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THE ASSESSMENT OF SUSTAINABLE DEVELOPMENT FACTORS IN THE RURAL AREAS - A CASE STUDY FROM AZERBAIJAN

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Abstract

Rural development is the effort to ensure the economic, social, and cultural development of these communities in a democratic way, by first creating a sense of need for individuals and communities living in rural areas and making their living from the agricultural sector or similar rural occupations. For improving and optimizing Sustainable Development Goals (SDGs) approaches for rural livelihoods, it is essential firstly to monitor and evaluate the current situation on SDGs in target villages and its achievements, also to identify the challenges and opportunities in this area. The purpose of study is to conduct surveys for assessment of current situation on SDGs and identifying opinions and understandings of farmers/producers and extension providers/input suppliers on this issue in farms located in Tovuz, Agstafa, Gadabay and Tartar districts in Azerbaijan. In the study, primary clients were farmers and secondary clients were extension providers/input suppliers including different representatives from the public and private sectors. During study, we identified the main pre-conditions, such as the technical, finance and economic problems, natural resources and hazards that farmers face in agriculture, as well as main difficulties faced by farmers in accessing agricultural extension services/trainings, also annual production volume and income on the farm and other difficulties faced by farmers for achievement of SDGs in farms. In the study, data were collected by face-to-face survey method from 47 farmers and 5 extension providers selected by random sampling from Tovuz, Agstafa, Gadabay and Tartar districts. Simple statistical methods were applied in the evaluation of the data obtained, and average and percentage calculations were performed. According to the results, farmers are facing some challenges preventing the achievement of SDGs such as finance and economic problems, natural resources and hazards, and technical issues in agriculture. To eliminate the negative effects of urbanization in target villages, there is a great need to improve rural income sources and promote employment for people in rural areas.

Key words**:** *sustainable agriculture, sustainable development goals, rural livelihood, rural economy*

INTRODUCTION

Sustainability includes the planning and implementation of today and tomorrow to ensure that economic development is sustainable and that the needs of future generations are met without depleting natural resources and disturbing the balance of nature. Sustainability can be divided into three main sections as economic, environmental, and social sustainability. An economically sustainable system must be able to consistently produce goods and services, maintain manageable levels of government and external debt, and avoid excessive sectoral imbalances that harm agricultural or industrial production. An environmentally sustainable system must maintain a stable resource base by avoiding the overexploitation of renewable resource systems and consuming non-renewable resources only to the extent that investment is made as adequate substitutes. This includes maintaining biodiversity, atmospheric stability, and other ecosystem functions that are not normally classified as economic resources. A socially sustainable system should be the provision of adequate social services, including distributional equity, health and education, gender equality and political accountability and participation. Sustainable development is the meeting and development of those who live today and those who will live in the future. To ensure

social, economic, and environmental sustainability, educating human resources in rural areas is of strategic importance. Agricultural activities constitute an important part of the basic economic activities in rural areas. Agriculture is the production of vegetal and animal products, increasing quality and efficiency, protection of products in appropriate conditions, processing, and marketing under appropriate conditions. Since the production of vegetal and animal products can be done largely in rural areas, agriculture and rural areas are directly related to each other. Therefore, the development of agriculture means the development of rural areas [34].

The problems facing development in rural areas are of a high complexity, the necessity of a multi-dimensional development approach towards these areas, and the need to change the conceptual framework of rural policies have created common views. It has emerged that the sectoral perspective in the rural area policies is insufficient and therefore it should be transformed into a policy area with both sectoral and spatial dimensions. Attention was drawn to the necessity of using key elements such as diversity in rural economies, the development of small and medium-sized enterprises, new technologies, and rural tourism in sustainable development, and it was concluded that the increase in services, protection of the environment, and increasing the quality of living spaces should also be considered. For a sustainable balanced development, the necessity and importance of rural and urban-related developments have emerged, as rural and the city are integrated [54].

In 2015, the United Nations (UN) and its member states adopted the 2030 Agenda for Sustainable Development to ensure peace and prosperity. The aim of this agenda is to ensure the development of all countries in relation to economic growth. It is also aimed at making improvements in health and education, reducing inequality, and tackling climate change. To achieve these goals, 17 Sustainable Development Goals (SDGs) including different purposes and actions are implemented. These goals are based on a modern understanding of human development that gives importance to health and education and tries to increase welfare based on a continuous economic growth process. The 17 SDGs are interrelated and include issues such as security, production, and consumption for the sustainable development of different human settlements (cities, towns, and villages). The creation of livable human settlements is recognized as a clear indicator of socially and economically sustainable development [8].

