

DEVELOPING HUMAN RESOURCES OF NORTHERN MIDLAND AND MOUNTAINOUS AREAS IN THE DIGITALIZATION TREND OF VIETNAM AGRICULTURE

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ABSTRACT

Agriculture is one of the sectors that play a key role in the economy of the Northern Midlands and Mountainous Areas (NMMA) of Vietnam. In the trend of digital transformation in the agricultural sector, there has been an urgent problem of training and developing human resources capable of meeting the process of agricultural digitization. With a view to assessing the current status and needs of human resources in the agricultural sector of NMMA, we use practical research methods to make statistics and analysis of natural and socio-economic conditions, human resources through published documents and the 2021 statistical yearbook. The results of the article, besides pointing out the need for human resource development, are also the basis for proposing some specific solutions to deal with the current problem of human resources in the region.

Keyword: *agricultural digitization, digital technology, human resources, Northern midlands and mountains*

INTRODUCTION

Implementing the national digital transformation program to exploit the benefits of the 4.0 revolution has brought out strong development to Vietnam's agricultural sector. Digital technology is widely applied in all stages, from breeding, planting, caring for plants and animals to harvesting, processing, preserving and consuming products, contributing to improving productivity, product quality, reducing labor and costs [4], [6]. These results have contributed to the outstanding development of agricultural production. According to the General Statistics Office, it is estimated that in 2021, the GDP of the agriculture, forestry and fishery sectors increased by 2.9%, contributing 13.97% to the growth rate of the whole economy [9]. In order to continue promoting the role of agriculture as a pillar of the economy, many new policies have been issued, focusing mainly on the application and development of digital technologies in agriculture [3],[7].

In the trend of agricultural digitization in all regions of the country, the implementation in the NMMA is still slow and facing many difficulties. NMMA is an area consisting of 14 provinces, accounting for a third of the country's area with a population of more than 13 million people, of which more than 7 million people are ethnic minorities of 32 different ethnic groups. This is an area with a particularly important strategic position in terms of socio-economic, defense, security and foreign affairs of the whole country. Agriculture, forestry and fishery production plays a key role in the region. The development of agriculture here has many favorable conditions, but has not yet brought into complete effect. In the high mountain areas, far from the center, production is still backward, mainly small and scattered production, agricultural production is still self-sufficient. Technical facilities for agricultural development are still limited, the irrigation system is still weak, household production model is the dominant one. Agricultural production is mainly based on human power, but the education and technical qualifications of workers are still low, and their access to science and technology is still limited [5].

Facing the inevitable trend of the industry, training and improving the qualifications of human resources is one of the urgent requirements to help the region approach to technical, scientific and technological advances,

transform production structure, bringing into full play the potential of the region. Thus, we conducted this study with the aim of understanding the current status of agricultural development, the current situation and the need for human resources in the region. From there, we will propose a number of solutions to develop human resources in accordance with the reality of the region.

METHODOLOGY

In this article, we use practical research methods to collect data, process and analyze documents related to agricultural development in the NMMA. Data sources on employment, population, training, industry structure and income levels from the results of the 2020 and 2021 population and economic censuses of the General Statistics Office are used for the analysis and assessment the current situation of human resources in the whole region. Descriptive statistics are used to describe and present data sources. The data tables are presented in the form of charts through Microsoft Excel software.

RESULTS AND DISCUSSION

1. The current status of human resources in NMMA

There are many documents referring to the concept of Human Resources, in this article, we use the definition of [11]: “Human resources include the entire population with working capacity, regardless of profession, field, or region to which the person is being assigned and can be considered as a social human resource”. According to this definition, human resources are considered the population groups of working age, capable of participating in productive labor, and are a resource for socio-economic development. Human resource development is the totality of laws, mechanisms, policies and measures to perfect and improve the quality of human resources of the whole society, to make reasonable adjustments in the quantity of human resources to meet the demand for human resources for socio-economic development in each development stage.

1.1. Structure of human resources in terms of age, gender and ethnicity

According to the 2021 statistical yearbook, the total population of the whole NMMA is 12,569.3 thousand people, accounting for 13% of the country's population, of which the average male population accounts for 50.2%. The average population growth rate is 1.33%. The population density is uneven, the majority of the population is concentrated in urban areas and industrial zones. The proportion of ethnic minorities accounts for nearly 56%, of which over 90% live in rural and mountainous areas. This is also the area with the highest rate of labor participation (85%) and the lowest unemployment rate in the country (1.29%). The rate of employees aged 15 years and over who are employed accounting for 60.8% of the total number of employees. Human resources in the region are of young ages and the number of workers who are at the ages of between 20 and 49 accounts for 69.3% of the total number of employees [10].

