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Impact of floods on rice based farming in Assam: A Gender Study

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ABSTRACT

The study conducted in Assam under IFAD funded project revealed that the rice growers experienced adverse effects of flood. The production, yield and area under rice decreased leading to reduced food availability. Women played vital role not only in agriculture but also in other allied activities. Any change in rainfall pattern affected farmers of the area. To reduce the vulnerability due to flood adoption of stress tolerant crop varieties, planting of early varieties to avoid crop loss and pest and disease management techniques as an effective technological interventions were suggested. Further, study suggests developing site specific varieties and training programmes on crop production management.

Key words: Impacts, floods, rice, farming and gender

Climate change on long time scale is believed to be the result of natural factors such as changes in parameters of the earth orbit around the sun. There has been widespread apprehension about impact of submergence situations. Farming households are obviously realizing that temperature is rising gradually in recent years; extreme events such as unexpected incidence of flash floods, submergence, drought, incidence of pest and diseases have increased year by year in last decades. However, these extreme events affect crops, livestock and agro forestry and ultimately influence the livelihoods of farming households in stress-prone areas. The effect of climatic variation is more visible in severe stress-prone areas, where farmers are entirely dependent on rains. Flash floods and variable submergence regimes are the major constraints in increasing the productivity of rice cultivated in rainfed situation in Assam. The share of production loss varied from 3.0 per cent in 2005-06 to 49.0 per cent in 2004-05 with an average of 21.0 per cent.

Floods, flash floods, river-bank erosion, and sand casting are the most frequent water- induced hazards affecting these areas of Assam. Sand casting, although not a new phenomenon, has become increasingly devastating, especially on the northern banks of the eastern Brahmaputra valley since the mid 1990s. All of these hazards have affected the livelihood of the communities living in the region significantly posing a severe threat before thousands of farmers resulting in emigration, unemployment and poverty. Both flood and flash flood leave people homeless and displaced, destroy their crops, damage public property, and damage development infrastructure, located in the north-eastern region of India in the eastern Himalayas, almost every year. Collapse of the indigenous adaptation practices or changes therein need to be taken seriously by researchers and planners. It is important to study how people, especially the poor women living with floods in such flood-prone areas and document their speciflc coping and adaptation strategies, both traditional and contemporary. It is also pertinent to examine whether the traditional coping capacities and adaptation strategies are still useful in dealing with the changing nature of the multiple water-induced disasters as well as the social, economic, cultural, and political changes affecting the society as a whole. Present paper is an effort in that direction.

MATERIAL AND METHODS

The study was conducted under IFAD funded AAU and IRRI Collaborative project in two districts *viz*, Sivsagar and Golaghat of Assam. Two villages from each district were selected for the study. A total of 240 respondents (equal number of husbands and wives selected separately from each of the 120 households) were interviewed. The sample households was selected based on proportionate sampling of farming households by farm size. The qualitative and quantitative data were used for the study. The primary data were collected on well structured pre-tested questionnaires through personal interview method. Data were analysed through tabular analysis.

RESULTS AND DISCUSSION

Impact of floods on rice production and livelihoods of the farmers

The major area of the study was rice cultivation carried out mainly during the *kharif* season (Sali) solely dependent on the monsoon rains. Floods during the monsoons affects the rice crop causing significant reduction in the rice productivity (63%) as also slight decrease in the productivity of pulses (8%) and oilseeds (18%). Majority of the population have to depend on crop production (84.0%) even during the flood year. However, people also had to take food from the open market (76.0%). Only 8.0 per cent of the flood affected people depend on food aid from various sources (Fig 2). However, during floods majority of farmers (60.0 %) felt that the quality of food was poor.

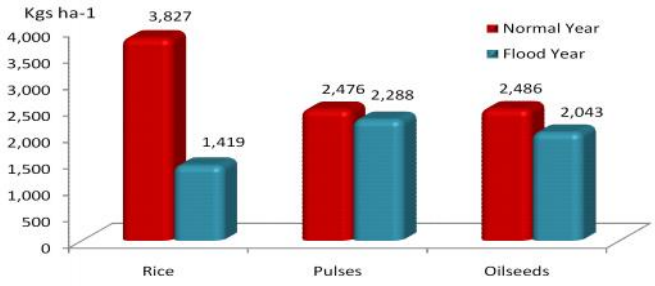

Fig. 1. Average yield of crops during flood

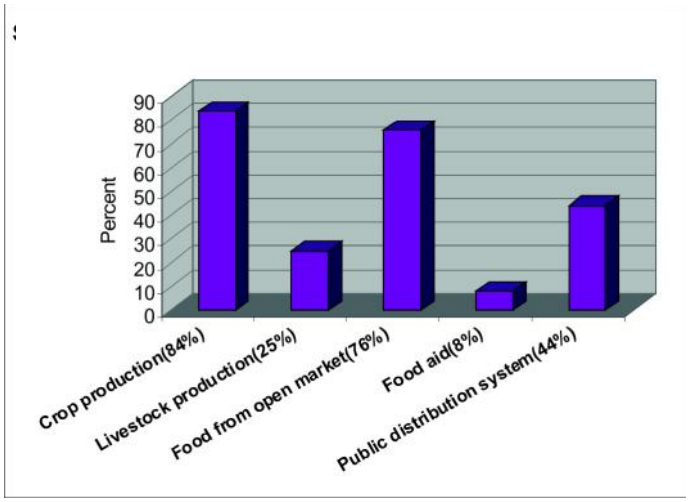

Fig. 2. Food availability by source during flood

Flood affects the rice availability and sufficiency of the population. While, in a normal year it is available for the whole year, it lasts only for 8 months during the flood (Fig 3).