Many studies have been carried out on the obstacles to sustainable rural development in rural areas and the development of different solutions in different countries of the world. Some studies present the main problems encountered in the country and examined regional conditions [12, 47, 45, 10, 51, 13]. Some authors specified rural tourism as a solution proposal [44, 32, 5, 29, 22, 1, 48]. The relationship between environment and ecosystem and rural development has been investigated by [41, 31]. The use of digital tools for this purpose has been evaluated by [16, 52]. Some researchers investigated the effects of rural development programs [27], policies applied [50], funding for rural development [49], rural migrations [35], social capital [17], private and family farms [30, 43, 15], agricultural cooperatives [20, 37], farm modernization [26] and Covid-19 [14].

Some researchers have developed different approaches and created models on SDGs and indicators [33, 39, 40, 18, 29, 19]

Today, the government of Azerbaijan performs the dynamic, rapid and advisable programs for achieving Sustainable Development Goals (SDGs) in the country, especially in rural areas [6]. Considering the principles of SDGs, the government of Azerbaijan has implemented different state programs for reducing poverty, promoting rural livelihood, stopping urbanization, and promoting the employment for people in rural areas [7].

Other researchers issued recommendations destined to ensure sustainable development in rural areas in Azerbaijan [4, 23, 24, 21, 2]. This research should be continued and

developed by studying the results obtained in different countries.

For solving the problems encountered in rural areas, especially to improve and optimize SDGs approaches for rural livelihoods, it is essential firstly to monitor and evaluate the current situation and to identify the challenges and opportunities in rural areas.

Considering the importance of measuring SDGs in promoting rural livelihood, we conducted surveys for assessment of current situation on sustainable development goals (SDG) in target villages located front-line areas of Tartar, Tovuz, Agstafa and Gadabay districts of Azerbaijan.

The purpose of study is to conduct the research for assessment of current situation on SDGs, as well as to identify the main challenges and the opportunities on this issue in the farms located in Tovuz, Agstafa, Gadabay and Tartar districts in Azerbaijan. In results of the study, we collected reliable data and achieved to describe the original picture of current situation related with SDGs in farms located in target villages, as well as identified the challenges and the opportunities existed in this area and the road for improving SDGs in target districts.

MATERIALS AND METHODS

The study was conducted in four target districts including in Shicheybat and Garalar villages of Tovuz district, in Kohnegishlag village of Agstafa district, in Arabachi, Farzali, Zamanli and Mormor villages of Gadabay district and in Gazyan and Yukhari Gapanli villages of Tartar district during July-September 2022 (Figure 1).

Fig. 1. Districts and cities in Azerbaijan
Source: [56].

The study tools include individual interviews and village level focus group discussion with primary and secondary respondents in target districts and villages. The research materials consisted of results of questionnaires and focus group discussion with different stakeholders.

The framework for assessing the current situation on SDGs in farms located in target districts is described in Figure 2. As illustrated in Figure 2, in general, for assessment of current situation on SDGs, the primary data was collected from main actors consisted of primary and secondary respondents relevant to this issue. In total, we conducted 52 interviews including 47 interviews with farmers and 5 interviews with extension providers. The respondents to be surveyed were informed about the aims of the study, their rights and limitations, their voluntary participation in the study, and the

prepared consent form was filled, and the questions were answered.