1.2. Structure of human resources in terms of education level and professional and technical level

By the end of 2021, in the whole region, there had been 5164 high schools, 82,810 classes with a total number of over 2.4 million students, more than half of which are ethnic minority students. The dropout rate of high school students from ethnic minorities was still high. The literacy rate of the population aged 15 and over in the region was the lowest in the country, reaching only 89.9%. There was a huge difference between the rates of different provinces, of which Lai Chau's rate only reached 64.4%. This is also the region with the highest disparity in literacy rates between urban and rural areas in the country (10.1 percentage points). The proportion of the trained workforce was uneven among the provinces in the region and was much lower than the national average (22.8%) (chart -1).

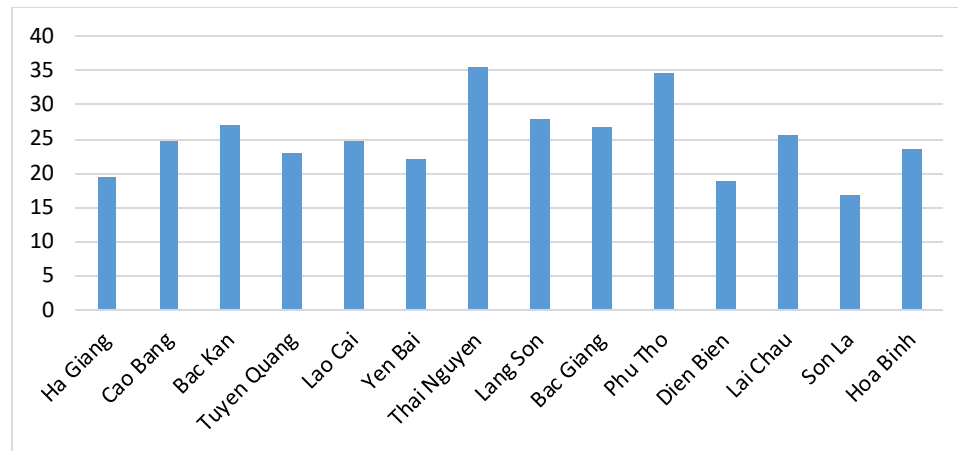


Chart -1: Percentage of trained workers by provinces in the region

Out of a total of 7,736,200 employees aged 15 and over, only 1,586,000 people have been trained, accounting for 20.5% of the total workforce, nearly 37% of which have a university degree or higher [9] (chart -2).

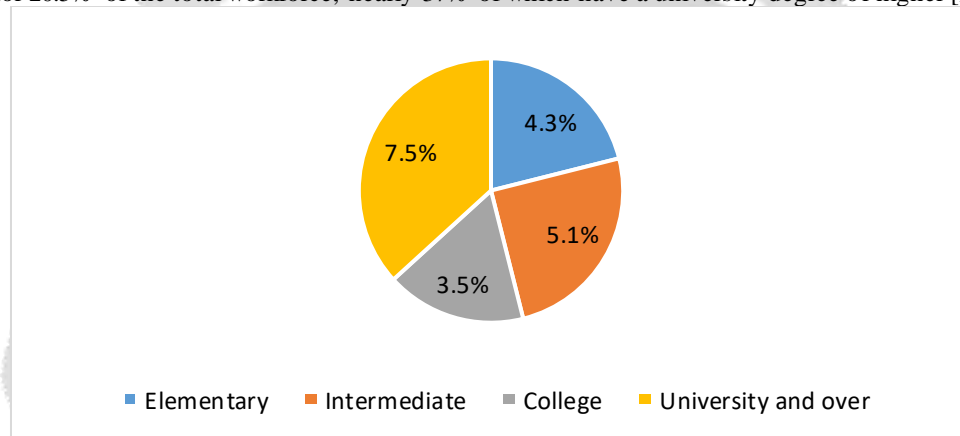


Chart -2: Percentage of training types

1.3. Structure of human resources in terms of occupation and economic sector

The pace of job restructuring from agriculture, forestry and fishery to industry and construction and services increased sharply (chart -3).



