Seminar report

AGRICULTURAL ANTHROPOLOGY: AN EMERGING FIELD

By

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DECLARATION

I, Lakshmi Muralikrishna (2018-11-063) hereby declare that the seminar entitled 'Agricultural anthropology: An emerging field' has been prepared by me, after going through various references cited at the end and has not been copied from any of my fellow students.

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20/01/2020 — 2018-11-063

CERTIFICATE

This is to certify that the seminar report entitled ‘Agricultural anthropology: An emerging field’ has been solely prepared by Lakshmi Muralikrishna (2018-11-063) under my guidance and has not been copied from fellow students.

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CONTENTS

List of figures

Agricultural anthropology: An emerging field

1. Introduction

Anthropology is the scientific study of humans, human behavior and societies in the past and present. It includes social anthropology that studies patterns of behavior, cultural anthropology that studies cultural meaning, including norms and values. linguistic anthropology that studies how language influences social life and biological/ physical anthropology that studies the biological development of humans.

Meanwhile, agriculture is the science and art of cultivating plants and livestock. It was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago. After gathering wild grains beginning at least 105,000 years ago, nascent farmers began to plant them around 11,500 years ago. Pigs, sheep and cattle were domesticated over 10,000 years ago. Plants were independently cultivated in at least 11 regions of the world. Industrial agriculture based on large-scale monoculture in the twentieth century came to dominate agricultural output, though about 2 billion people still depended on subsistence agriculture into the twenty-first.

2. Agricultural anthropology: (Nicholas and Tuttle, 2015)

2.1. History of agriculture

According to archaeologists, the two major revolutions in agricultural history are the Neolithic Revolution and the Industrial Revolution.

2.2. The Neolithic revolution (New Stone Age)

It was the first agricultural revolution. It was a gradual change from nomadic hunting and gathering communities and bands to agriculture and settlement. This period is described as a "Revolution" because it changed the way of life of communities which made the change. It occurred in different prehistoric human societies at different times. Many societies changed 9–7 thousand years ago. The term refers to the general time period over which these developments took place. It also applies to the changes which took place: the adoption of early farming

techniques, crop cultivation, and the domestication of animals. The Neolithic Revolution is important for developments in social organization and technology. The Neolithic revolution led to living in permanent or semi-permanent settlements. Because of this fewer people led a nomadic lifestyle. To be able to know who the crops grown belonged to, the concept of land ownership was developed. The natural environment was changed, population densities grew, and people ate more vegetable and cereal foods in their diet. Hierarchies developed in society. Grain was stored, and could be traded. Surplus production from good crop yields helped societies survive bad years (Willey, 2018).

2.3. The Industrial Revolution

It is now also known as the First Industrial Revolution, which was the transition to new manufacturing processes in Europe and the United States, in the period from about 1760 to sometime between 1820 and 1840. This transition included going from hand production methods to machines, new chemical manufacturing and iron production processes, the increasing use of steam power and water power, the development of machine tools and the rise of the mechanized factory system. The Industrial Revolution also led to an unprecedented rise in the rate of population growth. The major innovations and developments are crop rotation, use of Chinese plough, exclusive ownership of land, national market free of tarrif and trade, fertilizer use, selective breeding *etc* (Willey, 2018).

2.4. History of agricultural anthropology

The term "agricultural anthropology" was developed and adopted by Robert Rhoades (1942-2010) to explain his own work to other social and biological scientists in the late 1970s and early 1980s, during his post as a Rockefeller Postdoctoral Fellow at the International Potato Center (CIP) in Lima, Peru. Research protocols and policies in the Consultative Group on International Agricultural Research (CGIAR) system are largely catered and dictated by agronomists and biologists. It was not long before Rhoades (in collaboration with a fellow post-harvest colleague, biologist Robert Booth) turned the CIP approach on its head, suggesting that research should both begin and end with the farmer instead of the top-down approaches that prevailed at the time.

Rhoades and Booth (1982) called their model 'farmer back to farmer', which quickly became an early and popular participatory approach in agricultural development, leading to the formation of an entire new program in the CGIAR system directed by Rhoades and the diffusion of appropriate technologies to millions of farmers worldwide (Sarker, 2017).

2.5. Definition of agricultural anthropology

Agricultural anthropology is "the comparative, holistic, and temporal study of the human element in agricultural activity, focusing on the interactions of environment, technology, and culture within local and global food systems, and it has the practical goal of responsibly applying this knowledge to improve the efficiency and sustainability of food and fiber production. Agricultural anthropology views agriculture neither as a mere technical process nor even as a techno-economic combination, but as a complex human creation and the evolutionary process that includes equally important socio-cultural and ideological components in interaction with each one another and the natural environment. Agricultural anthropology is broader in scope than other agricultural disciplines which focus, and rightly so, on specialized and limited problems in agriculture (Rhoades and Booth, 1984)."

