

ZABO FARMING SYSTEM, NAGALAND



OVERVIEW

Certain communities in the North East have developed unique farming systems which are based upon traditional agricultural knowledge and practices that have been acquired and preserved over centuries. These practices make sustainable use of locally available resources and also conserve local agricultural biodiversity. One such case is the Zabo system of farming practised by the farmers of the Chakhesang tribe of Kikruma village, in Phek district in Nagaland.

The term Zabo is derived from the word *zabö*, which means 'impounding runoff water', in the *Chokri* dialect of Nagaland. Even though the Kikruma region received enough rainfall, water scarcity persisted due to surface runoff. This stimulated the communities to develop an elaborate water harvesting arrangement called Zabo [1] [2]. This system has an inbuilt water harvesting and recycling systems with a well-founded conservation base to control soil erosion and maintain soil fertility. Zabo is also known as *Dzüdū* or *Ruza* system in other parts of the region. It is a combination of forestry, horticulture, agriculture, fishery and animal husbandry [3] [4]. This integration of different enterprises enhances the overall income of farmers and the production of crops.



BIOGEOGRAPHICAL SIGNIFICANCE

Nagaland is a mountainous state located in the north-eastern part of India. Falling in the Indo-Malayan region it is also part of a global biodiversity 'hotspot' and the Eastern Himalayan endemic bird area [5]. It has Tropical, Subtropical Evergreen forests and unique Broad-leaved Moist Temperate forests. The biodiversity represents the transition zone of Indian, Indo Malayan and Indo Chinese biogeographic region. Many ancient angiosperms & primitive flowering plants are present in the area. It is also the center of origin of select rice variety and secondary origin of citrus, chilly and maize [6].



GOVERNANCE AND MANAGEMENT

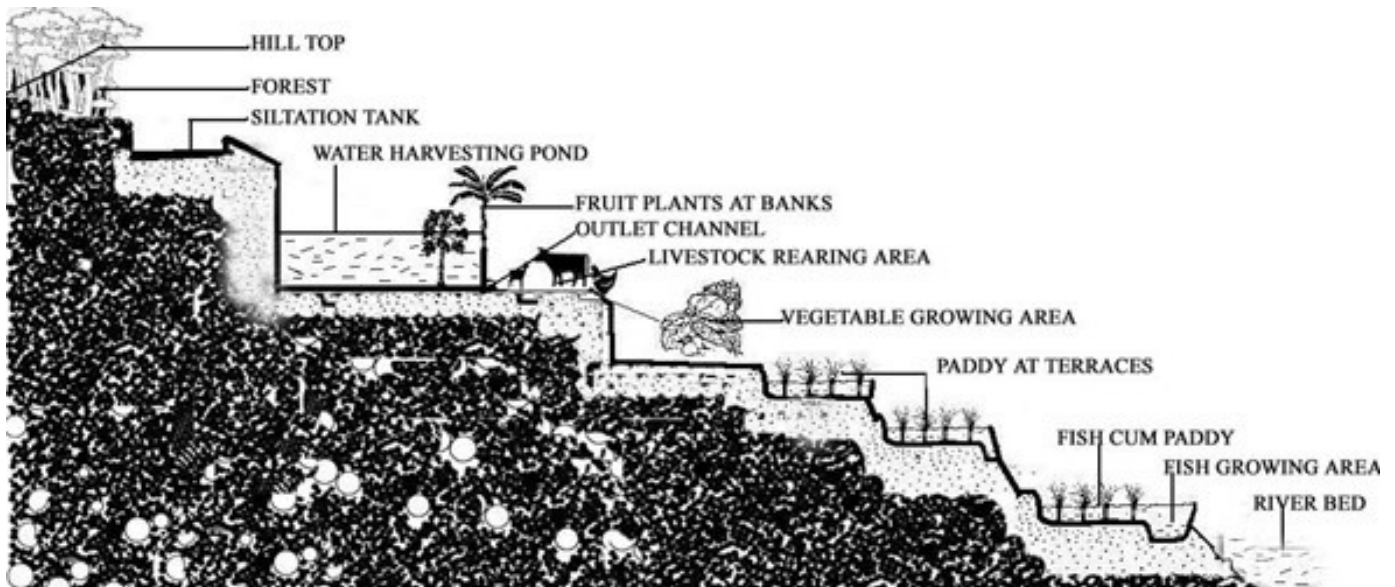
The Zabo farming system is governed and managed by the Village Development Board (VDB) instituted by the community members with the Secretary and other members taking major decisions regarding daily management issues such as regular cleaning of the main water channel (nullah), use and application of local tobacco leaf extract for pest control, weeding of the nursery bed etc. Land with Zabo cultivation system is owned by individual landowners and the Village Development Board (VDB).