Chart -3: Number of employees in terms of occupation (thousand people)

The shift of occupational structure is in accordance with the structure of sectors, in which occupations in agriculture, forestry, fishery, simple occupations and personal services decreased, while those in high-level professional and technical skills, installers and operators of equipment and machinery increased significantly compared to those of previous years. The total number of employees in the field of agriculture, forestry and fishery in the country accounted for 34.5%, of which only 7.3% were employed in agriculture, forestry and fishery with 4% of trained workers. The NMMA accounts for 2.3% of that number, mainly men in rural areas. The number of skilled laborers and workers in this field has continuously decreased over the years.

Regarding economic sectors, social labor productivity in the field of agriculture, forestry and fishery has increased over the years, however, compared to other occupations, it is only at a very low level of about 44.7 million/labor/year. The average monthly salary of paid workers in the whole region is: 6,077 thousand (chart -4) with 41.5 hours of working hours/week, while that of labors in the fields of agriculture, forestry and fishery was only 4,332 thousand with 35.8 hours/week.

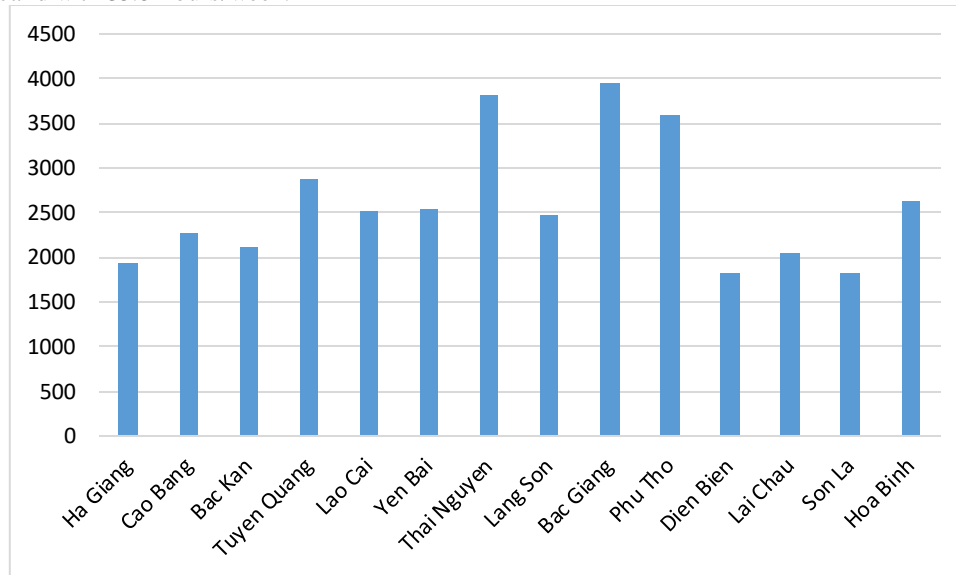


Chart -4: Per capita monthly income (million VND)

Looking at the above statistics, it can be seen that the NMMA is an area with an abundant labor force with a high proportion of young labor force and low unemployment rate. More than half of them are ethnic minorities, living in rural and mountainous areas. The majority of workers in the region do not have professional and technical qualifications, accounting for only a fifth of the total number of employees. This rate is also uneven among provinces in the region and has the lowest average in the country. The total number of employees working in the fields of agriculture, forestry and fishery accounts for a small proportion and is decreasing, the average salary is very low. When shifting to digital agriculture, the requirements for workers are increasing, the human resources that can meet the requirements of digital agriculture are seriously inadequate.

2. The current status of agro-forestry development in the NMMA

The agricultural development in the region is aimed at developing the strengths of each locality and the needs of the market. In recent years, many models of application of scientific and technological advances have been built. A number of concentrated agro-forestry products have been developed with products that have become commodities and are distributed in markets such as: Tea growing areas of Thai Nguyen and Phu Tho provinces; orange growing areas in Cao Phong, plum growing areas in Bac Ha, flower and vegetable growing areas in Sa Pa, rice growing areas in Dien Bien, medicinal plant growing areas in Ha Giang, dairy farming areas in Moc Chau, etc. Many products are recognized as OCOP products and are popular with consumers such as: microwave bananas, premium oranges, black lentils, hook-shaped tea, Vietnamese oolong tea, dried plums, fragrant pumpkins, seedless persimmons, Seng Cu rice, etc. [8].

In the application models of scientific and technological progress, many new technologies have been tested and applied, bringing high efficiency in labor, production and business such as: Using sensor measuring devices to maintain the right humidity and temperature for plants, monitor the health of livestock; using machines to get and preserve milk; using barcode technology for product traceability and management; automation technology in

product processing and packaging; using software to solve professional, production and business management tasks; application of information technology in advertising and promoting products, etc. [1], [2].

