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SUSTAINABILITY OF FAMILY FARMS IN THE MALDIVES: INFLUENCE FACTORS AND CHALLENGES

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СТІЙКІСТЬ СІМЕЙНИХ ФЕРМ НА МАЛЬДІВАХ: ВПЛИВОВІ ЧИННИКИ ТА ВИКЛИКИ

This research study aims to understand the concept of family farming communities and the importance of sustainability measures for their viability as the opportunities for employment, earning income and providing food security. A comparative analysis method was applied to clarify the key challenges faced by the Maldivian rural farming communities where the target group was selected from the registered farmers. The study findings were based on the data from the focus group of the directly interviewed 1200 family farmers on 13 visited islands. The research outcomes indicate four types of family farms, among which the most common form is the one with six members and access to 0.05—0.1 hectares of land. The research results reveal that the increase in the number of dependent people in one family reduces the amount of money available for daily needs such as food and education per person. The average daily income per capita among family farmers in the Maldives is around \$1.6, forcing the farmers to participate in off-farm activities. There are only 24% of family farmers who invest fully in agricultural activities and 21% of farmers can sell their agricultural products to earn income. The study shows that 30% of the Maldivian family farmers suffer from an insufficient supply of inputs, and only 5% of the farmers have access to running water and electricity. 95% of the family farmer communities do not use automatic machinery, and 55% of the farmers have no access to the agricultural markets and funding in the forms of loans and credits. The inflation rate, which increased up to 5.2% in 2022, led to the price growth for seeds, fertilizers, and transport costs leaving the farmers unable to carry out any farming activities. The study concludes that Maldivian family farming communities need tremendous support from the national government and private sector. Based on the above, the study then recommends to prioritize subsidies in allocating more land for farming and extending access to irrigation systems. Bringing innovation and technology to the family farming communities is a way of attracting youth in agriculture, which is essential for the development of the whole nation in tackling poverty, extreme climatic conditions, and food security.

Дослідження ставить за мету вивчення концепції сімейних фермерських громад для розуміння важливості заходів підтримки їх сталого розвитку і життєздатності як можливості працевлаштування, отримання доходу та забезпечення продовольчої безпеки. Для виявлення ключових викликів, що зазнають селянські фермерські громади на Мальдівах, було застосовано метод порівняльного аналізу, де цільова група була відібрана з числа зареєстрованих фермерів. Висновки дослідження ґрунтувалися на даних від фокус-групи безпосередньо опитаних 1200 сімейних фермерів на 13 відвіданих островах. Було встановлено чотири типи сімейних ферм, серед яких найпоширенішою формою є сімейне господарство з шести осіб і з доступом до 0.05-0.1 га землі. Результати дослідження показують, що збільшення кількості залежних осіб в одній родині зменшує кількість грошей, доступних для щоденних потреб, таких як їжа та освіта на одну людину. Середній дохід за добу на особу серед сімейних фермерів на Мальдівах складає приблизно \$1.6, що змушує їх брати участь у сторонній діяльності. Лише 24% сімейних фермерів інвестують весь свій час у сільське господарство та 21% фермерів, які можуть продавати свою продукцію для заробітку. Дослідження

встановило, що 30% сімейних фермерів на Мальдівах стикаються з браком ресурсів і лише 5% фермерів мають доступ до проточної води та електроенергії. 95% сімейних фермерських громад не використовують техніку, а 55% фермерів вважають себе позбавленими доступу до сільськогосподарських ринків і фінансування у формі позик і кредитів. Відчутний рівень інфляції, що зріс до 5.2% у 2022 році, мав наслідком підвищення цін на насіння, добрива та транспортні видатки, через що провадження фермерства значно ускладнилося. Це призводить до висновку, що мальдівські сімейні фермерські громади потребують величезної підтримки з боку національного уряду та приватного сектору. Виходячи з вищевикладеного, дослідження рекомендує визначити пріоритетність субсидій на виділення більших земельних площ для ведення сільського господарства та розширення доступу до зрошувальних систем. Крім того, запровадження інновацій і технологій у сімейних фермах є способом залучення молоді до сільського господарства, що має важливе значення для розвитку всієї нації, боротьби з бідністю, пристосування до екстремальних кліматичних умов та забезпечення продовольчої безпеки країни.

