

Empowering rural tribal youth through agripreneurship – evidence from a case study in North East India

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A case study of successful rural tribal youth on agri-enterprises in Wokha district, Nagaland, North East India, under a project on Attracting and Retaining Youth in Agriculture (ARYA) is presented here. A total of 200 rural, tribal, unemployed, educated youths between 18 and 35 years of age were selected for the programme. Four enterprises, viz. quality piglet production, poultry farming with hatchery unit, mushroom production with spawn production unit and cut-flower production were promoted. The output and outcome of the study over the last four years (2016–2020) revealed that a total of 194 rural tribal youths from 22 villages have been running the various enterprises successfully and generating a handsome income of Rs 61,000–460,000, and providing the employment opportunity of 213–1150 man-days in the villages. The number of rural youth who migrated to urban areas was reduced from 458 to 284 with a 37% reduction in migration rate after implementation of the project.

Keywords: Agri-enterprises, agripreneurship, migration rate, rural tribal youth, skill development.

AGRICULTURE is the prime source of livelihood for majority (75%) of rural tribal population in the North East hill region of India. It is characterized by subsistence, low input–low output, technologically lagged mixed farming system, mostly jhum (shifting cultivation) farming, and is dominated by smallholders. The present farming system in the region is not remunerative and sustainable, which results in the lack of interest towards agriculture. However, agriculture sector is still the largest employer for rural youth¹.

Youth could be the ideal catalyst to change the poor image of agriculture given their potential to adopt new ideas, concepts and technologies². The migration of people to cities is around 45% in India, of which youth account for 30% (ref. 3). This has several implications for

the future of Indian agriculture and food security of the country. According to the 2011 census, more than half of India's population is under the age of 25, and 65% under 35 years. Youth are three times likely to be unemployed than adults and more than 75 million youth worldwide are looking for work, according to the UN International Labour Organization (ILO). Due to their limited access to assets, markets, finance, education and skill training, youth are often unemployed or work informally – often in low-paid, manual and hazardous jobs⁴. This situation is enhanced in the hilly states of North East India because of less industrialization and employment opportunities. Nagaland has the distinction of being the state with highest unemployment rate in the country, according to the annual periodic labour force survey conducted by the National Statistical Office (NSO), Ministry of Statistics and Programme Implementation, Government of India during 2017–18 (ref. 5). The estimated unemployment rate for persons aged 15 years and above in Nagaland was 21.4% against the all-India average of 6%.

There is an urgent need to transform the present form of subsistence into a profitable venture as well as to promote agripreneurship in the region to generate interest and confidence among the rural tribal youth in agriculture and allied sector. Agribusiness sector has the potential to contribute to a range of social and economic developments such as employment generation, income generation, poverty reduction and improvements in nutrition, health and overall food security in the country⁶. Government must adopt a more systematic approach to encourage and support new agripreneurs and farmers to succeed in running their own farms and agribusinesses⁷.

Realizing the importance of rural youth in agricultural development, especially from the point of view of food security, the Indian Council of Agricultural Research (ICAR), New Delhi, had initiated the Attracting and Retaining Youth in Agriculture (ARYA) project during 2015–16. Special efforts were made to attract, engage and retain youth in agriculture through the development of different enterprises in the villages in order to check the

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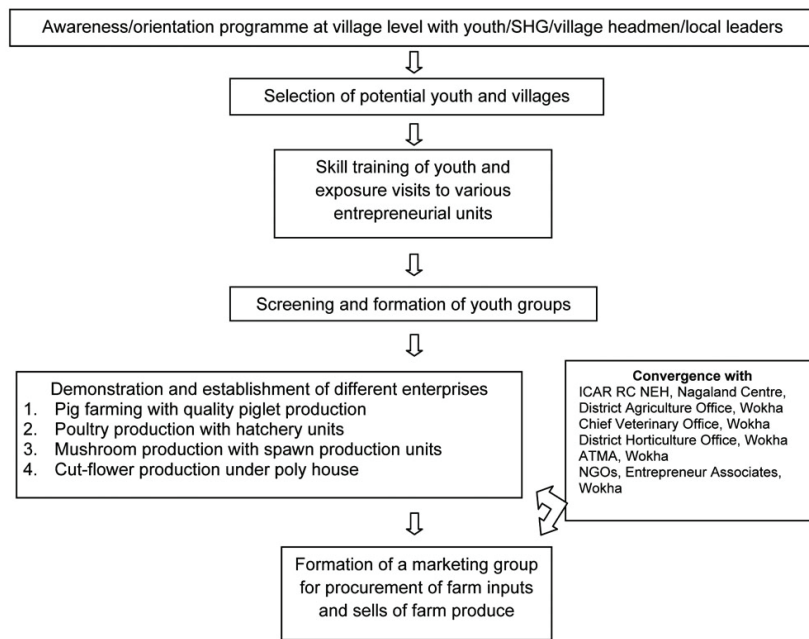


