76. Scale to Measure Management of Climate Induced Crisis of Fishery-based Farmers

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Operational definitions of the concepts related to crisis management

- **Climate change:** Climate change is operationally defined as a change in climatic parameters over time as perceived by farmers' it may be due to a natural variability or as a result of human activity.
- **Crisis:** Crisis is operationally defined as a situation of concentrated period of disturbance caused by the climatic factors affecting the farm yields and farmers income.
- **Climate-induced Crisis Management:** Climate induced Crisis Management is operationally defined as an ability of farmers to manage/overcome/resolve the Climate induced Crisis, which is assessed by the decision making ability, adaptability and economic performance of farmers.
- **Decision-making ability:** Decision making ability is operationally defined as an ability of farmers to select appropriate production alternatives and plan of action by systematic approach for achieving maximum returns in a given farming situation.
- **Adaptability:** Adaptability is operationally defined as behavioural actions (survival strategies) undertaken by the farmers to face the prevailing crisis and also anticipated future crisis. These behavioural actions are confined to crop management, horticulture, soil and water conservation, irrigation, fishery, livestock, land use, flood, labour, finance and family management.
- **Economic performance:** Economic performance is operationally defined as performance or management of the farm by taking important major and subsidiary enterprises to get maximum profit. It will be analysed on three indicators namely: Crop Yield Index, B:C ratio, Net income.

Value of Reliability: 0.91

1. Decision Making of Farmers to Overcome / Management of Climate Induced Crisis

Statements

1. Decision on selection of new crop/variety
2. Decision on selection of crops based on analysis of cost and returns
3. Decision on selection of crops based on drought tolerance
4. Decision on selection of crops based on flood incidence
5. Decision on selection of the crops based on the water availability
6. Decision on selection of crops based on market demand
7. Decision on selection of crops based on forecasting of weather uncertainties
8. Decision on development of contingency crops plan during the uncertainty
9. Decision on value addition to improve the profit

2. Adaptation Pattern of Farmers to Overcome/ Management of Climate Induced Crisis

2.1 Adaptation patterns related to agricultural crops production

Statements

1. Selection of appropriate crop/varieties
2. Adoption of inter cropping system during uncertainty
3. Use of short duration varieties
4. Alteration in sowing dates
5. Applying balanced chemical fertilizer to rainfed crops
6. Increasing area under cash crops under assured irrigation/ water supply
7. Intensified the Rabi crop cultivation during Kharif crop failure.
8. Adopting IPM methods for pest management
9. Reducing plant population during stress season

2.2 Adaptation patterns related to horticultural crops cultivation

Statements

1. Watering of horticulture crops during water scarcity
2. Planting a portion of rainfed land with horticultural crops
3. Raising of few fruit plants to earn an additional income during drought years
4. Adoption of agro-horticulture and agro-forestry
5. Value addition to horticultural crops to ensure higher income

2.3 Adaptation patterns related to soil and water conservation for field crops

Statements

1. Construction of bunds to conserve moisture
2. Stabilization of the bund by planting grasses/ tree sp.
3. Construction of water ways along the slope for safe disposal of rain water
4. Gully plugging to avoid soil loss
5. Adoption of drip or sprinkler to increase water-use efficiency
6. Leveling of the land in between the bunds
7. Construction of farm pond to store rain water
8. Ploughing and sowing across the slope
9. Adopting ridges and furrows for crop cultivation
10. Adoption of soil mulching
11. Adoption of contour farming
12. Planting cover crops
13. Adoption of crop rotation
14. Adoption of intercropping
15. Application of farm yard manure

2.4 Adaptation patterns related to irrigation/ water management

Statements

1. Adoption of drip irrigation

2. Storing of water in ponds
3. Increasing organic matter in soil to enhance water holding capacity of soil
4. Irrigation in alternative rows
5. Adopting water saving cultivation methods such as System of Rice Intensification (SRI)/ aerobic
6. Protective irrigation during critical stages

2.5 Adaptation patterns related to subsidiary farm enterprises

2.5.1 Fishery

Statements

1. Adoption of fish farming in addition to field crops
2. Adoption of fish farming to meet emergency financial need
3. Adoption of fishery to meet livelihood
4. Starting fishery to utilize time during off season

2.5.2 Adaptation pattern related to livestock management

Statements

1. Supplementary feed to livestock
2. Increasing number of small animals (sheep, goat) and decreased the number of big animals (buffalos and cows)
3. Start rearing sheep/goats to meet emergency financial need
4. Owning of multi specific holding of livestock (cows+ buffalos+ goats+ sheep)
5. Planting improved grass slips
6. Grown fodder crop in a small portion of irrigated area
7. Preservation of fodder

2.6 Adaptation patterns with respect to land use

Statements

1. Brining more dry land under cultivation to increase total yield even when rainfall is scarce
2. Intensified the agricultural activities on irrigated land
3. Use of organic sources of nutrients, avoiding use of chemical pesticides
4. Zero tillage, crop rotation to increase the yield
5. Site-specific demand-driven and balanced use of nutrients

2.7 Adaptation strategies with respect to labour use

Statements

1. Reducing the number of labourers employed on farm
2. Increase the number of family labourers to avoid waged labourers
3. Adoption of labour saving implements for cultivation
4. Diversification of labour use from crop to livestock
5. Developing wastelands through water and nutrient management for forestry, agro-forestry, grassland and crop production

2.8 Adaptation patterns related to flood management

Statements

1. Construction of Stone breakwater
2. Use of sandbags proving to avoid flood effect
3. Use of indigenous options such as walls of wood, stone or coconut leaf and afforestation to overcome flood effects

4. Use of hazard insurance
5. Practicing new agricultural practices by growing salt-resistant crops
6. Establishing improved drainage facilities
7. Use of desalination systems in the land
8. Use of Wetland restoration practices

2.9 Adaptation patterns related to family management

Statements

1. Reducing expenditure for social functions and festivals
2. Reducing spending on costly food items
3. Barrowing food grains from relatives
4. Selling jewellary during the distress year

2.10 Adaptation patterns related to sea fish farming

Statements

1. Purchasing larger, more sophisticated vessels with multi-fisheries capabilities to travel farther to catch sea fish
2. Maintaining multiple licenses or permits to allow shifting from one target species to another
3. Development of flexible fish product processing capacity for utilizing emergent resources
4. Diversifying income into non-fishing activities, which may include aquaculture and tourism
5. Risk management through insurance
6. Improving operational efficiencies, such as fuel efficiency and improved product handling, storage and preservation

2.11 Adaptation patterns related to financial management

Statements

1. Borrowing loan from commercial bank/ primary land development bank (PLDB) for land development
2. Borrowing crop loan in credit cooperative societies/ commercial bank
3. Insuring crops of rainfed and irrigated land
4. Starting to save money during normal year for using during drought year
5. Borrowing loan from SHG's

3. Economic Performance of Farmers to Overcome/ Management of Climate Induced Crisis

Components/Indicators

1. Crop yield index of the farm
2. Cropping intensity
3. Net income