

Food Habits and Livelihood of Nyishi Tribe in Arunachal Pradesh: A Comprehensive Socio-Ecological Analysis

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Abstract

Original Research Article

One of the largest indigenous groups in Arunachal Pradesh, the Nyishi tribe, has developed an adaptive and dynamic socio-ecological system comprising food habits and livelihoods that are closely linked. The Nyishi people traditionally relied on the forest ecosystem, shifting cultivation, and their traditional ecological knowledge for subsistence, thus maintaining food diversity and environmental sustainability. This research employs a qualitative and analytical framework based on secondary data to investigate the structure, dynamics, and evolution of the food and livelihood systems of the Nyishi people. The results show that the Nyishi people have historically relied on biodiversity and traditional practices to achieve resilience and ecological balance. However, the forces of modernization, market encroachment, and degradation have created a dynamic change within the food and livelihood systems of the Nyishi tribe. The argument is made for a development approach that utilizes both traditional ecological knowledge and current economic opportunities to support sustainable and culturally appropriate development.

Keywords: Indigenous Food, Livelihood Strategies, Socio-Ecological Systems, Sustainability.

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INTRODUCTION

Nyishi tribe, as one of the largest native communities of Arunachal Pradesh, is a significant socio-cultural group whose traditional lifestyle is closely intertwined with natural environment. The Nyishi people are inhabitants of hilly and forested areas of northeastern India, and have traditionally been dependent on a subsistence economy based on shifting cultivation, hunting, fishing, and the use of forest resources (Tada, 2016; Britannica, n.d.). The livelihood practice, the food habits are highly related to the ecological conditions, the seasonal availability of resources, and the food habits are closely related to the ecological conditions, seasonal availability of resources, and the food habits.

The food habits of the Nyishi tribe are mostly based on the locally available resources including rice, vegetables, wild plants, meat, and fish which represent a high degree of reliance on both agriculture and the forests and rivers available in the area. The standard diet includes boiled rice as a staple food and is supplemented with smoked or boiled meat, fish, fermented foods such as bamboo shoots and rice beer (Opo) both in terms of nutritional value and culture. Such food practices are not only subsistence-oriented but are entrenched in the social

rituals, community relations, and traditional ecological knowledge systems.

Livelihood patterns of the Nyishi tribe are also diverse and dynamic, including jhum (shifting) cultivation, wet-rice culture, livestock rearing (especially mithun) and forest-based activities. Gradually, these traditional practices have been transformed over time by the forces of modernisation, integration of the economy, and policy interventions, which has resulted in gradual changes in the dietary patterns as well as the economic activities (Ramya, 2016; Tada, 2016). Traditional food systems and livelihood strategies despite these changes still remain a vital part to maintain cultural identity and community resilience.

Thus, the analysis of food habits and livelihood of the Nyishi tribe offers important information on the interdependence of indigenous people and nature, as well as sustainability, preservation of culture and social-economic transition. This paper seeks to examine these dimensions in some detail with reference to how traditional practices are coexisting with contemporary changes in Arunachal Pradesh.

LITERATURE REVIEW

The current body of literature on food practices and livelihood of the Nyishi tribe in Arunachal Pradesh is mainly interdisciplinary and can be classified as ethnography, ethnobotany, anthropology, and rural livelihood studies. Initially, socio-economic studies outline the fact that traditionally, the Nyishi tribe has practised a subsistence-based economy which is based on hunting, fishing, shifting cultivation (jhum), and the use of forests as a resource (Tada, 2016). These subsistence practices are highly integrated into their social organisation and wealth and status is frequently gauged by the ownership of mithun and other traditional resources.

Much literature has been developed on how the Nyishi tribe relied on natural resources as their source of food. Research on traditional food systems shows that rice is a staple in their diet, supplemented by wild food, fish, insects, and forest vegetation plant resources (Chakravorty *et al.*, 2011). To illustrate, Chakravorty *et al.* (2011) record how widely vertebrates and insects are used as food and medicine, with particular focus on how food choices are influenced by ecological availability, cultural beliefs and indigenous knowledge systems. Likewise, it is claimed that traditional cooking methods were heavily dependent on firewood and locally sourced products although they are gradually being replaced by modernisation and market penetration.

