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Traditional Knowledge Research: Recycling Human Waste Among Ladakhis

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For centuries, human societies around the world have flourished and diminished as their cumulative wisdom of nature was tested against environmental sustainability. The importance of Indigenous Knowledge (IK) or Traditional Ecological Knowledge (TEK) has been recongnised by international communities. Environmental problems are global in scope and pose a direct challenge to the long-term survival of humanity. The role of indigenous knowledge system in cultural and ecological dynamics of sustainable development is significant.

The degeneration of traditional knowledge is an ongoing process. With the passing away of elders ancient language and cultures are lost. Likewise, traditional strategies for dealing with the challanges provided by nature in ecologically fragile environments are altered without thinking of consequences. Technological developments are eroding the traditional values and way of life. It is important to conserve the undocumented indigenous knowledge base of indigenous communities, which are still continuing with their way of life and traditional resource management.

A major challenge facing environment and development organization is the waste management. Man has always produced waste both general and domestic. With the development of the society, the problem of waste has emerged as a major issue. From the quantity and contents of waste, the type and status of the society can be judged. It indicates the habits and consumption pattern of the members of the society. Generally, the proportion of production of waste has always been greater than the levels of recycling. The low level of recycling gives rise to large quantities of refuse, which will never be used again. In the economy of ecosystems consumption and renewing of resources is a prepetual circle. Recovering, recycling, reusing and repairing are some of the "Rs.", that are associated witht he problem of waste.

The biosphere is a denoted recycler. In any ecosystem, after the death of living organisms, their molecules are broken down which can be used again in nature's biogeochemical cycles. Various chemical processes assist in this conversion. Human beings are waste-producers as they have learned to transform natural things into new substances. The more advanced the technology, the larger the amont of waste generated. The large proportion of this generated waste is non-biodegradable; resulting in contamination when recycling does not take place. The presence of residual refuse can affect the quality of water and atmosphere. Trans-forming refuse into raw materials saves energy and natural resources.

One form of regular human waste is excrement constant in quantity with an overall regularity. This form of waste needs proper depositing and recycling. Of all the human waste, this is the easiest to recycle and reuse. However, it is not being done by most societies and is not returned to the soil to counteract the impoverishment to make up for the loss of nutrients from the over exploiation.

Few studies have been carried out and reported on the reuse and recycling of the human waste. Some studies have reported the negative use of the same with short term epidemiology. These studes fail to mention the long-term effects of this rejectamenta in enriching the soils in areas which lack alternative sources of nutrients. Human waste has never been relised as commodity which can be used as manure to grow crops except in few hill societies in India and some parts of China where human waste is constantly been used for agriculture.

The ecological problem of human waste is multidimensional involving its collection and disposal. In most of the societies human excreta is a taboo topic. Researchers are not attracted to such topics and monetary reserach funds are not available for such projects.

Public health processes for disposal of excreta have been developed in western societies. These societies are small in comparison to societies in Asia and Africa. These societies are more

developed, have resources and adequate funds. These societies have plentiful water supply, an essential in excreta disposal system. The houses are connected to a centrally organised water supply which is used for flushing excreta. The drains are connected to a central sewage disposal system where the excreta is recycled in to water. It can be observed that very expensive processes are being used to recycle the human waste into a neutral susbstance rather than using it on the soil.

A precious commodity like water is being used like this when there is a global shortage of water. Besides there are communities who are residing in areas deficient of water supply. The western style excreta disposal system is limited to societies where water-supply is plentiful. It has been reported by Zhongmin (1985) that in Shanghai five million tones of waste is produced per day and only 200,000 tons are recycled. The untreated remainder is dumped in nearby river and the South-China sea.

Sewage enrichment farming has been practiced in some countries. In United Stats, new sophesticated systems for utilizing waste water both as a source of water and as a source of organic and inorganic nutrients are being developed.

In 1962, scientists at the Pennsylvania State University began evaluating the use of human rejectiments for irrigation and enrichment of forests and pastures. It was found that soil functioned as a filter. Clean water and some of the nutrients dissolved in that water were absorbed. These in turn were selected by vegetation, thus increasing it yeild. This method of treating human waste was criticised for he risk of chemical contamination and infections of water borne human pathogens. The degree fo risk depends upon the treatment process employed before the sewage is applied and the survivial of the pathogenic viruses/parasite eggs and bacteria in soil, crops, ground water and run off. For example, shellfish can accumulate human viruses and *Salmonella* has been shown to survive birth aerobic and anaerobic digesters and to be viable for more than a year in sludge spread on gransland (Hess and Beer, 1975).

