



A Report On The Survey Of Organic Manures, Farms And Documentation Of Indigenous Procedures, Practices And Techniques Followed In Manipur, India

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Abstract:

Techniques of agriculture followed in the traditional agriculture system were observed to conform the principles of organic farming. An understanding of the indigenous knowledge would help us in increasing the knowledge base of viable organic agricultural practices suited at the local level. Again the ideas and techniques could be addressed and refined for acceptance in the modern agricultural systems. Hence a study is worked out to document the various traditional practices relevant to organic agriculture being practiced in Manipur. Field visits, observations and contact discussion with elder farmers were carried out in rural areas of Manipur for collection of information regarding the traditional organic agriculture. An attempt had also been made to assign scientific rationale of the various practices followed by the traditional farmers. From the study it has been revealed that most of the practices could be assigned scientific rationale although it was not aware to the traditional farmers. In fact the traditional practices were time tested and particularly suited at the local areas concerned. They could be treated as specialized form of practice suited for the location specific region or locality. The practices were partly intermingled with the religion, culture and beliefs of the local people. The practices were sustainable and utilize locally available resources at the optimum for maximization of output. The waste from the fields, households, and other human activities were used as a source of soil input to enhance soil fertility and soil physical properties. The soil inputs ranges from cattle manure, garden waste and even kitchen waste. These were cost effective and easy to handle and they were ideal practices for nutrient recycling. In the disease management front, the principle of exclusion was the, most prominent mode of practice. Although practice were mostly confined to small marginal land holders yet, a study would help in understanding the vast knowledge pursued by traditional farmers which is expected to enhance the knowledge base for selection of appropriate practice for organic crop protection and sustainable agriculture.

Keywords: Traditional Knowledge, organic manures, Documentation

Introduction

Traditional knowledge is a knowledge resource contributed by our industrious and laborious forefathers to us. We need to safeguard the various indigenous techniques and practices. This indigenous traditional knowledge has withstood the test of time, effective and locally suited activities. We need to develop the techniques rather than simply disposing it and blindly accepting modern technologies for a robust crop production. Green revolution has enhanced the production of crops and ensures availability of food for the en-masses. The revolution is marked by introduction of new technologies especially western technology in particular. But its impact on the traditional knowledge of small holders is considerably large. It becomes a threat to the established and time tested activities of the traditional farmers. As per Abiola *et al* (2011), Indigenous agricultural Knowledge (AIK) is characterized with location and culture specificity, non systematic documentation, oral and rural in nature, dynamic and based on innovation, adaptation, and experimentation, and found relevant in local level decision making for survival and subsistence. It is acknowledged that small holders embark more on sustainable crop production rather than maximize production at the cost of external resources. The techniques of traditional knowledge of agriculture are important sources of knowledge applicable to organic farming system since most of the techniques of the traditional farmers conform to the principles of organic agriculture. It is of interest to document the traditional knowledge as they are found applicable in organic farming. Hence an attempt has been made to document various traditional knowledge practiced by the people of Manipur and to observe the practices from the scientific perspective. Since traditional Knowledge were region specific, a documentation of the knowledge would help in safeguarding the vast indigenous knowledge from being washed down the memory lane. Indigenous knowledge were invaluable resources. Every practices of the traditional farmers in the fields were taken up with due consideration of many factors and includes economic consideration, environmental considerations, feasibility, sustainability etc. The local farmers usually practiced the organic mode of farming agriculture. The concept of sustainable crop production was very much in their mind. Farmers belong to the marginal group or small holders were practicing organic mode and were subsistence cultivators till the present time. They sold few surpluses to the local market their cultivation practices had many encouraging ideas suited for organic agriculture.

Materials And Methods

Documentation of the traditional practices of agriculture and other activities has been done through a number of ways. Techniques for the documentation of the traditional knowledge has been studied in detail in the manual of International Institute of Rural Reconstructions (IIRR) entitled "Recording and using Indigenous Knowledge: A manual (1996)". Among the techniques certain techniques like field observations, interviewing, participant observation and surveys were adopted for the study for ease of application and suitability in our region.

A study of the various manures and practices followed by the agricultural farmers has been done through personnel field visits. Through the interaction of the farmers it has been tried to in ascertain the various practices of agriculture, their crop management techniques, the forms of fertilizer used and other cultural beliefs and practices found applicable to the sustainable agriculture. It is generally agreed that the traditional farmers prefer sustainable mode of agriculture as compared with robust production for a short period and failure/decline in next crop. They prefer to minimize profit rather than increasing risk.