Ethnobotanical research also demonstrates the significance of plant-based resources in Nyishi food practices and health care systems. The tribe has an indigenous rich knowledge of plant species used in the food, medicine, and culture sectors and developed through long-term interaction with the forest ecosystem (Bisht *et al.*, 2021). These studies indicate that numerous plant species can be used as nutritional as well as medicinal resource, which supports the interconnection of food and health in the livelihoods of tribes.

Moreover, recent studies have also investigated the cultural and symbolic aspects of food and livelihood. Their interaction with the environment, such as hunting and agricultural practices, is informed by the Nyishi belief system, especially, animistic practices and the concept of uyu (spirits). These studies point out that livelihood activities cannot be viewed as purely economic but rather are guided by ethical and cosmological considerations. In addition, the study of conventional drinks such as rice wine (Opo) shows the nutritional and socio-cultural value of fermented foods to the community.

Altogether, the literature implies that food practices and livelihood systems of the Nyishi tribe are strictly interconnected with ecological sustainability, cultural traditions and indigenous knowledge. Nonetheless, change is also being increasingly realized

as modernisation, integration of markets, and policy interventions are slowly reshaping traditional practices.

RESEARCH GAP

Although there is an increasing literature on the food patterns and livelihood of the Nyishi tribe, there are some significant gaps. The current literature is mostly descriptive and fragmented, as it focuses on ethnobotany, diet, or livelihood-related aspects separately (Tada, 2016). The analysis of food systems in connection with the livelihood strategies and ecological sustainability is not integrated. In addition, there is a huge lack of empirical and quantitative methodologies, especially econometric methods of measuring income, nutrition, and resource-use efficiency. There is also a lack of literature attention to the dietary transitions within modernisation, intra-community differences, gender roles, and the influence of policy and market forces. As a result, there is a need of a holistic, data-oriented framework, which would analyze the interrelationship between food practices, diversification of livelihoods, and socio-economic transformation among the Nyishi tribe.

OBJECTIVES OF THE STUDY

The following objectives will guide the present study:

1. To discuss the organization and the content of food habits of the Nyishi tribe, referring in particular to the local food systems and to forest-based resources.
2. To examine the livelihood patterns of the Nyishi community, both traditional and new economic activities, including shifting cultivation (jhum), hunting, fishing and emerging economic activities.
3. To determine how modernisation, integration in the food markets and environment changes have affected the food habits and livelihood systems of the Nyishi tribe.
4. To explore the challenges faced by the Nyishi tribe and thereby suggestions and policy implication.

RESEARCH METHODOLOGY

1. Research Design: The research design used in this study is qualitative and descriptive research design that seeks to understand the intricate interrelationships between food habits and livelihood practices. The design is suitable to examine native systems where quantitative data might be inadequate, and contextual analysis is a necessity.

2. Data Sources: The research is grounded in a thorough analysis of secondary sources, which include peer-reviewed journal articles, ethnographic reports, government publications as well as institutional reports. These sources will give a total idea of traditional practices and recent developments in the Nyishi community.

3. Data Collection Method: Information has been gathered by conducting a comprehensive review of existing literature including interdisciplinary literature in

anthropology, environmental science, and rural development.

4. Analytical Framework: The study uses a socio-ecological model that considers livelihood and food systems as interdependent factors that are influenced by natural resources and cultural practices, as well as by external forces like markets and policies. Key patterns and relationships are identified using thematic analysis, and comparative insights are made to understand transitions over time.

RESULTS AND DISCUSSION

The food habit and livelihood analysis of the Nyishi tribe of the Arunachal Pradesh reveals a complex and dynamic interaction between the ecological resources, socio-cultural practices, and the changing economic conditions. The findings indicate that the traditional systems of subsistence are still centrally located, albeit they are now characterized by increased influence of modernisation and external interference.

1. Dietary Organisation, Diversity and Nutritional Patterns: The findings reveal that the Nyishi diet is largely agrarian based, with rice as the staple food, consumed in virtually all the meals, which reflects the agrarian background of the community. Nevertheless, unlike diets based on monocultures, the Nyishi food system is highly diverse with the inclusion of meat, fish, wild edible plants, and insects. The sources of protein consumption are mainly hunting and fishing, with the addition of domesticated animals like pigs and mithun (Chakravorty *et al.*, 2011). Such a diversified dietary structure increases the nutritional intake especially in terms of proteins and micronutrients.