Key words: family farms in the Maldives, sustainable agriculture, land availability, access to markets and finance.

Ключові слова: сімейні ферми на Мальдівах, стійке сільське господарство, наявність земельних угідь, доступ до ринків та фінансів.

STATEMENT OF THE PROBLEM IN A GENERAL FORM AND ITS CONNECTION WITH IMPORTANT SCIENTIFIC OR PRACTICAL TASKS

Agricultural sectors must undergo many changes to meet the needs of the fast-growing world population since global food demand is expected to increase by 56% between 2010 and 2050 [1]. This will significantly impact South Asian countries where the world's largest rural population resides below the poverty line. A large part of the agricultural sector of South Asian countries consists of family farmers whose activities balance the whole communities' employment, diversify livelihoods, and eradicate the cycle of hunger and undernutrition [1].

There are more than 570 million farms worldwide. Among them, more than 500 million are family farms that own less than 2 hectares of land. Most of the world's rural farming population is distributed among South Asian countries. It boosts external and internal vulnerabilities which considerably threaten the continuity and viability of family farming communities [2]. The significant daily risks include production, market, financial, and climatic hazards due to limited access to inputs leading to loss of harvests. High-interest rates, legal uncertainties, and red tape in banking associated with property registration significantly exacerbate farming infrastructure. All these challenges push these farming communities to a stagnant growth stage where farmers have no growth or income stability [3].

The Maldives belongs to the South Asian group of countries with a total area of 30000 hectares, of which only 4000 hectares are arable. A small proportion of arable land is distributed among the family farming communities residing on rural islands, where it serves their basic income [4; 5]. The agricultural small and medium-sized enterprises ensure the food and nutrition security of the family farming communities and create job opportunities, boost economic development, and maintain a stable social environment, significantly impacting the whole nation's economy [6].

Due to the country's geographical location, it experiences unpredictable and fluctuating climate conditions such as high waves, pro-long dry conditions without rain, and the unavailability of fresh water suitable for farming purposes. More than 80% of the nationally registered farmers are family farmers vulnerable to the above weather conditions. They are dispersed among different islands separated by the sea with minimal support from the government or private sector [7]. Therefore, farming communities cannot reach sustainable development goals and cannot meet the country's food and nutrient demand. As a result, the nation depends on imports as its primary source of staple foods and dairy products. Reports accounted that the Maldives imported \$365.7 million by December of 2022 worth of food to meet the food and nutrient requirements of the domestic customers as well as the tourism industry of the country [8]. The rural farming communities producing fruits and vegetables have no access to

markets, assets, and minimal technical knowledge and assistance support. These farmers cannot make even one-third of the national requirement [7].

The United Nations formulated a plan based on 17 goals known as Sustainable Development Goals (SDGs), of which 17 SDGs encompass 169 targets that reflect poverty, health, climate change, and sustainable consumption and production. The two SDGs are focused explicitly on agribusiness development within the sustainability framework. This includes SDG 2, which addresses food security and the promotion of sustainable agriculture, and SDG 12, which aims to ensure sustainable production and consumption patterns [9; 10]. Sustainability is putting a balanced focus on enhancement and preservation concerning society and the environment while adding value and delivering future financial gains [11]. Sustainable agriculture is a combined system of animal and plant production specific to that farming and agricultural area, which will, over the long term, secure and satisfy human nutrients, sustain the natural resource base on which agriculture depends, increasing the efficiency of the non-renewable sources, maintaining the economic viability of the farming and agricultural operation, enhancing the social and economic well-being of its operating society [12]. Similarly, sustainable agriculture development is managing and sustaining the natural resources of nature, directing technological and institutional change to attain continuity in the satisfaction of human needs of the present and future generations [13]. Sustainable agricultural practices are crucial for the survival of family farms. Poverty, extreme climatic conditions, temperature, degradation of the environment and biodiversity, and food scarcity can be tackled with sustainable farming and innovative agricultural technologies, which need to be implemented in family farm operations and management. The succession and continuity of the rural communities depend on the successful management of the agricultural business. Hence sustainability cannot be separated from developing family farming communities in the Maldives [14].

ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

Family farming is a broad concept encompassing culture, region, and tradition. There is no one specific definition for family farms. However, this concept is based on certain principles where the family farms can be defined as agriculture, forestry, and fisheries activities carried out and managed by a family where the whole operations of these activities rely on the members of the family

as the primary source of labor where the continuity of the farms depends on inter-generational succession [15].

Family farms are defined into three categories. According to study reports, most family farms are operated on lands inherited over generations, where farmers work full-time and part-time. In most cases, these farmers function without any income where the product is used for consumption [15]. This includes family farmers, who have no access to finance to scale up their business further though they are well established and integrated into the market, farmers who have no infrastructure, no capital which makes them eligible for any credit or loan schemes, and poor farmers who have no access to market and inputs and are only able to produce bare minimum amount to meet their daily requirements [3].

The proper substantial and statistical definitions can describe the family farm. The substantial definition identifies family farming as a means of organizing and managing farming activities by family members where it depends on family members as the primary source of labor and where the family farms co-exist and co-evolve with the economic, environmental, social, and cultural functions. The statistical definition of family farms describes family farms as agricultural holdings organized and controlled by households [16; 17].

Family farms are defined based on four analytical criteria: labor force, land tenure, size/equipment, relationship with markets, integration in the local community, and relations with global societies. Family farm labor depends entirely on the family members as their primary source of work; farms are small, owned by the family members, and there is a comparatively small relationship with the market where most of the food production is used for consumption. A different definition of family farms states that family farm labor depends on both family labor and on exchanges based on local reciprocity, where the family farm production is targeted for the markets and meets the family's dietary requirements [17]. Analysis of different definitions proposed by various authors shows that all these definitions share some common characteristics in presenting the primary forms of family farms. In other words, all these definitions take aspects such as the origin of production, decision-making methods, and legal status to describe the family farms. Family farms range from entrepreneurial and business forms to family forms. In the entrepreneurial form, the land is owned by indirect formal tenure, where the farm is managed and organized technically, and the production is

targeted for the market. In the business forms, the family farms capitals are family associations that organize and manage farm activities. The production, by this form of farms, is mainly used for consumption, and the leftover is sold. Compared to these two forms of farming, a family form of agriculture is organized and managed by the family members, and the production is consumed to meet the daily requirements of the family [17]. The whole family farming concept links agricultural production by the family members mobilizing family labor and distributing final consumption, intermediate consumption, investments, and accumulation.

It is worth returning to the statement that the definition of a family farm has significant differences depending on the level of development of the country's economy. Thus, according to the National Institute of Food and Agriculture, USDA, most farms in the USA are family-owned and family-operated [18]. A farm can be considered a family farm if it is owned only by family members, in a partnership, or in sole ownership. It is important to note that hired managers cancel the family farm status, but something needs to be said about the involvement of workers of other categories. However, the economic level of the farm is different from the basis for determining the status of a family farm. In the USA, there are three groups of family farms, depending on the annual turnover. The most significant part of family farms is small ones — up to \$250000 of gross annual sales. It is about 91% of the total family farms in the country. Farms with a yearly sale of more than \$500000 are considered significant. It is about 5% of family farms. The rest are medium-sized family farms [18].

Canadian and EU agricultural policies also consider family farms' impact as significant, considering the social and cultural influence on agriculture and the environment. Family farms, especially small ones, can access support programs because of such recognition. Moreover, according to the research, the number of mid-size farms in Canada has essentially decreased since 1976, and the number of small family farms has remained constant. Still, their share in the total amount of family farms is 7% in 2021 against 5% in 1976 [19]. It demonstrates the sustainability of small farms in a competitive environment. Partly, it can be explained by the cooperative model of agribusiness, which is very popular in Canada, the USA, and the EU.

