

# TRADITIONAL *SHIFTING/SLASH-BURN* AGRICULTURE TECHNOLOGY OF EASTERN HIMALAYAN; A Study of Nyishi of Arunachal Pradesh

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## ABSTRACT

Agriculture is the next important revolution in human history after man's appearance on the earth. Some social scientists and archaeologists have taken to describe it as the commonsense view of the origin of agriculture. Some social scientists and archaeologists have stated that the earliest form of agriculture practice was *Shifting/Slash-Burn cultivation* with the help of stone and bone tools and implements, and later, it was with copper tools during the *Chalcolithic*. The traditional *shifting* agriculture technology defines the system of cultivation based on indigenous skills, techniques, innovations, knowledge, and experts by shifting, moving one plot to another to allow reverting to producing normal vegetation. There is no means of any modern technological involvement in it.

In the traditional economy of the Nyishi, this agriculture occupies the primary position as what other tribes of Northeast and across India. The tribe sees agriculture as the foundation of their civilization. The reason for maximum concentration to *shifting or Slash-burn* methods of cultivation, popularly called *Thump Rong-ngo*, owing by people have a rugged hilly terrain with varied topographical, climatic features, inaccessibility, fragility, marginality, and diversity which leaves a minor ratio of total landed area for amendable human settlements. The aspect in the process of *shifting/jhum* or *thump rong-ngo* methods of cultivation is simple. Implements, which were employed for such cultivation, were without any advanced technological aid. The mode of cultivation is highly human labor-intensive farming. In the early 90s, most of the North Eastern States of India were mainly dependent on this *shifting* agriculture. Ever since the *shifting/Slash-burn* cultivation was the main source of agriculture after hunting, gaming, and fishing, it also provided livelihoods to the large population of rural folk.

Keywords: Nyishi Tribes, Shifting Cultivation or Thump Rong-ngo, Traditional Technology, Implements and Tools, Arunachal Pradesh, North East, and India.

## INTRODUCTION

Nestled in the laps of the great Eastern Himalayan ranges, the state of Arunachal Pradesh- a land of sensuousness where the variant sportive natural topographical features play around the cliffs to plains like the gleeful children are home to several ethnic communities, which are warm and colorful as the land itself. Geographically, Arunachal Pradesh lies between 26°28 to 29°30. N latitudes and 91°30 to 97°30. E longitudes with a total area of 83,743 sq. km. It is bounded by Bhutan to the west (160 km), China to the north and northeast (1080 km), and Myanmar to the east (440 km). It shares an inter-state boundary with Nagaland in the east and southeast and Assam in the south.<sup>1</sup> As per the 2011 census, Arunachal Pradesh has

<sup>1</sup> Report on the Physical and Political Geography of the Arunachal Pradesh, 2001, p.1

a total population of 13,83,727 persons, of which 7,13,912 are male and 6,69,815 are female. The literacy rate is 65.38%. The scheduled tribe population accounts for 64.22 percent of the total population, as against 88.50 percent in 1961.<sup>2</sup>

The territory has comprised of 25 districts with 26 major tribes and several least populated tribes, which are from West to East and named after the principal rivers of the hilly terrain. The state is largely divided into three important cultural zones viz, the Western Zone, Central Zone, and Eastern Zone. Mahayana sect of Buddhism populates the western zone, while the major populations of the central zone are believers of *Donyi-Poloism* (Indigenous Faith). The Eastern zone is largely dominated by the Hinayana sect of Theravada Buddhism and also a sizeable number of indigenous worshipers like *Rangfrah*, *Nani Intiya*, etc.<sup>3</sup>

### Agriculture.

Agriculture is the next important revolution in human history after man's appearance on the earth. Some social scientists and archaeologists have taken to describe it as the commonsense view of the origin of agriculture. The story begins perhaps 500,000, perhaps 250,000 years ago, with men emerging as a rare animal and a food-gatherer that lived any other beast of the prey a parasites on other creatures by catching and collecting what food nature happened to provide. This gathering economy, corresponding to what Morgan terms *savagery*, provided the sole source of livelihood open to any human society during nearly 98 percent of humanity's sojourn on this planet throughout the whole of what archaeologists called *Palaeolithic* or *Old Stone Age*, and geologists name the *Pleistocene*.<sup>4</sup> In this period, a man was introduced to sickle and milling stones and only harvested wild grains. Then man started a sedentary life in the forests. Due to sedentism population increased. So man migrated to the peripheral areas in search of food, and then he started collecting wild seeds, which led the path toward cultivation. The agricultural revolution awakened man to this dreadful desire, and there is no limit to his desire now. It can be said that agricultural surplus was largely responsible for the birth of ancient civilization.<sup>5</sup> Likewise, not more than 8,000 years ago, some societies first appeared in the *Fertile Crescent*, a region of the Near East, by activity cooperating with nature and began to increase the supplies of food available by cultivating plants and often also by breeding domestic animals. The new food-producing economy is distinctive of what Morgan called *Barbarism* and is represented in its simplest form in what archaeologists term the *Neolithic* or *New Stone Age*.<sup>6</sup> The earliest evidence of the settled agriculture in the Indian subcontinent, attributed to 7000 BC, is in *Mehrgarh*, which is situated in Baluchistan, a province of Pakistan. It is located on the Bolan River in the Kochi plain, which is called the 'bread basket' of Baluchistan. It is called one of the largest Neolithic settlements between the Indus and the Mediterranean. They were the first settlers and produced cereals like Barley, Wheat, etc., but they were disturbed, and again agriculture activity resumed at around 5000 BC with the help of stone and bone tools.<sup>7</sup> Thereafter much progress took place according to the growth and development of the new culture. Some social scientists and archaeologists have stated that the earliest form of agriculture practice was *Shifting/Slash-Burn cultivation*<sup>8</sup> with the help of stone and bone tools, and later, it was with copper tools during the *Chalcolithic*.

