

International
Research Journal of
**APPLIED
SCIENCES**

Volume 01 | Issue 02 | 2019



SciRange
PUBLICATIONS

www.scirange.com

The Use of Indigenous Knowledge in Agriculture Allied Sectors in Coastal Region of West Bengal, India

¹Pratik Majumdar, ²Chakrapani Pegu, ¹Sanjeev Sen Ghadei,
¹Bijay Kumar Behera and ¹Basanta Kumar Das

¹ICAR-Central Inland Fisheries Research Institute, Biotechnology Laboratory Barrackpore, Kolkata 700120, West Bengal, India

²Regional Center ICAR-Central Inland Fisheries Research Institute, Tripura, India

ARTICLE INFORMATION

Received: December 10, 2018

Accepted: January 06, 2019

Corresponding Author:

Pratik Majumdar,
ICAR-Central Inland Fisheries
Research Institute, Biotechnology
Laboratory Barrackpore,
Kolkata 700120, West Bengal, India

ABSTRACT

This study focused on coastal region subsistence farming under critical natural situation. Interviews conducted with a sample of 100 participants. This interview showed that coastal region people of West Bengal, India sustain farming through their indigenous knowledge. Coastal region people continue subsistence farming in their kitchen gardens and agriculture fields through their indigenous knowledge and climate forecast. Basically this practice involves improvement of soil fertility, structure, crops, selection of seeds and storage for future purpose. Knowledge of rainfall calculation is helpful for the showing season. These indigenous knowledge practices could be helpful in the achievement of the food security, which is important of nutritionally safe food supply at family levels.

Key words: Subsistence farming, indigenous knowledge, climate forecast, rainfall, food security

INTRODUCTION

Various social scientists and other scholars have sought to define, describe and expressed the concept of indigenous knowledge, throwing light on various aspects of it and its relation to man, society, culture, environment, other kind of knowledge and concepts. Waage *et al.*¹ point out that these indigenous knowledge are not primitive, left over from the past but on the contrary, are systems of finely tuned and adopted, both biologically and socially, to counter the process of what are often harsh and inimical environment and often represents hundreds, sometimes thousands of years of adaptive evolution in which vagaries of climate, the availability of land, water, the basic needs of people and their animals for food, shelter and health have been amalgamated in a system which has allowed society to exist and develop in the face of tremendous odds. Indigenous knowledge pertains to various cultural norms, social roles or physical conditions. Their efficiency lies in the capacity to adapt to changing circumstances². The terms 'indigenous knowledge', 'local knowledge' and 'traditional knowledge' have been used in the literature interchangeably. Traditional knowledge is gathered over a period of time and transferred from generation to generation. It is synonymous to Local Knowledge (LK) and is defined as "a sum total of knowledge and practices based on acquired knowledge and experience of people in dealing with problems and typical situation in different walks of life"³. Local knowledge or traditional knowledge is highly localized and restricted and is generally governed by local environmental factors and

cultural conditions. It varies between countries, regions and even from farm to farm⁴. Indigenous knowledge may also be defined as the sum total of knowledge and practices, which are based on people's accumulated experience in dealing with situations and problems in various aspects of life and such practices are special to a particular culture⁵. Ulluwishewa⁶ defined Indigenous Knowledge (IK) as "Local knowledge"-knowledge that is unique to a given culture or society. This knowledge was the information base of the society, codified in the language of the society and it facilitates communication and decision-making. Technically, indigenous knowledge was defined as knowledge originating in and characterizing a particular region or country. The quantum and content of indigenous knowledge, however, vary across space and change over the time. Also the indigenization of knowledge originating outside a region often involves adoption to suit the specific characteristics of the region. Consequently, the knowledge embedded in the prevailing practices or technology, its users and innovators in a region at any point of time may not necessarily be whole. Indigenous knowledge continuously interacts with non-local knowledge and changing socio-economic, ecological conditions of the region. Consequently, indigenous knowledge should not be seen as a static pool of knowledge. The quantum and content of indigenous knowledge change continuously and probably this dynamics of indigenous knowledge is more important from the point of view of policy relating to research and development⁷. It was the knowledge, which has been accumulated by the people over generations by observation, by experimentation and by handling of old people's experiences and wisdom in any particular area of human behavior⁸. Indigenous knowledge (IK) or wisdom is the product of trial and error, natural selection and keen observation through centuries. This may come from various areas covering social, religious taboos, beliefs and customs, ecology, vegetation, climate, etc.⁹. Indigenous knowledge was unwritten, untapped and largely unutilized knowledge that is unique to a given culture and society. The importance of documenting IK was to widen and accelerate research, planning and development¹⁰. Over years, human experience with agriculture has given rise to paramount knowledge to the farmer who constantly was in interaction with various aspects of farming. This knowledge might have led him to invent or adopt certain practices in their own farms, which may be peculiar, unique and suit his own conditions over past many years¹¹. IK was the actual knowledge of a given population that reflects the experience based on tradition and includes more recent experience with modern technology. Indigenous