A characteristic characteristic of Nyishi food customs is the common entomophagy (consumption of insects). Empirical research suggests that a great diversity of insects including beetles, grasshoppers, and larvae are consumed, which provides the essential nutrients such as protein, fats and minerals (Chakravorty *et al.*, 2011). This is an ecological adaptation and native expertise towards the sustainable source of food.

In addition, fermented food products, including bamboo shoots, smoked meat, and traditional rice beer (Opo) are also considered a part of the diet. Not only do these foods enhance the shelf life, but they also increase the nutritional value of these foods through microbial processes. Fermentation also helps in gut health and it can be viewed as a progressive knowledge of food preservation methods that have been developed over time.

2. Forest-Based Food System and Ecological Dependence: The findings are a strong pointer to the fact that the Nyishi food practices are highly anchored within the forest-based subsistence systems. A large percentage of food is obtained directly in forests, such as wild fruits,

leafy vegetables, tubers and medicinal plants. Ethnobotanical research indicates that these plant resources can be used in two ways: nutrition and healthcare, which proves an integrated food-medicine complex.

This dependence on biodiversity ensures dietary diversity and ecological sustainability. Nevertheless, it also puts the community at risk of deforestation, loss of biodiversity, and environmental degradation. The results indicate that any disturbance in the forest ecosystems has a direct impact to food security and nutritional outcome among the Nyishi.

3. Livelihood Composition and Economic Structure: The livelihood system of the Nyishi tribe is typified by mixed subsistence economy, which is an integration of agricultural livelihood with forest resource utilization and animal husbandry. The main mode of agriculture is shifting cultivation (jhum), where forest patches are cleared and burned in order to cultivate crops. The crops that are cultivated with the aim of subsistence include rice, maize, millet, and vegetables (Tada, 2016).

Besides agriculture, hunting and fishing are very important in ensuring food security as well as offering additional income. Rearing of livestock especially mithun, pigs and poultry is also a major one. Specifically, Mithun has got a huge socio-economical and cultural value, as it is a symbol of wealth, prestige, and social status.

The findings also suggest that there is a gradual emergence of livelihood diversification which includes wage labor, small-scale trade, and involvement in government schemes. This diversification is an indicator of adaptation measures due to the fluctuation of economic conditions and integration of the market.

4. Indigenous knowledge systems and cultural dimensions: The paper confirms that the Nyishi food practices and livelihoods are not purely economic activities but are much embedded in the indigenous knowledge systems and cultural beliefs. Traditional ecological knowledge is used in the utilization of resources, seasonal food harvesting and agricultural cycles. As an example, the cultural norms and taboos are applied to a hunting practice, which indirectly leads to the conservation of biodiversity (Chakravorty *et al.*, 2011).

Food is also at the centre of social and ritual life. More traditional drinks such as rice beer can play a crucial role during festivals, ceremonies, and communal events, which strengthens social cohesiveness and cultural identity. Food, culture, and spirituality help to emphasize the holistic nature of Nyishi livelihood systems.

5. Change in Food Habits and Patterns of Livelihood:

One of the key results of the analysis is the recognition of the transitional shifts in food habits and the livelihood strategies. The gradual introduction of non-traditional food products like processed food, packaged food and modern agricultural inputs have been brought about by increasing exposure to markets, urbanization and government policies.

This shift has a number of implications (i) Reduction in the consumption and knowledge system of traditional food and (ii) Less dependence on forest-based resources. Although these changes enhance access and convenience, they also raise concerns about nutritional quality, the loss of a diet based on biodiversity, and the erosion of culture.

6. Household Dynamics and Gender Roles: These findings indicate that gender could be a major factor contributing to food practices and livelihoods practices. The women mainly do the food preparation, gathering of forest produce, and also taking part in farming activities. They also contribute significantly to the conservation of traditional knowledge and information regarding food processing and medicinal plants.

Nevertheless, regardless of their efforts, women do not have easy access to resources, the power to make decisions, and economic opportunities. The consequences of this gender inequality are both on household nutrition and livelihood sustainability.

7. Sustainability, Resilience and Emerging Challenges: The results demonstrate that the traditional Nyishi livelihood systems are intrinsically sustainable and resilient and were characterized by low use of

external inputs, biodiversity conservation, and adapting to the environmental conditions. Nevertheless, these systems are getting under the pressure of: Environmental degradation and climate change, and Market pressures and commercialization.