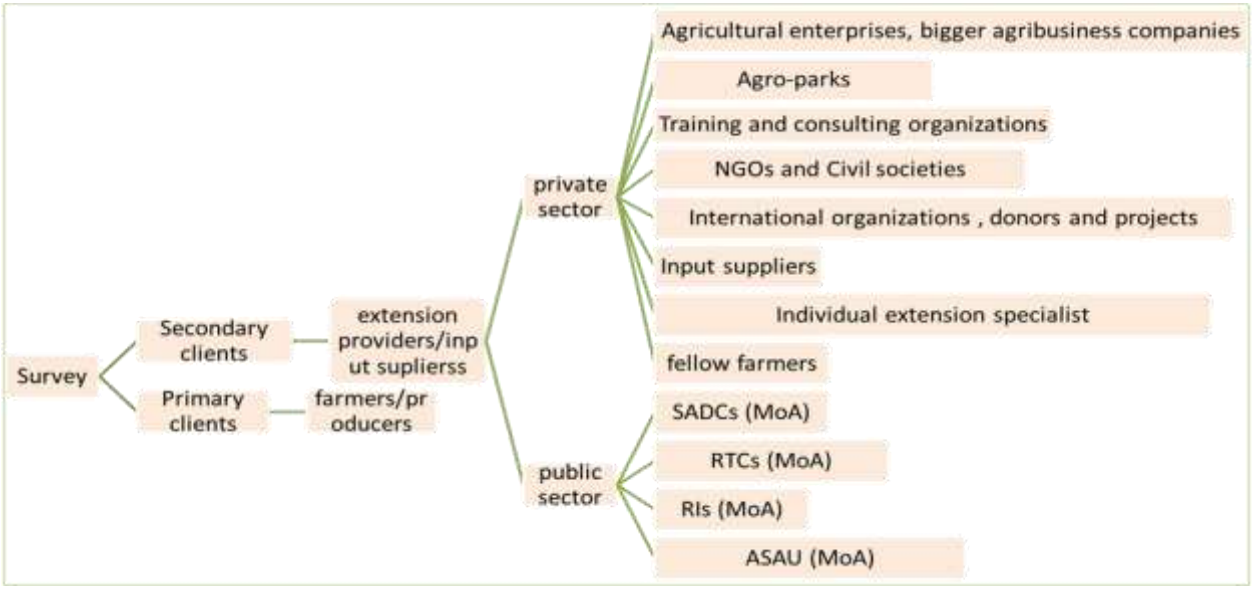

Fig. 2. Framework of assessment
Source: Contribution of authors.
Note: NGOs=None-Governmental Organization, SADCs= State Agricultural Development Centre, RTCs= Research and Training Center, RIs= Research Institute, ASAU = Azerbaijan State Agricultural University, MoA= Ministry of Agriculture

Along with the interviews, we also have conducted the village level focus group discussions with farmers in Shicheybat and Garalar villages of Tovuz district, in Kohnegishlag village of Agstafa district, in Arabachi village of Gadabay district, in Gazyan and Yukhari Gapanli villages of Tartar district, also with extension providers of Tartart Regional Training Centre for rapid assessment of current situation on SDGs and identifying opinions and understandings of farmers/producers and extension providers on this issue.

To collect accurate data and increase the confidence level of surveys we planned to cover all the target villages. Before the survey, the targeted villages were identified according to their social-economic indicators gained by SADCs (State Agriculture Development Centre). In result, we identified the specific villages to conduct the surveys.

But to be on the safe side, we identified the small-scale, medium, and large farmers, as well as poor and vulnerable families depending on their income per capita and involved 1-2 representatives from each above-mentioned group to surveys to cover all of levels of families with different socio-economic indicators in target villages. The respondents were chosen via a simple random sampling method based on their production resources and socio-economic indicators.

As for the number of respondents by districts and villages, 11 respondents including 5 farmers from Garalar village and 6 farmers from Shicheybat village of Tovuz district, 12 respondents including 11 farmers and 1 extension provider from Kohnegishlag village of Agstafa district, 14 respondents including 5 farmers from Arabachi village, 4 farmers from Farzali village, 4 farmers from Mormor village and 1 farmer from Zamanli village of Gadabay district, 12 respondents including 7 farmers from Gazyan village, 4 farmers and 1 extension provider from Yukhari Gapanli village Tartar district, as well as 3 extension providers of Tartart Regional Training Centre were interviewed.

During the surveys, together with vulnerable respondents, we also interviewed leader farmers who are open to innovations to describe the original picture of current situation on SDGs in target villages. In these meetings, we were discussing about the awareness of farmers and extension providers on SDGs, the identification of the special

agricultural extension and training needs of farmers and extension providers on SDGs, the staff capacity, especially the updating extension staff with new technologies and Good Agriculture Practices (GAP) approaches used to communicate with farmers, as well as the challenges prevented to achieve SDGs in farms.

During the field survey, the respondents were "face to face" interviewed based on the use of semi-structured questionnaires.

Before conducting the surveys in target villages, the survey forms (questionnaires) containing 11 pages were developed. The questionnaires were designed in such a way that we could obtain the right answers to the questions we are looking for. Questions asked were both open ended and closed. Also, the questionnaires contain both qualitative and quantitative questions. Before collecting actual data, the questionnaire was pre-tested to identify either irrelevant or to add missed part.

During the interview, the following issues were tried to be determined with the questions prepared in advance.

- Identifying financial and economic problems, natural resources and hazards faced by farmers to reach SDGs,
- To determine the level of knowledge of farmers regarding SDGs,
- To determine the knowledge and skills of farmers and their awareness on sustainable natural resource management,
- To identify the main challenges faced by farmers in agriculture.

According to the modern literature, there are different methodological approaches aimed to the socio-economic, ecological (natural) and agricultural aspects of identifying indicators for assessing the sustainable rural development in the regions [55, 28]. Today, most of the researchers prefer to identify and select the important factors with their indicators encouraging and measuring sustainable development of agriculture and the rural areas [9, 25, 20, 42].

[36] used some economic indicators for measuring sustainable rural development such as budget revenues of local or regional self-government units per capita, number of beds in rural tourism in relation to the total population, diversification of sources of income on the farm (additional activities on the farms), diversification of economic activities in the rural area, number of EU-level protected products in each county in relation to the total number of such products in the country, unemployment rate, GDP per capita, productivity of agricultural production, number of entrepreneurs in agricultural and nonagricultural activities in rural areas, education as a prerequisite for using innovation, number of cars per household, internet access- number of connections/number of inhabitants or households, availability of infrastructure facilities connected to agriculture, economic vitality-the number of blocked and newly established companies and land fragmentation-average farmland size.

