

Drought proofing

Drought Proofing

- “What is Drought Proofing?” and “What is our definition of drought proofing?”
- Drought proofing has various parameters.
 - Sustaining family economy through droughts is the aspect of economic vulnerability.
 - Sustaining village drinking water need is not directly linked with economic vulnerability but has a large impact on the economy of the household as most of the time, especially of women, spent on collecting drinking water for the family.
 - Social vulnerability parameters such as health, education, gender etc. should also be considered.

Effect of drought

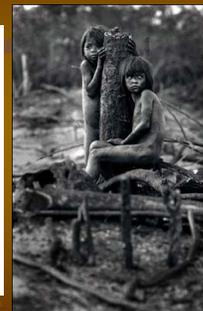
Droughts are triggered by lack of rainfall. They affect people in many ways

- loss of home-produced food grain,
- loss of employment,
- difficulty in getting water for daily domestic needs and for agriculture,
- lack of fodder for livestock,
- Change in level of agricultural output,
- availability of fodder

Types of droughts

•Socioeconomic Drought

- *Agricultural:* When crops are affected due to moisture stress and lack of rainfall.
- *Meteorological:* When there is more than 25 per cent decrease (from normal) in rainfall in any area.
- *Hydrological:* When recurring meteorological droughts result in decrease in surface water and groundwater levels.



Types of water scarcity and underlying causes.

	Dry-Spell	Drought
Meteorological	<p>Occurrence: [2/3 years] Two out of three years</p> <p>Impact: Yield reduction</p> <p>Cause: Rainfall deficit of 2 – 5 week periods during crop growth</p> <p>Resilience options: Build Ecological and social resilience - water harvesting</p>	<p>Occurrence: [1/10 years] One year out of ten</p> <p>Impact: Complete crop failure</p> <p>Cause: Seasonal rainfall below minimum seasonal plant water requirement</p> <p>Resilience options: Resilience Parachutes - Relief food, virtual water imports, cereal banks</p>

	Dry-Spell	Drought
Agricultural	<p>Occurrence: [>2/3 years] > two out of three years</p> <p>Impact: Yield reduction/complete crop failure</p> <p>Cause: Poor rainfall partitioning leads to low plant water availability Poor plant water uptake capacity</p> <p>Resilience options: Build Ecological and social resilience - soil and water conservation - crop management</p>	<p>Occurrence: [>1/10 years] > one out of ten years</p> <p>Impact: Complete crop failure</p> <p>Cause: Poor rainfall partitioning leads to seasonal soil moisture deficit to produce harvest</p> <p>Resilience options: Build Ecological and social resilience; Resilience parachutes - water harvesting - soil and crop management</p>

Impact of Rainfall Variation - Dryland Agriculture

First shower	1.5 to 2.0 inch of rainfall	Sowing can be done
Second shower	1.5 to 2.0 inch of rainfall	15 to 20 days after the first shower
Third shower	1.5 to 2.0 inch of rainfall	15 to 20 days after the second shower
Fourth shower	1.5 to 2.0 inch of rainfall	15 to 20 days after the third shower
Fifth shower	1.5 to 2.0 inch of rainfall	15 to 20 days after the fourth shower

- If it rains exactly as expressed above, then 16 *annas* (in vernacular language) means 100% dryland production takes place.
- If four showers fall, then 12 *annas* means 75% dryland production takes place.
- If only three showers falls then the production must be 8 *annas* means 50% dryland production takes place.
- If the rainfall is less than this then the crop fails.

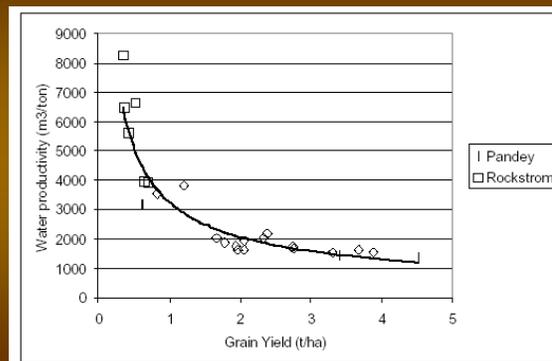
Impact of Rainfall Variation – Canal Irrigation

- The amount of water coming into the dam is dependent on the rainfall especially in its intensity that actually generates the runoff that fills dam.
- It has been assumed that,
 - If the dam fills then 100% crop productivity takes place under canal irrigation.
 - If dam fills up to 75% of its capacity then 75% crop productivity takes place under canal irrigation.
 - If dam fills up to 50% of its capacity then 50% crop productivity takes place under canal irrigation.
 - If dam fills less than 50% then we considered that the crop has not taken. In such conditions dam water has been kept reserved for future need.

