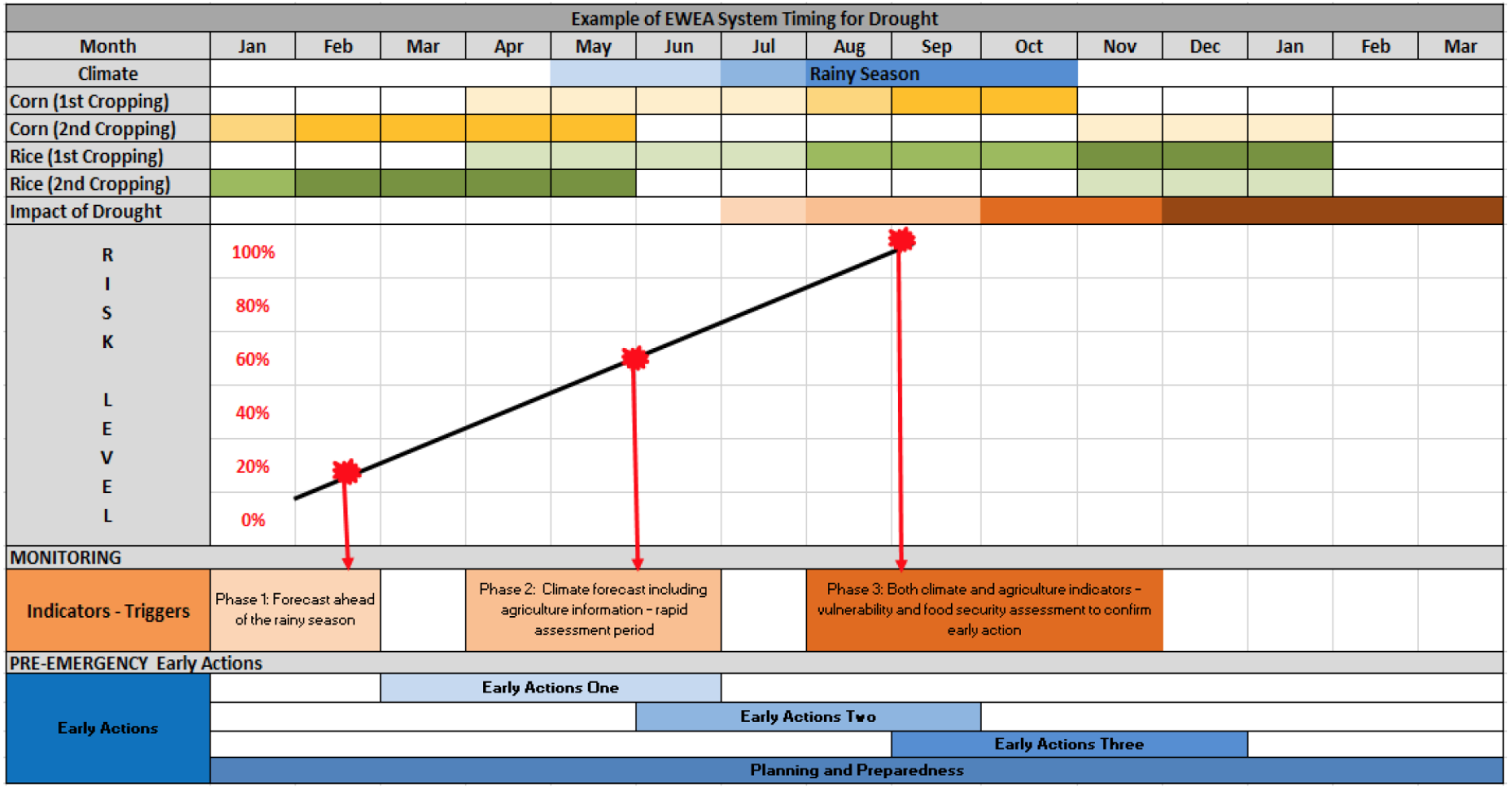
Review/update irrigation water schedule

Distribution of water pumps to highly vulnerable farms

Prepare for possible rapid disaster impact assessments

Additional agriculture and livestock inputs

Example: Monitoring drought risk and Early Action Planning in Mindanao, Philippines



Evidence, cost-benefit analysis helps scaling up anticipatory/early action

WHAT DO FARMERS THINK OF EWEA?

"With the help provided by FAO, I was able to save my weak animals. They are key to the money and milk available for the three generations of our family - my mother. myself and my daughter. We had milk and yogurt earlier in the year than expected. This particularly important for my elderly mother "
- Chimeddavaa Lodon

Madagascar: 2.5

Philippines: 2.5

Mongolia: For every USD 1 spent on early actions, households had a return of USD 7.1

Upcoming

- Asia-Pacific national agromet services report
- Climate services in agriculture report (with focus on last-mile)
- Asia-Pacific agriculture climate services week, 2nd half of 2021

Thank you

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