

Indigenous knowledge and Its Role in Sustainable Livestock and Fish Production in India

S.S. Dana* and Yarrakula Mahesh Babu#

Dept. of Fishery Extension

Faculty of Fishery Sciences

West Bengal University of Animal and Fishery Sciences, Kolkata, India

Introduction

Indigenous Knowledge (IK) is the term which is in murmuring and now became the hot topic among the nations in recent years where all the researchers are extoling, because of its Knowledge is widely recognized as the key resource for development. Indigenous knowledge has now been recognized and accepted as a vital knowledge source (Chimaraoke et al., 2003). IK is a key element of the social capital of the poor and constitutes their main asset in their efforts to gain control of their own lives. Indigenous knowledge is an integral part of the culture and history of a local community. IK helps to increase the sustainability of development efforts because of its integration process provides for mutual learning and adaptation, which in turn contributes to the empowerment of local communities. Empowerment through IK systems, especially of the poor, is a core objective of most development efforts. The basic component of any country's knowledge system is its Indigenous Knowledge (IK).

India is one of the World's 12 mega-diversity countries accounting for eight per cent of global plant genetic resources and a higher share of micro-organisms, most of them undocumented (Bidwai, 1997). Indigenous knowledge is continuously evolving and built from and based on thousands of years of experience needs careful documentation and analysis for developing sustainable farming systems, otherwise of which would be lost, not regain at any cost in the future (Talawar and Singh, 1993). Too often there is no systematic record for documenting the knowledge system - what it is?, what it does?, who does it?, or the local approaches for changing it (Atteh, 1991).

Importance of IK

Indigenous knowledge systems can help in the adoption of technology packages where there is poor cooperation with farmers (Lightfoot, 1995), some more importance of the IK are- i) It provides problem solving strategies for local

communities, especially for the poor. ii) It represents an important contribution to global development knowledge. iii) Its systems are at risk of becoming extinct. iv) It is relevant for the development process and v) It is an under-utilized resource in the development process.

Identification of IK

It is tacit knowledge, difficult to codify, embedded in community practices, institutions, relationships and rituals (Warren, 1991). Studies of traditional wisdom can not only benefit social scientists, but can also act as eye openers for the biological scientists (Kaul, 1994). Finding an optimum mix and balance between indigenous participation and scientific participation in research and development processes rather than a choice of either one or the other is required in finding best innovations. Farmers are a very rich source of indigenous technical knowledge related to cattle rearing (Kaul *et al.* 1998). Indigenous institutions, indigenous appropriate technology and low-cost approaches can increase the efficiency of development programs because Indigenous Knowledge is a locally owned and managed resource. Indigenous Knowledge can be identified by focus group technique, case study method, diary writing and photography besides the interview schedule.

Collection

After identification of the Indigenous people the Indigenous Knowledge should be collected for the documentation. In some circumstances they may fear that it may be misused and that it would be stolen and used against them or that if it is documented, they will not have claim to it and they will remain powerless. This can be overcome by bringing awareness among them and sometimes praising them may allow them free flowing and sharing of their ideas. The indigenous people in India, generally tribals and mostly illiterate, it is always wise to use observational techniques for collection of information. Difficulties arise where, for example, an extension agent asks for information on yield per acre from a farmer who is more concerned with yield per unit of labour. Problems are compounded when the questionnaire has a different native tongue from the respondent. The boundaries delineating colours, for example, vary between languages, but these variations may not be recognized; and culturally specific concepts are often hard to translate. Full-

scale anthropological methods of observer-participation can overcome these difficulties but they are time-consuming and probably rarely cost-effective. Methods of investigation are needed which are open-ended, quick and reliable.

Documentation

Recording and documentation of traditional knowledge requires close participatory interaction with communities, as they help in the identification and preservation of traditional knowledge in various ways (Ramakrishnan et al., 1998). Though women can play a significant role in protecting biodiversity, it has not been recognized (Mukhopadhyay, 1989), nor has their role in conservation. Since many of these traditional systems are environment-friendly and sustainable, efforts should be made to restore and support them with modern approaches to enable their effective mainstreaming to combat desertification. The participation of local communities would also lead to greater use of traditional practices. It is therefore necessary to document such a knowledge base through a properly designed research programme and to analyze their economic, technological and socio-cultural sustainability.