According to [38], the indicators used by them for assessing the sustainable rural development in the region were coefficient of changes proportionality in the territory's transport, coefficient of changes proportionality in the production infrastructure of the territory infrastructure, coefficient of balance, proportionality and efficiency of changes in the results of using production resource under production subsystem and coefficient of changes proportionality in the parameters of social and household objects under social and household subsystem of rural territories.

[46] stated the village SDGs indicators and targets for measuring achievement of SDGs in rural areas of Indonesia. The authors have pointed out 17 SDGs with their relevant indicators such as: 1.No Poverty (indicator: Income per capita per day); 2. Zero Hunger (indicators: Food menu; Frequency of eating); 3.Good Health and Well-Being (Number of types of disease in 1 family within 1 year); 4.Quality education (Adult household members with good access to education); 5.Gender equality (Women's access to education; Women's access to job opportunities); 6.Clean water and sanitation (Latrine ownership; Source of clean water); 7.Affordable and clean energy (Cooking fuel, Access to electricity); 8.Decent work and

economic growth (Unemployed working-age household members; Diversified livelihoods); 9.Industry, Innovation, and Infrastructure (Ownership of communication tools; Ownership of transportation vehicle; Household access to the internet and other media); 10.Reduced Inequality (Access to agricultural land); 11.Sustainable cities and communities (Building area/house per number of family members); 12.Responsible consumption and production (Commodity history; Garbage disposal location); 13.Climate action (Availability of green open areas at the neighborhood level); 14.Life below water (None; Farmland management level at household level); 15.Life on land (Farmland management level at household level); 16.Peace, justice, and strong institution (Participation in community organizations) and 17.Partnerships for the goals (Household external network level).

Also, as experiences from Norway, [11] has expressed key factors covering financial, technological, knowledge and plan processes, legal-laws and regulation, organizational/institutional, political, and cultural categories which can be identified as facilitating the implementation of the SDGs in Norwegian local and regional planning.

In addition to the above-mentioned approaches, according to the local priorities related with sustainable rural development, our approaches for measuring SDGs in target villages differed from others a little. During study, our surveys have covered the main assessment factors aimed to the technical, finance and economic problems, natural resources and hazards that farmers face in agriculture, as well as main difficulties faced by farmers in accessing agricultural extension services/trainings, also annual production volume and income on the farm and other difficulties faced by farmers for achievement of SDGs in farms.

Simple statistical methods were applied in the evaluation of the data obtained, and average and percentage calculations were performed. The obtained results are presented using figures.

RESULTS AND DISCUSSIONS

Overall overview of agriculture in target districts and surveyed villages

The target villages surveyed are in front-line areas and far from the district center. The target villages are mountainous except Gazyan and Yukhary Gapanli villages of Tartar district. Shicheybat and Garalar villages of Tovuz district are in the lowlands. Mountainous and foothill zones, where positive and negative relief forms are shifted. Kohnegishlag village of Agstafa district, Arabachi, Farzali, Zamanli and Mormor villages of Gadabay district are characterized by hills, mountainous and foothill areas. Gazyan and Yukhari Gapanli villages of Tartar district are in the plain area.

Land use is mainly characterized by irrigation farming in Gazyan and YukhariGapanli villages of Tartar district. Kohnegishlag village of Agstafa, Farzali, Zamanli and Mormor villages of Gadabay district, as well as Shicheybat and Garalar villages of Tovuz district are known for dry farming and rain crops are cultivated in these areas. But, today, the results of our research show that these lands have lost the status of non-irrigated areas due to decrease of precipitation/rain fall.

The agricultural employees make up approximately more than 50% of the labor force of the target districts. Agriculture is considered as a basic priority area in these target districts and villages. In the target districts, favorable climatic conditions and fertile land cover allow for planting various types of crops including grains (wheat, barley, corn), legumes (peas, beans, etc.), vegetables (potato, tomato etc.), melons, fruits, and berries, as well as for animal production including sheep, poultry, cattle (dairy cows and cattle for slaughter) etc.

Analysis of data obtained from the target villages shows that Garalar and Shicheybat villages of Tovuz district are mainly specialized in potatoes and legumes. Arabachi, Mormor, Farzali and Zamanli villages of Gadabay district are known mainly for potatoes and cereals. The widely cultivated crops in Kohnegishlag village of Agstafa district are cereals, potatoes, and legumes. The main crops produced in Gazyan and Yukhari Gapanli villages of Tartar district

are cereals, fodder crops (Luzerne), cotton and legumes. Regarding animal production, the target villages are mainly specialized to keep the dairy cows, cattle for slaughter and sheep.