<sup>2</sup> Arunachal Pradesh Census Report, 2011. Sources. <https://www.census.co.in>≥ state (Hereafter referred as APCR)

<sup>3</sup> Tana Showren, *The Nyishi of Arunachal Pradesh; An Ethnohistorical Study*, 2009, Regency Publication, New Delhi. P. 11 (Hereafter referred as NAPES)

<sup>4</sup> V. Gordon Childe, *What Happened In History*, Aakar Books, Mayur Vihar, Delhi. First published 1942, First Indian Edition 2016, pp. 23-24 (Hereafter referred as WHH)

<sup>5</sup> Basant K. Mohanta and Vipin K. Singh (edi), *Traditional Knowledge System and Technology in India*, Pratibha Prakashan, Delhi, 2012 p. 35 (Hereafter referred as TKSTI)

<sup>6</sup> WHH, op. cit, p. 24

<sup>7</sup> R. S Sharma, *India's Ancient Past*. Oxford University Press, Jai Singh Road, New Delhi. First Published in 1977, First Edition Published in 2005, P. 58 (Hereafter referred as IAP)

<sup>8</sup> Spencer, J. E. *Shifting cultivation in southeastern Asia*. Vol. 19, University of California Press, 1966, p. 18

In the context of Arunachal Pradesh as a general and Nyishi as a particular, there is no specific work that has been done for the reconstruction of the unrecorded period of the history of Agriculture and its seedling. There we found the existence of agricultural implements like stone and bone tools so far as according to artifacts. The first discovery of the Stone Age artifacts from the state was reported as early as 1871 by John Anderson in his report 'Neolithic Celts from the Mishmi Hills'.<sup>9</sup> Thereafter, R. D Banerjee described a stone adze found on the left bank of river Dihong in a village called Mebo, the then West Siang district, in a caption of "Neolithic Implements from Abor Country's" in his Archaeological Survey of India's Report 1924-25.<sup>10</sup> A. A. Ashraf further states that 'Worman (1949:181-200) suggests that China was the source of India's North East and Arunachal Pradesh Neolithic Celts as far as the faceted tools are concerned because the early man's traditions from Eastern Asia entered into India through this corridor.<sup>11</sup> In the prehistoric period, Nysihi were considered a nomadic tribe like other tribes of the state and migration from one place to another in search of better settlement and pastoral land. Nothing was known of the record of early human occupation in the Nyishi inhabitant place. It was the D. K. Duarah in 1979 that reported three Neolithic Celts, which he collected through B. Shukla is a school teacher from the Government Middle School, Leel, under the Sangram Administrative Centre of Kurung Kumey District. It is in the vicinity of Parsi-Parlo circle in Kurung Kumey district, which falls right bank of the kumey river about 65 km from the district HQ of Kurung Kumey, Koloriang, which is known as the *Parsi-Parlo Neolithic* site.<sup>12</sup> In addition, a few stone artifacts were collected in 2010 from *Leel* village, which fell left bank of the Kurung River, and it preserved at Arunachal state museum, Itanagar.<sup>13</sup> The finding of the above Neolithic Celts is evidence that there was human occupation, of course, with agricultural practices. The finding of the early cereal crops like *finger millet*, *foxtail millet*, *sorghum*, and tools like *quartzite stone axe*, *hammers*, and *hoes*, etc., is the pieces of evidence that the Nyishi people have existed since the pre-iron age. Many of these cereal crops and polished tools were lost later. This was related to the crises and fall of the medieval civilization of the Far East and later the early modern civilization with influences of colonialization in India and South East Asia.

### **RONG-NGO RIINAM (Traditional Agriculture Practice)**

In the traditional economy of the Nyishi, agriculture occupied the primary position as other tribes of Northeast and across India. The tribe sees agriculture as the foundation of their civilization. It is frequently held that only agriculture enables a society the luxury of excess production and that along with this excess production comes the development of the hallmarks of cultural civilization, metalworking, and the formation of a well-defined economic system. Despite this importance, our knowledge about the origin of agriculture and how it evolved among the Nyishi people is far from satisfactory because there is no scientific or written records are available. As Tana Showren states, 'oral and legend accounts of the tribe of the states that practice of agriculture developed out of "traditional sexual roles and the divisions of labor" that they created'.<sup>14</sup> In many ways, the Nyishi stands on the cultural and economic stage of Neolithic perfection. In prehistoric days, there was no hard and fast land-tenure system, but over time there was nearly symbolic ownership of the village-state

<sup>9</sup> J. Anderson. The stone implement of Yunnan, with a notice of bronze axe-like weapon, from the Sanda Valley: A report on expedition to the Western Yunnan via Bhamo. Superintendent of Printing, Calcutta, Government of West Bengal, 1871, p. 410-15

<sup>10</sup> R. D Banerjee, Neolithic Implements from Abor Country. Annual Report of the Archaeological Survey of India, 1924-25, p. 102

<sup>11</sup> A. A Ashraf. Prehistoric Arunachal. Directorate of Research, Government of Arunachal Pradesh, Itanagar. 1990, p. 3 (Hereafter referred as PA)

<sup>12</sup> Ibid, p. 5

<sup>13</sup> Tame Ramya and Bhaboklang Sohkhlet, *Anthropology in Arunachal Pradesh: Genesis, Establishment, and Contribution*, Dera natung Government College Research Journal, Vol-3, Issue-1, 2018, p. 86

<sup>14</sup> NAPES, op. cit, p. 129

territory land.<sup>15</sup> The Nyishi of Arunachal Pradesh has two types of agriculture system viz, (A) *Shifting/Jhum Cultivation* and (B) *Wetland Rice Cultivation* (in short, *WRC*).