Figure 1. Methodology adopted.

migration of rural youth to cities. Under this project, ICAR-Krishi Vigyan Kendra (KVK), Wokha, Nagaland had taken up entrepreneurship development programme in agriculture and allied sector for tribal youth in the Wokha district with the following objectives:

- To attract and retain rural tribal youth in agriculture through the demonstration and establishment of location-specific sustainable and profitable agricultural enterprises.
- To minimize the migration of tribal youth from villages to urban areas through round-the-year employment and income-generating activities in rural areas.

Approach and methodology adopted for agri-entrepreneurship development

An innovative method was adopted for the development of different agri-enterprises in the Wokha district (Figure 1).

Location of project area

The work was carried out in 22 villages of Wokha district (26°00'02"–26°26'98"N lat., 093°55'12"–09°23'15"E long.) over a period of four years, viz. 2016–2020 (Figure 2)^{8,9}.

Selection of study area/village

At the initial stage of the study, awareness/orientation programmes at village/block level were conducted to sensitize individual youth/Self Help Group/village head-

man/local leaders/NGOs. Benchmark survey and Participatory Rural Appraisal (PRA) of the villages were carried out to understand the physical, economic and social status of the population, land-use system, cropping pattern and livestock status. Selection of villages was done on the basis of socio-economic status, backwardness, status of natural resources, information and communication facilities.

Selection of youth

Selection of youth was done on the basis of certain prefixed criteria like age between 18 and 35 years and education qualification of minimum class X pass, with the involvement of Panchayat/local leaders/village headman. Youth showing keen interest and capabilities for a particular agricultural venture were selected. After selection of potential youth, commodity-based groups were formed.

Selection of agri-entrepreneurship

Based on the market demand and scope of the four most promising enterprises, viz. quality piglet production, poultry farming, mushroom production and cut-flower production were chosen under the project.

Capacity development of youth

For development of entrepreneurship capabilities, a total of 370 youth were imparted hands-on training for the