Dissemination

Rural people's knowledge is dynamic and unique to given culture and society. It changes through indigenous creativity and innovativeness as well as through contact with knowledge system. At present these pass from generation to generation orally and in the wake of intensive interventions are likely to be lost as the people become old and leave the world (Shiv Narayana *et al.*, 1993).

It is commonly exchanged through the personal communication and demonstration. It is necessary to develop databases of success stories, best practice lessons from projects and provide access to these databases and disseminate the same through publishing or electronic format. Dissemination to the wider community adds the developmental dimension to the exchange of knowledge and could promote wider and deeper impact of the knowledge transfer. Publicity material about the repository and the actual knowledge content of the repository, such as brochures, awareness programmes, presentations at seminars and

conferences, publicity programmes through mass media and hosting a website will raise the public awareness of the knowledge repository. The knowledge contents can be disseminated through the printed material, CD-ROMs, online database, community radio. Radio and television broadcasting in local languages could disseminate IK practices in the rural areas.

IK and its role in animal husbandry

Studies on indigenous animal husbandry practices have been conducted by different authors/researchers and they have documented different indigenous animal husbandry practices mainly concentrating on disease treatments such as, for skin diseases, indigenous knowledge like, sulphur oil containing 65 gm. of gandhak (Sulphur) and 250 ml of Sarson oil (Khanna, 1967) or Bonroson (*Alliaria sativum*) and mustard oil after proper boiling used on wounds of mouth (Dana, 1998), for Diarrhoea- fresh green leaves of Babla (*Acacia* sp) and sugar or juice obtained from bark of Banjam (*Aridisia solanaceasyn*) after proper grinding, juice obtained from Ban kurchi (*Holarrhena antidysentrica*) both juices are mixed and boiled to make a thick substance and drench it or juice obtained from bulk of Sal tree (*Shorea robusta*) as a drench (Dana, 1998) or leaves of Bamboo (*Bambusa arundinacea*) (Dohare, 1996 and Dana, 1998). For controlling Tympanitis, molasses and ashes of oyster shell after proper grinding and mixed together and drenched (Dana, 1998). Kulpaimeni (*Acalipaindica* Sp) is used for curing respiratory disorders, dry cough, bronchitis and lung ulcers (Venkatasubramanian and Fulzele, 1993) or juice obtained from roots of Isharmul (*Aristolochia indica*) after proper grinding and mixed with warm water and drenched shall be used to control respiratory problems (Dana, 1998). In case of wounds in animals, Kutcha halood (*Curcuma lonaga* Lin) after proper grinding and mixed with lime and apply in wound (Dana, 1998). 20-25 numbers of jack fruit (*Artocarpus* sp.) leaves with oil immediately after par-turition for smooth expulsion of placenta (De, 1994) or after proper grinding of masoor dal (*Lensculinaris* medic) and kutcha halood mixed with molasses and drenched (Dana, 1998) are using by the tribes in retention of placenta. In other case, three to four seeds of Bhilama (*Semecarpus anacardium*) are fed to animals when animals are not coming in heat or fail to conceive (Gupta and Patel, 1992) shall be useful in

controlling Anoestrous. To control worm infestation Kalajira mixed with sour whey is practiced by most of the tribal farmers to kill intestinal worms (Khatik, 1994). Hanging of Thor (*Euphorbia* sp.) branch at the gate of animal byre so that animals do not get infection of food and mouth diseases (Mane, 1992) or Vela seed (*Seme-carpus anacardium*) after proper grinding and mixed with mustard cake and allowed to eat it to control Foot and Mouth Disease in cattle (Dana, 1998). In the event of pus formation in the swelling of yoke gall, majority of the tribals use firing with red hot iron. The wound is then washed with boiled neem leaves (Srivastava, 1982), in case of treatment of yoke gall, 44.30 per cent santals applied Go-sap's fat (*Varanus* sp.), 40% santals applied pig's fat, 2.85% treated their bullocks with mohua oil (oil obtained from seeds of *Madhuca indica*) and 2.85% treated their bullocks with honey and lime (Dana and Kaul, 1998). More than 90 per cent of the tribals of Chotanagpur used an herbal plant "Harjora" (*Vitis quadrangularis*) in case of fracture (Srivastava, 1982 and Dana, 1998). Toda tribes of Nilgiris used to feed eggs of spider and flour of ragi to animals for protection against foot and mouth disease (Karthikeyan and Chandrakaran, 1996).