### **THUMP RONG-NGO (Dry Land Agriculture System)**

The *shifting or slash-burn* type of agriculture is called *Thump Rong-ngo* (which means dry land paddy field). Nyishi is mainly dependent upon *shifting* or *slash* methods of agriculture which require simple tools, likewise what other tribes of the state. The reason for the maximum concentration of *shifting, slash-burn* methods of cultivation by people has a rugged hilly terrain with varied topographical, climatic features, inaccessibility, fragility, marginality, and diversity which leaves a minor ratio of total landed area for amendable human settlements. The aspect of the process of *shifting* or *slash-burn* methods of cultivation is simple. Implements, which were employed for such cultivation, were without any advanced technological aid. The mode of cultivation is highly human labor-intensive farming. In this regard, S. N Mishra state that “the single most important common features of all the region of Arunachal Pradesh is their living by shifting agriculture it did not involve animal drawn-plough and was solely based on human energy”.<sup>16</sup> With regards to S. N Mishra’s statement, it is a partial narrative for the state, but of course, the bordering area where there is a lack of communication between plain and hill people is still cultivating the same because of marginality and inaccessibility. The *shifting, slash-burn* method of agriculture is also called *Jhuming* agriculture. In the early nineties, most of the North Eastern state of India was mainly dependent on this *jhum* agriculture. Ever since the *shifting* or *jhum* cultivation was the main source of agriculture after hunting, gaming, and fishing, it also provided livelihoods to the large population of rural folk.

The chief characteristic features of the *shifting or slash-burn* agriculture of the district are; (1) Clearing the bush, shrubs, creepers, and climbers from the site of the particular land and using fire to burn down, (2) Keeping the land fallow for regeneration for some years, (3) Rotation of the fields, (4) Use of human labor as main input, (5) Non-employment of draught animals, (6) Non-use of the plough, and (7) All the crops are mixed to grown together. The Nyishi practiced agriculture, for which they had indigenously developed tools and equipment. The tools and methods of the *shifting/slash-burn* cultivation had the technology of an incipient type, whereas; the use of the plough marked an improvement-a revolution in agrarian technology and agricultural production by Nyishi of the plain area.<sup>17</sup>

#### **(a) Methods of *Shifting* or *Slash-Burn* Cultivation**

##### **(i) *Nyoku Tungnam* (site verification or selection)**

Site selection is the first method before tilling the *shifting* or *slash-burn* cultivation. For this joint site/area, surveying is mandatory. A survey is being carried out by each head of the family whose plots of land are in the same locations.

After being surveyed, the selection of the site proceeded according to the invocation of the omen, and several other factors such as fertility of the soil, number of years of fallow, and soil maturity were verified. These are often carried out by senior male members and assisted by youth from individual families, groups, or villagers since they believe that cultivation close to each other and the same location is easy to fence or barricade the agricultural field from damage of wild

<sup>15</sup> Ibid, p, 130

<sup>16</sup> S. N Mishra, “Arunachal Tribal Economic, Formations, and Their Dissolution”, Economic and Political Weekly, xviii, 1983, p. 42

<sup>17</sup> A. K Thakur, Technology of the Tribes of Northeast India, DVS Publishers, Guwahati, Assam, 2017, pp. 41-42 (Hereafter referred as TTNI)

as well as domestic animals and convenient to help each other at an instant.<sup>18</sup> After this site verification or selection process started in January.

### (ii) *Rong-ngo Panam* (Felling and clearance of the Jungle)

After selecting the site for cultivation by performing all the modalities, the felling, and clearance of the jungle started in January month. This process is called *Rong-ngo Panam* in Nyishi. The methods to clearance of the virgin land mean felling and clearing the trees, bushes, shrubs, logs, creepers, and climbers and completely logging out the undergrowth at once before drying and setting on fire. Such type takes more time during the clearance of the field but easy and fast completion after being burning fire.

For felling and clearance of the jungle, simple tools such as cattle *jaws*, *hatchet*, *oryoq*, and *koriu* (hoe) are used and involve arduous labor. It takes around a week or more to complete the clearing as determined by the size of the agricultural field and its number of engaged laborers or workers. During the felling, several trees are left half-felled because they will use as support for climbing vegetable plants like green beans, yam, etc. After completion of the felling, it left for a month or half to dry felling trees and bushes.

### (iii) *Eme Rinam* (Ablaze/lit the fire)

Thereafter, when the sunny day is experienced, the dried felled trees, bushes, logs, debris, and their branches are set ablaze. In the olden days, there were not familiar with the use of match sticks, and the only fire-producing instrument was called *Madang* (clear quartz stone to stone and later piece of iron) and *Yungmag* (soft bark of Wallachia palm/tinder). When the two *Madang* is heated, the sparkling firecracker catch with the *Yungmag*, which is fixed between the two *madang*, and fire is used, a primitive method called *Madang Eme*.<sup>19</sup> Hence, the fire was produced, and *Moru* (a dried split bamboo) was used to light the fire on the field. The setting of the fire is determined by the direction of the wind blowing. It is believed that the direction of wind blowing is played a crucial role in determining the good burning of the fire. But of course, maximum by south to north point especially in a slopping area, the fire is set ablaze which easily and immediately spreading the fire through wind and field are complete state of burning all the raw dried debris. The setting of fire usually takes place in the afternoon when the heat of the sun is high, and debris is dried and freed from the morning dew.<sup>20</sup>

### (iv) *Rigram Ramnam* (Burning the Debris and Logs)

After the first burn, the entire half-burnt logs and debris are collected at specific points and again burnt down called *Maram/Mwrm Ramnam*. The mwram places are made as *Humpium*<sup>21</sup> after the burning, and during weeding seasons the weeds are also placed in *humpium*. This constant accumulation of burn debris and weeds becomes manures, and *humpium* becomes a place in the field that is known for its fertility. *Humpium* is very fertile; therefore, it's often growing green leafy vegetables.<sup>22</sup> During the collection and cleaning of the debris and logs in the field, the debris and logs are made separate. The logs are used for fencing or barricading the field, firewood, and for step terracing. The practice of step terracing is

