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RESEARCH ARTICLE

A Study on Technological Mitigation Strategies of Farmers to Overcome Drought Situations in Namakkal District

P. Sanjeevi, K. Mahandrakumar

Department of Agricultural Extension and Rural Sociology, Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai, Tamil Nadu, India

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ABSTRACT

A drought is an extended period where water availability falls below the statistical requirements for a region. Monsoon failure is experienced in many parts of the country almost every year. The study was conducted in Namakkal district of Tamil Nadu state, with the objective to identify and document the technological mitigation strategies that are currently adopted by farmers in the study area to overcome the adverse effects of drought. Simple random sampling method was used in the selection of 100 farmers; each 50 belongs to annual and seasonal crops, respectively. Considering various technological mitigation practices, the awareness, acceptance, and adoption level of farmers were collected and the data were analyzed using percentage analysis. The findings revealed that more than 75.00% of the respondents were aware of most of the technological mitigation strategies. When it comes to the acceptance level of technological mitigation strategies, a gap between awareness and acceptance was found. Nearly 50.00–60.00% of respondents who were aware of the technologies such as drip/sprinkler method of irrigation, mulching, selection of drought-tolerant varieties, and application of antitranspirant chemicals sprays but not adopted them. The technological mitigation strategies promoted by the extension agents were adopted by half of the realized farmers. As most of them are taking benefits of these programs.

Key words: Awareness, acceptance, adoption, drought, technological mitigation strategies

INTRODUCTION

India Meteorological Department[1] reported that approximately 16% of India's geographic area, mostly arid, semi-arid, and subhumid are drought prone. Due to high temporal and spatial variability in rainfall and wide variations in physiographic and climatic conditions in the country, droughts are experienced in varying intensities (moderate or severe) almost every year irrespective of a good monsoon.

Since 2001, the country has experienced six major droughts, in the years of 2002, 2004, 2009, 2012, 2013, and 2016 severely affecting the various sectors and overall economic development of the country, the capacity to cope with the adverse impacts is steadily increasing due to improved technology, irrigation practices, and partly due to diversification of rural economic activities away from pure farm activity. Tamil Nadu was witnessing severe drought, leading to poor agricultural productivity, rural distress, acute shortage of drinking water, and fodder in the past consecutive 5 years and the state government declared the state as drought hit in 2012–2013 and 2016–2017 (State Planning Commission report 2016). In Tamil Nadu, drought was viewed as a long-term development challenges, and hence, efforts were made to tackle the challenges through a multisectoral and multidimensional efforts to overcome. Such efforts are mainly concentrated on the aspects such as access to risk-reducing and productivity-enhancing technologies, diversification of livelihoods, better access to crop insurance, and improved infrastructure for reducing vulnerability of poor due to failure of monsoon. To assess the effect of those efforts,

Address for correspondence:
P. Sanjeevi,
E-mail: sanjeevipalanivel@gmail.com

the present study entitled as an explorative study of mitigation strategies followed by farmers to overcome drought situations in Namakkal district with one of the objectives to identify and document the coping strategies followed by farmers to overcome the adverse effects of drought.

Recent researchers have aimed at documenting the different adaptation or coping strategies followed by farmers to overcome drought situations using some of the technological practices. Bradshaw *et al.*[2] reported that important adaptation options in the agricultural practices include crop diversification, mixed crop, livestock farming systems, using different crop varieties, changing planting and harvesting dates and mixing less productive, drought-resistant varieties, and high-yield water sensitive crops. Saravanakumar *et al.*[3] reported that the coping mechanisms followed by the farmers to minimize the impacts of poor monsoon, the results revealed that reducing cultivated area was the major coping mechanisms and it was followed by 76% of farmers. Second, growing drought-tolerant crops were practiced by 61% of farmers followed by more use of water harvesting techniques (56%), crop diversification and mixed cropping (48%), early/late planting (46%), growing annual crops to perennial crops (45%), and traditional knowledge to pest and disease control for crops (45%). Menghistu *et al.*[4] indicated that the coping strategy followed by the majority of farmers to respond to drought is by storing crop harvest (71.25%), saving money (11.25%), and storing crop residues for livestock (7.5%).