The analysis of data obtained from the surveys shows that considerable growth wasn't achieved in grain production in target villages. In Kohnegishlag village of Agstafa district, in Arabachi, Mormor, Farzali and Zamanli villages of Gadabay district and in Gazyan and Yukhari Gapanli villages of Tartar district, the average yield of wheat amounted 1.9 tons/ha, 3.5 tons/ha and 3.1 tons/ha in 2022, respectively. But the current yield of cereals is considerably lower than potential resources. For instance: during harvesting period in 2022, Agro-diary company harvested 7-9 tons of wheat grain per hectare which is about 2-3 times higher than current productivity in the target villages surveyed. Our observations show that this situation is related to droughts and inadequate growing practices used on farms.

As for potato production, which is main product of surveyed villages, in Garalar and Shicheybat villages of Tovuz district and in Arabachi, Mormor, Farzali and Zamanli villages of Gadabay district, the average productivity of potato made up 9.4 tons/ha and 10.5 tons/ha in 2022, respectively. The reason for the low yield of potato in target villages is mainly the drought and unfavorable growing season. Moreover, the average yield of cotton, lucerne (dry hay production) and sugar beet per hectare were 3.8 tons/ha, 21 tons/ha and 20 tons/ha in Gazyan and Yukhari Gapanli villages of Tartar district, respectively. These productivity indicators of cotton, luzerne and sugar beet are more lover than average yield gained from advantage farmers in our country. The results of our research show that the poor yield of cotton, lucerne (dry hay production) and sugar beet in Gazyan and Yukhari Gapanli villages of Tartar district is related with the drought, water deficiency, unfavorable growing season, and lack of the innovative and good practices in plant production.

Therefore, statistical analyzes and results obtained from questionnaires show that the factual production indicators of plant production and livestock in surveyed villages are considerably lower than the potential. The main causes of this problem are mainly related to water deficiency, droughts, unfavorable growing season and insufficient knowledge and skills of farmers in surveyed villages. It should be noted that these surveyed villages did not achieve only the world middle level, even country middle level of productivity of main crops. This fact was also stated in report on Building Azerbaijan`s Farming Middle Class funded by World Bunk [53], as well as in national report prepared under "Strengthening of Agricultural Advisory Services" project funded by the European Union (EU) and implemented by FAO [3].

It allows us to note that most of farmers in surveyed villages have not sufficient skills on innovative technologies and business management know-how and experience due to the weak links to agricultural extension services. Because, if the quality of extension services was satisfactory, we could see these successes in the productivity of crops cultivated by farmers in surveyed villages. It should be noted that, there is a great need to integrate innovations in agricultural practices and provide the trainings for farmers on innovative and good practices in production of main crops such as wheat, potato, legumes, sugar beet, fodder crops and livestock production.

General characteristics of respondents

When it comes to gender proportion, most of the respondents interviewed were male accounted for 85% (44 people) and the minority of the participants were female responsible for 15% (8 people) during the survey period conducted in Tovuz, Agstafa, Gadabay and Tartar districts.

During surveys, most farmers involved to the surveys were male accounted for 87% (41 people), on the contrary the minority was female responsible for 13% (6 people) (Figure 3). Also, 60% (3 people) of extension providers involved to the survey were male, on the other hand 40% (2 people) of them were female (Figure 5).

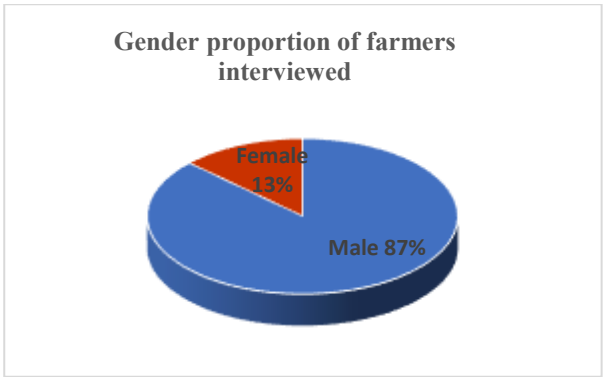

Fig. 3. The gender of respondents
Source: Results of survey

In terms of the age of respondents, the majorities (37%) have an age category between 51 to 60 years (mainly farmers older than 50), 21% of them were aged between 41 to 50 years, 14% of them were aged between 30 to 40 years, 19% of them were aged between 61 to 70 years and 9% of them were aged older than 70 (Figure 4).

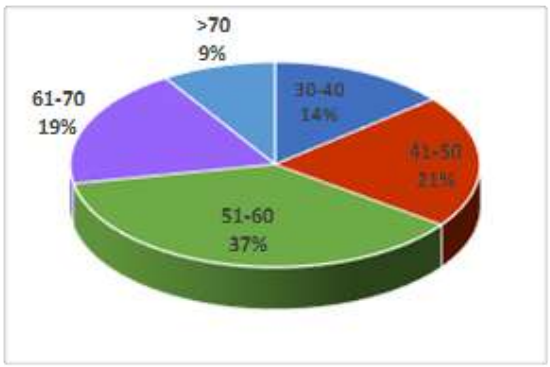

Fig. 4. The age of respondents
Source: Results of survey.