Human resource training in the region is currently carried out in two main forms: vocational education and training of university-level specialists. Vocational education is carried out in a variety of ways, from formal vocational training, regular vocational training, concentrated vocational training, mobile vocational training, vocational training at enterprises and craft villages. However, most of them are still providing knowledge about processes and technical measures, and they do not focus on high-tech agriculture as well as on technologies for processing, preserving, promoting and consuming products. The trend of learners going to work in industrial zones after graduating from high school is quite common in the region. The percentage of students enrolling in university has decreased, especially in the fields of agriculture and forestry.

In general, compared with the national average, the agricultural development in the region currently has many shortcomings and limitations: Resources for science and technology are limited; restructuring the sector and renewing production models in agriculture is still slow; commodity agricultural production is still on a small scale, unevenly distributed; maintaining models is still difficult due to lack of capital and high quality human resources; has not yet strongly attracted enterprises to invest in and innovate technology; post-harvest preservation and processing technologies are mostly in the form of preliminary processing, with low added value. Most of the workers in the region come from poor rural areas. They are arbitrary in terms of working hours, and their behavior and labor discipline have not yet met the requirements of the industrial production process; low level of education and professional - technical level, not yet fully equipped with necessary knowledge and skills; access to and application of new technologies is still limited.

3. The demand for human resource needs in the NMMA in the context of the 4th industrial revolution

The orientation for agricultural development in the NMMA region in the upcoming period will focus on: Agricultural restructuring, agricultural development towards commodity production; focusing on planting and producing specialty trees, key crops, OCOP products; applying digital technology to manage quality, automating production and business processes; building big data systems on land, crops, livestock and fisheries; branding, improving market access, promotion and marketing in agriculture, forestry and fishery; promoting forest economic development in association with environmental protection and sustainable development.

The solution to achieve success for the above orientations is to prepare the necessary conditions and apply advanced digital technologies in all processes, from fertilizing, cultivating, to producing and distributing products. Key technologies used include [7]:

- Cloud computing: Used in information storage to quickly and effectively share information about markets, customers, production and business processes and save storage costs.
- Big data: Collecting and analyzing information about weather, natural disasters, markets, customers, technology, etc. to make accurate forecasts and plans.
- Internet of Things (IoT): Using smart devices to control and monitor professional work to detect and make timely decisions, beneficial to agricultural production and business.
- Artificial Intelligence (AI): Supporting the process of making decisions in production that will gradually replace human decisions based on agricultural databases, experts and achievements of computer science.

Then, workers need to have enough capacity to deploy, organize and operate them. Therefore, it is necessary to give priority to the development of high-quality human resources, specific human resources, based on the structure of qualifications and occupations, with focus associated with practical needs.

Currently, all of the provinces in the region have vocational education (VE) institutions with a total of 52 colleges, 57 intermediate schools and 202 vocational education centers. Of which, there are only 6 public colleges and 2 vocational colleges, 4 intermediate schools, 10 vocational intermediate schools, and 5 universities that train professions in the field of agriculture and forestry, the others provide courses related to industry, service, economy, informatics, etc.

The five universities above are located in the provinces of Thai Nguyen, Bac Giang, Phu Tho, Son La and Lao Cai. These are facilities for scientific research and technology transfer in agriculture and forestry, and at the same time create high-quality human resources and scientific and technological products for the region as well as the whole country. However, only 2 out of 5 universities specialize in this field, the others are multi-disciplinary training institutions.

In addition, in the region, there are many institutes and high-tech research centers on agriculture (HRC) under the Ministry, the Department of Science and Technology, the Department of Agriculture and Rural Development in the provinces and in the universities. These are research centers for the testing of plant varieties, livestock, technical measures, issues on the market for agro-forestry products, and the implementation of scientific research programs, projects and plans and transferring agricultural and forestry technologies to serve the region's socio-economic development.

However, compared to other regions in the country, the number of educational institutions in the region is still small and unevenly distributed. This affects the training and provision of on-site qualified human resources. The scale of training and quality of resources in the region have not met the development of science and technology in agriculture yet. While the demand for human resources for agriculture is very large, the tendency to study the fields of agriculture and forestry has decreased sharply. The cause of this situation is due to mechanisms and policies in recruitment, awareness, human needs and social trends, employment issues and salary regime after graduation. That graduates cannot get a job or do not have a job in the right major or that their salary that does not meet the needs of life are common problems today. A current paradox is that businesses are in dire need of recruitment while many students cannot find jobs. One of the main reasons is that the ability of students does not meet the needs of employers. The general situation of students today is that they lack professional skills and necessary soft skills.