Every recognised village in Nagaland has a VDB. The Village Development Board Management Committee (VDBMC) members are selected from within the clans and sub-clans in the village along with representation from women and youth groups. The Secretary of the VDBMC is elected by the committee members from among themselves. The Committee is answerable to the Village Council [7], which is the highest governing body in the village. The VDBs receive annual financial allocations from the state through the Department of Rural Development. Public meetings are held where the Village Annual Plan is decided through a resolution by the will of the majority. VDBs also have fixed deposits in banks against which community members can obtain loans for various development activities [8].



TRADITIONAL AGRICULTURAL PRACTICES

The Zabo system adopts an innovative method of storing water channelised from the hilltops, in ponds via the silt retention tanks. Livestock are commonly reared close to these ponds, and vegetables and fruits are cultivated on bunds or just below the livestock enclosures. The water for irrigation to rice fields is channelised from the pond through the livestock enclosures to carry the excreta of these animals to the fields. This serves as a good source of nutrients for the paddy crops.



Land management in Zabo farming system. Souce: Singh et al., 2012

Protected forest lands on hilltops, act as catchment areas and the rain water is channelized through inlet channels to the ponds that are dug below the hilltops in order to harvest the rain water. The bottom surface of the pond is strengthened to minimize the loss of water through seepage. Silt retention tanks are constructed at various points before the runoff water enters into the pond. The water is kept in the silt retention tanks for 2 or 3 days before transferring to the main ponds. The silt retention tanks are cleaned annually by the farmers and the desilted material, which comprises good amount of organic matter and nutrients, is transferred to the agricultural fields at the bottom of the slope. Water is released from the pond for irrigation through an outlet at its base and guided through open channels or bamboo pipes [9] [10]. The ponds usually dry up by March or April, during which these are repaired.

[7] The Government of Nagaland enacted the 'Village Council Act of 1967' through which every recognised village has a Village Council. Its members comprise representative selected from various clans and sub-clans in the village. The primary responsibility of the Village Council is to administer the law and order within the village and coordinate with the Villages. Source: NEPED and IIRR, (1999). Building Upon Traditional Agriculture in Nagaland, India. Nagaland Environmental Protection and Economic Development, Nagaland, India and International Institute of Rural Reconstruction, Silang, Cavite, 4118 Philippines.

[8] NEPED and IIRR. (1999). Building Upon Traditional Agriculture in Nagaland, India. Nagaland Environmental Protection and Economic Development, Nagaland, India and International Institute of Rural Reconstruction, Silang, Cavite, 4118 Philippines

[9] Singh, R.K., Singh, V., Rajkhowa, C. and Deka, B.C. (2012). Zabo: A Traditional Way of Integrated Farming. ICAR. DOI: 10.13140/RG.2.1.1773.2647.