<sup>18</sup> Source provided by Mrs Nangram Para, age 63, traditional agriculturist expert, a resident of Kiya village, Koloriang, Kurung Kumey District, Arunachal Pradesh, India on Nov 10, 2019 (Hereafter referred as NPI)

<sup>19</sup> Fire producing from the quartz stone

<sup>20</sup> Source provided by Mr. Yumlam Piter age 47, a progressive farmer, resident of Yumlam Village and Mr. Nangram Bilo age 49, a farmer-cum-Gaon Bura, a resident of Nangram village, Koloriang, Kurung Kumey District, Arunachal Pradesh, India on Dec 2, 2018 (Hereafter referred as YPNBI)

<sup>21</sup> A dumping zone in dry paddy field where called by Nyishi

<sup>22</sup> Source provided by Mr. Nangram Taming, age 52, farmer-cum-RWD Labour, resident of Yaki village under Sangram Administrative circle on Nov18, 2019

called *Sangpa Panam*.<sup>23</sup> It's often erected horizontally along the field where step sloping area is experienced because the region is hilly in nature. It enables the farmers to control the erosion away of the upper layer of fertile soil during rainy and helps to rest their feet in it while working in the field by skidding off. Thus the indigenous knowledge of *sangpa panam* and *humpium*, which is placed right after the burning of fire, plays a crucial role in the production of various crops and vegetables because of their fertility in nature. The erection of the *sangpa panam* is only practice at step sloping area. Meanwhile, the boundaries between the same areas are properly demarcated by the parties during the clearing or burning of the debris and logs. The half-felled trees and logs are erected to mark the demarcated boundary line. The boundaries are often grown creeper and climber vegetables like *Tapey* (Pumpkin), *Enyi* (Taro), *Enying/Ali* (Yam), *Pihak* (Soya Bean), and *Mekung* (cucumbers). The growing creeper and climber vegetables are easy to identify the marked boundary between the parties.<sup>24</sup>

#### (v) *Solung/Gumpa Panam* (Erection of Indigenous Fencing)

Right after the *Rigram Ramnam* the fencing or barricading is erected by the male members of the family and joint venture by the parties who are cultivated in the same area as a service exchange system. This erection of the fencing/barricading is called *solung/gumpa panam* in Nyishi. This is the most important activity as the completion of fencing would ensure the proper protection of the crops from the damage of animals, and failing which sowing activities would prove meaningless exercise. The materials required for erecting fencing or barricading are; wooden, logs, bamboo, and cane rope. The wooden, logs, and bamboo are for erection, and the cane and bamboo string is for fastening. Firstly, the strong wooden rode is erected vertically one after another by parallel lines beyond the agricultural field. Thereafter the cane and bamboo string are fastened with the erected wooden rode. Since then, long bamboo and wooden have been erected horizontally with vertical erected wooden and ropes fasted are tied properly. The logs are then erected from both sides, which means to strengthen the fencing. The erection of fencing or barricading is to control or protect the damage of the crops in the field by wild, domestic, and semi-domestic animals or cattle.

During the erection of the fencing, the women folk feed *aching* (rice) and *oppo* (local alcohol), and youths assist in carrying logs and ropes from place to place. The erection of fencing or barricading in agricultural fields has been a mandatory subject since time immemorial, which is also associated with some rituals. The erection of fencing almost takes weeks to complete, and sometime it's determined according to participating workers. During the erection of fencing, the village male members are invited as they believe that maximum participation is obliged since otherwise animals/cattle might damage the sown crops before they grow.<sup>25</sup>

#### (vi) *Rong-ngo Obbo/Tabio* (Field Hut/Granary)

After fencing, another important thing to do is to construct a rest house/storehouse in a field called Hut-cum-Granary. This field hut is called *Rong-ngo Obbo/Tabio* in Nyishi. It's often constructed in the middle of the agriculture field or else in a plain suitable area. The hut/granary is made up of materials like wood, bamboo, cane rope, and wild banana leaf. At first, the wood is erected in a vertical line on the base of a rectangular shape. The rope is fasted at each wooden rod, and other wooden and bamboo are placed and crossing each other and tied up from the fasted strings. After structuring the hut, the bamboo called *Nyopi* is laid horizontally on the floor where people must take rest and goods to be kept safe. Then after, the top roof is covered by the *kolung okku* (plantain leaf) and becomes a complete field hut or granary. The construction of

<sup>23</sup> YPNBI

<sup>24</sup> Source provided by Mr. Yumlam Eriung, age 67, a farmer, resident of Yumlam Village, Koloriang, Kurung Kumey District, Arunachal Pradesh, India on Nov 20, 2019 (Hereafter referred as YEI)

<sup>25</sup> Source provided by Mr. Langkung Tajung, age 41, Xllth passed agriculturist as well as progressive farmer, resident of Parsi-Parlo circle Hq, Kurung Kumey District, Arunachal Pradesh, India on Oct 21, 2018

the agricultural field hut-cum-granary is often taken 2-3 days to complete. The basic purpose for the construction of a hut or granary, before the harvesting, is to take rest during rainfall, over sunshine, hold lunch, and store the grains and basic necessities utilization are kept. After harvesting, the entire crops and grains product shall be stored herein.<sup>26</sup> In the olden days, the hut sometimes was used as a home for agricultural bonded labor or slave. They were often asked to stay at the hut to carry out the related agriculture affairs right from felling to harvesting of crops. For this, they also get their share from the master as a token of love.