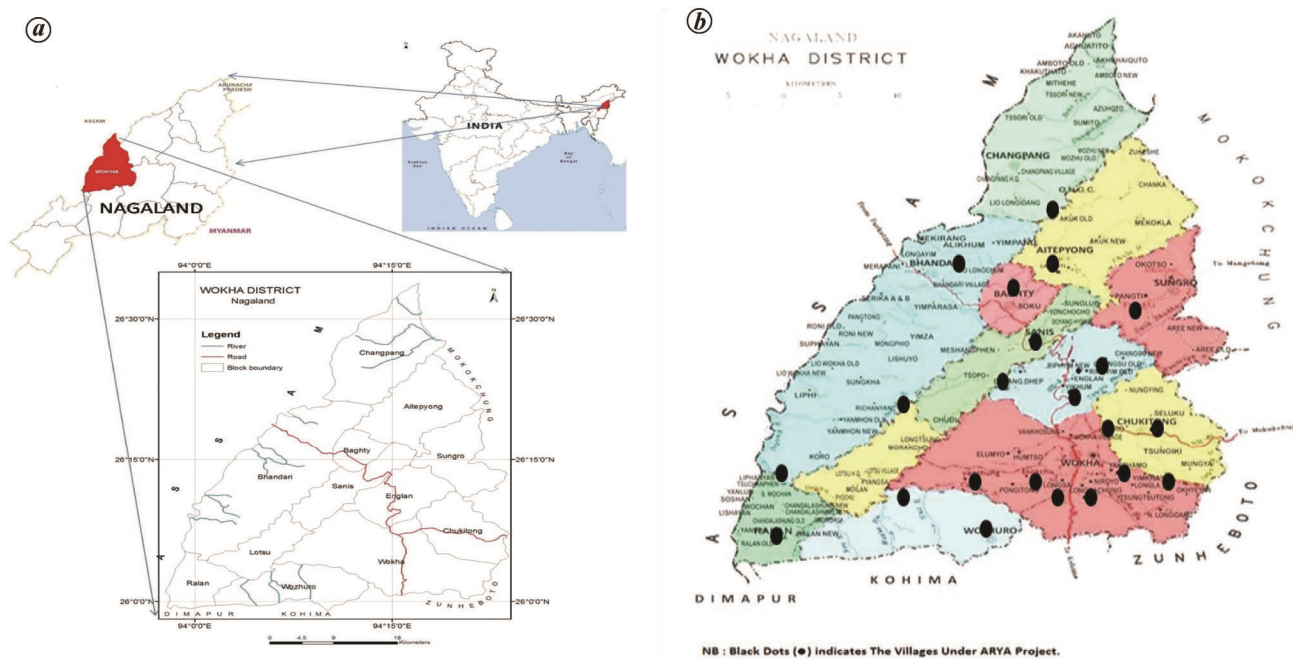


Figure 2. a, Location map of Wokha district, Nagaland⁸. b, Mapping of ARYA villages⁹.

Table 1. Enterprise-wise skill training of youth

| Thematic area | Training programme | No. of training sessions (seven days duration each) | No. of youth | | |
|-----------------------|---|---|--------------|--------|-------|
| | | | Male | Female | Total |
| Piggery enterprise | Scientific pig-rearing practices on housing, feeding, healthcare, vaccination, management of farm, artificial insemination and marketing. | 5 | 78 | 42 | 120 |
| Poultry enterprise | Improved poultry-rearing practices on housing, feeding, healthcare, vaccination, hatchery management and marketing. | 5 | 46 | 59 | 105 |
| Mushroom enterprise | Skill training on mushroom production, spawn production, processing, value addition and marketing. | 4 | 30 | 55 | 85 |
| Cut-flower enterprise | Training on cultivation practices, packaging, value addition and marketing of cut flowers. | 4 | 17 | 43 | 60 |
| Total | | 18 | 171 | 199 | 370 |

essential skills according to the requirement of the enterprise (Table 1). Activities were designed through the process of developing an innovative idea and creating a business plan that entailed key elements (e.g. input production unit, marketing strategies, sources of financing and action plan for implementation) necessary for making an enterprise successful. Classroom training was blended with practical demonstrations (learning by doing) and exposure visits to various successful enterprises in different institutions and organizations (seeing is believing).

Critical inputs like piglets, poultry chicks, mushroom spawn, flower bulbs, animal feed, housing materials, polyhouse, poultry hatchery, mushroom spawn unit, feed mill, etc. were provided to the youth at the end of the training course for starting their enterprise.

Innovative approaches adopted for development of rural enterprises

Promotion of pig farming with piglet production

Indigenous pigs are bred indiscriminately without much choice of male pigs. Due to the scavenging types of rearing of indigenous pigs, there is no control over breeding practices. In this case inbreeding of local pigs is a routine phenomenon, which results in poor growth rate and fewer number of piglets born. Most of the pig-breeder farmers in Wokha district used community boars (male) of improved breed for the mating of sow/gilt of improved breed. This also causes inbreeding and breeding depression, resulting in poor production and reproduction



Figure 3. a, Hampshire piglets. b, Sweet potato leaves. c, Pig house.

performance of pigs. With this background, the following technological and innovative approaches were adopted to make the existing pig production system more profitable and viable.

Establishment of pig-breeding farms for production of quality piglets: A profitable piggery should have its base on a good crossbred/upgraded pig. Hampshire and large black pigs which are improved breeds were chosen for the pig-breeding farms (Figure 3 a). Youth were given an option to start a pig breeding farm with a capacity of 5 pigs as micro unit, 10 pigs as small unit and 15 pigs as medium unit.