3. **Fieldwork methods used in agricultural anthropology** (Gordon, 2004)

In anthropology there are several types of fieldwork methods that are used while conducting research.

3.1. Observational Methods

The observational method is viewed as the least invasive method where the anthropologist minimally integrates themselves into the society they are studying and gathers data through verbal communication while attempting to remain non-intrusive of the culture. This group of methods focuses on community interaction through language. It usually entails many open-ended interviews with participants who are members of a group being studied. This type of research often strives to create an open dialogue, called a dialectic, in which information flows back and forth between researcher and subject. Because many anthropologists also hope to help the communities

they work with to make change on their own terms within the confines of their own culture, in some cases objectivity is abandoned in favor of community based activism and social change.

3.2. Participant Observation

Participant observation is a method for anthropological fieldwork, used to collect data such that the anthropologist must create an intimate relationship between themselves and the culture studied. This method requires that an anthropologist participate in a social event that is part of a specific culture. This includes, but is not limited to, observing members of a culture by taking notes, eating the food that is provided, and participating in festivities. The goal of participant observation is to be involved in the culture like a member of that society, all while observing and studying the culture. The information gathered in this observation is then recorded and reflected upon to gain further insight into the culture being studied. This observation method helps the anthropologist develop a deeper rapport with the people of the culture and can help others understand their culture further. This experience may result in the individuals opening up more to the anthropologist which allows them to understand more than an etic point of view of the culture.

3.3 Non-Participant Observation

In contrast to participant observation, non-participant observation is the anthropological method of collecting data by entering within a community but with limited interaction with the people within the culture. This anthropologist can be thought of as a fly on the wall. An etic approach that researchers often use to examine the details of how the subjects interact with one another and the environment around them. Detailed research such as body behavior (e.g. eye gaze, facial expression), speech styles (e.g. pitch) can be recorded through the nonparticipant method, but usually the emic approach is preferred when observing social context. An example of data collected through non-participant research would be the an estimation of how often women in a household wear high heels due to how worn out the carpet is. The non-participant observation, although effective in providing some research, has limitations. One being, the observer effect. This is caused by the presence of the researcher having an influence over the participants' actions. The researcher may use systematic approaches of field notes, sampling and data to ensure and increase comfortable interactions. While using the non-participant observation method, the researcher's

opinions may oppose that of the participant's on a certain issue. The only solution to this problem and to have a fuller and unbiased take on the research is to use both non-participant and participant method.

3.4. Ethnographic Method

Cultural data assumes the form of directly observable material items, individual behaviors, performances, ideas and arrangements that exist only in people's heads. From the perspective of the culture concept, anthropologists must first treat all these elements as symbols within a coherent system and must record observations with attention to the cultural context and the meanings assigned by the culture's practitioners. These demands are met through two major research techniques: participant observation and key informant interviewing.

3.5. Comparative Method

Since the beginning of anthropological studies, the Comparative Method has been a way to allow a systematic comparison of information and data from multiple sources. It is a common approach for testing multiple hypotheses on subjects including co-evolution of cultures, the adaptation of cultural practices to the environment, and kinship terms in local languages from around the world. Anthropologists Ruth Mace, who specializes in evolutionary ecology and Mark Pagel explored the comparative method of anthropological research in their article The Comparative Method in Anthropology. However, "cultures cannot be treated as independent for purposes of investigating cross culture trends," therefore they must instead be studied in relation to one another: How two or more cultures grow together, or how they are researched together has the ability to outline the entire premise of the comparative method. Having been used for hundreds of years, this method is still one of the main forms of research for anthropologists all over the world.

3.6. Reflexivity

Reflexivity is the awareness of the researcher of the effect they may be having on the research. It involves a constant awareness and assessment of the researcher's own contribution to and influence on the researcher's subjects and their findings. This principle was perhaps first thought of by William Thomas, as the "Thomas Theorem". Fieldwork in cultural anthropology is a reflexive experience. Anthropologists must constantly be aware that the information they are gathering may be skewed by their ethical opinions, or political standings. Even an anthropologists' presence in that culture can affect the results they receive. Reflexive fieldwork must retain a respect for detailed, accurate information gathering while also paying precise attention to the ethical and political context of research, the background of the researchers, and the full cooperation of informants. Some anthropologists have taken this method to the extreme, Margaret Wilson, for example, wrote her book 'Dance Lest We all Fall Down' in a reflexive biographical manner; this accounted for her inability to fully integrate into Brazilian society.