In countries with transition economies, the legal status of the family farm can be defined differently. For instance, in Ukraine, the family

farm can be identified as a "family farming household" or a family farm as a form of private entrepreneurship. The legislation initiative about the last state of the family farm without the status of a legal entity was implemented to motivate households to transition from the "grey" zone of economic activity to the legal one with the simplified taxation system and access to the state farming support program. Moreover, rural households in Ukraine can do farming without any registration as a legal entity, growing and processing food for their consumption and local markets. They are not considered family farms, but in many cases, their farming becomes their primary source of income and even business.

The approaches to the definition and role of family and family farms in highly developed and developing countries with transition economies differ. The primary difference is that farming, even the small ones, is a business and legal entity for developed countries, with all consequences. We must put an equal sign between the family and family farms for this group of countries. For countries with transition economies, the legal status of a family farm is an essential condition to participate in state support programs for farmers. Governments motivate unregistered farmers to transition to legal status and become taxpayers. In developing countries, family farms, in most cases, can be defined as family farms because of the production scale and involving just family members as the labor force. Many researchers emphasize the importance of family farming in developing the agricultural sector, given that it provides 70% of world food production and acts as the leading propelling agent to push development in rural communities [3]. Moreover, it is argued that these family farming communities are vital in addressing world hunger and malnutrition. They are believed as more productive and sustainable per unit of land and energy consumed [20].

Similarly, the Maldivian agriculture sector comprises more than 80% of family farmers. Most family farmers own land areas passed to them by their ancestors and managed and controlled by the head of the family. During the 1980s, farming communities depended entirely on their farming production as a means of food, nutrition, and source of income. Farming activities were carried as the primary source of food where a small amount is being sold due to many challenges. Men of the family work in the field, whereas women participate less in farm activities. These family farms are estimated to earn less than a dollar per person every month. Though the income they

earned was comparatively less, their farming activity kept running the families as it assured the food and nutrient security of these families [4; 21].

The vulnerability of the Maldivian economy to external shocks has a significant impact on the whole nation and these farming communities. The outbreak of COVID-19 closed the nation's primary income-earning source tourism sector, for which thousand solely depended as a means of earning income. The unemployment rate surged, leaving many with no income and no means to meet their daily needs [22]. The availability of food and nutrients became scarce as the country's primary source of food and nutrients depended on imports. The rural communities who depended on farming activities gained an advantage as they were able to produce just to meet their daily consumption. However, due to fragmented transport and logistics, the access yield could not reach the needy people, further deteriorating the nation's condition. This was a wake-up call to the nation to shift the attention and effort to strengthening the family farming communities. The importance of these farmer's role in sustaining the economy and well-being of the nation caught the attention of the government policymakers, and many private and individual businesspeople began supporting local farmers by providing them expert opinions, training the farmers who buy their agricultural inputs such as fertilizers, chemicals, and pesticides. There is a bloom in private agricultural enterprises that support farmers in providing inputs and opinions on how to grow crops [22]. Unfortunately, long-neglected and marginalized family farmers are faced with many challenges in carrying out farming activities in a sustainable manner. There is a great need to study and understand these family farmers' social, economic, and environmental conditions to strengthen these communities. It is nearly impossible to attain a self-sustaining community without empowering and strengthening the family farm communities, which dominate 80% of the rural island communities. To strengthen and develop family farms' operations and management, it is essential to understand and identify the challenges faced by the rural farming communities which weigh them down.

RESEARCH AIMS

The main objective of this research study is to identify the main challenges faced by the family farming communities living in rural islands and hence recommend possible directions to address these challenges in moving towards the sustainability of these family farming communities.