Adoption of low-cost feeding practices: Feeding contributes 70–75% of total production cost of pig farms. Therefore, the feeding of pigs should be balanced and economical. Low-cost feeding practice was adopted through 50% supplementation of feed with leaves and tubers of sweet potato/tapioca, banana pseudo stem and non-descript indigenous herbs in pig ration (Figure 3 b).

Development of housing system model utilizing locally available materials: Locally available resources like bamboo, wood, stone, etc. were used to reduce the cost of pig housing. The size of each room was 10 × 7 ft to accommodate one adult pig. The floor of the pig house was either concrete or wooden. The number of rooms varied from 5 to 15 depending on the size of the pig farm (Figure 3 c).

Introduction of artificial insemination technology: Artificial insemination (AI) in pigs using the semen of a superior male pig is one of the proven and robust technologies for the upgradation of indigenous pig population. AI practices also reduce the breeding cost involved in natural service of female pig with male pig (boar). Semen of Hampshire boar was utilized for AI in sow/gilt.

Promotion of poultry farming with hatchery units

More than 75% of total poultry population of Wokha district is indigenous, with production potentiality around

60–70 eggs and 1–1.5 kg chicken/yr/bird. People keep 10–20 indigenous birds in their backyards, which could only provide family nutrition and a subsidiary income of Rs 5000–8000. This type of farming does not attract the attention of youth for a vocation. To make the existing poultry production system more remunerative and economically viable, the following technological and innovative approaches were adopted.

Introduction of improved, multi-coloured, dual varieties of poultry: For optimum performance, the birds should be hardy and relatively resistant to various poultry diseases, should thrive well on locally available feed resources with moderately better meat and egg-production capacity. In the recent past, improved multi-coloured, dual varieties of Vanaraja and Srinidhi have been introduced for backyard and intensive farming that substantially contribute to the total chicken egg and meat production of the country (Figure 4 a). The number of poultry birds reared in micro, small and medium enterprises is 250, 500 and 1000 respectively.

Development of low-cost scientific housing system: Low-cost scientific housing system model was developed utilizing locally available construction materials like bamboo, wooden planks, straws, etc. (Figure 4 b). Houses were preferably constructed on an elevated area with plinth of 0.6–0.9 m to keep the floor above the ground in order to avoid seepage of moisture inside from the surroundings. Orientation of the houses was usually in the east–west direction to avoid direct sunlight, draft and rainfall inside. The floor of the house was provided with saw dust of thickness 8–12 cm for bedding materials and 1.5–2 sq. ft area was provided for each bird for better housing. A brooder house was constructed, where young chicks were grown up to 8 weeks of age.

Establishment of low-cost poultry hatchery units at village level: Regular supply of poultry chicks to the poultry farmers is essential for successful establishment of a poultry enterprise. Thus a poultry hatchery was established in the village for production of Srinidhi and Vanaraja poultry chicks. The hatchery produces 10,000–12,000 chicks annually (Figure 4 c).



Figure 4. a, Vanaraja birds. b, Low-cost poultry house. c, Poultry hatchery.



Figure 5. a, Paddy straw. b, Low-cost mushroom house. c, Mushroom spawn production unit.

Adoption of low-cost feeding practices: Feed alone accounts for 70% of the total expenditure of poultry production process. Incorporation of locally available feed ingredients was practised for poultry ration to minimize the cost on feed. Household waste, crop by-products, broken grains, etc. were also offered as feed to the birds depending on the availability. Three types of poultry feeds were used, viz. starter feed during 0–8 weeks of age, grower feed during 9–18 weeks and layer feed during 19–76 weeks of age. Feed was given ad libitum up to grower stage and for the laying hen 100–125 g daily/bird was given.

Mushroom cultivation with spawn production unit

Home-scale/small-scale oyster mushroom production by some rural youth and farm women had started for family consumption before the implementation of this project. However, it was not an enterprise for income-generating activities. Under the project, the following initiatives were taken to make mushroom cultivation an entrepreneurial activity in these villages.

Round-the-year cultivation: Round-the-year oyster mushroom cultivation utilizing locally available materials like paddy straw, banana leaves, maize stalk or saw dust as substrate (Figure 5 a).

Low-cost housing system: Low-cost housing system was developed with locally available bamboo, wood, thatch, etc. The size of these houses ranged from 450 to 1000 sq. ft depending on the number of mushroom bags.