3.7. Intersubjectivity

Intersubjectivity is the realization that knowledge about other people emerges out of people's relationships with and perceptions of each other. The concept was first introduced by the principal founder of phenomenology, Edmund Husserl, and creates a "theoretical frame for thinking about the ways in which humans interpret, organize, and reproduce particular forms of social life and social cognition". Intersubjectivity is defined by five key principles. The first is that intersubjectivity is not limited to the concept of matching one's mental state with another’s mental state. The second claim of Husserl's dissertation is that intersubjectivity is founded on the principle that we all share the same world, so that if two individuals were to "trade places", it would be present itself in the same way. The third claim is that intersubjectivity creates a synthesis of worldviews through the usage of empathy. The fourth claim is that intersubjectivity must precede meaningful interaction, as well as " The possibility of reflection on the self, discovery of the ego, capacity for performing any epoché, and the possibility of all communication and of establishing a communicative surrounding world as well".. Finally, the fifth claim is that intersubjectivity is the principle by which anthropologists must view their work. In order to properly create an account

of a group of people, one must develop relationships with others and deduce perceptions through experience

3.8. Participatory Action Research

This specific method requires a community commitment to change. It occurs in five steps:

a. Education on the Process or Creating a Dialogue

b. Collective Investigation

c. Collective Interpretation

d. Collective Action

e. Transformation: Self-Determination and Empowerment

Because of the intrinsic qualities of this type of research (ideally being conducted by people with close ties or membership of a community), it is usually very applicable to situations in the community. The research is an analysis of the community's behavior by the community's members. Not only are they by necessity, motivated to work on the problem, but they will already have significant rapport with other community members which allows them to better address and analyze it. The dynamic attributes of the process allow constant reevaluation and change. This cyclic or regularly repeated tendencies can develop into healthy adaptation patterns in the community without outside contributions or aid.

4. Farmer classification by anthropologists based on mode of subsistence (Shearn, 2019)

Anthropologists have classified farmers into four categories *i.e.* foragers (hunter gatherers), horticulturists (primitive agriculturists), pastoralists (nomadic livestock rearers) and intensive agriculturists (modern farmers).

Figure 1. A Jarawa forager

Figure 2. A Yanomami horticulturist

Figure 3. A Maasai pastoralist

Figure 4. An Intensive agriculturist

4.1.Foragers

A forager is a human living in a society in which most or all food is obtained by foraging (collecting wild plants and pursuing wild animals). Hunter-gatherer societies stand in contrast to agricultural societies, which rely mainly on domesticated species. Hunting and gathering was humanity's first and most successful adaptation, occupying at least 90 percent of human history. Following the invention of agriculture, hunter-gatherers who did not change have been displaced or conquered by farming or pastoralist groups in most parts of the world. Only a few contemporary societies are classified as hunter-gatherers, and many supplement their foraging activity with horticulture or pastoralism. Contrary to common misconception, hunter-gatherers are mostly well-fed, rather than starving.Aeta people, Aka people, Andamanese people, Angu people, Awá-Guajá people, Batek people, Efé people, Fuegians, Hadza people, Indigenous Australians, Inuit people, Jarawa people (Andaman Islands), Yupik people (Groenveld, 2016).

4.1.1. The Jarawas

The Jarawas are an indigenous people of the Andaman Islands in India. They live in parts of South Andaman and Middle Andaman Islands, and their present numbers are estimated at between 250–400 individuals. They have largely shunned interaction with outsiders, and many particulars of their society, culture and traditions are poorly understood. Since the 1990s, contacts between Jarawa groups and outsiders grew increasingly frequent. By the 2000s, some Jarawas had become regular visitors at settlements, where they trade, interact with tourists, get medical aid, and even send their children to school.The Jarawas are recognized as an Adivasi group in India. Along with other indigenous Andamanese peoples, they have inhabited the islands for at least several thousand years, and most likely a great deal longer. The Andaman Islands have been known to outsiders since antiquity; however, until quite recent times they were infrequently visited, and such contacts were predominantly sporadic and temporary. For the greater portion of their history their only significant contact has been with other Andamanese groups. Through many decades, contact with the tribe has diminished quite significantly (Kumar, 2012).

4.2. Horticulturists (Service, 2018)

Primitive agriculture is called horticulture by anthropologists rather than farming because it is carried on like simple gardening, supplementary to hunting and gathering. It differs from farming also in its relatively more primitive technology. It is typically practiced in forests, where the loose soil is easily broken up with a simple stick, rather than on grassy plains with heavy sod. Nor do horticulturalists use fertilizer intensively or crop rotation, terracing, or irrigation. Horticulture is therefore much less productive than agriculture. The villages are small—some no larger than many hunting-gathering settlements—and the overall population density is low compared with farming regions.

Forest horticulturists use fallowing techniques variously called “slash-and-burn,” “shifting cultivation,” and “swidden cultivation” (a northern English term now widely used by anthropologists). After about two years of cropping a plot is left fallow for some years and allowed to revert to secondary forest or bush. Before resuming cultivation the bush may be cut, left to dry, and then burned. The ashes bestow some fertilization, but the foremost benefit of this procedure is that the plot will be relatively weed free at first.

4.2.1.Yanomami tribe

Indigenous people of Amazon rainforest in Venezuela and Brazil who depend heavily on rainforest resources; slash and burn agriculture (controlled burning). They burnt organic matter gives nutrients to grow bananas, sugarcane cassavas and hunt animals and fish. Shifting cultivation was followed by polygamous society and men do the heavy work. Their diet was found to contain low levels of sodium, thus their population had zero to low blood pressure. Their diet is considered as DASH.

