

Rüza: Sustainable Development Practice in Kikruma Village, Nagaland, India

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Abstract: In 1987, the Bruntland Commission published its report, *Our Common Future*, in an effort to link the issues of economic development and environmental stability. This report provided the origin of the term 'sustainable development' to indicate "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This concept of sustainable development, thus, aims to maintain economic advancement and progress while protecting the long-term value of the integration of environment policies and development strategies. In the light of the above mentioned definition, Rüza, an indigenous irrigation and farming practice in Nagaland can be studied. It is a combination of irrigation, agriculture, forest and animal husbandry as well as with well-founded conservation base, soil erosion control, water resources development, and management and preservation of natural vegetation. The place of origin of Rüza system is at Kikruma village located at an altitude of 1,270 m. from sea level in Phek District of Nagaland inhabited by the Chakhesang Naga tribe. Rüza means impounding water or run-off water pond or tank for irrigation. The system is unique and comprises of confined forest land on hilltop, well designed water harvesting tank at the middle and cattle yard by the side and rice fields or paddy fields below the harvesting tank/pond. Over the years, the Kikruma community of Chakhesang has richly evolved such a detailed water harvesting plan whose various components interface to produce an efficient land-water management system. Protected forest lands on hilltops act as catchment area; ponds are dug in the middle where water is harvested through inlet channels from the catchment area; and terraced fields were constructed below the water harvesting tanks/ponds. This system of conservation and making judicious use of the scarce available water gives a quality and effecting farming system which prevents soil erosion and also bring about constant sustainable livelihood by rearing fishes for consumption and also cattle for consumption or commercial and have ploughing utility, along with the cultivation of rice in the wet terrace field which is the exclusive objective of Rüza. This paper is a humble approach to study how the Chakhesang tribe of Kikruma village does invented such a unique multi-purposed sustainable development system. This paper will not only analyse this system of Rüza of Kikruma village, but will also examine its affects on the sustainable development of Kikruma village and other hilly villages of Nagaland especially of Phek District.

Keywords: Chakhesang tribe, Kikruma village, Sustainable Development, Rüza and Zabo.

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I. Background

Utilisation of natural resources forms the very basis of sustenance of human life, while nature has only limited regeneration capacity. Expansion of human population, increase in per capita demand of natural resources and release of chemicals altogether new to natural ecosystems (e.g. chemical pesticides and plastics) innovated by human over the last two centuries has resulted in global environmental changes with adverse consequences for human being. The thesis of sustainable development emerged in the 1980s when it was realised that betterments in some spheres of life (e.g., comforts from air-conditioning technologies, dramatic increase in food production by green revolution technologies and rapid economic growth) were achieved at the expense of creation of new problems (e.g. climate change, loss of biodiversity, depletion and degradation of soil and water resources) or aggravation of pre-existing problems (e.g. inequitable development, natural constraints to production of resources needed by humans and earthquakes). While advancements in environmental/ecological sciences established that natural ecosystems had only a limited capacity to withstand/recover from human disturbances, those in social sciences drew attention to the importance of equitable economic development. Advancement in knowledge led to interdisciplinary approaches to development looking at environmental, economic and social problems and prospects across spatial (local to global) and temporal (short term to long term) scale simultaneously, the foundation of sustainable development. (Saxena,2015:7) In 1987, the Bruntland Commission published its report, 'Our Common Future', in an effort to link the issues of

economic development and environmental stability. This report provided the origin of the term ‘sustainable development’ to indicate “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” This concept of sustainable development, thus, aims to maintain economic advancement and progress while protecting the long-term value of the integration of environment policies and development strategies.(Emas,2015) This view is still regarded as the best definition of ‘sustainable development’.The connections between the environment and development thus provide a powerful rationale for environmental protection: enlightened self-interest. This inherent interdependence between the long-term stability of the environment and the economy is the foundation of the field of sustainable development. And sustainable development policies look to tackle the sources of environmental degradation, not just the symptoms, while still providing opportunities and creating incentives for economic development.(Emas,2015)