### (vii) *Aam Linam* (Sowing of paddy)

In *shifting or slash-burn* cultivation, the Nyishi has their traditional way of management and techniques used on a particular agricultural field over the years, including all spatial and temporal aspects of managing in an agricultural cropping system. The sowing of the seeds starts in May-June. In high altitudes region, the sowing of seeds starts early May, and the lesser altitude near the riverside starts in June. The first sowing of paddy in the agricultural field is called *Liw/Liu Hunam*.<sup>27</sup> Generally, it is carried out by a housewife of a single-family or invited her 1-2 women folk where just a few rice in the husk is sown in a particular spot. It is often sown near the hut but is not mandatory. A day before the first sowing, a particular spot around 5-10 meters is kept clear from all the raw debris. Before sowing the paddy into the ground, the women erect some ritualistic shrine decorated with white fowl feathers and place ginger and rice husk in *kukam* leaf, which is offered to the deities of the agricultural activities. *The liw hunam* is mandatory for every household cultivator since it offers the deities for good harvesting. *Liw hunam* is considered as first agriculture festival of the season. Thereafter, the major sowing of seeds starts soon after the *liw*. It might take a week or more, and during this period, the remaining light debris was cleared and burnt down, called *Regri Rinam*. Meanwhile, the nature of the Nyishi cropping pattern in *shifting or slash-burn* agriculture is a multi-cropping system. The following cropping patterns are;

#### (a) *Aamchik Chinam* (Sowing of Paddy)

After completion of the clearance of remaining debris, the sowing of the seeds starts in the month of midst May and early June. The sowing of paddy into the field is the first step after *liw* is called *Aamchik Chinam*. During *Aamchik*, a group of women folk around 10-15 or more in the village starts the sowing of the paddy called *Regghi Angnam*. This means the paddy must be sown one time at one field, but whose field is a bigger area, they need to sow twice. The *Regghi Angnam* in Nyishi means the exchange of the service between the person without paying any cash or kind. If someone does not want to exchange the service, they are offered and accept the cash or kind called *Ragjo Jonam*. The grouping *aamchik* continues one after another between the village cultivators, and it carries till the completion of each farmer.

#### (b) *Lenam-Paknam Rinam* (Sowing and broadcasting activities)

The women folks are the main instrumental in sowing and broadcasting the seeds while men are assisted them. For digging holes for paddy to sow, the *Lodap* (scraper) and wooden digging stick are the main articles. Sometimes men are also helping hand to make a hole in the women. Rarest of the rare case, man also sowed paddy. For sowing the paddy, women need to carry a small conical cane or bamboo basket on the left side of the waist called *Chungchak*. In *chungchak*, they carry raw rice, maize, jobs tear, etc, to place into the hole. The green bean, taro, and bottle guard are grown into the half-felled trees, and ginger, chili, pumpkin, yam, etc, are placed way irregularly. The other varieties, like finger millet,

<sup>26</sup> Source provided by Mrs. Nangram Yasap Gida, age 54, a progressive farmer, resident of Gida Village, under Sangram Circle, Kurung Kumey District, Arunachal Pradesh, India on Oct. 14, 2018 (Hereafter referred as NYDI)

<sup>27</sup> First sowing of paddy in dry land agriculture field

foxtail millet, and sesame, are just simply broadcast by female members.<sup>28</sup> All crops to be dribbled and broadcasted are well acquainted by the farmers, which are based on the special character of the seedlings of the vulnerability to the heat of the sun. Crops like paddy, maize, jobs tear, greens, creeper, and climber are dribbled because they cannot sustain the heat of the sun and get dried even if exposed for a day. Whereas other seeds which are broadcasted take 7-8 days for germination, and less vulnerable to sun, and comparatively take longer time to get dried. Thus, based on these criteria, the crops to be dribbled and broadcasted are determined by the farmers. The different types of indigenously developed scare marks are placed in the field by the farmers right after the completion of the sowing<sup>29</sup> to protect the broadcasted seeds from the birds and other animals.

#### (viii) *Aehang Manam* (Weeding)

Generally, one month after the completion of the sowing, when seeds have sprouted and grown up, the first spell of the weeding starts. This first wedding is called *Aehang Manam*. It is believed that unnecessary weeds generally disturb the healthy growth of the crops; therefore, it is compulsory to uproot the weeds. During this period, the weeding is thorough, where a single weed is not left out, and when weeds are uprooted, it carries away at *humpium* and *ragam* (outer line of the field). That unwanted weeds are dried out from the heat of the sun. Adult male, female members, and youth have all participated in the uprooting of the weeds. The *Lodap* (scraper) is an important device for weeding. Hereafter, the *Ragbu Bunam* is the second supplementary to the first spell of weeding. This spell of weeding is generally carried out after two months of the first spell.<sup>30</sup>

#### (ix) *Aam Nanam* (Harvesting of paddy and other grains)

Harvesting is the operation of gathering the useful part or parts of the pulse crops and is carried out at the time when all the nutrients have developed, and edible parts reached the appropriate degree of maturity. Once the pulse crops get ripened, the reaping and threshing are the last important agricultural operation in the field. The bunch of corn is plucked and collected with a conical bamboo/cane basket from the stalk by bared hand and stripped and stored at the field hut. Same as the *Teyak* that is reaped by plucking ripened heads and stored separately. Soon after, the ripening of the paddy starts in the early October months. The first ripened paddy is reaped and collected from *Liw/Liu* place as well as the outer line of the field. The collected rice is boiled and then husked from the mortar and pestle by the women, and the next day, hoisting a small ceremonial party called *Amji Danam/Dwnwm*.<sup>31</sup> During the *Amji*, the old man/woman of the family is fed the first taste, and soon, the rest is fed away. Thereafter, the main event of the reaping of paddy and threshing of the other grains starts with the women folks.<sup>32</sup>