4.3. Pastoralists (Schoof *et.al.,* 2018)

Pastoralism is a form of animal husbandry, historically by nomadic people who moved with their herds. The species involved include various herding livestock, including cattle, camels, goats, yaks, llamas, reindeer, horses and sheep.Pastoralism is found in many variations throughout the world, generally where environmental characteristics such as aridity, poor soils, cold or hot temperature, and lack of water make crop growing difficult or impossible. Operating in these more extreme environments with more marginal lands, mean that pastoral communities are very vulnerable to global warming.Pastoralism remains a way of life in many geographies including Africa, the Tibetan plateau, the Eurasian steppes, the Andes, Patagonia, the Pampas, Australia, and other many other places. As of 2019, 200-500 million people practice pastoralism globally, and 75% of countries have pastoral communities. Pastoralist herds interact with their environment, and mediate human relations with the environment as a way of turning uncultivated plants like wild grass into food. In many places, grazing herds on savannas and woodlands can help maintain the biodiversity of the savannas and prevent them from evolving into dense shrublands or forests. Grazing and browsing at the appropriate levels often can increase biodiversity in Mediterranean climate regions. Pastoralists shape ecosystems in different ways: some communities use fire to make ecosystems more suitable for grazing and browsing animals.Traditional pastoral systems preserve natural ecosystems through extensive ranching and rotational grazing and by using a variety of livestock

4.3.1.The pastoral Maasai of East Africa

They keep cattle, goats and sheep and move their herds throughout the year to optimize the utilization of rangeland resources for maximum meat and milk production. The strategy of mobile grazing allows their animals to utilize a wide variety of forage vegetation types that are wildly dispersed. This increases seasonal grazing and the carrying capacity of the land. As a result of well-skirted livestock movement, the herds stay healthy, and produce a reliable supply of milk and meat that meets the demands of polygamous pastoral households. Through their intimate association with the natural grasslands, Maasai pastoralists are familiar with numerous plant in their rangelands and pastures. They can also describe each plant's seasonality, nutrition value, toxicity, and medicinal properties for the different animals they keep. Division of labour pastoral households divide their members into groups (boys and girls over the age of 10, women, warriors, etc.) and each herds different classes of livestock in such a way that is compatible with the composition and functions of the pastoral household economy. Rangeland utilization warriors supervise grazing techniques and provide instruction on animal grazing behaviour. Elders order warriors to conduct ecological skirting, which includes identifying and classifying plants and accurately assessing the water-holding capacity of distant pastures. Then they draw up movement itineraries on the basis of the warriors' reports. (REFARM, 2018).

4.4. Intensive farming

Intensive farming or intensive agriculture is a kind of agriculture where a lot of money and labour are used to increase the yield that can be obtained per area of land. The use of large amounts of pesticides for crops, and of medication for animal stocks is common. This is a contrast to traditional agriculture, which does not get as much output per area. When agriculture is intensified, this means that the amount of work needed goes up, until the worker is replaced by a machine. At that point, there will only need to be a few workers to operate the machines. Intensive farming has often been done as a response to rising population levels. It is criticised, because the standards of animal welfare are low.[Intensive animal farming leads to increased pollution and to health issues.Modern day forms of intensive crop based agriculture involve the use of mechanical ploughing, chemical fertilizers, plant growth regulators or pesticides. It is associated with the increasing use of agricultural mechanization, which have enabled a substantial increase in production, yet have also dramatically increased

environmental pollution by increasing erosion and poisoning water with agricultural chemicals (Tong, 2017).

4.4.1 Study on the Mekong Delta in Vietnam

Harvest is mostly used for sale and trade. Rice intensified monoculture is mainly followed and they also cultivate vegetables on a small scale. In addition, they also raise pigs, chicken and frequent fishing. Intensive shrimp farming is prevalent and the population consists of a few implement makers.

5. **The emphasis of agricultural anthropology at present** (Sarker, 2017)

5.1. Agrobiodiversity conservation (Veteto and Skarbo, 2009)

Agrobiodiversity studies have been a longstanding and current research focus of anthropological inquiry. It also points to future directions in agrobiodiversity research that have been understudied to date including agrobiodiversity and its relationship to climate change and migration, the potential marriage of agrobiodiversity and food studies, agrobiodiversity in the Global North, and the incorporation of agrobiodiversity into emergent sustainable/alternative agriculture systems. Agricultural anthropology is suggested as a potential holistic subdiscipline for incorporating anthropological studies of agrobiodiversity.