Therefore, training human resources with professional and technical qualifications and high skills, with necessary soft skills to meet the requirements of the job and the needs of society such as: IT skills to master the modern technologies in agriculture; entrepreneurial skills to be active in research, future-oriented, capable of creating jobs for themselves and others; negotiation skills, market development negotiation, product promotion; social skills; self-learning and adaptive skills, innovation ability, etc. are one of the key solutions to solve the problem of human resources for digital agriculture in the NMMA.

4. Solutions to develop human resources to serve the needs of agricultural digitalization in the NMMA

4.1. General solutions

Focusing on vocational training for rural and mountainous workers in order to improve the quality of human resources in the agricultural sector. Developing high-quality human resources capable of quickly adapting to the working environment and new scientific and technological advances.

Accurately forecasting human resource needs to have appropriate development policies.

Improving the quality of training in training institutions, linking training with use and needs of society

Strengthening the promulgation of policies on education, training and employment for the region, especially in mountainous, remote and isolated areas.

4.2. Solutions on mechanisms and policies

Increasing investment in vocational schools in mountainous, remote and isolated districts, and encouraging enterprises to use on-the-spot vocational training workers. Strengthening policies to support and encourage production and development of services for traditional occupations.

Effectively implementing the propaganda and dissemination of agricultural production development policies; Encouraging and mobilizing young workers to participate in vocational training to improve production and raise incomes.

Promoting projects on agricultural and forestry extension in order to improve professional capacity in cultivation and husbandry, and to change the structure of livestock and plants.

Strengthening investment policies in science and technology, encouraging the opening of industrial areas, enterprises, and production and business establishments in high-tech agriculture in order to bring into play the region's advantages and create motivation for vocational training and attract workers.

Strengthening and effectively implementing policies on training, fostering, planning, recruiting, linking training with job creating for learners.

4.3. Solutions on training

- Short-term training for the direct workforce

Developing a training program that is appropriate and close to reality in order to equip employees with practical skills to serve the requirements of their current jobs. Focusing on improving the ability to apply new scientific and technical advances in agriculture.

Strengthening facilities, improving the quality of teaching, performing well the inspection and evaluation of training quality.

Propagating, mobilizing and raising awareness of employees about the need to improve professional qualifications and capacity to meet the development of society.

- University-level specialist training

Training program (TP): Developing TP is the basis for improving the quality of education. Therefore, the development of TP must be paid attention to, implemented regularly, continuously, in accordance with the output standards and associated with the needs of the market and enterprises. This process must be implemented in turn: Starting with the analysis of the context, technical requirements and needs of the market as a basis to determine the general purpose and specific goal; followed by the process of developing training content, plans and elements to ensure the implementation of the training program; Finally, after the TP is completed, it must be tested and evaluated widely. The training program must be built in an open direction, enhancing the connectivity between sectors, approaching the advanced countries in the world, especially those with developed agriculture. Promoting applicability in research activities, learning content, promoting practical elements, increasing the time for vocational training and professional practice. Focus on developing professional skills, soft skills and necessary professional ethics for students.

Training form: Diversifying forms of training to facilitate learners and employees to improve their skills anytime, anywhere, depending on their own needs and job requirements. Training must be associated with scientific research and transfer of scientific and technological advances to meet practical needs and developing trends of society. It is necessary to strengthen the connection between institutions and enterprises in training. Training institutions base on the needs of employers to change training objectives, programs and methods accordingly, taking advantage of enterprises' facilities to equip students with practical knowledge; enterprises use this form of association to be proactive in training human resources. This connection brings benefits to both sides in meeting the labor needs of enterprises and promoting the application of research results into practice.

Training orientation: It is necessary to invest in researching labor market trends in order to provide orientation and training scale, thereby creating a focused investment plan.

CONCLUSIONS

Agriculture is one of the fields that play a key role in the economy of the NMMA. However, the results of the article show that the agricultural development here is still limited due to the shortage of human resources, especially high-quality ones. Through analyzing the current situation and needs of human resources in the region, the article has proposed some specific solutions on mechanisms, policies and training for each specific target group in order to improve the quality of human resources training quality, exploiting local labor resources, and attracting high-quality human resources as well as investment projects for agriculture. Solving the problem of human resources effectively is one of the prerequisites for the development of agriculture in the NMMA in the meantime.

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