The women folks start their harvesting of the paddy during the midst of the October month, soon after a week of the first feeds. Before reaping the paddy, they laid a *Uppih* (a mat for exploiting and gathering the paddy, which is made up of bamboo) at the proper place. Then after women folk start their reaping and stripping the paddy. The traditional methods of reaping and threshing are simple where the farmers reaped with the help of simple tools like *Eagay* (conical basket of bigger size carried at the back) and *Chungcha* (smaller conical basket tied at the waist) and *Riuchak/Chegnia* (knife made up of bamboo and iron). Tools like a knife is used to cut the bunch of paddy from the stalk, while *eagay* is for the collection

<sup>28</sup> NPI

<sup>29</sup> Ibid

<sup>30</sup> NYGI

<sup>31</sup> A ceremonial community feast of the first rice from the paddy field

<sup>32</sup> NPI



of reaping ripened paddy, and *chungcha* is for collecting the half-ripened rice. The reaped rice is collected at the *upih* along the half-ripen are kept aside. The stripping and separation of the raw husk start after the collection of the rice at the mat. While after gathering the *aam* (raw rice), the exploitation of the grain starts. The man and woman started threshing with bare feet by crushing and stamping the bunches of the paddy to separate the straw from the grain. They are then cleared off the chaff with a winnowing fan called *uppiu*.<sup>33</sup> The *uppiu* is used for winnowing separate the raw particles of the rice husk called *Amrow*<sup>34</sup> and *Amsok*<sup>35</sup> from the crop. After the separation of the raw husk, the rice is filled into a large conical basket (eagay), and the man used to carry the rice up to the home granary and stores at large container called *Chanrang/Hapum*. The process of the reaping of the paddy goes continuous up to 6-10 days. After reaping the paddy, the harvesting of other grains starts, and store them in a granary store.

## TYPES OF CROPS

Where there is agriculture, crops, and grains are the main items to grow; without crops and grains, there is no value in agriculture. Since the discovery of rice and other substitute wild grains by the *semi-nomadic* and *nomadic men*, the evolution of agriculture began. Thereafter, where there is a civilization, agriculture is the basic means for the economy of society. Likewise, the region is also adopted many crops and grains to grow in agriculture fields are;

- (1) **RICE**. Rice is the principal crop and staple food for the Nyishishi as well as other tribes of the state for centuries. This is popularly called an *Aam* by Nyishi. This needs the main attention and care right from sowing to till harvesting and threshing.
- (2) **MAIZE**. This is another important crop that grows by the Nyishi of the region. This is called a *Topu* by the local name.
- (3) **MILLET**. There are two types of millets called *Tami* (finger millets) and *Teyak* (foxtail millet). Both the millets are mainly used as red wine called *Tami/Teyad oppo*. Both the millets are grown at *shifting/slash-burn* fields along with maize, rice, etc. They are also sometimes consumed as pleasure and as alternative foods during the scarcity of rice.

Apart from the above, there are many more crops and grains which are grown in the field by the Nyishi tribe and other tribes of the state as well. They are; (4) Green Bean (*Periing*), (5) Soya Bean (*Pehak*), (6) Sweet Potato (*Guriya*), (7) Sesame (*Tanam*), (8) Chilli (*Nyemdak*), (9) Ginger (*Taki*), (10) Himalayan Garlic (*Ditte* and *Talap*), (11) Jobs Tear Plant (*Tanyek*), (12) Barley (*Kurpaksi*), (13) Sorghum (*Ambuk*), (14) Yam (*enyng*), (15) Taro (*Engyi*), (16) Cucumber (*Mekung*), (17) Bottle Guard (*Opum* and *Ojuk*), (18) Pumpkin (*Tapey*), (19) Banana (*Kopak*), (20) Pakyi, and (21) Tayi etc.

## DIVISIONS OF LABOUR

In a traditional economy, the family is the unit of production. All the members of the household-father, mother and children, jointly form the production unit. The division of the labor between the sexes is seen by the fact that nearly every man was a hunter-gatherer, fisherman, collector of certain edible forest products, agriculturist, and maker of crafts, weapons, ropes, ornaments or skilled in wood carver and skilled builder of houses. The women predominantly play the role of collector, housekeeping, pounding and cooking, etc. However, there is certainly some preference for the kind of activity in

<sup>33</sup> A traditional winnowing fan

<sup>34</sup> A pedicel

<sup>35</sup> A panicle blanking rice

which he or she excelled.<sup>36</sup> Besides, there are also specialists like ironsmiths, wood carvers and cane workers, artistic ornament makers, and priest-pathologists, who are compensated for the practice of skills by foods, beads, and paddy. But these things are always considered as present, not as payments. This form of labor work was greatly stimulating and interesting, and it allowed for the emulation of a better quality of work, which ethnologists called communal labor.<sup>37</sup>

When the agricultural operation starts, the family can mobilize the labor of the co-villagers based on 'mutual reciprocity.' The division of labor sex-wise is more or less prominent among the tribe, and usually, the men consider women physically weak. But in rare cases, some women are strong as men and can do what men and vice-versa, some men too. However, men and women work according to their physical capacity and level of skills.<sup>38</sup> The Nyishi called this 'mutual reciprocity' labor *Reyi Yenam/Angnam*. Other ethnic groups of the state also have the same practices and are called different dialectical names such as '*Patang*' in *Apatani*, '*Reh*' in *Tagin*, '*Enliik-Enpe/Engul*' in *Adi*, etc. In the case of Nyishi inhabitant district, sometimes the large or nuclear family or else who do hold many bondage labor or slave called *Solung* (Puriok) don't need such reciprocity labors for the cultivation of the agricultural field of both *jhum* and *wet rice cultivation*. During the *Reyi Yenam/Angnam* day, the host family has to offer all the food and drinks to all those workers. In the labor division during the *shifting/jhum* cultivation activity, male folk is engaged in felling the large trees and branches, clearing logs and branches of felled trees, torching the field, burning fire of debris, erecting the fences/barricading the field, construct field huts called *Rong-ngo Obbo/Tabiyo*, erecting a terraced wood in horizontal called *Sangpa Paanam/Pwnwm*, clearing the debris, bushes, creepers, and climbers at the outer side of the field. the women folk helps in felling small trees, bushes, and charred debris, assisting during fencing/barricading and field huts construction, feeding the feast during mutual reciprocity of labor at work, sowing the paddy and other grain seeds, planting, dibbling the rice, weeding the weeds, harvesting, and threshing of crops.

