INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print), 2222-5234 (Online)
http://www.innspub.net
Vol. 17, No. 4, p. 170-178, 2020

RESEARCH PAPER OPEN ACCESS

Exploring the implications for Agricultural Extension Services to combat food insecurity in District of Tharparkar Sindh, Pakistan

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Key words: Food insecurity, indicators of food insecurity, agricultural extension, survey, Tharparkar.

http://dx.doi.org/10.12692/ijb/17.4.170-178 Article published on October 10, 2020

Abstract

In Tharparkar, Sindh-Pakistan, climate change is causing drought. Predominantly, drought is a regular phenomenon in the district of Tharparkar. The present study was carried out in the Department of Agricultural Extension and Rural Development, Sargodha University during 2017. The study aimed to find out the role of public and private agricultural extension services in combating food insecurity in the study area and to identify ways for providing secure food to the respondents. The study made use of two data collection instruments such as structured survey questionnaire and key informant interview guide. The research findings depicted that in the study area various NGOs (private) were providing extension services i.e. creating awareness about copping strategies for drought conditions and water saving methods etc. Results show that respondents get extension services from private NGOs. Public extension services and self-help groups are playing less active role than NGOs. Results showed that among various implications; construction of ponds for water storage, establishment of model agricultural and livestock farms, reuse of saved foods and products were highly to strongly recommend by respondents in the study area to combat food insecurity. Respondents further recommended that drought resistant verities, and maintenance of RO plants are important implications to combat food insecurity in the study area. Moreover, as per results the respondents moderately recommended protection of livestock for constant food supply, planting shrubs and trees, linkage of respondents to improve veterinary services, coordination with social safety network and vocational training programs to combat food insecurity in the study area.

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Introduction

Pakistan is a developing country with diversified ecological zones. However, its population is increasing day by day, and shrinking all available resources at high speed. According to latest research reports Pakistan has to manage its water resources by 2025 otherwise due to climatic changes in the region Pakistan would face severe water crises in near future. (Tagar *et al.* 2015). Agricultural extension is the bridge between research and farmers. Extension transfers agricultural innovations to the farming masses with the objective of enhanced adaptations for economic improvement of households. Therefore, extensions possess noteworthy importance in bringing improvement of rural households. In this way, extension does have potential in combating poverty, unemployment and food insecurity through increased production. Role of extension in rural uplift and agricultural boom is well documented (Abdullah *et al.* 2014).

Agriculture sector is prime sector for economic strength and alleviation of poverty, hunger and food insecurity. If agriculture sector is meager to produce sufficient food, economic stability of nation remains at risk. Therefore, food sufficiency only could be met through enhanced crop production. Enhanced production is subject to awareness and adoption of growers about innovations, facilitation about crop management and developing market linkages. Agricultural extension is the only pillar to serve growers in this regard (IFPRI, 2010). Hereafter, technology transfer, wider emphasis on rural development, rendering non-formal education and facilitation at doorstep are major dimensions of extension function (Birner *et al.* 2009). Extension aims at increasing attitude, knowledge and skills of stakeholders. Report of World Bank (2006) reported that disseminating knowledge, technologies and improving attitude and skills play pivotal role in bringing sustainability in food production which is essential for food sufficiency.

Extension sector could render critical part in sharing chunk of information about major challenges and need of food sufficiency through educational programs (Hersman, 2004). However, role of extension is under criticism because partial success in objective. Allahyari (2008) agreed with the potential role of extension in food production but in the same time paved the criticism that traditional extension approaches are not successful in achieving the set targets. This sluggish success could be observed from wider adoption gap of innovations.

Extension service started experiencing some challenges in the last decade due to socio-economic changes and agriculture sector reforms are taking place. The increase in food price, high demand for agricultural products, weather changes and constrained resources become critical to food security and poverty reduction in Africa (World Bank, 2010).