Although the risk of cotamination and inflections can be avoided by new technologies at further costs. However, these methods are using the dwindling water supplies and are costly requiring tertiary sewage treatment. These are linear solutions rather than cyclic. The cycling of waste makes profound ecologic sense as all parts of the environment are interrelated and everything must go some where. The technologically heavy systems are not in harmony with natural systems and can not be relied upon.

It has been observed that there is social ignoracne of the fact that humna waste can provide replacement nutrients to the soil roughly equivalent to the nutrients eaten from an equivalent area. And, there is always a large scale imitation in the models of indiviual and collective behaviour. After Independence in the post colonial nations western model for development were adopted forgetting that these models were conceived for different cultures and scenarios. The western countires could afford the public health systems which they have installed in their environment. These environments had plentiful water supply and could support such health systems. The new Republics were not capable of centralised water borne sanitation system. In india the centralised water. borne sanitaion system were installed in only urban centres. The rural people practiced their traditional system of going to fields to relive themselves. Among social classes, which were not going to fields, this problem was culturally solved by having castes of untouchables who traditionally clean lavatories and remove waste generally. In moden India, this systems of carrying human waste has broken down with democratic institutions. Traditionally, these cleaning castes were socially segregated in a village but were at the sametime an integrated part of the village. It was customary to pay them in cash or kind. With the change in village administration, and social scence also changed, these clenaing castes became paid sanitary workers. The informal relations among villagers were formalised thus dissolving the village integration. Till now, subsistence farmers prefer to defaecate in their fields or in nearby uncultivated areas. However, there is no conscious effort to use the human waste in food production.

Few studies have been carried about excreting practices. Kochar (1977) has done systematic analysis about behavioural aspects of the disposal of excreta in a rural west Bengal region.

Cheesmond and Fenwick (1981) have studied the human excretion behaviour in schistosomiasis endemic area of the Gezira, Sudan.

It has been reported that it is only in China that human wastes have been deliberately and widely used over a wide geographical area of fish ponds, wet rice fields and vegetable growing (Tanner, 2001). Historically, there has been a symbiotic relationship in the use of human wastes between the city and the surrounding rural area supplying its food (Whitney, 1970: 50 cited from Tanner, 2001). The present paper deals with the recycling of human waste among Ladakhis of Jammu and Kashmir, India.

AREA AND PEOPLE

Ladakh is a part of the Central Asian Plateau a vast rocky cold desert, utterly deviod of natural vegetation. Lying between 32°15' to 36° latitude and 75°15' to 80°15' longitude. Ladakh is a mountainous country situated in eastern part of the Kashmir valley. These is hardly any place in this region which is less than 2,500 meter high. Ladakh is a cold desert, both southerly and westerly winds prevail in summer and winter making climate of Ladakh extremely dry and cold. The excessive dryness of Ladakh climate is chiefly due to elevation, by which air is so rarefied as to be incapable of hold moisture in suspension. The winter lasts from October to April/May. During this time water channels freeze and hence cannot be used for agriculture or as soruce of power. The quantity of rain and snow that falls in Ladakh is exceedingly small. The winter snow is never more that a Pneedeep. The mean annual temperature is 4°C at Leh. In Ladakh, the temperature generally falls, below the freezing point which causes chilling effect. The average rainfall per year does not exceed 96.4 mm in the east and 60 mm in the west. Inspite of high altitutde, the snowfall is scanty except in Zanskar. There are only two seasons in Ladakh: a short torried summer and a long icy winter.