For our study techniques and practices were considered traditional based on the assumptions that

- In India green revolution begins in nineteen sixties, Hence information's from the elder farmers above seventy years were evaluated. Often elder heads of the family who were no more practicing agriculture due to advancing age were consulted for the techniques and practices of the different farming practices in their fields
- Farmers who do not use any synthetic fertilizers or agrochemicals and quite unaware of the recent trends in organic farming were considered as traditional farmers. These peoples were extensively consulted for their farming practices. The practices were generally applicable in sustainable mode of agriculture.
- Farmers cultivating crops as subsistence type were considered traditional. This is the most interesting aspect of farming in organic environment. In places where there is extensive cultivation of crops especially vegetables on a commercial scale using synthetic fertilizers and agrochemicals, a small plot is usually maintained for home consumption without using any agrochemicals. These small plots were organic by default.

- Monocropping of rice and few staple crops are usually practiced but extensive cropping of other crops especially vegetables were characteristics of modern farming. Hence farmers with small growing land and with mixed cropping are regarded as traditional farming and the modes of farming in such fields were traditional and could be considered organic.

For collection of the information survey work covers some part of Senapati, Imphal west, Imphal east, and Thoubal districts of Manipur. Among the nine districts of Manipur I choose the four districts as they are relatively easy to assess. Again an understanding of these regions would give us overall ideas of the state, since the valley areas were cosmopolitan with peoples of different communities and religion even though the meitei communities were dominant.

Results and Observations

The observations are summarized in tabular form in table:1 for ready reference.

Product/ methods	Mode of application/practice	Farmers objective	Scientific rationale
Manure application			
a)during field preparation	Manures were applied at the time of field preparation	Maintain fertility of the soil and ease in application and uniform distribution	Conform with the modern techniques of fertilizer application
b)after the crops has established	Manures were applied near the crops after the plants have established in the soil.	Utilize the manure to its maximum potential	Ease of application ,Less chance of nutrient leaching as manure application and plant maximum growth usually considered
Manures used (animal source)			
Cow manure	a)composted due to deposition in a pit of dump in a heap were applied to the fields. Most widely used form of manure	Increase soil fertility and soil properties.	Cow manure is regarded as a good source of nutrients of the plants

	b)fresh	It also acts as a sort of mulch and applied on crops which require high humidity.	Mulching has value but the application of fresh manure would not give direct manure effect to the plant.
	c)dry matter	It provides a source of organic matter to the soil. Also it acts as a source of mulch.	Mulching effect is expected. Again it would organic matter to the soil in the long run.
Poultry manure	The waste from the coop is applied near the crop plants.	To increase fertility of the soil.	Poultry manure is a good source of nutrient.
Pig litter	Fully decomposed matter used as manure	To increase the nutrient of the plant.	Pig manure has high nutrient value and its use is encouraging.
Manure used (Plant source)			
Saw dust and Paddy husk	The husk is applied during the preparation of the fields	To increase the soil physical characters. It enhance the soil porosity and prevents water logging	The addition of organic matter in the soil would increase physical and chemical properties of the soil.
Compost from floating phytomass (<i>phumdi</i>)	Plant materials from the water bodies were often deposited near the pond. The composting materials consist of all sorts of plants found in water bodies.	The decomposed materials were applied in the soil for enhancing fertility.	Compost made from water bodies plant materials were a good source of nutrient to the crops.
Garden waste	The litter from the garden was usually burnt and the ash applied to the fields or composting of the materials was allowed naturally by depositing the materials in heaps.	It acts as a sort of soil amendment and increase the soil physical properties like easy soil leavening and easy water drainage.	Compost increases soil physical and chemical properties. Ash also adds minerals to the soil.
Kitchen	Waste dumped in a pit	To enhance the	The pits were often

waste	developed into a compost material. The fully composted materials were applied in the fields. Ash from household use were also added to the pit	soil fertility of the soil.	found to be colonized with earthworms. Thus the compost developed from the pit would have characteristics of vermicompost.
Floral waste	Floral waste from the morning offerings was dumped in a pit near the edge of the courtyard. These materials decomposed in time and they are used as manure for some plants especially ornamental plants.	The compost developed were fine and would enhance the growth of the plants	The materials being floral parts and are easily degradable. In such pits earthworms often colonize and materials would be a good vermicompost.
Application of ash	Farmers applied the ash produced in the kitchen or burning of crop debris on fields and ploughed along with the soil. Also they apply ash to the plants infected with diseases especially aphids on vegetables.	The application of ash increase the soil properties like easy leavening, good plant growth etc. The application of the ash on the insects decreases the spread of the disease.	Ash is a good source of nutrient of plants. Hence application of ash would definitely increase the fertility of the soil. Again the alkaline nature of the ash might affect the insects thereby preventing the rapid spread of the disease on its application.
Pond mud application.	Mud from the pond was applied as a base material in planting banana. They are also applied near the new transplants.	The application would help in keeping the plants cool and would help in the establishment of the transplants	Since the mud was fine it would act as a sort of material for water retention hence would have a mulching effect on its application. Again the pond mud was rich in nutrients.
Application of floating flora of water bodies.	Plants growing on the water surface of ponds and water bodies were applied near plants.	It increases the fertility of the soil. It also acts as a sort of mulch for the crop.	Decomposition of the plant material would enhance the organic and nutrients of the soil. Some weeds like azolla were widely used as biomanure
Field			