knowledge system may appear simple to outsiders but they represent mechanisms to ensure the minimal livelihoods for local people¹². Indigenous practices may help in increasing the knowledge of formal science and also give clues to the scientists in designing newer and newer experiments. Besides, many of such practices may well be recommended for adoption in the farming situations having similar agro-ecological conditions¹³. Indigenous knowledge was the local knowledge that was unique to a given culture or society where its knowledge passes from generation to generation. It was the knowledge that people have gained through inheritance from their ancestors. It was a people derived science and it represents people's creativity, innovations and skills⁶. In trying to clear up the confusion or entanglement in the interchangeable was the use of the terms "indigenous knowledge" and "traditional knowledge". Devi¹⁴ put forth the view that all indigenous knowledge are traditional by nature but not *vice versa*. The knowledge was transmitted down from generation to generation, which may after some years be given status of tradition or considered as traditional knowledge. Indigenous knowledge was the information base for a society, which facilitates communication and decision-making. Indigenous information systems were dynamic and were continually influenced by internal creativity and experimentation as well as contact with external systems¹⁵. The unique, traditional, local knowledge existing within and developed around the specific conditions of man and women indigenous to a particular geographic area¹⁶. In contrast to the process of synthesized acquisition of knowledge through theories and methods, Indigenous knowledge was acquired know how and wisdom by observation of specific natural and social phenomena connected with the experience of supernatural powers that influence life. Rather than being replaced by scientific knowledge, indigenous knowledge remains strong throughout developing countries, particularly in rural areas and also to form a, holistic, more often than not scared, world view and a valuable source of self reliant cultural persistence in a period of rapid social change. This study examined community-based mechanisms of ongoing subsistence farming under poor environmental conditions.

METHODS

Study area: The study was conducted in four villages of South 24 Parganas districts of West Bengal. Salient features of the district have been presented in the following Table 1. As per 2011 census the total number of literates in three villages Bali1, Bali 2, Pathankhali of Gosaba CD Block was 172,781 (78.98% of the population over 6 years) out of which

Table 1: Salient feature of villages

Village name	Block name	District	State	Division
Bali-1	Gosaba	24 Paraganas South	West Bengal	Presidency
Bali 2	Gosaba	24 Paraganas South	West Bengal	Presidency
Pathankhali	Gosaba	24 Paraganas South	West Bengal	Presidency
Dhablatlalpur	Sagar	24 Paraganas South	West Bengal	Presidency

96,642 (56%) were males and 76,139 (44%) were females (Table 1). As per 2011 census, literacy in South 24 Parganas district was 77.51. Literacy in West Bengal was 77.08% in 2011. Literacy in India in 2011 was 74.04%. As per 2001 census; Gosaba block had a total literacy of 68.93% for the 6+ age group. While male literacy was 80.74% female literacy was 56.60%. South 24 Parganas district had a total literacy of 69.45%, male literacy being 79.19% and female literacy being 59.01%. As per 2011 Census of India Gosaba CD Block had a total population of 246,598, all of which were rural. There were 125,901 (51%) males and 120,688 (49%) females. Population below 6 years was 27,841. Scheduled Castes numbered 154,484 and Scheduled Tribes numbered 23,343. As per 2001 census, Gosaba block had a total population of 222,764, out of which 113,827 were males and 108,937 were females. Gosaba block registered a population growth of 11.10% during the 1991-2001 decade. Total growth of a decade for South is 24 parganas where total West Bengal growth rate 17.84%. Scheduled castes at 146,060 formed more than one-half the population. Scheduled tribes numbered 22,561.

Study design: This study was conducted to examine sustainable production of subsistence crops. Data were collected through focused group discussion with villagers.

Participants: Fifty villagers were purposely selected. Semi-structured interviews were conducted aged between 25 and 70 years. They were 30 males and 20 females.

Data collection: Data was collected by asking questions about the indigenous knowledge used to continue subsistence farming. Data analysis was affected through a computerized SPSS software package and content analysis.

Quality criteria: Comprehensiveness and trustworthiness of collected data were attained through reviews of data with the participants. The participants were able to provide corrections to the inconsistencies, contradictions and data gaps. Consultations were made to validate and clarify data.