Global acceptance of sustainable development philosophy was further firmed up with United Nations Conference on Sustainable Development in 2002 in Johannesburg, South Africa and a quantum jump in financial and human resources for environmental sound, economically viable and socially acceptable development. With time, it was realised that ‘achieving sustainable development’ was an ideal approach and needed articulations in terms of concrete time bound goals. This realisation led to framing of the Eight Millennium Development Goals (MDGs), namely 1.reduce extreme hunger, 2.achieve universal primary education, 3.promote gender equality and empowerment of women, 4. reduce child mortality, 5. improve maternal health, 6. combat HIV/AIDS malaria and other diseases, 7. ensure environmental sustainability, and 8. global partnership. Among these goals, environmental sustainability is the goal which covers climate change along with other environmental issues like biodiversity, water resources and human habitats. Monitoring of the achievements of MDGs, the United Nations Rio+20 Summit in Brazil in 2012 committed governments to create a set of 17 sustainable development goals (SDGs) that would be integrated into the follow-up to the MDGs to combat climate change; and protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation, and halt biodiversity loss become more important especially to combat climate change. (Saxena,2015:8-10)In this way, sustainable development requires the integration of economic, environmental, and social objectives across sectors, territories and generations. Thus, the key principle of sustainable development underlying all others is the integration of environmental, social, and economic concerns into all aspects of decision making. (Emas,2015)From the above mentioned various goals of sustainable development, Rüza, an indigenous unique irrigation and farming practice in Kiruma village, Nagaland, India can be studied. Kiruma village is located at an altitude of 1,270 m. from sea level in Phek District, Nagaland inhabited by the Chakhesang tribe. The village is situated on the top of a mountain about 57 km. from Kohima town and about 13 km. from Pfutsero town of Phek District; and it is the biggest village in Phek District blessed with beautiful landscape. According to Census Record of 2011, total population is 7,298 of which 3,716 are males and 3,582 are females. The village is endowed with rich culture and it is surrounded with large flora and fauna which are little known to outside world. Over the years, the Kikruma community of Chakhesang has richly evolved such a detailed water harvesting plan whose various components interface to produce an efficient land-water management system. This paper is a humble approach to study to study how the Chakhesang tribe of Kikruma village did invent such a unique multi-purposed sustainable development practice; and its multi-purpose affects on sustainable development of Kikruma village as well as to other villages of Phek District, Nagaland, India.

II. Objectives Of The Present Study

The main objectives of the present study are:

1. To explain what does Rüza mean;
2. To differentiate between Rüza and Zabo;
3. To study how the Kikruma villagers did invent such a multi-purposed sustainable development practice;
4. To examine Rüza’s affects on sustainable development of Kikruma village and other villages of Nagaland through its multi-purposed utilities of water harvesting, water management, irrigation, farming, ecological and environment conservations.

III. Methodology Of The Present Study

The present study is explorative, historical and descriptive in nature. Both primary and secondary sources are used. For collecting primary sources, interview and observation methods as well as other statistical tools are applied whenever necessary arises. For secondary sources, government publications, books, journals, relevant websites etc. are used.

IV. Results And Discussion

4.1 What is Rüza?

Rüza is an indigenous system of irrigation and farming practice in Kikruma village, Phek District, Nagaland. It is a combination of irrigation, agriculture, forest and animal husbandry as well as with well-founded conservation base, soil erosion control, water resources development, and management and preservation of natural vegetation. The place of origin of Rüza system is at Kikruma village located at an altitude of 1,270 m. from sea level in Phek District of Nagaland inhabited by the Chakhesang Naga tribe. Rüza means impounding water or run-off water pond/tank for irrigation of wet terrace cultivation. The system is unique and comprises of confined forest land on hilltop, well designed water harvesting tank at the middle and cattle yard by the side and rice fields or paddy fields below the harvesting tank/pond. The sole purpose of Rüza is to irrigate the wet paddy field in the times of shortage of water source in the paddy field and stored water. Impounded water in Rüza is not used for human consumption but is a source of water for cattle and other domesticated animals.