preparation			
a)season selection	Season prior to the rainy season has been selected, marked by religious rituals like, <i>panchami, lui-ngai-ni, gudui-ngai, lura, yarra, mangkhap</i>	Waiting for the rainy season for the successful establishment of the plants	Being rain fed, field preparation prior to the rainy season has value .again the time coincides with the hot period where the soil was left dry
b)soil drying and pulverization	Small holders first plough the soil into chunks and dried then pulverized in the next round	Make the soil fully dry	The dryness of the soil would help in decreasing the disease inoculum potential in the soil.
Ridges and furrows	Plants were often planted in discrete furrows	The discrete furrows help in water retention in the furrows moreover the furrows were filled up at the time of soil leavening and manure application.	Furrows would help in channeling water towards the bottom of the furrow. This technique would help in optimum utilization of available water resources.
Water ring around seed bed.	A water ring is made around the seed bed and water is maintained around the bed.	Prevents from ants attack	The technique seems feasible in small seed beds. The formation of a water ring prevents access of the ants to the beds.
Sun screen for plants	Farmers often provide shades to newly planted plants. Short strips of banana sheath were made to stand near the plants providing shade to the new plants.	It provides shade to the new transplants. It would help in preventing the transplants from damage due to solar heat.	This is a very convenient technique for protecting the new transplants from direct exposure to sunlight during the days.
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Disease management	There is culture of personification of Fields and crops. The fields and crops were managed as a	Constant vigil of the crops helps in timely intervention thereby reducing the	Through constant vigil timely intervention would be possible. Again the

	<p>living object. Due care has been taken in providing the nutrients to the plants. The crops were weeded in regular intervals. There is regular visits of the fields.</p>	<p>loss of crop. Again the maintenance of sanitary condition of the fields prevents diversion of soil nutrients to the weeds.</p>	<p>sanitary measures would help in decreasing the secondary host of pathogens; it would ensure proper sunlight reducing many plant diseases.</p>
Seed procurement and storage			
Seed selection	<p>Crops with the best fruits were saved for the next season rather than consuming it. Often seeds with the best physical characteristics were reserved for the next season</p>	<p>Good seeds would produce good fruits and harvest.</p>	<p>The selection of the best seeds from the good crops is a technique of breeding of good seeds. Hence the technique of saving the best seed for the next season is commendable from the scientific point of view.</p>
Bean seed storage	<p>Pods were allowed to mature in the plants and are harvested during dry conditions. The mature pods collected were then dried in the sun till the pods and seeds separate. Then the seeds were store in bamboo baskets and placed near the granary where it is warm and airy.</p>	<p>The separation of the pods and the seeds is allowed naturally to attain maximum maturity. They believe that the immature seeds do not grow in the next season. Drying reduce the damage of beans from pest and pathogens.</p>	<p>Proper drying reduces the chance of infection of the seeds as most micro organisms could thrive in conditions of high humidity. The dryness would create an environment non conducive to the pest and pathogens.</p>
Chili seed storage	<p>The mature fruit were selected and dried in the sun for a day to reduce the moisture of the fruits. Then it is stored in earthen pods along with ash. Only the seeds remain in the next season and the seeds along with the ash are used in sowing.</p>	<p>The storage helps in easy maintenance of the fruits from infestation of pest and pathogens. The ash acts as a sort of barrier for a wide range of pest and pathogens.</p>	<p>The storage would help in the maintenance of a stable climatic condition as ash are poor conductors of heat it would shield the seeds from the fluctuating weather conditions of the surroundings.</p>