According to the research of Slim *et al.* (2011), more than one billion people face the persistent inadequacy of items of food. In the midst of escalating poverty rate and climatic threats, it is a prompting test of all the national and international extension services to demonstrate their usefulness in maximizing the agricultural production and enriching the sources of living for the poor population all over the world.

Agricultural extension followed diversified approaches for better services. With the passage of time, modern approaches like use of information communication technologies were adopted by sector. This advancement presented an opportunity of fostering information sharing among stakeholders (Lwoga, 2010). Trainings about other extension programs also exhibited significant outcomes. For instance, Training and Visit approach improved yields in Kenya, Burkino Faso and India. In Pakistan, T&V showed best partial effects. Farmer Field Schools (FFS) recorded significant increase in knowledge regarding use of pesticides (Tripp *et al.* 2005; Van den Berg & Jiggins, 2007).

Various researchers also noted significant influence of extension on poverty alleviation and food security achievement (Dercon *et al.* 2009). It can be said that

agricultural extension does hold significant potential in combating food insecurity. The term agricultural extension organization can have different implications relying upon the nature of its utilization. As far as the lives of average farmers are concerned, it can provide support by enhancing their understanding, proficiency, effectiveness, yield and economic stability of households, networks and larger community (FAO, 2005). For the sake of government officials, organizers and administrators, it might prove a tactic tool to cause positive increment in the output, to accomplish the target of providing sufficient food in accordance with the required demand and to fight against the sense of destitution in villages (FAO, 2005).

Materials and methods

Research objectives

Following research objectives were measured during the study.

i To find out the demographic profiles of the respondents in the study area.

ii To find out the role of public and private agricultural extension services in provision of secure food in the study area.

iii To study the satisfaction level of the study respondents regarding awareness / provision of information about food security from different sources.

iv To explore the implications for agricultural extension to combat food insecurity in the study area as perceived by respondents.

Research design

Cross sectional survey research design was chosen to answer the research objectives for tackling food insecurity in drought hit areas of District Tharparkar, Sindh, Pakistan. Present study was carried out during July to December 2017. This design assisted the researcher in exploring the implications for agricultural extension services in drought hit areas of District Tharparkar.

Population and Sample Size

The study was conducted in district Tharparkar. District Tharparkar is the most food insecure district of Sindh province. It has four talukas or tehsils namely Mithi, Diplo, Chachro and Nanger Parkar. Out of these four tehsils one tehsil (Mithi) was selected purposively, based on severity of food insecurity and drought conditions in the area. Tehsil Mithi was constituted of 12 union councils. All union councils were surveyed in the present study. Further from each union council, two (02) villages were selected purposively. The target population (most affected dwellers) was unknown therefore following formula was used as suggested by Casely and Kumar (1989) to compute the accurate sample size for unknown population.

$$n = Z^2 V^2 / d^2$$

Where,

Z= Normal variant or confidence level 95% = 1.96

n= Sample size

V= 51% assumed variation in the sample size of selected households those were highly affected from food insecurity in tehsil Mithi.

d= assumed marginal error (5%)

$$n = \frac{(1.96)^2 (0.51)^2}{(0.05)^2} = 399.68 \approx 400$$

The sample size was rounded off to the nearest discrete number of 400 respondents. For equal allocation of the respondents among the villages, instead of two villages from each union council, one extra village was selected form the last union council. Hence, 16 respondents from each village were purposively selected from 25 villages of 12 UCs of tehsil Mithi and thus make the sample size of 400 respondents.

Research Instruments

The study employed two types of data collection instruments. Interviewer-administered structured questionnaire and key informant interview guide, Questionnaire was used for data collection from households while interview guide was used to collect data from extension field staff in the study area.

Pre-testing of Research Instruments

Thirty respondents were randomly selected from tehsil Mithi to pre- test reliability of questionnaire. Different locations and varying time slots were chosen for pre- testing to make sure plausibility and authenticity of responses. Revisions were made in light of respondents' observations and remarks concerning quality of research instrument to enhance its validity and reliability.