The minor children, old men, and women they are staying back at home to look after the baby or take care of the house for security purposes like torching the house, stealing something from thieves etc. Teenage boys and girls assist parents from all walks of life. The boys are always helping hand with the father's side, so therefore they are actively involved in watching and protecting the crops from the birds and rotten animals/cattle of both wild and domestic agricultural fields. The girls are vice-versa with the mother. 'By and large in its unitary production, both man and woman perform the process of consumable goods and services cooperatively'.<sup>39</sup>

## IMPLEMENTS AND TOOLS

Tools and implements are the main instruments for any agricultural activities around the world. Without tools and implements, there won't be possible to develop a systematic agriculture system in the world, like without any food items, human beings can't be survived. Therefore, tools and implements, irrespective of any materials, have been the principal instrument of the agricultural operation since time immemorial. Since the beginning of agriculture the, primitive tools and implements were used by the men, which was made up of stone tools, animals, bone etc. After the development of modern technology the, primitive agricultural tools have been replaced with iron tools, and machineries. Yet many tribal societies around the world are still using primitive type tools and implements as instruments for their agricultural practice.

<sup>37</sup> NAPES, op. cit, p. 132

<sup>38</sup> Ibid, pp. 132-133

<sup>39</sup> NAPES, p. 133

The Nyishi to meet the demands of their agricultural operations, made the best use of nature. Stone, bamboo, cane, wooden and animal bone are the most used materials in the making of indigenous tools and implements. The origin of iron (*riukder*) remains obscure; if the myth is to be believed, there is mention of deities like *Nima Loma* and *Loa*, who are considered to be the principal chief architect of all the metallurgy objects for mankind. The origin of the metal technology of the Nyishi is applied in same to other *Tanyi* Ethnic groups of the Arunachal Pradesh, such as; *Abo Loma* by Apatani, *Ninur Loma* by Galo, *Ninur Lomang/Bisi Yada* by Adi, *Niya Loma* by Tagin. The Nyishi do not extract iron from the ore, but in the olden days, they procured pig iron from the *Nyeme Nyoku* (Tibet/Upper Region) and later from the *Nyepak* (plain/Assam).<sup>40</sup> Their mode of procurement was a barter system, not by cash. Since then, the pig iron era started; they made related tools and implements for agricultural purposes like an axe, hoes, scrappers, dao, knives, chisels etc., which enabled them to cultivate more advance and large fields. All these tools and implements were made by a rarely skilled blacksmith called *Ryugmu Nyubh* since they have born knowledge, skill, native genius idea, and techniques. Black smithy is considered a simple but regarded a high respect in society. They made different types of tools and implements with quality products consisting of iron tools.<sup>41</sup>

The following iron tools and implements made from pig iron for agricultural and allied propose are mentioned below;

**(a)Ahey (Hatchet)**

These tools are used prominently for felling large trees, trunks, and branches. The *ahey* are of different shapes and sizes, to felling large or big trees, they made large size axe, and for medium trees and branches, they used a hatchet. They are designed with extremely sharp blades and slowly tapered heads in order to cut across the wood as deeply as possible. In the olden days, there is a belief that *Talug Ahey*, which was made up of stone hafted with forest rope and grinding. Such tools are still available at the *parsi-parlo* administrative circle of kurung kumey district Arunachal Pradesh.<sup>42</sup>

**(b)Oryoq (Dao/Machete)**

The *Oryoq* is considered to be the most important and multipurpose uses tool for the village folk since then. The uses of *oryoq* are cutting, felling, chopping, and digging. Without *oryoq*, the physical work of the village folk cannot be possible; therefore, *oryoq* is considered as heart and soul of the villagers. It is of different shapes and sizes with streamlined sharp, edge iron tools. It has a sharp edge and is a bit narrow toward the tip. The *oryoq* has a trailing point and has a single edge top-heavy blade. The blade has a tang which is inserted into a bamboo or wooden hafted handle, which gives handling convenience. The *oryoq* is always carried in a bamboo knitted case called *Bukhi* (scabbard) with regular sharpening and maintenance. The Nyishi used to make themselves which specialists and were called *yormo* (ironsmiths).

**(c)Riukchek/Cwiqnia (Knife)**

It is a small sharp knife made of iron pointed one-edged and thin blade. It is invariably carried in a case made of bamboo strips finely plaited and slang down on the chest. The blade is fixed to handle by a tang and obtuse angle. It is

<sup>40</sup> Source provided by Mr. Nangram Kaha, ex-military serviceman and progressive farmer, resident of Bello-II, Kimin, Papum Pare District, Arunachal Pradesh, India on Nov. 10, 2021 (Hereafter referred as NKI)

<sup>41</sup> NKI.

<sup>42</sup> Ibid

constantly used for cutting strips of cane, meat, green leafy, and bamboo and also used in harvesting for cutting a bunch of grains and sometimes for minor security purposes.

**(d)Lowdap (Chisel/Scraper)**

The tool is a characteristically shaped cutting edge of the blade on its end. It is provided with a hafted handle of bamboo or wooden at one end. It is made from various materials. The Nyishi in the olden days used stone, bamboo, animal bone, and wooden *lowdap* for clearing or stabbing the green grass during the weeding of the weeds in the agricultural fields. Soon after the discovery of pig iron, they procured and used iron *lowdap* for curving wood and stabbing the weeds and clearing the green grass from the agricultural field.