Fifty eight per cent of the population reported that the amount of rice during the flood year was insufficient . Three per cent people felt that the quality of food during floods was very good (Fig. 4). While flood cause some deficiency in food, members of 88.0 per cent of households got sufficient food. No difference in food sufficiency between the two genders was observed. These observations throw light on a very important aspect of the society in the study area. (Fig. 5).

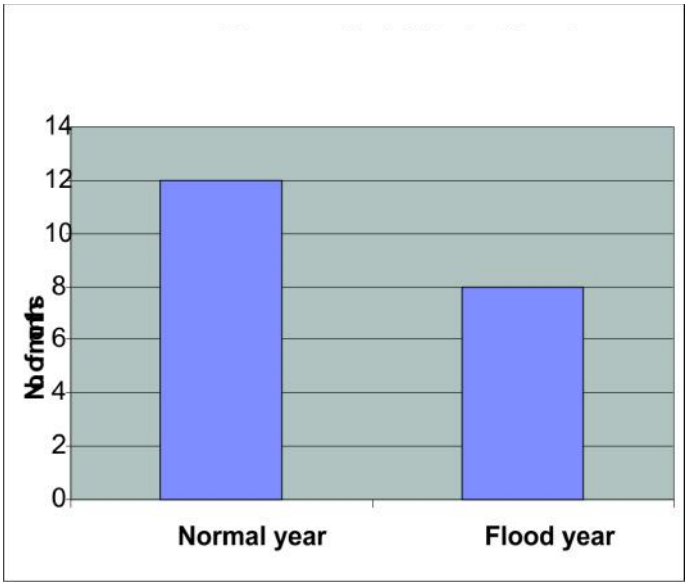

Fig.3. Rice availability

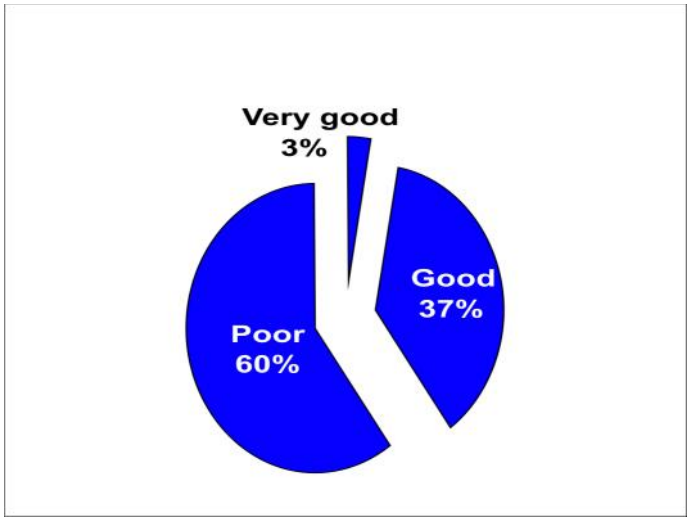

Fig.4. Quality of food during flood

The per capita annual income in the surveyed area was about Rs. 52,797.00. It has been found that there was substantial reduction (31.37%) in annual per capita income

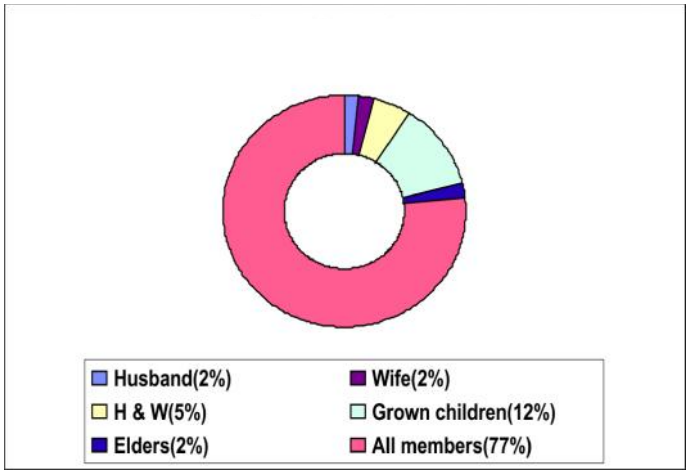

Fig.5. Perceptions regarding food during flood years

of farmers during the flood year. The major sources of annual per capita income are non-farm professions (40%), sales from rice (33.0%) and sales from non-rice crops (12%). In a flood year, there is significant reduction (80.73%) in the income from the sales of rice compared to other two sources. This might be due to the damage/reduction in the rice production due to flooding. However, there is considerable increase in income from vegetable and other *rabi* crops during the flood years. This may be due to more effort in cultivating vegetable and other *rabi* crops during the flood year. The farmers can also raise the *rabi* crop in time due to the damage of *kharif* rice due to flood (Table 1).