5.1.1. Agrobiodiversity conservation in Nicaragua and Honduras

Participatory Plant Breeding results in the enrichment of local gene pools. In many cases the local varieties are the starting point for recombination of local genes and/or introduction of exotic alleles. In both Nicaragua and Honduras, as well as in other Meso-American PPB projects, the farmers identify what local varieties they like most and which characteristics they would like to see improved. The breeders then make crosses with improved germplasm, introducing desirable characteristics, which in many cases involve disease resistance, and then provide the farmers with the segregating material. In Honduras, the CIALs have so far generated a range of bean and maize varieties of which 11 (seven bean and four maize varieties) have been informally released. Informal release involves registration of the locally named PPB variety and recognition of CIAL ownership of it, both of which are recorded for posterity in the local municipality, and finally blessing the new seed by the local priest and/or pastor. The varieties are further multiplied and diffused through the CIAL network which embraces six agro-ecological regions of Honduras and

a variety of altitudes. Each zone generally represents environmental and cultural conditions that are more marginal than those normally targeted by the breeding program at EAP-Zamorano. Thus, PPB in Honduras essentially represents a complementary breeding strategy. In Honduras, some CIAL members report preferring the taste of newly created PPB bean varieties over the favoured traditional landraces even when they are not derived from them, while marketability (principally due to better form and colour) has also improved (USC Canada, 2008).

5.2. Sustainable agricultural practices (Sarker, 2017)

Sustainable agriculture in anthropology involves three main areas i.e., conservation agriculture, cultural memory banking and homestead gardening. The goal of sustainable agriculture is to conserve the natural resource base, protect the environment, and enhance the prosperity of a family or household over a period of time. The United Nations General Assembly has declared the year 2014 as International Year of Family Farming, recognizing the importance of this system of farming in conserving biodiversity, household nutritional security, and in maximizing production.

5.2.1 Conservation agriculture

Conservation agriculture can be defined by a statement given by the Food and Agriculture Organization of the United Nations as “a concept for resource-saving agricultural crop production that strives to achieve acceptable profits together with high and sustained production levels while concurrently conserving the environment” (FAO 2007). Agriculture according to the New Standard Encyclopedia is “one of the most important sectors in the economies of most nations” (New Standard 1992). At the same time conservation is the use of resources in a manner that safely maintains a resource that can be used by humans. Conservation has become critical because the global population has increased over the years and more food needs to be produced every year (New Standard 1992). Sometimes referred to as "agricultural environmental management", conservation agriculture may be sanctioned and funded through conservation programs promulgated through agricultural legislation, such as the U.S. Farm Bill.

E.g., In Dindori district (Madhya Pradesh) Baiga tribals practice ‘Benvar’ agriculture system. During early summer small bushes and branches, fallen leaves are lit up in a fire. In this thin layer

of ash mixed seeds are scattered. After about 3 years the site of farming changes. However after resting the land soil for some time, the tribal farmers again return to this land after 9 years. About 16 crops are routinely grown in this mixed farming system. These further have about 56 varieties. Various crops support each other in this mixed system. The bigger plant growth of maize protects Kulthi from strong winds. Legume crops make up for the nitrogen taken up by cereals. This 'benvar' system does not require the land to be ploughed. This system is rooted in the belief that ploughing hurts mother earth. So not to mention a tractor, even ploughing by bullocks is avoided. This in turn helps women farmers to be very self-reliant in benvar system. Generally ploughing is one aspect of farming that has been monopolised by male farmers. A researcher Vishwambharnath Tripathi has catalogued 26 types of cereals, 28 roots and tubers, 40 vegetables, 45 fruits and 21 mushrooms used in various tribal villages practising bio-diversity rich agriculture. Tribals also collect many kinds food from forests on the basis of their knowledge about the plant and tree diversity of forests (Singh, 2016).

5.2.2 Cultural memory banking

Every seed has a story to tell. "Cultural memory banking," a term coined by anthropologist Virginia Nazarea, recognizes the inextricable link between crop diversity and human cultures. Cultural memory banking refers to the integration of cultural information associated with seeds conserved in seed banks.

Traditionally, seed banks have been a tool for conserving genetic material, but they haven't typically captured traditional knowledge associated with how the crop is (or was) used by a community. Cultural memory banking includes agricultural practices, stories, songs, recipes and other cultural information associated with a specific crop variety.

Beginning in the late 1990s, Native Seed Search, a non-profit seed conservation organization based in Arizona, began to integrate cultural histories gathered from Native American farmers in communities where traditional seeds were earlier collected. One result is a computer program on Navajo agriculture that is being used in Navajo schools to introduce students to the rich heritage associated with Navajo agricultural traditions. Globally Important Agricultural Heritage Systems" (GIAHS) are outstanding landscapes of aesthetic beauty that combine agricultural biodiversity, resilient ecosystems and a valuable cultural heritage. Located in specific sites around the world,

they sustainably provide multiple goods and services, food and livelihood security for millions of small-scale farmers. These ancestral agricultural systems constitute the foundation for contemporary and future agricultural innovations and technologies. Their cultural, ecological and agricultural diversity is still evident in many parts of the world, maintained as unique systems of agriculture (Nazarea, 2006.