RESULTS AND DISCUSSION

Subsistence farming: Subsistence farming reflect the community members provide food or their families through

production of indigenous crops in the kitchen-gardens or others surrounding the compound and ploughing fields allocated to each household by the chief-in-council.

The use of indigenous knowledge to sustain subsistence farming:

According to questionnaire participants asked questions relating to the indigenous knowledge of coastal region use to sustain subsistence farming. The responses provided show that community members use their indigenous farming practices such as planting on different soil types, soil fertilization, selection and storage of seeds and maintenance of crops. In addition to these knowledge systems the participants mentioned the use of knowledge of rainfall forecast. These indigenous knowledge systems are produced by local people based on their lived experiences.

Rainfall forecast:

During the study period it was established that the sprouting tree leaves and flowers, to predict rainfall. The rural people knowledge of rainfall prediction corroborates Speranza *et al.*¹⁷ findings that local farmers possess knowledge on the use of some local indicators, such as plants, birds, insects and astronomy, in prediction of rainfall. Kijazi *et al.*¹⁸ show that people use the behavior of animals and plants to predict the coming agricultural Season. Chang'a *et al.*¹⁹ show that this type of indigenous knowledge is very important in farm decision-making to respond to poor yields. The farmers predict rainfall through the moon's shape and colour. They predicts about the rainfall patterns for the specific season of the year through the movement of stars to make inferences²⁰.

Knowledge of soil types:

According to survey black clayey soil is very good for cultivation of pumpkin, gourd and maize this type of soil are very rich nutrients. Sandy soil is good for melon, beans and sweet reed. There was another type of soil mixture of sandy and clayey soil, which was good for all crops. In general, knowledge of soil varieties through the soil colour and soil texture.

Mulching:

According to Buthelezi *et al.*²¹ after the harvesting, the residue was tilled with the soil to improve moisture preservation and fertility of the soil. Straw, dried beans, nut plants were the best for the mulching.

Multiple cropping:

By hand, sowing of seeds was done randomly. All seed varieties were sown equally in the field. Through multiple cropping practices the growth of all crops at the same time in the same field. Through multiple cropping systems productivity per unit of area was higher than in mono-cropping systems with the same level of management.

The farmers include a variety of crops with different growth habits in the same field to maximize the chances for production of multiple crops²².

Storage of seeds and crops: The crops were stored and disallowed from attack by weevils after harvesting and threshing. The crops remain fresh until they were all consumed. The most useful preservation practice mentioned by the participants was by hanging the maize, sorghum and millet. Sometimes the seeds were mixed with the ash and stored into clay-pots and baskets. The seeds stored during five seasons. To preserve the harvested cowpea in storage was by Chili pepper (*Capsicum annum*)²³.

CONCLUSION

These results show that indigenous knowledge was still precious for the community level. The study concludes that subsistence farming was constant by indigenous farming practices and rainfall calculation. These practices involve the improvement of soil, preservation of crops and the collection and storage of seeds for replanting. Rainfall calculation helps coastal region members plan the showing time. This indigenous knowledge could be helpful towards the achievement of food security at the household level. The knowledge could also make contributions to the development of sustainable adaptation policies to assist rural based communities which were weak to climate change hazards.