[10] Singh, A. K. (2007). Indigenous water management system by the farmers of northeastern hill region, Leisa India. Accessed from:

Enclosures for livestock such as cattle, goat, sheep, pig and poultry, are constructed on a lower elevation than the water-harvesting ponds which are fenced with bamboo and wooden branches. The water for irrigation of rice fields at the bottom of the slope, is channelised from the pond via the livestock enclosures so that the animal excreta may be carried to the fields. This serves as a good source of nutrients for the paddy crops. Vegetables and fruits like squash, colocasia, cucurbits, banana, papaya, oranges and citrus are cultivated on the banks of the pond and below the livestock enclosures [11].

In the *Zabo* system, paddy fields are generally located at the lower elevations. The field embankments are strengthened by beating with wooden sticks to avoid percolation and seepage. Paddy husk is also used along with the mud to reduce seepage from the bunds. April to May is the sowing season and transplantation is done during the months of June and July [12]. Paddy cum fish culture is commonly practised; farmers rear fish varieties such as *Pfutho* (*Channa striatus*) and common carp (*Cyprinus carpio*) along with local varieties of rice [13]. A small pit is dug out in the middle of the rice field and fish fingerlings are released in it during the month of July. In case of poor rains, on average two additional irrigations are required, which are sourced through the *Zabo* ponds [14]. Paddy matures by the end of October and the excess water is drained out from the fields before harvesting of the paddy. As the ponds dry out, the fish move into the pit and are harvested [15]. The festivals *Sükrünyi* and *Thürinyi*, are celebrated during the months of January, February and November for a good harvest.



IN-SITU CONSERVATION

The *Zabo* agricultural system provides in-situ conservation of several traditional varieties of rice (*Nyode*, *Nyogo*, *Rhunyo Küzü*, *Pvakhrü Munyo*, *Dzücho Münyotanie*, *Kumunyode*, *Tanyekemuga*, *Ribolü*, *White tanie*, *Red tanie*, *Chide tanie*, *Thüvüri*, *Thüri*, *Kumunyothuziri*, *Richolü*, *Rüli* and *Caha*) which are maintained and preserved by the communities and are passed on from one generation to the next. They also plant traditional varieties of maize (*Kotho*, *Methohubo*, *TüphreSako*, *KhünelüSako*, *TüphreSako*, *Tieciesako* and *Tsakotsa*), beans (*Kürhise* and *Kütirese Batüse Tikünalüse*), vegetables and fruits as a part of the *Zabo* system [16]. Composite of rice with fish culture has been traditionally practiced by using fish variety such as *Pfutho* (*Channa striatus*) and common carp (*Cyprinus carpio*). Integrating fish with rice cultivation along with integration of horticulture and animal husbandry, assures higher productivity and sustenance for farmers.



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[11] Singh, R.K., et al. *Zabo*. (2012).

[12] Singh, R.K., Singh, V., Rajkhowa, C. and Deka, B.C. (2012). *Zabo: A Traditional Way of Integrated Farming*. ICAR. DOI: 10.13140/RC.2.1.1773.2647. https://www.researchgate.net/publication/274001343_Zabo_A_Traditional_Way_of_Integrated_Farming

[13] Singh, R.K., Hannah, K., Asangla, R., Bharali, D., Borkotoky. (2018). *Zabo: A Time-tested Integrated Farming System Practiced by Chakhesang Tribe of Nagaland*. *Indian Journal of Hill Farming*. June, Volume 31, Issue 1, Page 188-192.

[14] Sharma, U.C., and Sharma, V. (2003). The "Zabo" soil and water management and conservation system in northeast India: tribal beliefs in development of water resources and their impact on society - a historical account of a success story. *The Basis of Civilization - Water Science* (Proceedings of the UNESCO/IAHS/IWHA symposium held in Rome, December 2003). IAHS Publ.

[15] Singh, R.K., et al. *Zabo*. (2012).

[16] Singh, R.K., Hannah, K., Asangla, R., Bharali, D., Borkotoky. (2018). *Zabo: A Time-tested Integrated Farming System Practiced by Chakhesang Tribe of Nagaland*. *Indian Journal of Hill Farming*. June, Volume 31, Issue 1, Page 188-192..