Plate 1: (a-d) Data collection with annual crops and seasonal crops growers

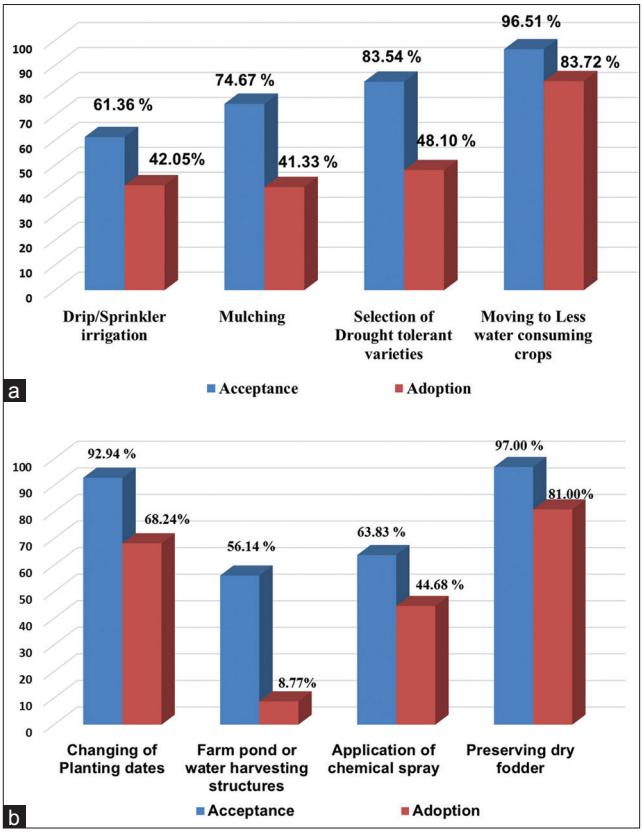

Figure 1: (a and b) Extent of acceptance and adoption of technological mitigation strategies

METHODOLOGY

Namakkal district of Tamil Nadu was purposively selected for this study, as it received normal rainfall only 2 years of the past 5 years (Rainfall data 2017, JDA Office Namakkal). Since this study is focused on coping up strategies being adopted by the different farmers, the experts opined that this study should cover both the seasonal crops and annual crops cultivated in this district. Keeping these in mind, two blocks, namely Kabilarmalai block and Vennandur block, of 15 blocks of Namakkal district were chosen for major area of annual crops (namely, Sugarcane and Tapioca) and seasonal crops (Maize and Groundnut), respectively. Villages were chosen based on major area under cultivation and the respondents were chosen randomly to constitute the sample size of 100 from five villages. Data were collected through semi-structured interview schedule during February–March 2018 [Plate 1].

Drought mitigation strategies mean that the different coping mechanisms that were followed by farmers to reduce the effects of drought in farm level [Figure 1]. Here, in this study, among different mitigation strategies carried out by farmers, the technological mitigation strategies were taken into consideration. The coping mechanism followed by the farmers to mitigate the drought through some proven scientific technologies recommended by the Tamil Nadu Agricultural University and popularized by the State Department of Agriculture and Horticulture is termed as technological mitigation strategies.

RESULTS AND DISCUSSION

The awareness, acceptance, and adoption level of farmers regarding technological mitigation strategies are given in Table 1.

From Table 1, it is observed that more than 75.00% of the respondents were aware of most of the technological mitigation strategies. Such as preserving dry fodder for livestock (100.00%), drip/sprinkler method of irrigation (88.00%), moving to less water consuming crops (86.00%), changing of planting dates (85.00%), selection of drought-tolerant varieties (79.00%), and mulching to reduce moisture loss (75.00%). Nearly half of the respondents were aware of the formation of farm pond or other rainwater harvesting structures (57.00%), and application of antitranspirant chemicals, foliar spray of pink-pigmented facultative methylotrophs (PPFMs), and spraying crop boosters (47.00%) as technological mitigation strategies to overcome drought. And preservation of dry fodder is a traditional mitigation strategy being followed generation after generation. Hence, the awareness level was found to be higher.