To accommodate more mushroom bags in less floor space, hanging and multilayered method was adopted (Figure 5 b).

Establishment of mushroom spawn: The main problem faced by the mushroom growers was the unavailability of mushroom spawn locally. To address this problem, a mushroom spawn production unit with a capacity of 12,000–15,000 spawns was established in the village by a group of youth under the programme (Figure 5 c). With this initiative, the youth are now readily getting spawn in their local areas, helping the mushroom enterprises in the district.

Cut-flower production under polyhouse

There is tremendous scope to harness the potentiality of horticulture crops in Wokha district. The barren and uncultivated land, the cultivable wasteland, the jhum fallows (abandoned land after shifting cultivation) can be diverted to horticultural crops. Horticulture could become a key driver for economic development in the district. There is an increasing demand for cut flowers, mainly gerbera, liliun, carnation, tuberose, etc. The following technologies have been adopted for cut-flower production.

Polyhouses: Polyhouses with iron structure of 150–200 m² were constructed under the project. Poly films of 200 μ m and side wall with 75% green shade net were used as cover (Figure 6 a). A low-cost polyhouse model



Figure 6. *a*, Polyhouse. *b*, Gerbera flowers. *c*, Jalkund.

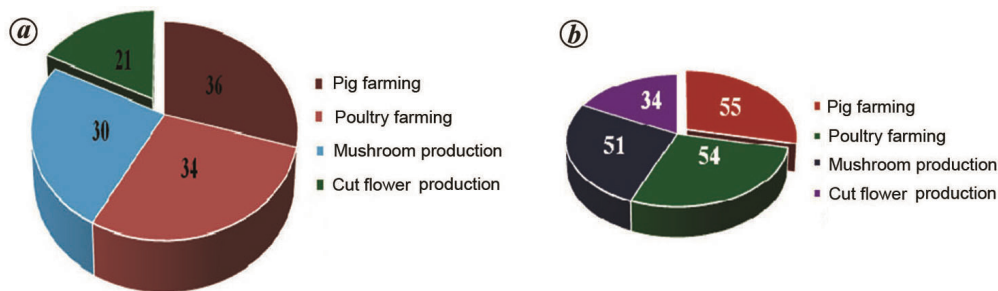


Figure 7. *a*, Entrepreneurial units established. *b*, Youth engaged in various enterprises.

with wood and bamboo structure was also developed for cut-flower production.

Cut flowers: Gerbera, liliun and carnation were selected for cut-flower production. Both Asiatic and oriental varieties were cultivated (Figure 6 *b*).

Low-cost rainwater harvesting structures: Wokha district receives a reasonably high amount of annual rainfall (1996 mm). However, there is acute scarcity of water, especially during winter season because a large portion of rainfall is lost either through run-off or deep percolation. Low-cost rainwater harvesting structures (jalkunds) using 250 GSM silpaulin sheet proved to be viable option for flower cultivation to generate more income (Figure 6 *c*). The size of the jalkund was 7 m × 6 m × 1.5 m, with the capacity of harvesting 60,000–70,000 litres of water.

Agripreneurship developed by the rural tribal youth

The implementation of the project in the tribal and backward hilly areas of Wokha district resulted in a tremendous growth in agri-entreprises among the rural tribal youth, with the establishment of various entrepreneurial units. A total of 121 entrepreneurial units have been established in piggery (36), poultry (34), mushroom production (30) and cut-flower production (21) over the last four years (Figure 7 *a*). Before the establishment of entrepreneurial units, a total of 370 (171 male and 199

female) rural tribal youth were given training on scientific pig-breeding farming, poultry farming with hatchery management, mushroom with spawn production and cut-flower production. Among these, 194 youth were engaged in pig-breeding farming (55), poultry farming (54), mushroom production (51) and cut-flower production (34) (Figure 7 *b*). It was also observed that, 76 youths from 12 new villages also adopted piggery, poultry, mushroom and cut flower farming after witnessing the success of the demonstrated enterprises.

An observation recorded during the follow-up of the project was that the availability of quality piglets (Hampshire crossbred) in rural areas was no longer a problem for pig growers in Wokha district. The availability of quality piglets in the villages has a direct positive correlation with the production and reproduction performance of pigs.