PRESENTATION OF THE PRIMARY RESEARCH MATERIAL

Statistics show that the Maldivian rural population hits over 240000. Among them, more than 8000 family farmers are officially registered in Maldives, where 90% of the rural population practices subsistence agriculture as means of living, food, and nutrient security. More than 2000 family farmers are not registered in the system as family farmers but practice farming activities and rely on food produced through their farming activities. The remaining 160000 rural population depends on fishing, tourism, construction, and other government jobs (powerhouse jobs, water desalination plant jobs), guaranteeing a fixed income at the end of each month. The instability of the agricultural sector jobs drives a more significant proportion of the rural community to other industrial jobs. The rural farming population farmers are distributed among the rural island of the country, where more than 80% of these farmers' yield is used for self-consumption, and the leftover is used for economic gain. 45% of all the rural farmers are men who carry out off-farming activities such as fishing and boat building to attain food and nutrients and to support their families. Family farmers cannot solely depend on their farming activities as their daily requirements and needs are becoming costly and inaccessible daily. Family farm communities mainly consist of women farmers who depend on their farm-based earnings as a primary income source and support their families. Studies show that 54% of the registered farmers are rural women who work in the farmlands without proper farming equipment and knowledge [4]. These farmers have insufficient knowledge of managing soil nutrients and little knowledge of correctly applying sufficient fertilizer and chemicals [21]. Their actions and methods further deteriorate the condition of their farmlands. This not only results in the loss of the natural resource but also affects their health as well. Moreover, one thing observed among the Maldivian family farmers is that more than 80% of the farmers are above 40 years of age and practice farming with the knowledge passed on by their elders. The young population leaves their home island to neighboring resorts and other urbanized islands in search of high-income earning jobs, leaving the farm activities to the family's elders. Women are subjected to taking care of kids, and house chores help men with the farming activities, which are marginalized to menial jobs such as weeding, planting, and harvesting, where men play the decision-making role. Most family farmers have children of the age group of 0—15 years old who are supported by family farming



Figure 1. Representation of farmers (in %) by access to land resources

Source: compiled by the author based on data derived from research data.

activities. No official study has been done on how much income these family farming communities achieve through their farming activities. However, based on the situation, these farmers are estimated to earn daily less than \$1 per family member. Maldivian family farms consist of large households ranging from 4 members to 6 members, where there was a belief that more family members mean more hands to work. One thing observed in the family farming communities of Maldives is that the whole family does not solely depend on farming but also carries out other economic activities [4; 21].

The performed study used a sample of farmers actively involved in family farming activities. A total of 13 islands were visited, and data from 459 farmers were collected. In addition, more than 1200 family farmers were directly interviewed to understand the factors that influence their farming behavior and the challenges they, as farming communities, face in continuing farming as a means of sustainable development. Interviews and focus group discussions were conducted to understand how they view farming as a successful business to achieve sustainable development goals. Both qualitative and quantitative data collection method was used to analyze data.

The results show that the availability of natural resources dramatically influences the viability and success of family farming communities. As shown in Figure 1, among the registered family farmers, only 26% of the farmers can carry out farming activities.

Registered farmers have been farming and plan to start farming to earn a viable income. This includes farmers who have been farming for a long time, allocated land plots of more than 2000 SQFT for agriculture, and backyard farmers who have less than 500 SQFT of the land plot and want to increase their scale of farming land to increase their productivity and earning. However, among

Table 1. Basic characteristics of family farms in the Maldives

Farm land (hectares)	Average number of family members	Average farming income (MVR)	Daily income per person (\$)	Share (%) of each type of family farms
0.03–0.05	4	800–1500	1.6–2.7	25
0.05–0.1	6	1500–3000	1–1.06	50
0.1–0.2	7	3000–4000	1–1.2	15
0.1–0.2	8	6000–9000	1.6–2.4	10

Source: compiled by the author based on data derived from research data.

the registered 1200 farmers, only 459 farmers were able to successfully start farming as they are required to have farmland of a minimum of 0.0139 hectares (1500 SQFT) from the urban areas.