Eg. Rice- fish culture in Zhejiang Province of China

5.2.3 Homestead farming

Homestead farming or home gardening is a historical tradition that has evolved in many tropical countries over a long period of time. It is generally understood to be a system for the production of subsistence crops for the cultivator and his/her family. Numerous terms are used to denote these practices: mixed garden horticulture, home gardening, Javanese home gardening, compound farming, mixed or house gardening, kitchen gardening, household gardening, and homestead agroforestry. According to the Gumla District Census Handbook, 2011, the district has 71 per cent tribal households. Of this, over 65 per cent of the tribal population make a living through cultivation while 20per cent workers are agricultural labourers. 90 per cent of the population was anaemic.

E.g., Gumla tribe in Jharkhand

While a study revealed that the diet of Gumla's villagers consisted mostly of rice and leafy vegetables, the National Family Health Survey (2015-16) showed that the percentage of rural women with anaemia and lower body-mass index in Jharkhand was higher than the national average. To enrich villagers' diet and make it more nutritious in a cost-effective manner, reviving traditional kitchen gardens appears to be the best option.

Those without homestead lands use available spaces near the house, or homestead lands of others, with mutual consent. Based on this practice, PRADAN (Professional Assistance for Development Action), an NGO, piloted an initiative named Poshan Vari in July 2016. Designed as nutrition-based cultivation models in homestead lands, Poshan Vari gardens were grown in 47 villages across nine Panchayats.The intervention covering over 600 households was intended to enrich the diet and improve the nutrition status of the residents. All the families didn't have homestead lands;

where available, the size varied between 2 and 10 square feet, the most common being 5 square feet to 7 square feet. Families of small and marginal farmers with farmlands measuring less than two hectares grew kitchen gardens (Kundu, 2007).

Figure 5. Agrobiodiversity Conservation By PPB

Figure 6. Logo of GIAHS

5.3 Farmers' technology adoption behavior

The two pertinent anthropological models that study the farmers' technology adoption behavior are, Farmer Back to Farmer model (FB2F model), Farmer-to-farmer extension model (F2FE Model) and based on participatory approach.