Impact of Rainfall Variation – Animal Husbandry

- Animal husbandry is directly dependent on grassland.
- Grasses have different kinds of rainfall requirements as compared with dryland crops.
- Dryland crops require well distributed rainfall through out the season where as grasses requires the same amount of rainfall but have no problem with distribution of rainfall.
 - If three rain showers of 2.5 to 4 inches occur at any intervals in the rainy season, then 100% (means grass availability is throughout the year) grassland productivity takes place.
 - If two rain showers of 2.5 to 4 inches occur at any intervals in the rainy season, then 75% grassland productivity takes place.
 - If only one rain shower of 2.5 to 4 inches occurs at any intervals in the rainy season, then 50% grassland productivity takes place.
 - If a shower is not any of the above kind, then the grassland productivity fails.

Yield versus water requirement



Coping Strategies

■ Migration

The most common form of migration was when one male member of the family migrated or commuted to the nearby city, where he would undertake one of a range of activities. Migrants would be employed in shops and restaurants, or would work as casual labourers. In Baasri

Coping Strategies

■ Credit

Resorting to credit is known to be one of the most common ways of tiding over shortages that occur in times of drought

Main Reasons for Borrowing

- Of the 247 families that did borrow,
 - 123 borrowed to meet their food consumption needs
 - 81 mainly for agricultural operations
 - 46 to buy fodder
 - 42 to meet medical expenses
 - 30 to meet marriage expenses
 - 18 to meet other consumption needs
 - 1 to migrate

Coping Strategies

■ Hunger

When food was short in the house:

- 105 homes reported eating less than usual.
- 85 reported borrowing money, buying food on credit.
- 18 sought the help of their neighbours and relatives.
- 13 resorted to changing their food basket.

People try to preserve their holdings of key productive assets rather than protect a certain standard of consumption

Vulnerable Groups

- Small and marginal farmers
- Land less
- Poorest of poor

Strategies

■ Drought Mitigation

- Government policies for drought mitigation can be viewed as its short-term response to drought.
- Drought proofing
 - There has been a gradual shift away from mitigation measures to the more "permanent" proofing measures

Strategies

- Prevention
- Drought proofing policies can be of two kinds: those aimed at drought *prevention*, i.e. countering the trigger event, and those aimed at reducing the *impact* of drought on people.
 - Examples of the former include attempts to predict the extent of rainfall or devise early warning systems, and extend to reforestation programmes (based on the assumption that the failure of rain is related to environmental degradation).

Strategies

- Proofing
- Within the second category of responses, i.e. those aimed at reducing the impact of drought, policies tended to various programmes such as the Drought Prone Areas Programme
- Drought-resistant varieties of seeds, varieties with short stalks, short ripening period,
- Watershed programmes and creation of water harvesting structures
- diversity in people's livelihood strategies and the need to focus on them.

Average family of 6 persons require about 3300 per month i.e Rs 39000 per year.

Vulnerability Classes

- If family earns this much of amount or has in kind, Rs. 39,000/- per year as discussed earlier we call it a non-vulnerable family.
- If it earns between Rs. 26,000/- to Rs. 39,000/- per year we call it as a moderately vulnerable family.
- If it earns between Rs. 13,000/- to Rs. 26,000/- per year we call it as a vulnerable family.
- If earning is less than Rs. 13,000/- we call it as an extremely vulnerable family.

Major reasons for Vulnerability

- Much of the vulnerability of the population to drought can be traced to its sole or primary reliance on subsistence agriculture.
- Consequently, most of our efforts for drought proofing have concentrated on reducing this vulnerability, which is triggered by an unpredictable monsoon, and is exacerbated by social and economic factors.
- What has been ignored is the equally important need for further diversification of livelihood strategies, especially a move away from sole or primary reliance on subsistence agriculture.

Diversification of livelihoods

- If share of income from other sources (within a household and across households) can be raised and made more predictable, the objective of drought proofing would have been achieved. This may be easier
 - Live stock
 - Poultry
 - Embroidery
 - Non farm activities

Economics of Natural Resource based Activities in Good Year

Livelihood Type	Unit	In general condition		
		Gross Profit in Rs.	Expenditure in Rs.	Net Profit in Rs.
Dryland Agriculture	1 Acre	1950	450	1500
Canal Irrigation	1 Acre	4050	1000	3050
Buffalo	1 no	7150	3575	3575
Cow	1 no	2375	1187.5	1187.5
Sheep and Goat	1 no	150	0	150