Coping mechanism

In stress conditions, 88.0 per cent of the loans were found to be acquired and also repaid by the male counterpart showing their dominance in the society. Females are comparatively much less empowered to deal with the financial matters (Table 2). In spite of significant reduction in rice production during flood years, ironically, 44.0 % respondents opted for no change in farming activities. This may be attributed to their socio-economic and technological unawareness. The major changes perceived beneficial were to cultivate smaller area than usual and grow different kind

Table 1. Change in income due to severe flooding

Source of income	Normal year	Flood year	Per cent change
Sales from rice	18,258	3,518	-80.73
Sales from 2nd important crop	358	108	-69.83
Sales from vegetables	1,673	2,100	25.52
Sales from other crops	4,699	5,654	20.32
Sales from large animals	3,121	1,913	-38.71
Sales from small animals/ poultry	1,539	1,024	-33.46
Fisheries	608	204	-66.45
Wages from off- farm income	1,050	1,008	-4.00
Non- farm	20,246	19,458	-3.89
Remittances	1,083	1,083	0.00
Others	161	161	0.00
Total	52,797	36,232	31.37

of crops and change in cropping pattern. The variety of rice to be grown in the area under flood condition was decided either by the husband alone (38%) or along with the wife (47%). The wife decided independently in only 3 per cent cases. Thus, the male has a major role in decision making (85%). This again reflects poor involvement of females in critical economic situation. Good yield was the deciding factor to choose variety during severe flooding and change in the cropping pattern. Tolerance to stress and recommendation by University experts also significantly influenced their decision (Table 4).

During flooding, 59.0 per cent farmers used stress tolerant varieties, followed by appropriate varieties (58.50%), and adopting pest and diseases management techniques (38.5%) and timely sowing of rice to grow other additional crops (21%) as technical interventions (Table 5). To reduce the vulnerability of severe flooding, the farmers were suggested training on pest management (59%), crop management (51%), water management (36%) and seed

Table 2. Loan acquired during flood

Family member	Acquire (%)			Repay (%)		
	Male (n=22)	Female (=20)	Both sexes (n=42)	Male (n=22)	Female (n=20)	Both sexes (n=42)
Husband	91	86	88	91	86	88
Wife	5	5	5	5	5	5
Both		5	2		5	2
Elders	5	5	5	5	5	5

Table 3. Changes in farming activities during severe flooding

Particular	Response (%)
Change in cropping pattern	11
Shift from crops to livestock	1
Cash crops	8
Diversification	25
Resource conserving crops	2
Grow water-saving crops	1
Cultivate smaller area than usual	18
Fallow	11
No change	44

Table 4. Factors affecting change in the rice varieties and cropping pattern during flood

Factors	Decision making to change	
	Rice variety (%)	Cropping pattern (%)
Good yield	100	87
Tolerance to stress	30	38
Recommended by Dept. of agri.	9	8
Recommended by University	15	21
Recommended by NGO	1	11
Capital	1	12
Availability of water	1	10
Market demand	8	8
Suitability to soil type/ land type	9	1
Availability and access to inputs	1	

Table 5. Technical interventions to reduce the adverse effect of flood

Source	Per cent		
	Male	Female	Both
Use of stress-tolerant crop varieties	60	58	59
Shift to improved cropping system	12	9	10
Appropriate varieties (early/medium/late)	59	58	58.5
Timely sowing of rice to grow other additional crops	9	32	21
New land management techniques	3	4	3
Changes in water-management techniques	3	3	3
Pest and disease management	32	45	38.5
Use of diseases resistant varieties	5	6	5
New livestock breeds	2	3	3
Animal health management	6	7	6

health (34%). The crop production training was needed by 75 per cent of male, whereas, 61 per cent of female were interested to have training on pest management (Table 6).

Table 6. Training as an intervention to cope up the floods

Source	Percent (%)		
	Male	Female	Both Sexes
Seed health management	30	38	34
Crop production management	75	28	51
Water management	16	56	36
Crop nutrient management	44	48	46
Pest management (weeds, insects, disease)	58	61	59
Post harvest including storage	20	18	19
Animal management	18	23	21
Other income generation	13	11	12
Others	-	1	1
No response	3		1

CONCLUSION

It can be concluded that the rice growers experienced the adverse effects of flood. The production, yield and area under rice decreased resulting in reduced food availability. Women played an important and vital role not only in agriculture but also in other allied activities. Any change in rainfall pattern affected farmers of the area. To reduce the vulnerability due to flood, adoption of stress tolerant varieties, planting of early varieties and pest and disease management techniques, as an effective technological interventions, was advised. Further, the study suggests developing of site specific varieties and training programmes on crop production management.

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