4.2 Origin of Rüza in Kikruma Village:

Kikruma village is situated at 1,270 m. in the rain shadow mountain of Phek District, Nagaland. The annual rainfall of Nagaland is 200 cm./2000 mm. with 150 rainy days. Rainy seasons generally start from June and ends in October. Since the village is situated under a rain shadow and is hill top area, Kikruma village has an average annual rainfall of 1,613 mm. So, the villagers of Kikruma face scanty rainfall for agriculture and other farming purpose as well. At the same time, there is also a constant shortage of drinking water. To overcome such water scarcity problem, they have devised and developed a system of their own way of irrigation by conserving water for cultivation popularly known as Rüza through harvesting impounding water which is flowing along the steep roads to water harvesting tanks/ponds of Rüza. Thus, the Kikruma villagers invented Rüza system as a result of the dictum, "necessity is the mother of invention."

V. The Components Of Rüza

The various components of Rüza can be divided as the follows

5.1 Forest Land:

In Rüza system, the protection and preservation of forest land is very much essential. Because during the rainy season, the roots of the trees of the forest stored water which give water to downward small streams flowing to the roadsides of the village. A catchment area of about 1.5 hectare or more is kept under natural vegetation upstream of the ponds to serve as water source during monsoon season. The slope of the catchment area is usually very steep.

5.2 Water Harvesting System

Below the catchment area, water harvesting ponds are dug and an earthen embankment constructed. Silt retention tanks are constructed at several points to prevent silt from entering the ponds with runoff. The entire water harvesting set up generally occupies about 0.2 hectare. These silt retention tanks are cleaned annually. At the time of constructing the pond, efforts are made to compact the inner surface area so as to avoid water through seepage. The ponds are Kikruma's unique feature. Spread over the village, at present, they are more than 200. They are constructed in such a manner that surplus water from one pond flows down to pond below. Water is released from end through an opening at its lower end, which is otherwise blocked by a piece of wood. The ponds are dry up by March or April and this dry period is used to repair them. Another peculiar about these ponds are that each existing pond is owned by around five persons who cultivate the adjoining fields. Two channels, each over a kilometre long, drain water from the surrounding areas into the pond. The villagers have made the channels compact by hammering its base, thereby reducing water percolation. When water is required for paddy transplantation, the farmers dig a hole at the base of the pond. Another peculiar method of conserving and saving every drop of water in this village is that Kikruma's water conservation method saves even the water flowing along the steep approach road to the village. The roadside flowing water is directed to the ponds known as Rüza and utilised it for irrigation. The villagers build a series of speed breakers on the roads which block the runoff water, at certain circumstances small cuts are dug across the road to divert the water flowing along the road. The water drains into a channel along the roadside, and takes a right-angled turn when blocked by a stone. From there, it is channelled into the harvesting ponds. The sharing of this water between different families or clans is through mutual negotiations. Sliced bamboo strips are also placed along the hills slopes to drain water into a pipe that goes below the road and emptied into the channel on the other side of the road, before being diverted into the fields., after the water reaches the fields, human feet churn the soil into a thick slush. Water flows from one plot to the other through passages which are designed to retain 15 cut of water in the fields. The same arrangement exists in the last plot before the excess water is let out. In terrace cultivation, the sowing

season generally lasts from April to May and transplantation is done in June and July. Water is allowed to remain in the fields for the whole period of paddy growth. It is, sometimes, drained out just before harvesting.

Here, it is necessary to know about 'Zabo'. Zabo is a small pond inside or within the paddy field or wet terrace field cultivation to rear fish in the paddy fields. It provides a place for the fishes to shelter and breed. It is also used for necessary supply of water for paddy plants. This Zabo or small pond in the paddy field is common to many villages of Phek District, Nagaland. The small area of deeper with a catchment boundary encircling the deeper area, inside a larger water harvesting pond/tank for rearing fish, is also known as Zabo.

5.3 Cattleshed:

It is common practice to maintain a cattle yard fenced with small bamboos or ordinary branches of bamboo. The yard is managed by a group of farmers by stocking cattle on a rotation basis or together, preferably a little below the water harvesting pond or by the side of the pond. Washing of the cattle yard is done with runoff water, which then enters the paddy fields rich in manure. When there is an overflow of water from the pond, it finds its way through a diversion passing through the cattle yard and washes down the manure to the fields below. Split bamboo channels are used to carry dung and urine from cattle yard to a central point from where it is spread all over the fields.

