Contingency Plan for Agriculture in Khowai District

1. Introduction

Khowai district, located in Tripura, falls under the Humid Eastern Himalayan Region and experiences a hypothermic climate with high rainfall. The district is characterized by diverse soil types, including lateritic red soils, sandy loam, and alluvial soil. Agriculture in the region is prone to several climatic risks, such as drought, floods, cyclones, and pest outbreaks. This contingency plan has been developed to mitigate the adverse effects of such climatic challenges and ensure sustainable agricultural production. The plan focuses on preparedness, response, and recovery strategies for farmers and stakeholders.

2. Climate and Agricultural Profile

Khowai district receives an annual rainfall of approximately 2191.5 mm, making it a region with significant water availability. The major crops grown in the district include rice, maize, mustard, groundnut, pulses, and a variety of vegetables. Additionally, the region cultivates important horticultural crops such as pineapple, mango, banana, and jackfruit, along with plantation crops like arecanut and coconut. The cropping intensity in the district stands at 168%, and irrigation covers around 9.71 thousand hectares, with a net irrigated area of 6.287 thousand hectares. Despite this, a large portion of the cultivated land remains rainfed, making it vulnerable to climatic variations.

3. Risk and Vulnerability Analysis

The district faces moderate risks of drought, particularly during delayed monsoons. Flooding is another major challenge, especially in areas with poor drainage systems. While cyclones occasionally affect the region, their impact is not as severe as in coastal areas. Pest and disease outbreaks pose a significant threat to crops, with common issues including late blight in potatoes, root rot in vegetables, brinjal fruit and shoot borer, and fruit fly infestation in cucurbits. The impact of these challenges can be minimized through timely interventions and preventive measures.

4. Contingency Measures

4.1 Drought Management

Drought conditions can severely affect crop production, particularly during delayed or deficient monsoons. To mitigate the impact of drought, short-duration and drought-resistant crop varieties should be introduced. For example, drought-tolerant rice varieties such as Gomati and hybrid maize varieties can be promoted. Conservation agriculture practices, including mulching, zero tillage, and rainwater harvesting, should be encouraged. Farmers should also be trained to adopt contour planting techniques and agroforestry models to reduce soil erosion and enhance moisture retention.

During the kharif season, a shift to early-maturing paddy varieties and drought-tolerant pulses like black gram, pea, and lentil can help sustain production. The System of Rice Intensification (SRI) and alternate wetting and drying irrigation methods should be promoted to optimize water use efficiency. Establishing community nurseries can help ensure timely transplantation of seedlings.

In the rabi season, promoting drought-tolerant crops such as mustard, lentil, and groundnut can be beneficial. Zero tillage and conservation farming should be adopted to utilize residual soil moisture effectively. Farmers should also be encouraged to grow fodder crops to ensure adequate livestock feed during dry periods.

4.2 Flood Management

Flooding, caused by excessive rainfall and poor drainage, is another challenge that affects agriculture in Khowai district. To manage flood risks, proper drainage systems should be developed to prevent waterlogging. Farmers should be encouraged to cultivate flood-resistant rice varieties like Swarna Sub-1, which can survive prolonged submergence. Raised-bed planting techniques should be used for vegetable and pulse cultivation to prevent crop loss due to standing water. Strengthening embankments and constructing bunds around fields can also help mitigate flood damage.

In the aftermath of floods, establishing seed banks can ensure a quick recovery by providing farmers with seeds for replanting. Post-flood soil treatments, such as the application of gypsum and organic amendments, can help restore soil fertility and productivity.

4.3 Cyclone and Extreme Weather Preparedness

Although cyclones are not frequent in Khowai district, their occurrence can cause severe damage to standing crops. Establishing windbreaks and shelterbelts with fast-growing trees can help protect crops from strong winds. Strengthening greenhouse and polyhouse structures can provide additional protection for vegetable cultivation. Staking and mulching techniques should be encouraged to prevent crop lodging during high winds. Farmers should also be trained to use early warning systems and advisories to prepare for extreme weather conditions.

4.4 Pest and Disease Control

Pest and disease outbreaks can significantly reduce crop yields and farmer incomes. To address these challenges, integrated pest management (IPM) strategies should be implemented. The use of neem-based biopesticides, pheromone traps, and bio-control agents should be promoted as environmentally friendly alternatives to chemical pesticides. Crop rotation and the adoption of pest-resistant varieties can also help minimize pest infestation. Regular pest and disease surveillance should be conducted to provide timely advisory services to farmers.

5. Livestock and Fisheries Contingency Plan

In addition to crop-based interventions, it is crucial to ensure the well-being of livestock and fisheries, which form an integral part of rural livelihoods in Khowai district.

- **Livestock Management:**
  - Adequate fodder storage should be ensured through silage and hay-making techniques.
  - Rainwater harvesting structures should be developed to provide drinking water for animals during dry spells.
  - Regular vaccination and deworming campaigns should be conducted to prevent disease outbreaks.
- **Poultry Management:**
  - Stocking of poultry feed should be done in advance to mitigate shortages during adverse weather conditions.
  - Proper shelter should be provided to protect poultry from extreme weather events.
- **Fisheries Management:**
  - Ponds should be desilted and renovated to improve water retention capacity.
  - Water quality should be monitored and appropriate measures such as liming and aeration should be implemented.
  - Fish should be harvested before extreme weather events to minimize losses.

6. Institutional Support and Implementation Strategy

For effective implementation of the contingency plan, various institutions and stakeholders must work collaboratively. The **Krishi Vigyan Kendra (KVK), Khowai**, will play a pivotal role in capacity building, training, and technology dissemination among farmers. Research institutions such as **ICAR and the State Agricultural Department** will provide technical support and policy guidance. Government schemes such as **MGNREGA, RKVY, NFSM, and IWMP** can be leveraged to build infrastructure and support farmers in adopting climate-resilient practices. Farmer groups and cooperatives should also be actively engaged in community-led risk management and resource-sharing initiatives.

7. Monitoring and Evaluation

To ensure the effectiveness of the contingency plan, a robust monitoring and evaluation framework should be established. Regular climate risk assessments should be conducted, and early warning systems should be strengthened. Community-based participatory planning should be encouraged to incorporate farmer feedback and local knowledge. Annual reviews of the contingency plan should be carried out to update strategies based on emerging risks and climatic trends.

Contingency planning for 2024

a. Crop based Contingency planning

Contingency (Drought/ Flood/ Cyclone/ Any other please specify)	Proposed Measure	Proposed Area (In ha.) to be covered	Number of beneficiaries proposed to be covered		
			General	SC/ST	Total
Drought	Introduction of Drought Tolerant Paddy Variety. Tripura Hakuchuk-2,Tripura-Nirog	5	0	70	70
	Introduction of Mulching in Bitter Gourd with Paddy Straw	5	0	50	50
		10		120	120

a. Livestock based Contingency planning

Contingency (Drought/ Flood/ Cyclone/ Any other please specify)	Number of birds/ animals to be distributed	No. of programmes to be undertaken	No. of camps to be organized	Proposed number of animals/ birds to be covered through camps	Number of beneficiaries proposed to be covered		
					General	SC/ST	Total
Flood	200	2	1	100	10	10	20