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Traditional Paddy Field Practices and Health Implication Among Apatanis

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ABSTRACT

Apatanis are well known for their innovative fish cum paddy cultivation and sustainable balanced ecology. Like any other tribes, the paddy cultivation is an integral part of Apatani tribe however the process is different and very intense; every inches of land is used judiciously in best possible way to stabilised their food security. This paper attempts to highlight the partial setback of traditional cultivation system as whole specific focus on wet-paddy cultivation including traditional waste recycling process, water management, and nature of work and traditional process of cultivation that potentially may various health implication to the farmers. These traditional method of water management for irrigation and waste recycling process continue to act as mode pathogen transmission from abiotic to biotic mean in cyclic pattern that aggravate the spread of specially water born communicable disease such as typhoid, diarrhoea and hepatise A are the attributes of vicious communicable diseases, which is highly prevalent among Apatani tribes.

KEYWORDS

Traditional paddy cultivation, Traditional irrigation system, Agriculture cycle, recycling process and health implications.

Introduction

Traditional cultivation is an age old method of farming, which the technic and method are inherited from ancestral and has been collectively practice by the community for thousands of years. In traditional method, cultivation is done by manual labour, used simple tools like spade, wooden sledge and sickles for ploughing and harvesting. Surplus vegetables and weed is decompose to organic manure to retain the soil nutrient in natural way, waste product from household is added to enhance the fertility of the soil. Traditional farming involves no use of any kind of fertilizer, herbicide or pesticide (Fukuono, 1975).

Although there are various method of traditional cultivation varies from region to region based on the geographical condition. Predominantly, in most of the tribal community specially in hilly region jhum cultivation or shifting cultivation was traditionally practiced to extract optimum fertility of soil contained, other practice crop rotation to sustain the soil nutrient, while wet paddy cultivation is more popular where water supply is sufficiently available like in plain or plateau area. There are variety of rice that is cultivated by farmer around the world suitability of their climatic condition.

Recently, subject on health issue related to traditional cultivation has drew interest of many scholars around world. There are several studies has been done on paddy cultivation and highlighted plight of farmer working in paddy field. Studies evidence shows that there are several health hazards involves specially in wet paddy cultivation, which is further aggravated by changing environment and increasing uses of chemical in traditional wet-paddy field. It is also implicate on non-user as the water is passed from one field to another. Charles et al (2008) studied on Ecuadorian potato production found that pesticides like carbofuran and methamidophos cause sickness to farmers who are substantial exposed to, reduced in their haemoglobin level. Rao et al, (2005) reveals that changing climate and increasing usage of chemicals in agriculture has impact of ecological balance such as disappearance of Green field frog, drastic decreasing numbers of sparrow and with using carbofuran, chlopyrifos insecticide on paddy field has contaminated the fish harvest.

In nature of work in traditional cultivation requires constant bending and lifting heavy loads because they devoid of any modern implements, all the work is done by manually, which is very exhaustive that leads to several physical ailment such as back pain, arthritis etc. also the spike or laceration of many weeds and paddy traumatize the skin. Urticarial papules is causes by litter and straw (Mitchell et al., 1979) most of the time farmers suffer skin irritation due to parasite-phytodermatitis or pseudopgyto-dermatitis from grain dust (Uenotsuchi, 2000). Other diseases commonly associated with paddy workers are prone to headache, malaise and freckles due to constantly exposure to the sun and exhaustive task, and also due to persistent encounter with several potential agent while ploughing, harvesting, weeding and transplanting time from dungs, muds, dust from decayed plant and pesticides, the Paddy field workers are susceptible to many disease followed by other dermatitis problems on hand, feet and face by bacterial and fungal infection such as tinea versicolor, foot intertrigo, palmer plantar hyperkeratosis fissuring scaling feet lesions dystrophy of the fingernails and toenails (Shenoi, 2005) as a result of constantly feet being immersed in water (Mencher and Saradamoni 1982). Cercarial dermatitis invade human skin and caused dermatitis in human on repeated exposure (Narain, 1994). Ascaris infection and diarrhoea diseases are significantly higher prevalence among farm workers who are in constantly in contact with waste water through irrigation (Jung, et. al., 2007) and high risk of intestinal and gynaecological infection (UNDP, 1980). The person may get infected if the closed water infested with pathogen from infected person through skin abrasions and excretes (Chang, et al. 1997). Most of the causal agent are transmitted through recreational water or through other waterborne route, through food and just by person-to- person contact (UNDP, 1980).