**(e)Koriu/Koriw (Hoe)**

Koriu/Koriw is a long-hafted handle tool with a thin stone blade, animal bone blade, and later metal blade. It is a versatile agricultural hand tool used to shape soil, remove weeds, clear soil, and harvest root crops. Shaping the soil includes piling soil around the base of plants, digging narrow furrows, and shallow trenches for planting seeds or bulbs. Nyishi in the olden days used bamboo, bone, and stone hoes for agricultural practices. The iron hoe was used in a later stage.

In addition to iron tools, many agricultural implements made from bamboo, wood, and cane. The climate and soil facilitate the abundant growth of different flora in the state. Each variety of species has its specific utility, and these are utilized by the Nyishi people as per their basic needs and requirements. Cane, wood, and bamboo are used extensively in making houses, various kinds of baskets, winnowing fans, daily households utensil, fishing traps, hunting tools, rucksacks, head dresses, war implements, agricultural implements, effigies, etc. The technology and techniques involved in developing these traditional tools were highly indigenous. Their traditionally developed implements were meant to meet the demands of the work progress in agriculture. Such implements are:<sup>43</sup>

**(i)Eggay/Arra (Grain carrying basket).** It is one of the most popular agricultural implements among the Nyishi especially for carriage purposes, and is mostly used by the female of the society. A maximum of the female always carries one *eggay/arra* each while going to the field. With this, they carry out their basic stuff like a meal for lunch, wine, water, and changing clothes. While *Eggay* is mainly concentrated on carrying rice or grains and other basic stuff and whereas *Arra* is for carrying firewood and other basic raw material.

**(ii)Uppiu (Winnow fan).** It is a winnowing fan used as an agricultural implement to separate the sheaf and husk from the grains. This is made of woven bamboo strips and cane which is parabolic in shape.

**(iii)Uppiuh (Mat).** It is a mat for efficiently exploiting the grains in the field. It also uses for gathering, storing, drying, and collecting purposes for paddy and other grains of field and nonfield. This carpet is made of woven bamboo in a rectangle shape of around 3-4 meters in length and breadth, respectively.

**(iv)Chungcha (Small Pot).** It is pot shape small conical basket for reaped half-ripened paddy during harvesting, which means separating the ripened and half-ripened paddy. This was also used during dibbling of the paddy to carry an amount of rice and other grain seeds to broadcasting at the field by women. It is made of bamboo strips and cane rope.

<sup>43</sup> YEI

(v)**Narrah (Rucksack)**. This is a traditional backpack carried by the men's folks called *narrah*, and is made from cane. This indigenously developed *narrah* is used by men folks on every event like harvesting, hunting, fishing, and foraging while carrying multiple items.

(vi)**Botup (Umbrella/Parasol)**. This is an indigenously developed local umbrella/parasol often used by both men and women folks during agricultural cultivation. It is made of bamboo strips and cane, which is of two layers. Between the layers, the banana and palm leaves are inserted as shield covers. The top shape is concave, and rest lower level is progressively flat, which farmers can comfortably carry during farming. It helps as a shield for rain and sunburn.<sup>44</sup>

The methods of making above bamboo and cane agricultural implements are twill patterns with zigzag designs. Not every man or woman can make those implements since it needs skill in the profession.<sup>45</sup> Sometimes the implements are exchanging with goods in as barter system. The other related agriculture implements which are simple with easily available are as follow;

(vii)**Amchik Sangda (Dribbling Stick)**. This is a long stick of more than a meter used for dribbling seeds in *jhum* field. It's made of bamboo and wood, which is strong, straight shape and size for comfortable holding during the dribbling of the seeds. The dribbling endpoint is made sharpened, which enables the farmers to dig a hole easily.<sup>46</sup>

## Conclusion

The traditional *shifting/slash-burn* agriculture called *thump rong-ngo* cultivation is played a pivotal role in Nyishi society since time immemorial. Each cultivator cultivates at least one plot of the land under *thump rong-ngo* each cultivation season.<sup>47</sup> They put forward every possible means to maximize production from the field. Therefore, they growth mix crops in a single field since they are completely dependent upon and it is the way of their life. Nevertheless, to be devoid of the land for settled cultivation, the *shifting/slash-burn* agriculture or *thump rong-ngo* of Nyishi is inevitable to persist for many years to come, and any government legislation will not work at this stage to uproot the system rather than anything imposing on them will injure their age old practices. It is suggested that the tribe and its people should be developed along the lines of their genius, no doubt, but the obsolete and irrelevant genius should be discouraged, and some implication must be imposed on them through local rural self-government and concern administrations. Experts and pre-explorer should visit and observe the impact of both merits and demerits of felling and clearance of the trees, bushes, creepers burning, and vice versa the indigenously developed technology uses which are environmentally free and its organic products from the Nyishi *thump rong-ngo*. Thereupon, suggest the best possible broadening way with respect to the traditional social customs and their values.<sup>48</sup>

Moreover, one cannot deny the change and development. The trends towards change are experienced today. Society is moderately heading conscientious modernity in habits and practices, dress and ornaments, amusements and food habits, political and administrative outlooks and way of living standards, etc. This change is not limited to the urban administrative centers but is also applicable in some rural areas to some extent. The major factors affecting these rapid changes are the introduction of means of transport and mass communications, which directly contact and touch with the people from the different areas, regions, across the state and northeast as well. This happens because of changing modern educational

<sup>44</sup> YPNBI

<sup>45</sup> Ibid

<sup>46</sup> Ibid

<sup>47</sup> NPI

<sup>48</sup> NKI

systems, new agricultural systems like *wetland rice cultivation* (WRC) with its pesticides and other chemicals, terrace farming and other horticulture gardening scope by the government in the place of *shifting/slash-burn agriculture* or *thump rong-ngo*, introduction of medical faculties, formation of the state Legislative Assembly and introduction of Local Self Government called Arunachal Pradesh Panchayati Raj System, more and more new changes are expecting and optimistic in nature by the tribesmen of the Nyishi community.

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