Reliability

The reliability coefficient of instruments was calculated using Cronbach's Alpha formula using Statistical package for social sciences (SPSS). Alpha (α) ranges from 0 to 1. A value of ≥0.70 reflects good reliability. Reliability coefficient for all factors measured on Likert type scale for the present study was computed and found satisfactory which was above 80% (Mugenda and Mugenda, 2003).

Validity

The content and face validity was ascertained by seeking the suggestions of experts. Relevant variables matching scope of study were included in questionnaire development. Questionnaire was reviewed and adapted the instructions of experts.

Data collection procedures

For qualitative data collection household heads were assumed as the sample of the study to answer the questions on food insecurity and how they tackle the situations as the administrator of their families. Quantitative data was collected from random respondents of the study area for interview sessions conducted by using structured questionnaires administered by the researcher.

Data analysis

Quantitative data was analyzed using the computer software program Statistical Package for Social Sciences (SPSS). Distinct categories, patterns and themes were also identified to elaborate the data in a qualitative manner.

The tools of descriptive statistics such as percentages, frequencies, and means were used to describe the data statistically.

Results and discussion

Demographic profiles of the respondents

Number of factors such as Age, Gender, education level, family members who earn, and major profession were explored during the study.

Table 1. Existing role of Agricultural Extension Services for food security.

Organizations	n	Mean	Rank
Public Extension services	400	1.85	3
NGOs (Private extension services)	400	2.83	1
Self-help groups	400	2.01	2

*1=Never, 2=Sometimes, 3=Usually, 4=Constantly, 5=Always.

Age

Findings of the study showed that mean age of the respondents in the study area was above 41years while more than 59% of the respondents fall in age group of 31-45. Hence, concluded that majority of the respondents were middle aged in the survey.

Gender

Gender refers to the socially constructed roles, behaviors, expressions and identities of girls, women, boys, men, and gender diverse people. It influences how people perceive themselves and each other, how they act and interact, and the distribution of power and resources in society. According to the results, there were 66% male headed and 34% female headed households were included in the study.

Education

Education is the basic right of any individual and responsibility of state to provide standard and free basic education to all citizens of the country. Findings showed that majority of respondents (55%) were

illiterate followed by 16% had education up to primary. Almost 17% of respondents had education up to middle whereas 7.8% had education up to matric and 3.8% had intermediate education. Literate individuals can get more benefits than illiterate by using print media for information acquisitions and foster adoptions of innovations and measures for food security.

Table 2. Provision of different types of services by public extension services in the study area.

Services	n	Mean	Rank
Provision of wheat from warehouses	400	1.33	6
Drinking water availability	400	1.94	1
Cash payments (BISP)	400	1.67	2
Trainings programs/ Awareness movements regarding Food security	400	1.17	9
Provision of crops seeds and fertilizer	400	1.65	3
Provision of kisan card for purchase of crops seeds, fertilizer and sprays	400	1.02	11
Planting of fast growing grain crops	400	1.15	10
Planting of suitable shrubs and trees for fodder	400	1.62	4
Protection of livestock for regular supply of meat and milk	400	1.22	7
Establishment of model agriculture/livestock farms	400	1.19	8
Drought resistant varieties of food crops	400	1.56	5

Scale: *1=Never, 2=Sometimes, 3=Occasionally, 4=Usually, 5=Always.

Earning hands

Respondents with more earning hands may have better economic condition and more incline towards the food security.

The data indicated that most of the respondents such as (32%) had one earning member that supports his family followed by 29.50% of respondents had two earning members in the household while 17.30% had three and 21.30% had
four earning members.

Existing role of public and private Agricultural Extension Services for provision of secure food in the study area

Number of factors such as Public extension services, non-governmental organizations (NGOs), Self-help groups, Provision of wheat from warehouses, availability of drinking water, cash payments (BISP), vocational trainings programs/ Awareness movements regarding food security, provision of crops seeds and fertilizer, provision of kisan card for purchase of crops seeds, fertilizer and sprays, planting of fast growing grain crops, planting of suitable shrubs and trees for fodder, protection of livestock for regular supply of meat and milk, establishment of model agriculture/livestock farms and drought resistant varieties of food crops were taken into account to examine the role of public and private agricultural extension services.