The results regarding the education background of respondents interviewed are illustrated in Figure 6.

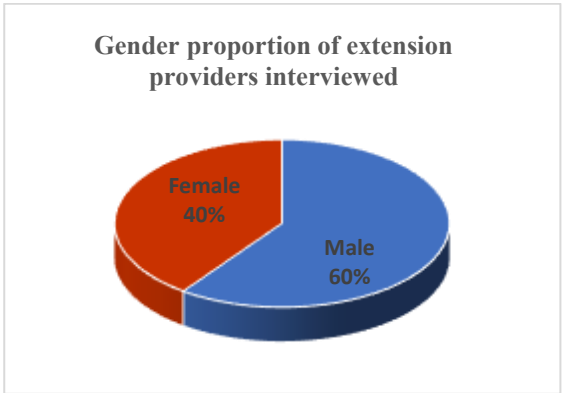

Fig. 5. Gender proportion of the interviewees
Source: Results of survey.

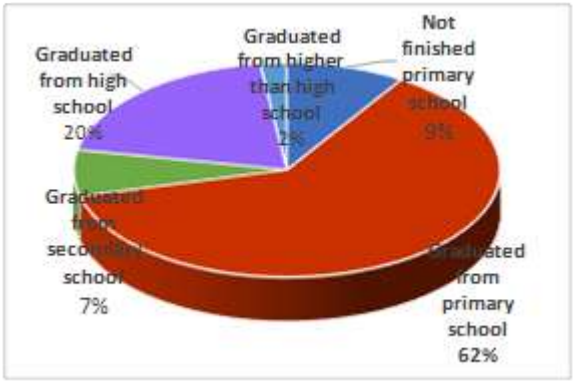

Fig. 6. The education background of respondents
Source: Results of survey.

The land size of farms in target villages

In terms of the land size of respondents, from the sampled farms, as illustrated in Figure 6, all the respondents are small-scale farmers (less than 50 hectares). Figures show that the majority (52%) are small farms occupying less than 1 hectare, 29% of them are farms occupying less than 4 hectares, 13% of them are farms having 10 hectares and 6% of them haven't land. In target villages, we can classify the agricultural producers into three groups: family farms and households.

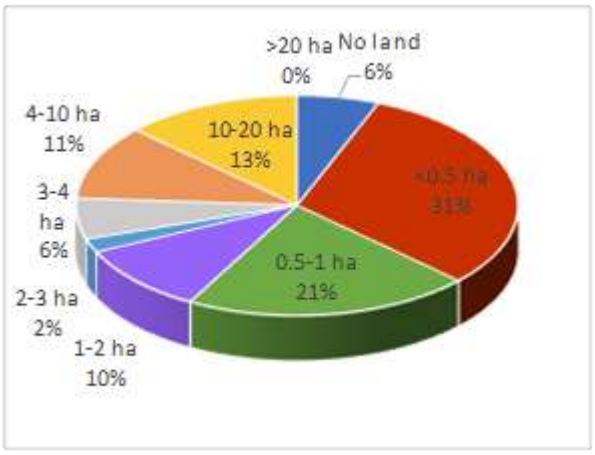

Fig. 7. The land size of respondents
Source: Results of survey.

By far the largest group (52% of total respondents) consists of 'households' with agricultural land producing mainly for home consumption and family farms, which comprise individual farmers that are market oriented. Family farms have only 2-3 ha on average, out of which households have plots of 0.5 ha or less. According to the results of our statistical surveys, average land per capita

in the target villages amounts to 0.05-0.20 hectares which results in 0.5-2 hectares of land per family.

The analyses show that 90% of agricultural products are produced by family peasant farms and households in surveyed villages. Also, separate small farms lead to problems such as expensive purchase of seeds, pesticides and fertilizers, improper soil and water use etc. To meet the social-economic demands of small-scale farmers and change their approaches to good agricultural practices, there is a great need to take the advisable measures in surveyed villages. Also, small-scale farmers are obliged to aim for good agricultural practices which are fundamental for high productivity.

The main factors affecting SDGs, especially sustainable agricultural and rural development in surveyed villages

We know that the difficulties faced by farmers in the field of agriculture prevent considerable achievement of SDGs in farms. According to the research and our observations, there are financial and economic problems of farmers including low prices of product, lack of market information and high input cost; natural resources and hazards related problems such as decrease of precipitation, increase of temperature, lack of water resources for irrigation and poor soil and soil fertility; and technical issues in agriculture including lack of tools and equipment, lack of agricultural knowledge in general, lack of pest and diseases management, lack of application of integrated pest management (IPM) and lack of implementation of Good Agriculture Practices (GAP).

Based on the results illustrated in Figure 3, in Figure 8 there are shown the results on how the respondents stated that their finance and economic problems.