5.3.1. Farmer back to farmer model

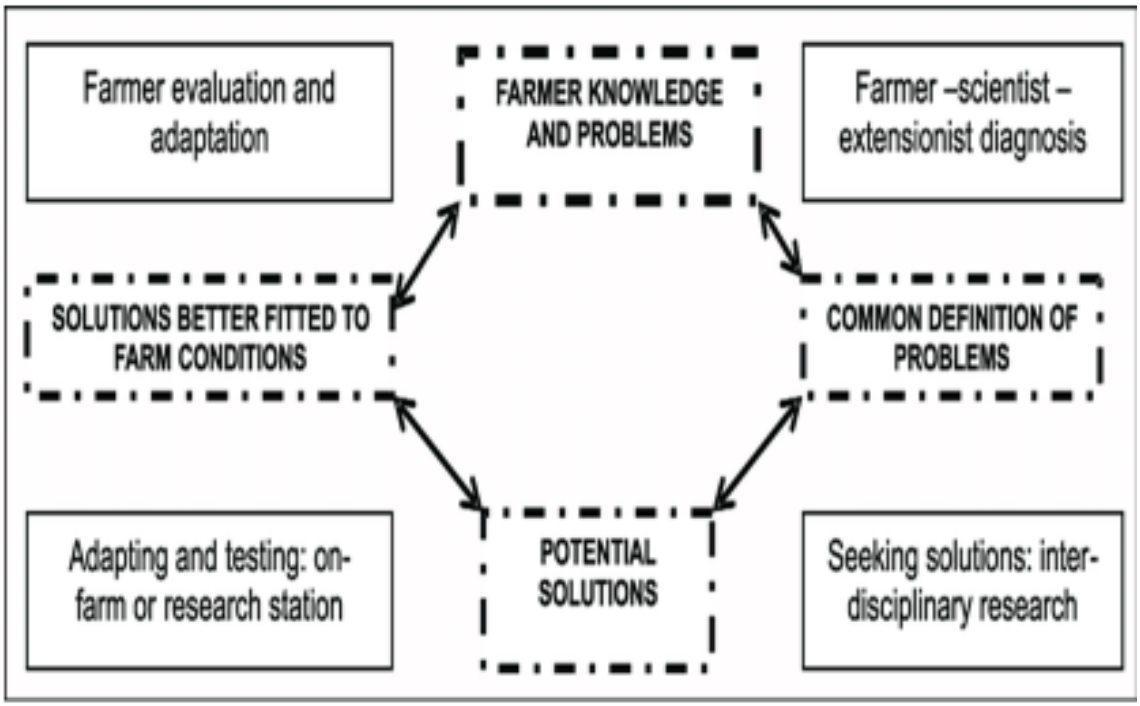

Figure 7. Diagrammatic representation of the F2BF model

Robert (Bob) Rhoades (1942–2010) developed and adopted the term "agricultural anthropology" to describe his work to other social and biological scientists in the late 1970s and early 1980s, during his post as a Rockefeller Postdoctoral Fellow at the International Potato Center (CIP) in Lima, Peru (Rhoades 1980,1984). At the time, and still today, research protocols and policies in the Consultative Group on International Agricultural Research (CGIAR) system were largely catered to and dictated by agronomists and biologists. It was not long before Bob (in collaboration with a fellow post-harvest colleague, biologist Robert Booth) turned the CIP approach on its head, suggesting that research should both begin and end with the farmer instead of the top-down approaches that prevailed at the time. Rhoades and Booth (1982) called their model "Farmer- Back-to-Farmer" ,which quickly became an early and popular participatory approach in agricultural development, leading to the formation of an entire new program in the CGIAR system directed by Rhoades (Users Perspective with Agricultural Research Development - UPWARD, Asia) and the diffusion of appropriate technologies to millions of farmers worldwide.

The farmer-back-to-farmer model emerged from an interdisciplinary CIP team that included both social and biophysical researchers. CIP's first director, Richard Sawyer, hired anthropologists and expected them to work in an integrated team with the center's breeders and agronomists. The combination of different views amongst the scientist around seed potato storage led to the farmer-back-to-farmer model (Rhoades and Booth 1982). This model, with its insistence at looking at actual farmer practice in a pragmatic way, was a major influence on much of the farmer participatory research that would follow at CIP and elsewhere. In many ways farmer-back-to-farmer was ahead of its time.

E.g. FB2F in the International Potato Centre, Lima

In the late 1970s, a team of CIP researchers was studying post-harvest losses of potato in the Mantaro Valley of Peru. CIP started its participatory research in the Mantaro Valley because it was then one of Peru's main potato producing areas and one of the nearest to the main market in Lima. An early breakthrough in the Mantaro Valley potato research came when the anthropologist told the biologists that post-harvest potato losses were really of little concern to farmers, who could use the smaller tubers for seed or for animal feed. Even damaged potatoes could be salvaged for the cooking pot and shriveled tubers could be made into chuño - the Andean method for freeze-drying at high altitudes. However, seed potatoes grow long sprouts that farmers disliked having to break off before planting.

Now it was the biologist's turn to be helpful. Booth explained to the anthropologist that the long sprouts were induced by the darkness where the potatoes were stored, inside the farm houses, and that while seed potato needs to be sprouted, the shorter sprouts were more vigorous than longer ones. This insight helped the anthropologist to refine his questions. By working together, the biologist and the anthropologist refined their problem topic. The issue was no longer post-harvest losses, but how best to store seed potatoes on-farm.

On the Santa Ana research station in the Mantaro Valley, the biologist showed the anthropologist how potatoes stored in diffused light (not in total darkness) developed short vigorous sprouts and a greenish skin. Such tubers were ideal for planting. The anthropologist then took some of the wooden greening trays from the station to the homes of some collaborating farmers and Farmers liked the seed tubers with short sprouts, but observed that the fine wooden trays would be too expensive, so a CIP technologist made some simple racks from local lumber. CIP soon began

teaching diffused light storage (DLS) to farmers in the Philippines and in Peru, teaching farmers how to make and stack wooden seed trays, but also explaining the underlying scientific principle that potato sprouts are shorter and more vigorous, increasing yield if seed is stored in diffused light (Ortiz *et.al*., 2019).

5.3.2. Farmer to farmer extension model

Farmer to Farmer (F2F) extension approach in agriculture is a systematically utilization of community leadership and informal communication between farmers. This approach aims to strengthen the information flow and enhance the agricultural production. As a generic term we use it as 'farmertrainer', even though we recognise it by different names e.g. lead farmer, farmer-promoter, community knowledge worker may imply different roles.F2F approach helps in building the effective, farmer-centred extension systems and empowering farmers as change agents for improving livelihoods in their communities.F2F model can reduce the extension cost and workload of extension functionaries in a large country like India where extension worker and farmer ratio is very wide. Moreover, this approach needs community as well as government support for sustainability and scalability (Franzel and Wambugu, 2011).

E.g. ICRAF study in Central Kenya

On information dissemination and adoption by fodder shrub adopters in East African countries. 58 per cent more adoption was seen when the technology was disseminated through F2FE model with the help of farmer trainers. At present, the East African Dairy Development Project, that implements and evaluates 2000 volunteer farmer trainers in Kenya, Uganda, Rwanda is being funded by the Bill and Melinda Gates foundation (Franzel and Wambugu, 2011).