Due to intensive extension strategies being promoted through various programs such as National Agricultural Technology Project, National Horticulture Mission, and precision farming. The awareness level on drip/sprinkler method of irrigation, selection of drought-tolerant varieties, and mulching to reduce moisture loss of these technologies was found to be higher. Although formation of farm pond was promoted by the State Agricultural Department for the past one decade, such establishments were not well routed as farmers was fear of losing their cropped area. Application of antitranspirant chemicals, foliar spray of PPFMs, and spraying crop boosters is the technology promoted by KVK in limited scale through their OFT less awareness is being observed.

When it comes to the acceptance of technological mitigation strategies, a gap between awareness and acceptance was found to be more in drip/sprinkler method of irrigation followed by formation of farm pond, use of mulching to reduce moisture loss, and application of antitranspirant chemicals, PPFM, and crop boosters. The gap was found to be very low related to the technologies such as moving to less water consuming crops, preserving dry fodder for livestock, and changing planting dates according to the availability of soil moisture. The trend that has been expressed above indicates that respondents are not having full realization of water conservation and preservation methods that are being promoted through different extension programs. The technologies such as moving to less water consuming crops, preserving dry fodder for livestock, and changing of planting dates as these are traditionally being followed and being observed. Most of the respondents did not have any difficulties in acceptance of these practices. To ascertain the percentage of respondents who have not adopted the technological mitigation strategies, even though aware of them was worked out and presented in Table 1, it can be observed from that the technological gap was found to be low only in moving to less water consuming crops followed by preservation of dry fodder for livestock and changing the planting dates

Table 1: Awareness, acceptance, and adoption level of farmers regarding technological mitigation strategies

Technological mitigation strategies followed	*n*=100			
	Awareness (%)	Number of respondents accepted (%)	Number of respondents adopted (%)	Number of respondents aware but not adopted (%)
Drip/sprinkler method of irrigation	88 (100.00)	54 (61.36)	37 (42.05%)	51 (57.95)
Mulching (stubble, straw, or plastic mulching) to reduce moisture loss	75 (100.00)	56 (74.67)	31 (41.33)	44 (58.67)
Selection of drought-tolerant varieties	79 (100.00)	66 (83.54)	38 (48.10)	41 (51.90)
Moving to less water consuming crops	86 (100.00)	83 (96.51)	72 (83.72)	14 (16.28)
Changing of planting dates	85 (100.00)	79 (92.94)	58 (68.24)	27 (31.76)
Formation of farm pond or other rainwater harvesting structures for effective management of scarce water	57 (100.00)	32 (56.14)	5 (8.77)	52 (91.23)
Application of antitranspirant chemicals, foliar spray of pink-pigmented facultative methylotrophs, spraying crop boosters, etc.	47 (100.00)	30 (63.83)	21 (44.68)	26 (55.32)
Preserving dry fodder for livestock	100 (100.00)	97 (97.00)	81 (81.00)	19 (19.00)

according to the availability of moisture. Nearly 50.00–60.00% of respondents who were aware of the technologies such as drip/sprinkler method of irrigation, mulching, selection of drought-tolerant varieties, and application of antitranspirant chemicals sprays but not adopted them.

The higher level of technological adoption gap is observed in the formation of farm pond or other rainwater harvesting structures among the already realized farmers. As the initial investment for the establishment of rainwater harvesting structures was found to be higher and fear of losing available cultivable area might be the reasons for the less adoption. The technological mitigation strategies promoted by the extension agents were adopted by half of the realized farmers as most of them are beneficiaries of these programmes.

CONCLUSION

Based on our research, it can be concluded that even though many technologies are promoted by State Department of Agriculture and Tamil Nadu Agricultural University for farmers to mitigating drought situation. The farmers are interested in adopting traditional mitigation practices that are being followed generation after generation. This may be due to reason that less knowledge regarding those scientific-technological practices.

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