To facilitate access to agricultural inputs, a poultry hatchery unit and a mushroom spawn production unit were established in the villages through involvement of youth for regular production of one-day old Vanaraja poultry chick, and oyster mushroom spawn for poultry and mushroom growers under the project. Availability of poultry chicks and spawn in the district was limited because of remoteness and poor road connectivity. People had to procure chicks/spawn either from other districts or states. On an average 1000 chicks are produced in the hatchery with a net return of Rs 15,000/month/youth. Similarly, from the spawn unit a total of 800 spawns are produced with a net return of Rs 10,000–15,000/month/youth.



Figure 8. *a, b*, Shops set up for marketing. *c*, Collection and distribution of chicks.

It was noticed during the implementation of the project that there was a high demand of pig and poultry feed either in the form of formulated feed or as single-feed ingredients due to increased pig and poultry farming activities in the district. To support for regular feed supply to the existing pig and poultry farmers and also considering the high demand of livestock feed, a feed mill was promoted in the district so that feed would be available to the pig and poultry entrepreneurs at a lower price and also one entrepreneurial activity could be taken up by youth for employment.

Formation of a youth marketing group

Viability of any enterprise depends on the market. Due to the remoteness, hilly terrain and poor road conditions of the district, the marketing system is not efficient. Producers do not accrue premium prices for the agricultural commodities. Hence a marketing group involving four youth was formed under the project. The group was involved in the procurement of different inputs from whole sellers at a lower price, and distributing them to the beneficiaries at a reasonable price (Figure 8 *a-c*). Similarly, the group was also involved in the marketing of various produces of the beneficiaries in different markets within and outside the state for a higher price. In this process both the ARYA youth as well as the marketing group were mutually benefitted through a better marketing system and also generating round-the-year employment with an income of Rs 10,000–12,000 per youth.

Impacts/benefits resulting from various enterprises

The project directly benefitted 194 rural tribal youth from 22 villages in Wokha district through the adoption of agri-enterprises. The business model developed provided employment opportunity to 1–5 youth per entrepreneurial unit. In addition, another 76 rural youth from 12 new villages were also benefitted through the horizontal expansion of entrepreneurial activities. Over the last four years,

the project has generated over 270 jobs for tribal youth in the village ecosystem.

Economic gain and employment generation from various enterprises

Figure 9 reveals the economic benefits arising from the various demonstrated enterprises in the villages. The annual economic returns were Rs 95,000–350,000, Rs 65,000–215,000, Rs 61,000–415,000 and Rs 125,000 from pig farming, poultry farming, mushroom production and cut flower production respectively.

Figure 10 shows the employment generated from various enterprises. The annual number of man-days generated from pig farming, poultry farming, mushroom production and cut flower production was 225–875, 213–713, 213–1037 and 313 respectively.

Horizontal expansion of entrepreneurial activities

Local youth were motivated after witnessing the worth and economic gain of the demonstrated enterprises. The horizontal diffusion of the enterprises was witnessed from the adoption of pig farming by 22 youth, poultry farming by 18 youth, mushroom production by 23 youth and cut flowers by 13 youth from the neighbouring villages (Figure 11).

Reduction in the migration of rural youth

The number of rural youth migrating to urban areas had reduced from 458 to 284 after implementation of the project. There was a reduction of 37% in the migration rate of rural youth and it would be less in the coming years as the number of youth involved in agri-enterprises is increasing in various villages of the district.

Micro to medium agribusiness models promoted in the villages proved to be an important tool to stop the exodus of youth from rural to urban areas. It provided employment opportunities in the areas of piggery, poultry, mushroom, floriculture, agricultural inputs production

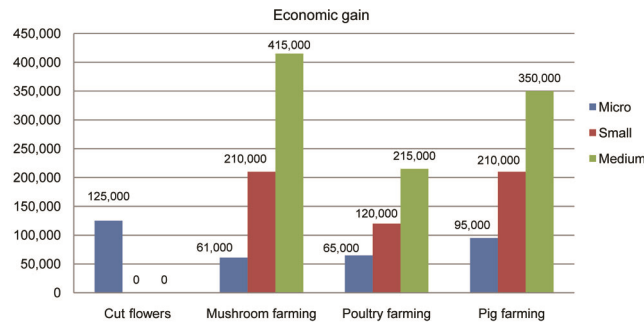


Figure 9. Income from various enterprises.