The infectious disease can easily be infected, when a person come in contact with infested water like common water place such as swimming pool, beaches including paddy field water etc. For instance, evidence provided by WHO (2003), reports shows that there is direct correlation between concentrations of intestinal enterocci and gastrointestinal illness and AFRI in marine environment and scuba diving and gastro-intestinal illness in New York. The longer a person immerse in the water, more they get exposed to pathogens; may enter into body through ingestion or direct penetration or ingalation of the skin such as schistosomiasis. For instance, pseudomonas, aeromonas, and halophilic vibrios are the some of the environmental bacteria, an opportunistic causal agent, which may trigger the wound infections that might also be life-threatening for example Vibrio vulnificus. The level of faecal pollu-

tion determines the concentration of pathogens either from point and non-point source through in some of the tropical and sub-tropical aquatic species. The likelihood of contacting illness depends on the level of exposure to pathogens, toxic agents and other potential hazards largely influence by the degree of water temperature (Jung et al. 2012). Most excreta-related pathogens survive for long periods of time in colder waters (Freachem et al. 1983). Non-faecal discharging into the water body is a source of potential non-enteric pathogen organism. Infected users can directly contaminate the pool, hot tub or spa waster and the surrounding the pool with pathogens such as virus and fungi, which result to skin infections like verrucas. In both coastal and freshwaters, sluggage from domestic sewage, chemical discharges and contamination from infected person are the point sources of pollution that cause most health concern (WHO, 2003).

Material and Methods

Area of study

Ziro valley lies in central zone of Arunachal Pradesh of eastern most part of India, inhabited by Apatanis one of the major tribes of the state. It is located in 1543 ft. above sea level. The climatic condition varies from pristine in summer to frozen cold in winter. Nature has endowed the valley with scenic beauty and salubrious vegetation. Apatani are largely self-sufficient agrarian society. The 74% of the population is engaged in agriculture activity and 80% of land are under cultivation. Out of which 90% is cultivated rice. In ziro valley Japonica type is largely cultivated by Apatanis (Hore, 2005). In recent decade farmer adopted Bora and Jaha oryaza from Assamese variety. It is believed that advanced technic traditional cultivation was developed over the period of time rather they carried these ideas and seeds from their origin place of migration (Dollo, 2009). According to Apatani folklore, it was dogs who steal rice seed from Goddess sun when ancestral legendary father Abotani lost every things in tragedy. Hence rice is not just food to feed but precious revived lost treasure. Paddy cultivation is the ways of life for the Apatani tribe, to honour and for abundance rice harvest there are many ritual and rites is observed and offering is made to deities for blessing but the most important agriculture festival is Dree, which is celebrated every year in the month of July with great prompt.

Rice is the staple food of Apatanis, it is produce by wet-paddy cultivation whereas the majority of tribes in Arunachal Pradesh practice jhum cultivation. The vast valley surrounded by mountains and hills made favourable for wet paddy cultivation. The streams from surrounding forest and jungle supplies sufficient water needed for paddy cultivation. During early 80's fishery Dept. introduced fish cum paddy method of cultivation with an intent of utilitarian water management, which practically successful till date. Today ziro valley is famous for fish-cum-paddy cultivation in Arunachal Pradesh.

The land ownership and management of irrigation system of practices is community-based. And land is classified for each specific purpose so that essential needs of the whole community is met sufficiently (Saundarya, 2009). The traditional customary norm regulates the pattern of community land usage, such as all the residences in one place and paddy fields, granaries, bamboo grove or pine groves and gardens etc. in another place rather than spatial settlement. It has both merit and demit in such settlement, which was framed out of necessity (Kala, 2005). Villages are settled at the foot hill of the mountain in compact manner in linear pattern. Back side of the village are generally bamboo groves or pine grooves; woodland is far away from villages. The granaries are slightly distance from main village; followed by nurseries and kitchen gardens and paddy field in the middle flat valley. Some of the paddy fields are near and some in distance (Panggin et al, 2009).

Traditional method waste recycling process

Apatani practice several effective ways to restore soil fertility after each harvesting; such as recycling crop residues; weed decomposition and the use of organic waste from the village such as animal's excreta, ashes from fire place, husk, sluggish, etc. to compensate the nutrition lost from soil with crop. The drains from villages are club with streams canals that originates from forest, which is tapped at shed area and distributed to field though channels and pipes. These stream water carries lots of organic debris from forest and drains from village also contain rich organic waste including human and animal excreta from households.

Another method to restore the soil nutrient is the traditional ways of waste recycles. The hen coop is attached at very entrance adjacent to rice pounding place, so that fall out rice grain may consume by hens. Rice husk with foul excreta is used as manure for kitchen garden. Pig is generally accommodated in traditional toilet feed on human faeces and waste surplus vegetables, again pig excreta is use as manure. Weeds and waste vegetable products are decomposed within the field, straw and rice husk are burned after the harvesting so that nutrients that loss from soil in crops may retain.

These streams that originated in the forest is tapped together into canal and redistributed to numerous secondary and tertiary canal for irrigation. And the drain from villages are discharged into the main irrigation canal, which also carries decomposed organic material such as excreta, vegetable waste from the households in addition to nutrient wash out from the hill slopes. These drains from villages is said to have abundant organic manure that significantly enhance the rice yielding (Dollo, 2009).

Traditional Agriculture cycle

The paddy cultivation is exhaustive never-ending process. Three session of agriculture work is considered to most crucial that is *haling piilo* (sapling), *entt piilo* (harvest), and *pagherr piilo* (bunding). The whole operations of cultivation is done in communal approach. A traditional farmer group "*Patang*" are form for every peak season of cultivation for paddy transplantation, harvesting, and bunding task. The generally agriculture work is perform in two "*Konchi Patang* (morning 4 am to 7 am) and *Alo patang (day 9 am to 5 pm)*".