Monetary equivalents of Natural Resource Based Activities

- 1 Buffalo
- = 3 Cow
- = 24 Sheep\Goat
- = 2.38 Acre Dryland Agriculture
- = 1.17 Acre Canal Irrigation

Economics of Non-Natural Resource based Activities

- For agriculture and un-skilled casual labor
 $2 \text{ seasons} \times 2 \text{ months each} @ 75\% \text{ efficiency} = 90 \text{ days} \times \text{Rs. } 50/-$
 $\text{per day} = \text{Rs. } 4500/- \text{ per year}$
- For activities like handicraft
 $\text{Rs. } 20/- \text{ per day} \times 20 \text{ days a month} \times 12 \text{ months} = \text{Rs. } 4800/-$
 $\text{per year say Rs. } 5000/- \text{ per year}$
- For skilled labour
 $\text{Rs. } 150/- \text{ per day} \times 25 \text{ days a month} \times 3 \text{ months} = \text{Rs. } 11,250/-$
 per year

Application of Household Vulnerability Analysis for Drought Proofing

- To identify most vulnerable family due to drought.
- To identify the reasons for this.
- To know how does NRM programmes effects the vulnerable families.
- To identify those families who will remain vulnerable even though NRM programmes.
- Planning can be done with these families.

AGRICULTURAL DROUGHT MITIGATION STRATEGY

- **Long-Term Strategy**
- **Short-Term Strategy**
- **Empowering Communities for Sustainable Livelihoods**

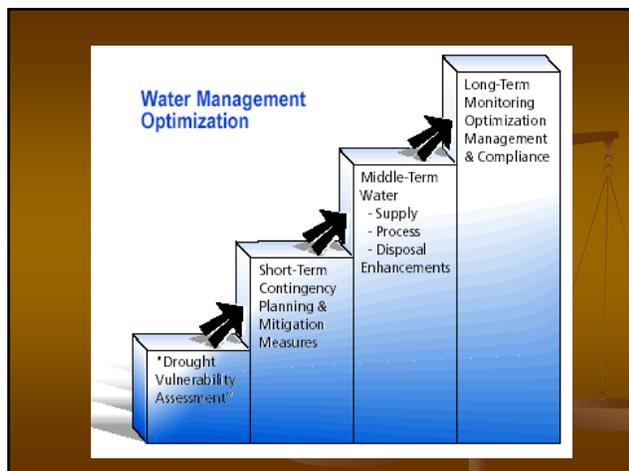
Long term strategies

- Formation of women's groups and their capacity building for Low cost use of efficient water systems like sprinklers/drip irrigation systems
- Land development by farm bunding, contour ploughing and other improved soil and water conservation practices.
- Construction of roof top water harvesting structures, anicuts, check dams and other water harvesting structures.
- Rejuvenation of traditional water conservation practices
- Increase of Dairy cooperatives for value addition and marketing of milk products for increased farm income
- Animal husbandry management and disease coping strategies of milch cattle for better yields

- Facilitate the reduction of the dependence of women on agriculture by the Development of wool, stone and other rural industries for providing other opportunities of livelihood.
- Development of the tourism industry and local crafts in rural areas most affected by drought.
- Promotion of non-farm activities like sericulture, mushroom cultivation etc
- Handi crafts and other non farm activities

Short term strategies

- Immediate livelihood opportunities for farm women
- Arrangement of drinking water by repair of handpumps and providing mobile tankers.
- Establishing food grain, fodder and seeds
- Facilitating supply of vaccines/medicines for livestock, mobile vans in distant regions.
- Animal Camps/ 'Goshalas' for abandoned and stray milch cattle and animals
- Access to cooked food as a supplement and providing vitamins for pregnant, lactating and diseased women.



Irrigation to Control Drought in Various Crops

- *Supplemental irrigation*
- **Water harvesting**
- **Diversification of farming**
 - **Spatial diversification of fields**
 - **Crop diversification**
 - **Temporal diversification**
- **Drought Resistance and Crop Yield**

sustainable dry land farming systems

- Improved soil and water conservation practices and the associated tillage systems.
- Weed control
- Soil fertility management.
- Optimized plant population density and spatial arrangement of plants with respect to the expected soil moisture regime.
- Improved forage/livestock/grains integration and rotation.
- Avoidance of mono cropping and the diversification of farming.
- The increase of precipitation by cloud seeding, as an ongoing experiment

Risk management

- The activities fall into three main categories which together make up a comprehensive risk management strategy:
- Identifying risk.
- Reducing risk.
- Transferring or sharing those risks that cannot be eliminated or sufficiently reduced.

End