Seeds of certain plants.	Seeds of plants like cucumber, pumpkin, gourd etc. which bears soft pulp along with the seeds were pasted on the mud walls of the house which is usually airy, in shade and dry. The pulp paste the seeds firmly on the mud walls.	The seeds could be easily stored with this method. The technique helps in keeping the seeds in the dry condition and it also helps in preventing loss of the few seeds	Since the seeds are in the dry and airy region it is expected that there would be less infection. The pulpy layer would act as a sort of coating and prevents direct contact with the surrounding environment.
Post harvest techniques of crops			
Sun drying	Crops harvested were generally exposed to the sun in special bamboo mats " <i>phoura</i> " The crops were turned over and again till the crops were dry.	Dryness helps in prevention of crops from damage by insects and microorganisms.	Drying of the seeds help in reducing the moisture level of the seeds thereby creating an unfavorable environment for the microorganisms.
Storage of crop products over the furnace.	Crops especially with low water contents were stored over the furnace, high enough not to catch fire but low enough to get the heat around seven to eight feet from the ground. The materials were placed on a bamboo platform known as " <i>sagai</i> "	The crop materials were saved from infestation of pest and pathogens and helps prevent crop loss.	The heat and smoke would hinder the establishment of pest and pathogens in the crop. The application of constant heat and smoke in each days ensures safe storage of the materials
Cultural and religious practices			
Personification of the fields and crops	There is tradition of personification of the fields. The fields were treated as living body and constant supervision is done on a daily basis.	Constant observation would help in early detection and timely management.	The philosophy of constant monitoring, though laborious is commendable from the scientific point of view. As it would help in taking up proper

			management practices in the proper time.
Prayer of field free of disease	On the day of <i>cheiraoba</i> a mixture of turmeric, charcoal and rice were spread in the field with the prayer to ward of disease in the field	The application would help in reducing disease in the coming season	Turmeric in the application has good antimicrobial activity and would directly impact on the microbial activity of the soil.
Prayer for bamboo groove	On the day of <i>cheiraoba</i> soil from the garden where there is good crop in the previous season were applied on bamboo grooves.	The soil would help in making the bamboo grow well like the crops in the garden.	Since most garden soils were organic by default, the soil from the garden would act as a good source of healthy soil micro-flora to the bamboo groove.
Felling of trees and bamboos	Prior intimation before the felling of trees and bamboos has been done, a day in advance. Also felling of trees were done on Monday, Wednesday and Friday	Religious belief that wrath of mother nature would lead to crop loss if permissions were not taken from mother nature.	A sense of conservation is observed, moreover the practice enhance the logical relationship between man and the environment.

Table 1: Indigenous practices in Manipur and their brief description with appropriate scientific rationale

Conclusion

Documentation of the traditional knowledge in agriculture is imperative for the present generation so as to safeguard the rich heritage of the local people. There has been extensive study and documentation of the indigenous practices the entire world over. For instance Abioye et al (2011) had documented an array of traditional practices in Nigeria. The study unfurls many potential indigenous techniques for food production and disease control. The traditional storage practices described in "traditional procedures and methods of storage protection" by Carolin Bothe presents the feasible practices applicable to every farmers. They seemed very effective. The extensive work of Maden et al in Nepal also presents a wide array of potential indigenous techniques found relevant still today. Chhetry and Belbahri(2009),Jeeva et al (2006) have done works on traditional knowledge in north East India. This paper would add to the preexisting documentation of traditional knowledge. From the studies it seems rather common that practices of the traditional farmers were tedious and laborious. The farmers seem to

possess great power of patience and endurance in cultivating crops. They worked in the field's day in and day out. It was this constant vigil by the farmers that there was less wide scale damage of crops in their fields. Though mechanization was inevitable for commercial scale production yet it was not suited for the small holders. Hence the traditional mode was still relevant in the rural farming community. It is hoped that this paper would add to the resource base of documented traditional knowledge of the world.

Reference

1. Abiola Abioye, Yetunde Zaid, Halima S. Egberongbe (2011), Documenting and Disseminating Agricultural Indigenous Knowledge For Sustainable Food Security: The Efforts of Agricultural Research Libraries in Nigeria, <http://conference.ifla.org/ifla77>
2. Recording and Using Indigenous Knowledge: A manual (IIRR, 1996, 211)
3. H. Barua, M. M. Rahman And M. M. Masud, (2009), Effect Of Storage Containers Environment At Different Storage Period On The Quality Of Chilli Seed, Int. J. Sustain. Crop Prod. 4(4):28-32
4. Traditional procedures and Methods of Storage Protection , Carolin Bothe <http://www.greenstone.org>
5. Maden k, Ramjee Kongren & Tanka Maya Limbu Documentation of Indigenous Knowledge, Skill and Practices of Kirata Nationalities with Special Focus on Biological Resources, <http://himalaya.socanth.cam.ac.uk>
6. G.K.N.Chhetry and Lassaad Belbahri, (2009), Indigenous pest and disease management practices in traditional farming systems in North east India: A review, Journal of plant breeding and crop science 1(3)28-38
7. Solomon Retna Dhas Nadar Jeeva, Roytre Christopher Laloo and Bhanu Prakash Mishra, (2006), Traditional agricultural practices in Meghalaya, North East India , Indian Journal of Traditional Knowledge, 5(1)7-18