It describes the role of various extension service offered by governmental and non- governmental associations working in Tharparkar. Data depicted that in the study area various NGOs (private) were providing various extension services i.e. creating awareness about coping strategies for drought conditions and water saving methods etc.

Insert table-1 here

Results from descriptive statistical analysis show that respondents get extension services from private NGOs with the mean value of (2.83). Public extension services and self-help groups are playing less active role than NGOs with the mean values of (1.85) and (2.01) respectively.

Table 3. Satisfaction level of the respondents regarding awareness / provision of Information for food security in the study area through different sources.

Source of information	n	Mean	Rank
Public extension services	400	2.48	6
Non-government organizations (NGOs)	400	4.01	1
Self- help groups	400	3.85	2
Initiatives at Neighborhood level	400	3.58	4
Information provided from elders	400	3.26	5
Information / awareness from group of volunteers (Electronic Media)	400	3.72	3
Information from educational Institutes	400	2.37	7

*1= Very unsatisfied, 2= unsatisfied, 3 = No Opinion, 4 = Satisfied, 5 = Very satisfied.

Public Extension services delivery in the study area

Results regarding services provided to the rural people of district Tharparkar show that Govt. of Sindh (provincial) has installed Reverse Osmosis (RO) plants in rural areas. The results from table 2 showed that higher mean value (1.94) for drinking water availability was observed followed by cash payment while (1.67) was provided by Benazir income support program and training programs launched by different local and international organizations to create awareness related to food security. Mean score of (1.17) was linked to further provision of wheat from ware-houses, mean score of (1.33) by different local and international organizations while provision of crop seed and fertilizer was ranked at 5 with the mean value of 1.65.

Insert table-2 here

The results further show that sometimes public extension services at the most helping respondents in availability of drinking water with the mean score of (1.94). On the other hand, according to the respondents public extension services never help in providing Kisan card for purchase of crop seed, fertilizers and sprays with the mean score of (1.02).

Satisfaction level of the respondents regarding awareness / provision of information for maintaining minimum level of food security in the study area through different sources

Results from table 3 are related to satisfaction level regarding awareness/provision of information about food security provided by different sources. The data in table showed that among various sources, NGOs were ranked at 1st ranked with the mean value of 4.01 as respondents perceived satisfaction level in the study area. Further, self- help groups mean score of (3.85) information / awareness from group of volunteers (electronic media) with mean score of (3.72), initiatives at neighborhood level showed that the mean score of (3.58), information provided from elders, govt. extension department with mean of (2.48) and information from educational institutes with mean of (2.37) respectively.

Insert table-3 here

The results depicted that the respondents were satisfied with the information provided by NGOs mean value (4.01), self-help groups (3.85), volunteer groups (3.72). However, the respondents were quite unsatisfied from the public extension services (2.48) and information from the educational institutes (2.37). Further respondents said that different local and international NGOs and extension field staff were the major source of trainings. Both public and private sector were organizing farmer's trainings in the regard of food security. The extension staff is responsible to educate the farmers in learning to incorporate modern day discoveries in their cultivation practices. If the integration of up- to-dated technologies emerges as a reality in the agriculture sector, the diffusion of new trends will attract other farmers to apply experimental techniques to produce for maximum yield. The practical demonstration of extension education principles assists extension employees to analyze

farmers' needs, constraints, priorities and opportunities.

As far as the exploration of the implications of agriculture extension services is concerned, number of factors such as construction of ponds for water storage, protection of livestock reuse of saved food, discourage population migration, establishment of model farm, planting suitable shrubs and trees, improved health services, improved veterinary services, Kesan Card, coordination with social safety network, drought resistant varieties for food crops, maintenance of reverse osmosis (RO) plants, vocational training programs were evaluated during survey.