8. Policy interventions that might not be consistent with the traditional practices: Although it is economically advantageous in certain situations, the shift towards modern livelihoods can compromise long-term sustainability and cultural integrity.

INTEGRATED DISCUSSION

In general, the findings indicate that the food, cultural, economic, environmental complex of the Nyishi tribe is an entire socio-ecological system, where food, culture, economy, and environment are closely interrelated. The traditional practices are sustainable, diverse in diet and culture and adapted to the broader socio-economic changes, the emerging changes. The discussion highlights the importance of having a balanced approach that:

- Encourages the diversification of livelihoods without compromising on the traditional systems.
- Encourages sustainable use of forest resources
- Incorporates indigenous knowledge in development policies.

This is critical towards safeguarding the economic growth as well as cultural sustenance among the Nyishi tribe. The Table 1 and Table 2 indicate the dietary composition of the Nyishi Tribe and livelihood structure of the Nyishi Tribe.

Table 1: Dietary Composition of the Nyishi Tribe

Food Category	Major Items Consumed	Source of Food	Nutritional Contribution	Cultural Significance
Staple Food	Rice, millet, maize	Jhum cultivation, wet rice	Carbohydrates (energy source)	Central to daily meals and rituals
Animal Protein	Pork, mithun, chicken, wild animals	Livestock, hunting	Protein, fats, micronutrients	Indicator of wealth and status
Fish & Aquatic Food	River fish, crabs, snails	Rivers, streams, ponds	Protein, omega fatty acids	Common in daily diet
Insects (Entomophagy)	Beetles, grasshoppers, larvae	Forest and agricultural fields	High protein, minerals	Traditional ecological knowledge
Vegetables & Greens	Leafy vegetables, bamboo shoots, roots, tubers	Forests, home gardens	Vitamins, minerals, fiber	Seasonal consumption
Fruits	Wild fruits, bananas, citrus	Forests, orchards	Vitamins (especially Vitamin C)	Supplementary diet
Fermented Foods	Bamboo shoot, smoked meat, fish	Household processing	Probiotics, enhanced nutrition	Preservation and taste enhancement
Beverages	Rice beer (Opo)	Fermented rice	Energy, probiotics	Ritual and social importance

Source: Compiled from Chakravorty *et al*. (2011), Tada (2016)

Table 2: Livelihood Structure of the Nyishi Tribe

Livelihood Activity	Description	Nature of Activity	Contribution to Income/Food Security	Socio-Cultural Role
Shifting Cultivation (Jhum)	Slash-and-burn agriculture for crops like rice, millet	Primary (subsistence)	High (food security)	Traditional practice
Wet Rice Cultivation	Settled agriculture in valley areas	Emerging/secondary	Moderate to high	Indicator of modernization
Hunting	Hunting of wild animals and birds	Subsistence + seasonal	Moderate (protein supply)	Cultural identity and rituals
Fishing	Capture of fish from rivers and streams	Subsistence	Moderate	Daily consumption
Livestock Rearing	Mithun, pigs, poultry	Subsistence + economic	High (income + food)	Wealth and prestige (Tada, 2016)
Forest Resource Collection	Collection of firewood, fruits, medicinal plants	Subsistence	Moderate	Indigenous knowledge system
Handicrafts & Trade	Bamboo products, weaving	Supplementary	Low to moderate	Cultural preservation
Wage Labour & Services	Government/private employment	Emerging	Increasing	Economic transition
Government Schemes	Participation in rural development programs	Supportive	Supplemental	Institutional integration

Source: Compiled from Tada (2016)

IMPACT OF MODERNIZATION

The changes in the socio-economic fabric of the Nyishi tribe due to modernization have brought drastic changes in food habits and livelihood patterns. This trend has resulted in the substitution of the traditional diets with processed and packaged foods, which could have health and nutrition implications. Meanwhile, the shift towards the wage labor and commercial activities, as opposed to subsistence-based livelihoods, has changed traditional economic systems.

Another contributing factor to the erosion of indigenous knowledge is that younger generations are less involved with the traditional practices. Their livelihood system is also threatened by environmental challenges like deforestation, land degradation and low fallow periods. Although modernization can give an opportunity to develop the economy, it is also important to manage it carefully not to damage traditional knowledge and ecological balance.