As illustrated in Figure 8, The main finance and economic problems of the respondents are mainly related with the lack of capital (29%), high cost of inputs (21%), low prices of product (15%), lack of market information (11%), subsidies programs (11%) and other related issues (13%).

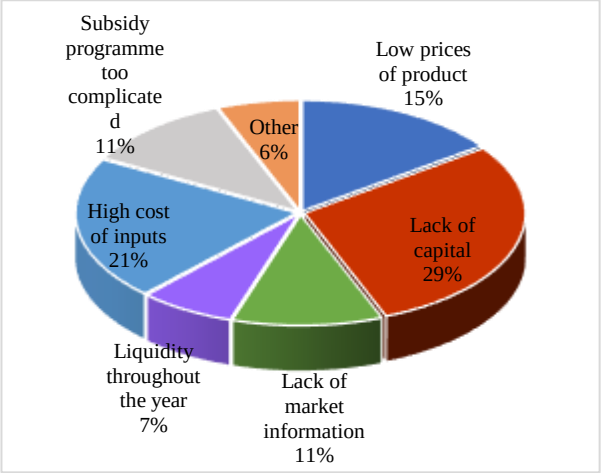

Fig. 8. Finance and economic problems of respondents
Source: Results of survey.

Concerning to the natural resources and hazards related problems, the answers of respondents interviewed showed that lack of water resources for irrigation (28%), decrease of precipitation/ rain fall (24%), soil erosion (13%), poor soil and soil fertility (10%), increase of temperature (9%), loss of biodiversity, floods and other related issues (16%) are main problems faced by farmers in surveyed villages during growing season (Figure 8).

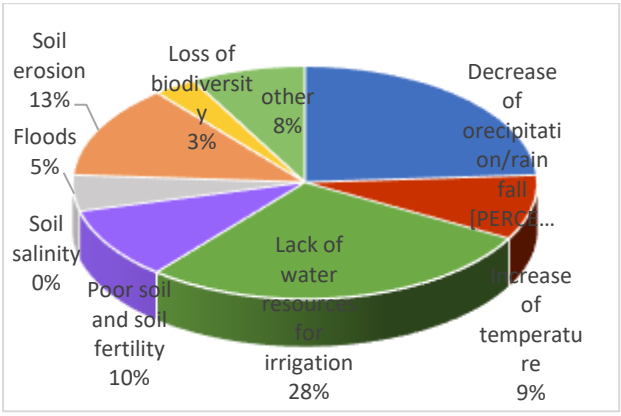

Fig. 9. Natural resources and hazards related problems of respondents.
Source: Results of survey.

Based on both our observations made during the survey process and the results of the questionnaires, many respondents were faced by technical issues including lack of pest and diseases management (31%), the shortage of farm tools and equipment and difficulties in accessing agricultural machinery (30%), lack of agricultural knowledge in general (17%). Also, 22% of respondents state other technical

problems such as lack of application of IPM, lack of implementation of GAP for growing plants, lack of skilled and knowledgeable workers (Figure 10).

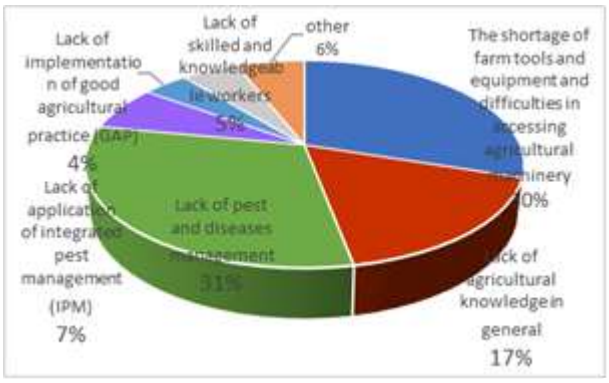

Fig. 10. Technical inadequacies in agriculture
Source: Results of survey.

While the main purpose of countries, especially developing countries, is general development, the multiplier effect of the added value obtained by rural development. It is obvious that it will add potential value to first regional and then general development.

At the core of the sustainable development approach, development is not perceived as just growth. Of course, there will be growth in development, but this may not be enough for development. Sustainable development includes social values such as human and environment rather than physical values such as growth. For this reason, development for the development of human resources in sustainable rural development is defined as human development and constitutes an important structure for both rural development and general development.

In a study conducted in Russia, rural development includes development of the labor market (staff potential), housing construction in rural areas, increasing level of household improvement, formation of a modern appearance, arrangement of engineering infrastructure facilities and improvement of fields located in rural areas. However, it is production that determines the development of all rural areas. Thus, to all the above must be added the restoration and improvement of agricultural production [51].

Another study conducted in Russia, an information model for sustainable rural development was developed. The model enables the formulation and evaluation of settlement scenarios to solve sustainable rural development problems. The research results showed that the information model is an effective tool for monitoring sustainable development at the local planning level. The strategy to be implemented in the country should not only focus on economic development, but also consider social, environmental, political, and other dimensions [19].