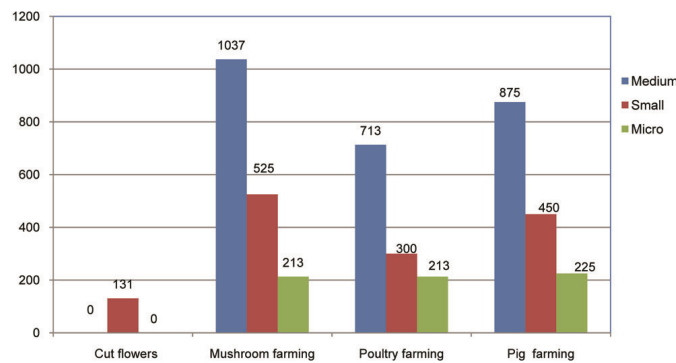


Figure 10. Employment generation from various enterprises.

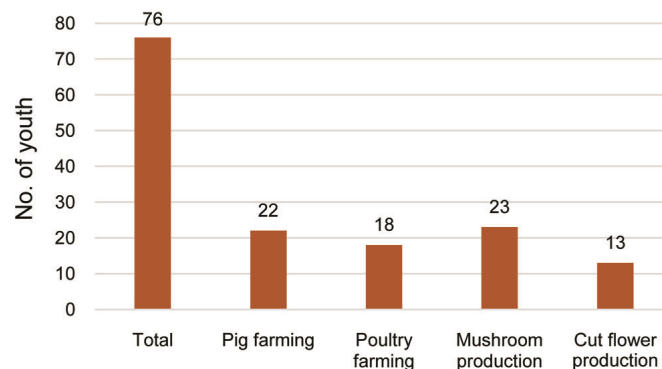


Figure 11. Horizontal expansion of enterprises.

(chicks, spawn, feed) and agricultural marketing. Agri-business models developed helped in remunerative farming which increased the level of income, employment and living standards of people in the tribal and hilly areas of NE India.

Education, skill training, exposure visits, critical input support, innovative marketing and convergence with stakeholders were the key elements for leveraging the development of enterprises in the tribal villages of the hill ecosystem. The success of the demonstrated enterprises has instilled confidence among the rural youth to take up farming rather than chasing menial jobs in cities. Successful youth have motivated and encouraged others

to take up such entrepreneurial activities. There is a necessity to develop and strengthen entrepreneurial quality, motivate it and provide the necessary support to the youth. The involvement of youth in agricultural production is significant not only because of the need to feed the country, but most importantly, because it offers options for wealth creation and financial security in rural areas.

Following are the key learnings and recommendations derived from the present case study:

- The ARYA project is a path-breaking programme for the rural youth in NE India, as evidenced from the case study of Wokha district, Nagaland.

- Agripreneurship is a solution to many economic problems like poverty, unemployment, low economic growth and migration. This situation can be modulated through developing rural micro-enterprises in piggery, poultry, mushroom and floriculture for generating employment opportunities in rural and tribal backward areas.
- Profitability of farm activities needs to be increased according to the expectation of the youth, in order to appeal to them. Agriculture needs to be modernized to attract the young. Various agri-enterprise models should be developed according to the needs and demands of the youth.
- Entrepreneurial skill development and market orientation of youth are key elements for the success of entrepreneurs.
- Access to financing and capital institutions must be facilitated. Farm youth clubs and farmer producers' groups can facilitate credit access from several institutional sources.
- There is a need for large-scale demonstration of piggery, poultry, mushroom and cut flower production of NE India along with policy, institutional and financial support for large-scale spread of economically viable agri-enterprises.
- Success stories and case studies of innovative youth/agripreneurs may be disseminated through the media to motivate other young farmers.

In conclusions, this case study of tribal rural youth in Wokha district, NE India provides a detailed insight of the journey from being unemployed to becoming successful entrepreneurs in rural agri-enterprises.

Conflict of interest: The authors declare that there is no conflict of interest.

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