6 Conclusion

Agriculture is a cogent example of situation where anthropogenic effects are major determinants

Changes in agronomic and animal husbandry practices around the world due to evolutionary and migratory reasons with collateral effects on the balance and nature of farming communities. Agricultural anthropology studies how farmers globally are affected by and adapt to these changes and gain knowledge from them and solve their present problems. It also aims at preserving agricultural heritage and some core beliefs of farmers

Agricultural science can be improved by incorporating agricultural anthropology as a major sub-discipline. For better utilization of knowledge to the field level. For better providing a connection among agricultural practices and research to society and environment.For achieving sustainable agriculture.This new discipline needs the support of government and educational institutions to flourish

7. Discussion

1. Which of the fieldwork methods is most suitable for anthropological research?

Though it depends on the situation and needs, participant observation is more suitable as it helps create a rapport with the native people who are often reclusive and wary of outsiders.

2.What is an egalitarian society?

It is an ideal society in which everybody has equal rights and opportunities irrespective of gender, social status, *etc.*

3.What is a Chinese plough?

The conventional mould board ploughs that are prevalently used today with two oxen.

4.How does Participatory Plant Breeding differ from conventional plant breeding?

The farmer is given most priority as they are not passive listeners here. They have a role in each step of decision making and the breeding objectives are based on their immediate prioritized needs, unlike conventional methods which is according to the breeders' wishes with less framer participation.

5.Which model is mostly used in India to disseminate technology among FB2F and F2FE models?

In India FB2F is not commonly used. F2FE model is the major technology dissemination model in Indian states of Rajastan and Uttar Pradesh.

6.Which are the GIAHS sites in India?

There are three in India, namely, Kuttanad in Kerala (Below MSL paddy cultivation); Pampore in Kashmir (Saffron cultivation) and Koraput in Orissa (rich biodiversity).

7.What is optimal nutrition as seen in the case of Jarawas?

Optimal nutrition refers to the best nutrition available and is found out by their lifespan, BMI, activeness, disease occurrence *etc.*

8.What are cogent changes in agriculture due to anthropological reasons?

Changes in agronomic and animal husbandry practices around the world due to evolutionary and migratory reasons with collateral effects on the balance and nature of farming communities. It studies how farmers globally are affected by and adapt to these changes and gain knowledge from them and solve their present problems. It also aims at reserving agricultural heritage and some core beliefs of farmers

9.Why do early varieties show better risk management?

Landraces are more resistant to pest and disease as they possess diverse resistance alleles to impart the characters.

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9. Abstract

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Venue: Seminar Hall
Date : 10-01-2020
Time : 09.15 am

Agricultural anthropology: An emerging field

Abstract

Anthropology is the scientific study of humans, human behaviour and societies in the past and present. The four major classifications in anthropology are social anthropology, cultural anthropology, linguistic anthropology and biological anthropology (Nicholas and Tuttle, 2019). 'Agricultural anthropology is an applied branch of cultural anthropology which is the comparative, holistic and temporal study of the human element in agricultural activity, focusing on the interactions of environment, technology and culture within local and global food systems with a practical goal of improving the sustainability of food production' (Rhoades and Booth, 1982).

In agricultural anthropology, the fieldwork methods used while conducting research are observational method, participant observation, non-participant observation, ethnographic method, comparative method, reflexivity, intersubjectivity and participatory action research (Gordon, 2004). Anthropologists have classified farmers into four categories based on the mode of subsistence as foragers (hunter gatherers), horticulturists (primitive agriculturists), pastoralists (livestock rearers and herders) and intensive agriculturists (Shearn, 2019).

Agricultural anthropologists at present, emphasise on agrobiodiversity conservation, sustainable agricultural practices and farmers' technology adoption behaviour. Agrobiodiversity conservation is a longstanding and current research focus of anthropological inquiry. Sustainable agriculture in anthropology involves three main areas *i.e.*, conservation agriculture, cultural memory banking and homestead gardening. Farmer technology adoption behavior emphasises on participatory and collaborative analysis of farmers' problems (Sarker, 2017).

Two pertinent models with regard to farmer technology adoption behavior are Farmer Back to Farmer model (FB2F) and Farmer-to-Farmer Extension (F2FE) model. Farmer Back to Farmer model was developed by Robert Rhoades in International Potato Centre, Lima to study the effect of post-harvest losses in potato among Peruvian farmers (Ortiz *et al.*, 2019). Farmer-to-Farmer Extension approach in agriculture is the systematic utilization of community leadership and informal communication between farmers using farmer trainers. At present, the International Council for Research in Agroforestry (ICRAF) has started an initiative called 'East African Dairy Development Project'. This project is being funded by the Bill and Melinda Gates Foundation to implement and evaluate two thousand volunteer farmer trainers in Kenya, Uganda and Rwanda (Franzel and Wambugu, 2011).

There have been tremendous cogent changes in agronomic and animal husbandry practices around the world due to evolutionary and migratory reasons. So, this branch of anthropology focuses on how farmers are globally affected by and adapt to these collateral changes so as to gain knowledge from those and solve their present problems. Agricultural science can be improved by incorporating agricultural anthropology as a major subject for providing a better connection among agricultural practices and research to society and environment. This new discipline needs the support of government and educational institutions to flourish.

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