CHALLENGES FACED BY THE NYISHI TRIBE

The study of food habits and livelihood of the Nyishi tribe depict several structural, ecological and socio-economic problems:

1. Decline of Traditional Food systems: The traditional Nyishi diets that once depended on forest resources and food items that are readily available in the market are slowly being overtaken by market oriented and processed foods. The transition of cooking and preparation of indigenous foods to the use of modern kitchen systems has also led to erosion of the traditional

food preparation and cooking methods. The change does not only impact the cultural identity, but there is also the possibility that the nutritional diversity may be reduced.

2. Indigenous Knowledge loss: Nyishi community is rich in ethnobotanical and ecological knowledge, which is under threat due to modernization, lack of documentation and generational gaps. Research underscores the fact that traditional plant knowledge is quickly waning due to the move by younger generations towards abandoning traditional practices (Bisht *et al.*, 2021).

3. Environmental Degradation and Resource Pressure: Forests, rivers and biodiversity are all heavily relied on by Nyishi livelihoods. Nevertheless, the environmental degradation, deforestation and loss of biodiversity are the major threats to food security and livelihood sustainability. The community is very susceptible to ecological changes due to relying on natural resources (Chakravorty *et al.*, 2011).

4. Cautions of Moving Cultivation (Jhum): Despite the cultural importance attached to jhum cultivation, it is experiencing a number of challenges including reduced soil fertility, reduced fallow periods, and poor productivity. Growing population pressure has decreased the availability of land, and the traditional shifting cultivation is not so sustainable (Ramya, 2016).

5. Economic Marginalization and restricted market access: The Nyishi economy is mostly subsistence-based and has a low level of integration into formal markets.

Income generation and economic growth are limited by lack of infrastructure, poor connectivity, and lack of price regulation in local markets (Tada, 2016).

6. Health and Nutritional Transition: The gradual change in the traditional foods to processed and market food can result in nutritional imbalances and the development of new health concerns. Although ancient diets were varied and rich in micronutrients, modern ones might be deficient in the diversity of micronutrients (Dubey *et al.*, 2021).

7. Socio-cultural Transformations: Traditional institutions, rituals, and food related to cultural practices are being undermined by changing lifestyles, education and urbanization. The given transformation can result in the loss of community unity and culture (Tada, 2016).

SUGGESTIONS AND POLICY IMPLICATION

The following strategies are suggested to cope with these challenges:

1. Traditional Food Systems Promotion: Policies are supposed to promote and protect indigenous food practices by creating awareness, documenting and making the practices part of the nutrition policies. The nutritional and cultural value of traditional foods like fermented foods and forest-based foods should be appreciated.

2. Preservation and Documentation of Indigenous Knowledge: It is necessary to have systematic records of ethnobotanical knowledge, food practices, and livelihood strategies. Cultural heritage can be preserved with the help of community-based knowledge preservation programs and integrating the indigenous knowledge into the education systems.

3. Sustainable Resource Management: The need to encourage sustainable forest management and conservation of biodiversity practices. The conservation models based on communities can be used to guarantee sustainable use of natural resources and ensure ecological balance.

4. Agricultural practices are improved: The productivity can be increased by introducing better agricultural practices in addition to traditional practices. A shift in shifting cultivation towards more sustainable practices such as agroforestry and terrace farming can enhance soil fertility and long-term sustainability.

5. Livelihood Diversification and Skill Development: Reliance on natural resources can be minimized by encouraging non-farm activities like handicrafts, eco-tourism and small scale enterprises. The income opportunities can be improved with the help of skill development programs and access to credit.

6. Strengthening Market Linkages: Enhancing infrastructure, transportation, and access to markets are important in the economic development. By forming cooperatives and equitable pricing systems, farmers and producers are likely to get improved returns.

7. Nutrition and Health Interventions: The traditional diets are supposed to be incorporated into the nutrition programs through which the public health policies are to be implemented, in order to provide a balanced dietary intake. The health problems associated with nutritional transition can be avoided through awareness campaigns on the benefits of indigenous foods.

8. Gender-Inclusive Developments: Policies must acknowledge and augment the importance of women in food systems and livelihood by providing access to resources, education, and decision making opportunities.