The purpose of study was to conduct surveys for assessment of current situation on SDGs and identifying opinions and understandings of farmers and extension providers/input suppliers. Based on the analysis of study, main findings and results are described below:

In target villages, we can classify the agricultural producers into three groups: family farms and households. By far the largest group (52% of total respondents) consists of ‘households’ with agricultural land producing mainly for home consumption and family farms, which comprise individual farmers that are market oriented. Family farms have only 2-3 ha on average, out of which households have plots of 0.5 ha or less. According to the results of our statistical surveys, average land per capita in the target villages amounts to 0.05-0.20 hectares which results in 0.5-2 hectares of land per family.

Also, separate small farms lead to problems such as expensive purchase of seeds, pesticides and fertilizers, improper soil and water use etc. To meet the social-economic demands of small-scale farmers and change their approaches to good agricultural practices, there is a great need to take the advisable measures in surveyed villages. Also, small-scale farmers are obliged to aim for good agricultural practices which are fundamental for high productivity.

The factual production indicators of plant production and livestock in surveyed villages are considerably lower than the potential. The main causes of this problem are mainly related to water deficiency, droughts, unfavorable growing season and insufficient knowledge and skills of farmers in surveyed villages. It should be noted that these

surveyed villages didn't achieve not only the world middle level, but even the country middle level of productivity of main crops.

It allows us to note that most of farmers in surveyed villages have not sufficient skills on innovative technologies and business management know-how and experience due to the weak links to agricultural extension services. Because if the quality of extension services was satisfactory, we could see these successes in the productivity of crops cultivated by farmers in surveyed villages. It should be noted that, there is a great need to integrate innovations in agricultural practices and provide the trainings for farmers on innovative and good practices in production of main crops such as wheat, potato, legumes, sugar beet, fodder crops and livestock production.

In relation to annual production volume in farms surveyed in target villages, answer of respondents shows that the production volume of agro products in farms is low and there were some deficiencies for self-sufficiency by cereals, leguminous, potatoes, fodder crops etc. This fact gives us a good insight into the low-income farm problem of small farmers in target villages.

The responses of respondents showed that most farmers (88% of them) don't conduct farm assessment, margin analyzes of farm and marketing surveys except 12% of them. This fact shows that either the respondents interviewed haven't sufficient knowledge and skills for conducting these assessments or they haven't been aware of the importance of these issues. The farmers managed to trade is sold poorly to wholesale buyers, because of difficulties with moving around the country.

There is a great need for information consulting services intended for the extension providers and farmers about Good Agriculture Practices (GAP): GAP in land preparations, GAP practices for fertilizer application, GAP related to water using, GAP in sowing and seedling production, GAP in managing crop pests and diseases, hygiene and safety hazard during harvesting; new technologies in vegetable growing, field and industrial crop production; IPM for cotton, corn, winter wheat, potato, vegetable growing and etc.; Climate Smart Agriculture and Precession Agriculture; Organic Farming Systems; Conservation agriculture, especially conservation soil tillage in target villages.

Also, farmers are facing some challenges preventing the achievement of SDGs such as finance and economic problems, natural resources and hazards, technical issues in agriculture. To eliminate the negative effects of urbanization in target villages, there is a great need to improve rural income sources and promote employment for people in rural areas.

CONCLUSIONS

When the research results are evaluated in general, it is seen that commercial production is limited in farms with small lands. Farmers encounter problems in the supply of inputs, and they cannot irrigate adequately, especially due to lack of water. It is stated that climate change also has negative effects. Operational lands cannot be evaluated effectively in this way. Farmers must grow certain products. It has been determined that farmers need technical information, but extension services are insufficient. Since farmers cannot develop commercial production, they do not conduct market research. Economic and financial problems of farmers also negatively affect their adoption of new production techniques. They need more information and support on GAP and organic farming practices. In addition, it has been determined that urbanization in the research region has caused the use of agricultural lands for other purposes.

In almost all countries, economic problems are encountered in rural areas. Because this sector is dominated by the agricultural sector. The agricultural sector is also highly affected by the changes in ecological, economic, and political conditions. In this context, both national and international policies and strategies are determined and implemented in the fight against economic conditions. The measures to be taken and the policies to be followed to reduce and prevent the economic problems in developing countries are important both in terms of ensuring the

continuity of development and economic growth. Therefore, effective policies for rural areas should be produced in Azerbaijan as well. Objectives should be determined with a sustainable understanding and a holistic approach in the formation of policies for combating poverty and rural development. Policy makers in Azerbaijan should evaluate their effects on ecology, economy, and social areas together while making decisions on these issues. In addition, while determining the policies, a wide participation including the participation and contribution of the local people, non-governmental organizations and representatives of all organizations operating in the region should be ensured.

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