Conditions of food insecurity persist during the transient periods after harvest due to recurrent joblessness and shortage of food reserves which forces families to look for different remedial strategies. The results revealed water and food availability were the major threat in the study area due to which respondents suggested that construction of ponds for water storage and food storage (4.99) skills were the important implications for securing the food in the study area.

Table 4. Implications for Agricultural Extension to combat food insecurity in the study area as perceived by respondents.

Implication	n	Mean	Rank
Construction of ponds for water storage	400	4.90	1
Protection of livestock for constant food supply	400	3.50	10
Reuse of saved food and other products	400	4.50	4
discourage population migration	400	2.25	13
Establishment of model farm with the help of local people	400	4.87	2
Planting suitable shrubs and trees for fodder (Cactus, Jetropha etc)	400	3.99	8
Linking respondents to improved health services	400	4.67	3
Linking respondents to improved veterinary services	400	3.33	11
Kesan Card may be introduced to supply for agricultural Purpose	400	4.47	5
Coordination with social safety network for sustainable development	400	3.00	12
Drought resistant varieties for food crops	400	4.33	6
Maintenance of RO plants	400	4.17	7
Vocational training program may launch regarding food security	400	3.98	9

*1= Fairly recommended, 2= Recommended, 3=Moderately Recommended, 4= Highly recommended, 5= Strongly recommended.

Insert table-4 here

Results from the above table showed that among various implications perceived by respondents in the study area to combat food insecurity; construction of ponds for water storage establishment of model agricultural and livestock farms (4.87), linkage of respondents to improve health services (4.67), reuse of saved foods and products (4.50) were highly to strongly recommend on likert-type scale. Respondents highly recommended that Kisan Cards (4.47), drought resistant verities (4.33), maintenance of reverse osmosis (RO) plants (4.17) to combat food insecurity. Moreover, the respondents moderately recommended the following factors to combat food insecurity: protection of livestock for constant food supply (3.50), planting shrubs and trees (3.99), linkage of respondents to improve veterinary services (3.33), coordination with social safety network (3.00) and vocational training programs.

Similarly, different studies also pointed out the importance of awareness and knowledge level of farmers through learning and training (Tripp *et al.*, 2005).

Conclusion

It is concluded from the study that respondents generally get extension services from non-governmental organizations followed by public extension services and self-help groups. . This show that private sector was more active in the provision of extension services in the study area as compared to other public sector sources. Results regarding provision of services to the rural people of district Tharparkar show that Govt. of Sindh (provincial) has installed Reverse Osmosis (RO) plants in rural areas, ensured cash payments provided by Benazir income support program and training programs launched by different local and international organizations to create awareness related to food security. . Moreover, the provision of wheat from warehouses by different local and international organizations and provision of crop seed and fertilizer are the additional services provided to respondents but on limited scale. Food insecurity prevails during the transitory post-harvest periods due to seasonal unemployment and lack of food stock which forces households to adopt different coping strategies.

Data shows that various implications perceived by respondents in the study area to combat food insecurity include construction of ponds for water storage ranked at first number, protection of livestock for constant food supply, reuse of saved food and other products, discouraging population migration, establishment of model farm with the help of local respondents, planting suitable shrubs and trees for fodder, linking respondents to improved health and veterinary services. Introduction of Kisan cards to supply for agricultural purpose, coordination with social safety network for sustainable development, drought resistant varieties for food crops, maintenance of RO plants, and vocational training programs may be launched regarding food security.

Recommendations

Public sector extension services need to launch model farms, model water storage facilities, model health services and model self-help groups of the respondents.

The need of the time is that public and private extension organizations must work cooperatively in the study area to overcome the sufferings of the respondents.

Public sector departments and banks should provide loans to the respondents in the study area to boost up agricultural activities in the study area.

Kisan card should be introduced to small scale farmers for agricultural productivity.

Health-care card system needs to be initiated in district Tharparkar immediately to give some kind of relief to the respondents in the study area.