IK importance in fisheries

During monsoon season, the inundated paddy fields and low-lying areas gave birth to today's aquaculture. The natural seed of fish got trapped after water receded which eventually led to the idea of trapping and holding of fish seed and raising them to the table size. Probably this is the milestone of the first innovation in aquaculture. Since the evolution of mankind, man has been entrusted with resources and location specific avenues like agriculture, fishery, diary, animal husbandry, indigenous , medicine, weather study, etc.

In rural areas, traditionally associated technical knowledge of fish farmers followed from generations to generations to cope up with different situational constraints (Gupta, 1990). The tested and proven innovations of one ancestors needs to be valued, validated and blended with new technological support (Das et al. 2002 and Pandey, 1996). Understanding of the dimension of technologies of the fish farming helps in asserting the degree and directional change through formal

research (Pandey, 1996 and Gupta et al., 1994).

A study was conducted by Goswami *et al.* (2006) in South 24 Paraganas district of West Bengal. Within the district two blocks namely, Namkhana and Kakdwip were selected. A total 20 hatchery owners and 70 traditional farmers were selected from both the blocks. The population of the study was selected by using simple random sampling technique without replacement. Data were collected from the respondents through personal interview using semi-structured schedule. The respondents followed the indigenous practices, such as to minimize protozoan diseases and worm of fish they use banana logs in pond. Banana plant cells helps in increasing the pH of pond water through their alkaline secretion. To manage the fish lice Pala and Bamboo logs have been used, where the fishes will rub their body to the Pala and Bamboo logs. As a result the lice will be removed from the body. Some of the hatchery owners are using broken Catechu nut extract to obtain higher hatching rate. Some of the small and medium farmers are using indigenous fishing instrument, Polo to capture the fishes in low water raising area. To advance the brooders maturation, some of the hatchery owners are applied the eggs into brood stock pond.

Conclusion

Indigenous forms of communication and organizations are vital to local level decision making process and to the preservation, development and spread of indigenous knowledge. According to one estimate there are about 15,000 external tribal cultures in the world which represent a vast assortment of sound ecological and biological knowledge, an invaluable library that is being destroyed every year (Linden, 1991). The World Bank states that IK systems are “at risk of becoming extinct” (World bank, 1999) so there is a need to search for more effective and creative interactions between indigenous knowledge and scientific knowledge systems (Dewalt, 1994). Indigenous knowledge is a critical factor for sustainable development. Empowerment of local communities is a prerequisite for the integration of IK in the development process. The integration of appropriate IK systems into development programs has already contributed to efficiency, effectiveness, and

sustainable development impact. IK need to be preserved, many indigenous knowledge practices can at the same time be integrated into local, national, regional, or even global development efforts. However, experience has shown that this cannot be done by one institution alone. Therefore, partnerships are needed to support this process at all levels. The Indigenous Knowledge for Development Program of the World Bank will continue to champion IK and join others in their efforts to harness indigenous knowledge for development in a process of continuous learning from local communities. As IK is the information base for a society that facilitates communication and decision-making, it needs to be well documented and disseminated to the corresponding target communities to achieve better empowerment which leads to development of the nation.

Though the IK gained importance in all the international development activities certain critical issues need to be answered which are very fundamental to development of Indigenous People. The important questions are, “whose knowledge?”, “for whom?” and “who will benefit?” we should not fail to mention the methods of providing Indigenous people access to the documented information.

References:

- Bidwai, 1997. Blocking biopiracy: We must not trip over TRIPS. The Times of India, March 12th, 1997.
- Chimaraoke, O.I., Ugai, G.A., Ukwai, J.K., 2003. Indigenous knowledge and communal conflict resolution: evidence from Nigeria. *INDILINGA—African Journal of Indigenous Knowledge Systems* 2 (2).
- Dana, S.S. 1998. Animal Husbandry Practices among Santals and Lodha Tribes of Midnapur District of West Bengal. Ph.D. thesis, IVRI, Izatnagar.
- Dana, S.S. and Kaul, P.N. 1998. Indigenous veterinary medicines. *Honey bee*, Vol.9 (4) : 14.
- Das, P., Das, S.K., Arya, H.P.S., Reddy Subba G and Mishra, A. 2002. Inventory of indigenous technical knowledge in Agriculture, Mission unit, Division of Agricultural Extension, ICAR, New Delhi.