REFERENCES

1. Waage, J.K., D.J. Greathead, R. Brown, R.R.M. Paterson and P.T. Haskell *et al.*, 1988. Biological control: Challenges and opportunities. *Philosophical Transactions of the Royal Society of London. Series B. Biol. Sci.*, 318: 111-128.
2. Norgaard, R.B., 1984. Traditional agricultural knowledge: Past performance, future prospects and institutional implications. *Am. J. Agric. Econ.*, 66: 874-878.
3. Warren, D.M., 1991. Indigenous agricultural knowledge, technology and social change. *Sustainable Agriculture in the American Midwest: Lessons from the Past, Prospects for the Future*. University of Illinois Press, Urbana, pp: 35-53. <http://agris.fao.org/agris-search/search.do?recordID=US9154585>
4. Admas, W.M. and D.M. Anderson, 1988. Irrigation before development: Indigenous and induced change in agricultural water management in East Africa. *Afr. Affairs*, 87: 519-535.
5. van den Ban, A.W., S.V.N. Rao, D.V. Rangnekar and K. Ranganathan, 1995. Indigenous technical knowledge and livestock. In: *Handbook for straw feeding systems: Principles and applications with emphasis on Indian livestock production Indo-Dutch Project on Bioconversion of Crop Residues*, pp: 119-128.
6. Ulluwishewa, R., 1993. Indigenous knowledge systems for sustainable development. The case of pest control by traditional paddy farmers in Sri Lanka. *J. Sustainable Agric.*, 3: 51-63.
7. Agrawal, R., 2002. Small Farms, Women and Traditional Knowledge: Experiences from Kumaon Hills. In: 17th Symposium of the International Farming Systems conference. ifsa.ufl.edu/ifsa/papers/c/c1.doc.
8. Ajibade, L.T., 2003. In search for methodology for the collection and evaluation of farmers' indigenous environmental knowledge. *Indilinga Afr. J. Indigenous Knowl. Syst.*, 2: 99-105.
9. Ranganatha, A.D., 2002. Identification of Indigenous Farm Practices Followed By Soliga Tribals. Ph.D Dissertation, University of Agricultural Sciences, Bangalore, krishikosh.egranth.ac.in/bitstream/1/5810016817/1/UASBang-6565.pdf.
10. Bhanotra, A., 2012. Study of Indigenous Technical Knowledge on Dairy Farming in Kathua District of J and K. (Ph.D Dissertation, NDRI, Karnal) <http://krishikosh.egranth.ac.in/bitstream/1/84143/1/ADHITI%20PDF%20COMBINE%20THESIS.pdf>.
11. Kumar, S., 2014. Study on Indigenous Knowledge in Agriculture and Allied Fields in Purnea District of Bihar District Of Bihar (Ph.D Dissertation) <http://krishikosh.egranth.ac.in/handle/1/96113>.
12. Sillitoe, P., 1998. The development of indigenous knowledge: A new applied anthropology. *Curr. Anthropol.*, 39: 223-252.
13. Sharma, R., 2003. Identification and use of itk's in Relation to Adoption of Recommended Agricultural Practices by Tribal Farmers of Surguja District in Madhya Pradesh (Ph.D Dissertation, Indira Gandhi Krishi Vishwavidyalaya Raipur) http://krishikosh.egranth.ac.in/bitstream/1/78872/1/RAJNISH%20SHARMA_EXTENSION%20T-769_2003.pdf.
14. Devi, B.N., 2009. Indigenous Technical Knowledge in Fisheries of Manipur (Doctoral Dissertation) <http://krishikosh.egranth.ac.in/bitstream/1/5810021054/1/Nightingale%20Thesis%20work%20on%20Indigenous%20Technical%20Knowledge%20i.pdf>.
15. Senanayake, S.G.J.N., 2006. Indigenous knowledge as a key to sustainable development. *J. Agric. Sci.*, 2: 87-94.
16. Grenier, L., 1998. Working with indigenous knowledge: A guide for researchers. IDRC, http://hdrnet.org/214/1/Working_with_indigenous_knowledge.pdf
17. Speranza, C.I., B. Kiteme, P. Ambenje, U. Wiesmann and S. Makali, 2010. Indigenous knowledge related to climate variability and change: Insights from droughts in semi-arid areas of former Makueni District, Kenya. *Clim. Chang.*, 100: 295-315.
18. Kijazi, A.L., L.B. Chang'a, E.T. Liwenga, A. Kanemba and S.J. Nindi, 2013. The use of indigenous knowledge in weather and climate prediction in Mahenge and Ismani wards, Tanzania. *J. Geogr. Reg. Plann.*, 6: 274-280.

19. Chang'a, L.B., P.Z. Yanda and J. Ngana, 2010. Indigenous knowledge in seasonal rainfall prediction in Tanzania: A case of the south-western highland of Tanzania. *J. Geogr. Reg. Plann.*, 3: 66-72.
20. Elia, E.F., S. Mutala and C. Stilwell, 2014. Indigenous knowledge use in seasonal weather forecasting in Tanzania: The case of semi-arid central Tanzania. *South Afr. J. Libr. Inform. Sci.*, 80: 18-27.
21. Buthelezi, N., J. Hughes and A. Modi, 2010. The Use of Scientific and Indigenous Knowledge in Agricultural Land Evaluation and Soil Fertility of Two Villages in KwaZulu-Natal, South Africa. In *Proceedings of the World Congress of Soil Science, Soil Solutions for a Changing World*, Brisbane, Australia, 1-6 August, pp: 20-23.
22. Rankoana, S.A., 2016. Perceptions of climate change and the potential for adaptation in a rural Community in Limpopo Province, South Africa. *Sustainability*, 8: 672.
23. Altieri, M., 1991. Traditional farming in Latin America. *Ecologist*, 21: 93-96.