5.4 Agricultural Land:

Terraced fields are located on an elevation lower than the water harvesting ponds. The area of paddy fields varies between 0.2-0.5 hectare. Use of green manure like Albizia lebeck and methonu tree leaves, application of cow dung and diversion of runoff from open cattle yards are the usual methods adopted to fertilise the paddy. Farmers also use azolla for enhancing soil fertility wherever permanent impounding of water sources is available. Paddy fields are thoroughly rammed due to treading by both humans and cattle, and battering with sticks to create a hard pan to avoid percolation losses. Seepage losses through shoulder bunds are checked by using paddy husk on the upstream side. The main source of draught power for agricultural operations is buffalo. The only paddy crop grown is the The yield of paddy is about 3-4 tonne per ha. Most farmers practice paddy –cum-fish culture and derive about 50-60kg of fish per ha as an additional output. The entire community participates in building terraces. "Area proposed for terracing is cleared by cutting and burning the jungle. The width of the terrace depends upon the slope, keeping the height of the risers (Vertical pieces connecting two treads in a stairs) to one-two m. on an average. Contour lines are drawn by scraping the top soil upwards so that the subsoil layers exposed for a firm foundation. After removing the thin topsoil layer, the sub soil below the proposed riser, where the sub-soil is kept exposed, is dug and heaped up for compaction with wooden dubs vertically and horizontally to form the riser and the side bond. After it is filled up with stones and shale's removed while digging. Levelling of terrace is done by half And half – fill methods, by pressing and compacting the filled soil with beet and sticks, taking care that the topsoil is not buried. After the terrace is thoroughly levelled and completed, the topsoil, curlier removed and kept aside is spread evenly over the surface of the terrace. Weathered shale's collected from the nearby forests are also spread over the terraces. As soon as these come in contact with water they disintegrate and percolation. The terraces are constructed from bottom up so that the topsoil from the upper proposed terrace is removed and thrown to fill the terrace just completed below. Leaves and twigs of alder, And other trees and thrashes are added to the Constructed terraces; and allowed to decompose and fertilise the soil. Initially, beans, Naga dal, pumpkins, potatoes etc. were grown to recondition the soil for cultivation." The above description is trace of all terraces construction. But there are certain differences with respect to details. If the source of water for a terrace is a stream of river, then the topsoil is not removed before the terrace is made, it is spread again over the land once the terracing is complete, as described above. This is because stream water carries with it enough sediments, and suspended matter which soon form a layer over the surface.

VI. Major findings of this Paper

The major findings of this paper can be outlined briefly as follows

1. Rüza , an indigenous water harvesting practiced by Kikruma villagers is very unique in nature and does not exist in other Chakhesang village of Phek District, Nagaland.
2. It is a combination of irrigation, agriculture, afforestation, fishery and animal husbandry with well founded conservation base soil erosion control. Water resources development, and management and preservation of nature vegetation.
3. It also helps in combating climate change which is impacting on the natural ecosystems and agriculture through its various component parts.
4. It also helps in promoting eco-tourism as well as rural tourism as Rüza system is very unique.
5. It also helps in accommodating sustainable habitat of the villagers of Kikruma through their collective participation for the maintenance and successful of the system.

VII. Concluding Observation

In places where there is no rivers, water canals, and scarcity of rainfall, highest priority is to preserve rainwater whenever it falls to recharge soil profile, ground water and surface storage. It also improves surface and sub-surface flows perennially. Surface runoff harvesting and storage structures, roof top rainfall collection into cistern or ground water recharging, dug out ponds, tanks,.....check dams, stop dams, gully plugs are several water harvesting structures known by different regional names. (Sarma, 2017:39) Kikruma village, being a rain shadow and hill top area, its villagers have evolved a unique system of water harvesting technique which is a combination of irrigation, agriculture, afforestation, fishery and animal husbandry as well as with well-founded conservation base, soil erosion control, water resources development, and management and preservation of natural vegetation. This system helps in achieving and propagating 17 Goals of Sustainable Development especially Goal No. 17 which says, “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation, and halt biodiversity loss.” So, Rüza system helps in many ways for sustainable development of the villagers of Kikruma. Therefore, it needs all the forms of incentive from the Governments of Nagaland and the Centre for its scientific improvement and its applicabilities to other hilly villages.

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