- De, H.K. 1994. Identification and assessment of indigenous technologies in animal husbandry in Bankura district of West Bengal. M.Sc. Thesis, NDRI, Karnal.
- Dewalt, B.R. 1994. Using indigenous knowledge to Improve agriculture and natural resource management. *Human Organisation* 53(2): 123-131.
- Dohare, R.S. 1996. A study on indigenous technical knowledge in animal husbandry in Mathura district. Ph.D. thesis, IVRI, Izatnagar.
- Goswami, B., Mondal, S. and Dana, S.S. 2006. Indigenous Technical Knowledge in fish farming. *Indian Journal of Traditional Knowledge*. Vol. 5(1) 1-166.
- Gupta, A.K. 1990. Documenting indigenous farmer's practices. *ILIEA News letter*, 6 (2) (1990), 29-30.
- Gupta, A.K. and Patel, K.K. 1992. Survey on farmer's innovations in Gujarat. *Honey Bee* 3 (2) : 22.
- Gupta, S.L., Singh, S.P. and Dubay, V.K., 1994. Traditional wisdom; A conceptual exploration, *interaction*, 12(1).
- Karthikeyan, C. and Chandrakandan, K. 1996. Indigenous technical knowledge of the tribes in Agriculture. *Journal of Extension Education* 7(2): 1417-1421.
- Kaul, P.N. 1994. Traditional wisdom in veterinary science. *Farm Digest* 4(5): 25-26.
- Kaul, P.N., Mishra, O.P, Kumar. A. and Lal, B. 1998. Cattle rearing practices of Bareilly farmers. *Diary Guide Jan-March*, 1998.
- Khanna, B.M. 1967. A study on the indigenous systems of Veterinary medicine as practiced by the farmers of Hissar-1 Block. M.Sc. thesis, Punjab Agricultural University, Hissar.
- Khatik, G.L. 1994. A study on training needs of tribal dairy farmers in Rajasthan. Ph.D. thesis, NDRI, Karnal.
- Lightfoot, C. 1995. Using indigenous knowledge systems in the design of on-farm experiments- a Philippine case. In *the cultural dimension of development: indigenous knowledge system* (edited by Warren, D.M., Slikkerveer, L.J. and

- Brokensha, D.), International Technology Publication Ltd., London, U.K., pp 348-353.
- Linden, E. 1991. Lost tribes, lost knowledge. Time Magazine Sep. 23, cited by Brahmachary, R.L. (1995).
- Mane, P.M. 1992. Branch of Euphorbia sp. Honey Bee 3 (2): 20.
- Mukhopadhyay, D. 1989. *Culture, Performance and Communication*. B. R. Publishing, New Delhi.
- Pandey, A.K. 1996. A comparative study of livestock rearing system among tribal and non tribal in Chotanagpur region of Bihar. P.h.D. thesis, NDRI, Karnal.
- Ramakrishnan, P. S., Saxena K. G. and Chandrashekara U. M. (eds). 1998. *Conserving the Sacred for Biodiversity Management*. Oxford and IBH Publishing, New Delhi.
- Shiv Naraina, G., Dubey, V.K. and Gupta, S.L. 1993. Methodologies for tapping and documenting indigenous technologies. Paper presented at National seminar on Indigenous Technologies for sustainable agriculture. March 23-25, 1993
- Srivastava, R.M. 1982. Cattle in culture and economy of tribal Mundas of Bihar. Ph.D. Thesis, Kurukshetra University, Kurukshetra.
- Talawar, S. and Singh, Y.P. 1993. In search of wisdom among the farmers of arid agriculture: documentation and analysis. Paper presented at National seminar on Indigenous Technologies for sustainable agriculture. March 23-25, 1993, held at IARI, New Delhi.
- Venkatasubramanian, V. and Fulzele, R.M. 1993. Indigenous knowledge and practices in animal husbandry. Paper presented at National Seminar on Indigenous Technologies for sustainable agriculture. March 23-25, 1993 held at IARI, New Delhi.
- Warren, D. M. (1991). *Using Indigenous Knowledge in Agricultural Development*. World Bank Discussion Paper No.127. Washington, D.C: The World Bank.

World Bank. (1999). World development report 1998/1999: Knowledge for development. Retrieved April 30, 2005, from <http://www.worldbank.org/afr/ik/ikrept.pdf>

*Professor and Head

Ph.D. Scholar