LIMITATIONS OF THE STUDY

Despite providing valuable insights, the study is subject to certain limitations. First, the study is completely founded on secondary data which limits the possibilities of empirical verification and possibilities to trace real-time ground-level variations in food habits and livelihood practices. Lack of primary survey data, field observations, or interviews lowers the richness of context specific knowledge.

Second, the research is mostly qualitative and descriptive, without quantitative analysis of the levels of income, nutritional intake or productivity indicators. This restricts the possibility of statistically evaluating the economic and nutritional consequences of livelihood and dietary shifts.

Third, the research findings are generalized to the entire Nyishi tribe which is geographically spread to various districts of Arunachal Pradesh. They may not be completely reflected by regional differences, intra-community differences and local practices.

Fourth, the study does not include a longitudinal analysis of changes over time, which makes the study provide only a cross-sectional perspective of food systems and livelihood transformation. Lastly, some of the dimensions are discussed in a limited sense meaning that more detailed, focused research is possible in future studies.

CONCLUSION

The study brings out a subtle appreciation of how subsistence practices, ecological knowledge and cultural traditions are closely interwoven in the establishment of the daily life of the Nyishi community. The food traditions of the Nyishi are also highly based on the locally available food resources, which are largely based on rice as the staple, supplemented by forest foods, meat, fish and a variety of wild edibles reflecting a highly

sustainable and dependent on the environment dietary system. Simultaneously, their livelihood patterns which are primarily comprised of shifting cultivation (jhum), hunting, fishing and collection of minor forest products, indicate a close symbiotic relationship with nature, which is supported by indigenous knowledge systems that developed over generations.

Nonetheless, the research also reveals that these conventional systems are being gradually transformed under the influence of the forces of modernization, market penetration, the shift in consumption preferences and policy interventions. The growing usage of settled agriculture, wage labor, and market-based activities has already started to redefine livelihood strategies and even dietary patterns. Although these changes can also work towards better income opportunities and access to modern amenities, they also present challenges in terms of erosion of traditional knowledge, declining dependence on biodiversity and potential nutritional shifts. In essence, the Nyishi experience reflects a critical transitional phase where traditional ecological practices coexist with emerging socio-economic realities. Thus, there is an urgent need to practice balanced development that will not only improve livelihood security and economic well being of the community but also preserve the rich cultural heritage and sustainable food systems of the community. Policy interventions must aim at agro-ecological practices, nutritional awareness, documentation of indigenous knowledge, and ensuring agro-ecological practices, nutritional awareness, and documenting indigenous knowledge remain culturally sensitive and environmentally sustainable. This would be an integrated approach which would allow the Nyishi tribe to negotiate change whilst maintaining the fundamentals of their identity and resilience.

REFERENCES

1. Bisht, P., Joshi, N. C., & Pandey, S. (2021). Ethnobotanical study on plant species used by the Nyishi tribe of Arunachal Pradesh, India. *Journal of Traditional and Folk Practices*. <https://doi.org/10.25173/jtftp.5>
2. Britannica. (n.d.). *Nyishi*. Retrieved from <https://www.britannica.com/topic/Nyishi>
3. Chakravorty, J., Ghosh, S., & Meyer-Rochow, V. B. (2011). Practices of entomophagy and entomotherapy among the Nyishi and Galo tribes. *Journal of Ethnobiology and Ethnomedicine*, 7(5). <https://doi.org/10.1186/1746-4269-7-5>
4. Chakravorty, J., Meyer-Rochow, V. B., & Ghosh, S. (2011). Vertebrates used for medicinal purposes by members of the Nyishi and Galo tribes in Arunachal Pradesh. *Journal of Ethnobiology and Ethnomedicine*, 7(13). <https://doi.org/10.1186/1746-4269-7-13>
5. Dubey, A., *et al*. (2021). Gut microbiome and dietary patterns among tribal communities. *Scientific Reports*. <https://doi.org/10.1038/s41598-022-23124-w>
6. Ramya, T. (2016). Agricultural rituals as the ceremonial cycle of the Nyishi tribe. *Dera Natung Government College Research Journal*. <https://doi.org/10.56405/dngcrj.2016.01.01.01>
7. <https://doi.org/10.29121/granthaalayah.v13.i3.2025.5984>
8. Tada, B. (2016). The socio-economic life of the Nyishis of Arunachal Pradesh. *Dera Natung Government College Research Journal*. <https://doi.org/10.56405/dngcrj.2016.01.01.03>