Acknowledgement

This study is a part of doctoral degree research work in the discipline of Agricultural Extension. The unique aspect of this research is the intervention in Tharparkar district by the scholar to show the solidarity with people of the Tharparkar in Sindh province. The author also acknowledges valuable inputs from Dr. Ejaz Ashraf, the main Supervisor, Dr. Zaheeruddin Mirani, the Co-supervisor, and my other colleague Dr. Raees Abbas, the co-author in this manuscript and above all the respondents of the Tharparkar area. The sole purpose to conduct this research in Tharparkar-Sindh is to pinpoint the ongoing sensitive issue of drought and weak food security in one of the greatest deserts in the world. This study is an effort to unveil the continuous sufferings of the respondents in the study area of district Tharparkar.

Conflict of interest

The authors and co-authors have declared no conflict of interest in this study.

References

Abdullah M, Xia LC, Li J, Ghazanfar S, Mehmood Y, Ishaq MN, Saud S. 2014. Effectiveness Comparison Between the Farmers Field School and the Training & Visit Approaches of Agricultural Extension in Two Districts of Pakistan.

American- Eurasian Journal of. Agriculture and Environmental Sciences **14(1),** 33-39.

Allahyari T, Saraji GN, Adi J, Hosseini M, Iravani M, Younesian M, Kass SJ. 2008. Cognitive failures, driving errors and driving accidents. International Journal of Occupational Safety and Ergonomics **14(2),** 149-158.

Dercon S, Gilligan DO, Hoddinott J, Woldehanna T. 2009. The impact of agricultural extension and roads on poverty and consumption growth in fifteen Ethiopian villages. American Journal of Agricultural Economics **91(4),** 1007-1021.

FAO. 2005. Food and Agricultural Organization. Assessment of the World Food Security. http://www.fao.org/3/a-a0200e.pdf

Hersman, McNabb JWC, Schumacher RA, Todor L, Adams G, Anciant E, Anghinolfi M, Bagdasaryan. 2004. Hyperon photoproduction in the nucleon resonance region. Physical Review **69(4),** 042201.

International Food Policy Research Institute IFPRI. 2010. Tewodaj, M., Cohen, M. J., Birner, R., Mamusha, L., Randriamamonjy, J., Fanaye, T., &Zelekawork, P. (2009). Agricultural extension in Ethiopia through a gender and governance lens. Ethiopia Strategy Support Program 2 (ESSP2) Discussion Paper No. ESSP 2, 7.

Kumar S, West DC, Ponting JM, Gattamaneni HR. 1989. Sera of children with renal tumours contain low-molecular-mass hyaluronic acid. International journal of cancer **44(3),** 445-448.

Lwoga ET. 2010. Bridging the agricultural knowledge and information divide: The case of selected telecenters and rural radio in Tanzania. The Electronic Journal of Information Systems in Developing Countries **43(1),** 1-14.

Mugenda A. 2003. Research methods Quantitative and qualitative approaches by Mugenda. Nairobi, Kenya.

SlimPirlet IAK, Kwiatkowski F, Michot F, Millat BL. 2011. Emergency preoperative stenting versus surgery for acute left-sided malignant colonic obstruction: a multicenter randomized controlled trial. Surgical endoscopy **25(6),** 1814-1821.

Tagar HK, Bullo A, Shah SR, Shah SMM. 2015. Sustainable Development Goals: End poverty, Food Security and Healthy Lives through Human Resources and Managing Agriculture Productivity (A case of Pakistan). International Journal of Innovative Research and Development **4(10),** 283-289. www.ijird.com

Tripp R, Wijeratne M, Piyadasa VH. 2005. What should we expect from farmer field schools? A Sri Lanka case study. World Development **33(10),** 1705-1720.

Van den Berg H, Jiggins J. 2007. Investing in farmers—the impacts of farmer field schools in relation to integrated pest management. World Development **35(4),** 663-686.

World Bank. 2006. Agriculture Investment Source book. Washington, DC, World Bank.

World Bank. 2010. Agriculture Investment Source book. Washington, DC, World Bank.