Right after Murung festival, cultivation starts from Seeds sowing at nursery, which is transplanted to the field once the saplings grows up to 15-18 cm, followed by millets transplantation on the bunds soon after. It is further followed by replanting of dead or weak sapling once it holds it is rooted, rahu fishes is put into the field to rear alone with paddies. To ensure weed free, at least twice weeding is done before the harvesting. The weeds is mounted at several place within field, then it is plasted with mud on the top for quick decompose. Again these mounted weed is turn upside down to shorten the decompose process. Water is drain out before reaping and fishes are catches. After harvesting, trench in field is dug up, cows are release into for grazing. And final weeding are done and straw are burned before winter breaks (dollo, et al. 2009). During fallow period from November to January; mending bunding, soil shifting and levelling are done.

The women in paddy cultivation

The Apatani tribe is patriarchal society. Labour is strictly gender bias, heavier task like mending fence, construction, hunting etc. is for men and house chore and agriculture work for women. In traditional society, paddy field is consider as the image of women's virtues rather than person's nature. Hence, meticulously taken care of paddy field. The utmost priority of women is to ensure abundance harvest and weed free field, as the weed is seen as parasitic to paddy plants that absorbs the nutrients from the soil results to poor yielding in harvest. Sincere effort are made to increase the productive by supplying additional manure such as husk, dungs, organic waste from household are transport to field and garden. Due to this over emphasis on cultivations trend to neglect the hygiene of domestic chores, personal health care and family.

Data collection

A cross-section survey was conducted in field, sample was

targeted only female respondents considering social fact of farming as women job in traditional society. The questionnaire was semi structure interview schedule. Variables included were food habit, diseases, income source, stress level and nature of work etc. The time consumed 1-2 hour for each respondent total n = 100.

Participant observation was the major source of primary data, as researcher spend two months in Dutta village during paddy transplantation season in the month of June. All the respondent were informed the purpose of participation in field work. Though it was hard to catch up with villager's routine however it was fruitful get rich information on the subject. Govt. district hospital records proved to be crucial secondary data in confining water born communication diseases in the valley. For data analysis**,** SPSS software and Microsoft excel.

Result and Discussion

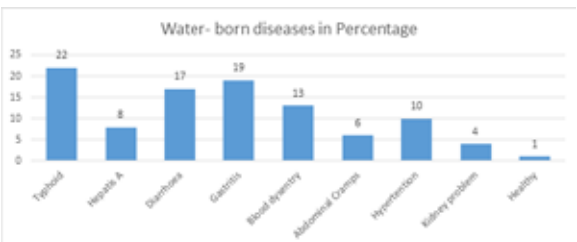


Chart: Common Disease prevalent among Apatani farmers during paddy transplantation

Result shows that 99% paddy workers suffers from one or other water born communicable diseases. Particularly typhoid, diarrhoea, blood dysentery and intestinal crumple are high shown in chart. Though there are many different ways in which infectious diseases are spread and transmitted. Finding reveals that most prominent reason beneath the communicable disease in valley are: 1) Lack of hygiene. Once a catholic priest went on to say that "*Instead of calling for house blessing, rather people should have called me for field blessing*", because people are more cautious over paddy field hygiene than their house. 2) The traditional way of cultivation is quite intense and exhaustive persistent work to produce sufficient food supply. Nature of work involves constant bending, lifting heavy load and immerse in water for whole day, out which weeding is the major headache for the farmers. 3. For instance, farmer would say "I *am unable to sleep because of unfinished weeding"* this persistent worrying may leads to anxiety; implicate on both physical and mental health, leading to several other health complications due to the chemical released by the body during stress and susceptible to stress related diseases such as hypertension, paralytic and gastritis etc. besides the occupational related diseases. Unconsciously majority of the population suffers from anxiety due to overwhelming self-consciousness in social encounters, which further aggravated by fear of embarrassment as being under constant watch and judge by neighbours that contributes to many health stress related health problems. 4.) Untreated water usage. Generally water borne diseases are transmitted by water that has been contaminated with human waste containing different types of pathogenic organisms. For instance in water used for cooking and hand washing in outdoor are contaminated with drainage water from village. 5.) Increasing usages of pesticide and fertilizer enter into food chain, as soil and breeding fishes absorb these chemical. 6.) Traditional methods of recycling of organic waste via consumption process continue to establish the vicious cycle of pathogen transmission.

Conclusion.

Traditional method of paddy cultivation for Apatani is very exhaustive and stress process until usual paddy cultivation, this is because paddy field attached with genderism in traditional society. The paddy field is considered as the image of women's character. Therefore meticulous cultivation of paddy field is the utmost priority for farmer (women). These situation tend to resulted in negligence of personal hygiene and household chores. Traditional method of organic waste recycle and management is eco- friendly and good source of organic manure of agriculture, however such practices also act as channel for spreading infectious communicable diseases, making it difficult to mitigate health crisis.

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