The soils in Ladakh are neutral to slightly alkaline. The soils are loose type which have a good aeration provision, but lack capacity to absorb and hold sufficient moisture and nutrients. The drainage system of the Ladakh division consists entirely of the three great mountain feeders of the Indian, the Shyok and the Zausskar rivers. These ia regular flow of streams during summer seasons, which bring water from the glaciers. Water comes with great pressure from mountains causing gully formations. Ladakhis are expert in water harvesting, they make check dams for diverting water to their storage tanks. Storage tanier emanate small irrigation channels for irrigating individual fields (For details see Bhasin, 1997)

Ladakh mountains are almost devoid of vegetation cover and scattered grass patches, stunted cedars and willows are found in the moist scattered strips. Availability of fuel wood is an acute problem in Ladakh. This is due to the limited and inadequte forest resources of the region and higher per capita consumption due to extremely cold and prolonged winter. There is dearth of eletricity in Ladakh, so that rule out this form of energy for room heating and cooking. About 1/3 of the annual consumption of fuel is met out with local strubs and vegetation whereas 2/3 of the requirements are met with dried dung (which otherwise a precious commidity to be used as fertilizers). In Ladakh due to high altitude and lack of moisture dung dries up quickly and does not mould or ferment. And dry as tinder and relatively odourless it can be stacked in patties ready for burning.

Villages in Ladakh region are more or less self sufficient. These ususally have subsistance level agro-pastoral economy. Only in recent years, certain unplanned and planned changes are evident in the villages, particularly in those which are situated in the vicinity of the towns. The essence of environmental hygiene was understood by traditional Ladakhis when a new house was built. Almost all Ladakhi houses have dry laterine system. These toilets are a valuable means of enriching soil and are free from pollution and is still the only method for the disposal of human waste in Ladakhi villages, except in Leh and Kargil towns. The traditional toilets (*Chaksa)* by using it as manure to enrich cultivable land. For centuries, in Ladakh human excrement is used as manure to enrich soil. Non-availablility of chemical and other fertlizers in sufficient quantities, high cost of transportation of these helped in continuation of the traditional practice.

TRADITIONAL LAVATORY (CHAKSA)

It is a little room on the first floor of the house with a rectangular hole in the floor, complete with

a pile of hearth and a shovel. In high sited houses, these rooms are build out from the main building so that everything falls several faet down, but as a rule everything goes to a ground floor room that opens on the outside and into which earth and straw is thrown everyday. This night soil (*Chaklut)* is taken out after a long interval and is used in the fields. This traditional practice involves heavy shoveling work done by both the sexes. The human excrement (*Chaklut)* thoroughly mixed with sand or straw wood ash is brought to field by donkeys in wicker baskets. This *Chaklut* is mixed with *Pursh* (goat-dung) and is ready to be spread on the fields the moment the snow melt. These toilets are a valuable means of enriching soil and free from pollution and is still the only method for the disposal of human waste in Ladakhi villages except in Lehn and Kargil towns where modern flush toilets have been constructed.

In Leh and Kargil towns, because of increase in population and the irregularily of ground soil supply (which is traditionally used in the toilets instead of water and construction of modern flush toilets have led to various health and sanitation problems. Besides, the flush toilets not only use up the immensely valuable fresh water supply, they also pose great threat because of poor sewarage system and poor construction and maintenance of septic tanks. The traditional type of toilets which are still retained by majority of the Ladkhis proved to be effective in recycling of waste by using it as manure to enrich the cultivable land.

It has been known for years that the use of raw human wastes is a potential health hazard depending on the area's load of excreta and the degree of immunity of individuals in the recipient community (Shaval, 1986 a). Feachem et al. (1983) reported that these pathogens can survive for varying periods. Viruses can survive for usually more that 50 days, bacteria between 30 and 60 days but usually between 10 and 30 days and protozoa more than 15 days. Though studies have been reported abou the harmful effects of excreta use but little information is available on the benefits resulting from its use in raising crops like Ladakhis do. Ladakhis have been reusing the human waste instead of waste disposal and in doing so are helping their subsistenc agriculture. Ladakhis are elimianting the health risk from human wastes by using it after a long gap and in dry as most risks from human waste are distributed in irrigation.

Traditional knowledge of Ladakhis may be used to develop the means of collecting human wastes on a household basis for use on their fields. It is ridiculous to try and transport important fertilisers to fields when farmers are producing their own manure in households. The excreta from 80 persons per hectare amounts to 20-30 tons annualy which could be used to fertlize the same area (Schadewalot, 1983; c.f. Tanner, 2001)

KEY WORDS Himalayas. Tribes. Environmental Sustainability. Indigenous Knoweldge.

ABSTRACT A major challenge facing environment and development organization is the waste management. In the present paper, how Ladakhis have been reusing the human waste instead of waste disposal and in doing so are helping their subsitence agriculture has been reported.

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