In family farms, the amount of nutrients and finance available for the household depends on how much they can produce from their farm. Farm production is used as a means of nutrients for the family, where a portion of their production is sold in the market, where the small amount of money they receive is used on the expenses such as education and health requirements of the family [23]. The small yield the farmers gain at the end of each harvesting cycle is sold by most family farmers of the island communities, where a small portion is used for self-consumption. The income they gain is used for purchasing food for the nutrient requirements of the family.

Table 1 gives a brief description of the economic situation of family farmers. As shown in Table 1, there are four types of family farmers depending on the land size available for their farming activities.

All these farmers grow staple crops that are mainly used in their diet. They also specialize in growing crops such as chilli, watermelons, bananas, and papayas which have a comparatively high demand. The research findings also show that with the increase in available land area for farming, the number of dependent family members also

increases. This shows that farmers with more than 0.1 hectares have a higher household income than those with 0.05 hectares of land. The increase in the number of dependent people in one family shrinks the amount of money available for daily needs such as food and education per capita. The daily income per capita is the amount spent on everyone for the necessities of life.

For land areas 0.1—0.2 hectares, there are two groups where the family size varies from 7 to 8 members. The farms with more family members earn a comparatively higher income. This is because the more extensive the family size, the more hands work and manage the field resulting in a higher yield. It also helps these family farmers produce more for market purposes, increasing their daily income from \$1.6 to \$2.4 per person. This amount is the same for the lesser land area family farms (0.03—0.05) where the number of family members is half the number of the family farm with the land area of 0.1—0.2 hectares, hence increasing the share of income per person. Table 1 also shows that among small family farm communities, the most common type of small family farmers is one with 0.05—0.1 hectares of land with six members per family farm. Since the Maldives has very few islands with ample arable land, only 10—15% of the family farmers have access to 0.1—0.2 hectares of land. Besides, 25% of the family farms have a land area of only 0.03—0.05 hectares. These farmers live on small islands where no land can be allocated for farming purposes. These people carry out farming activities in their backyard or inland areas that are allocated for housing purposes. In reality, the family farms with larger land areas must gain a larger share of income per person. However, Table 1 shows this is not the case. Though the land area is big enough, farmers cannot gain an advantage as they are challenged by high input costs and cannot reduce yield loss to pest and plant disease damage.

Studies show that most farm families hold farms of less than 2 hectares, whereas South Asian farmers own even less than 2 hectares. In South Asian countries such as Bangladesh and Vietnam, the family owns land of an average size of 0.24—0.32 hectares, respectively [19]. However, the performed research shows that the Maldivian family farming communities own much smaller land areas than most South Asian countries. This study indicates that Maldivian family farming communities own less than 0.2

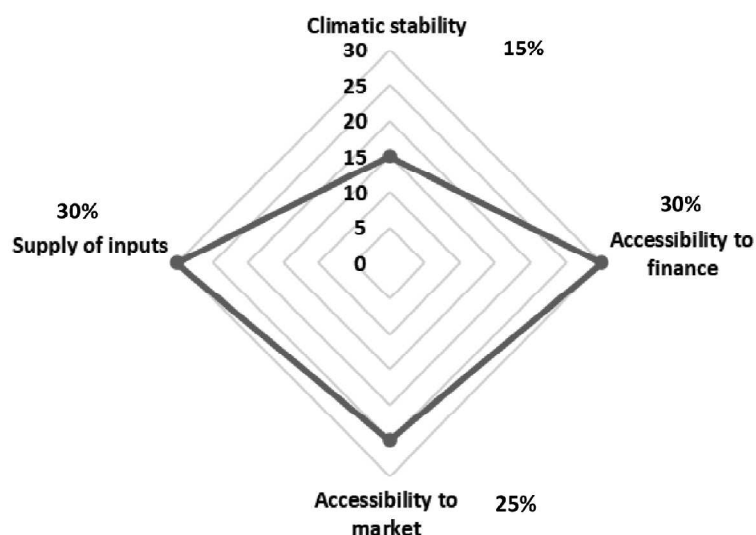


Figure 2. Representation of crucial constraints (in %) faced by family farmers

Source: compiled by the author based on data derived from research data.

hectares of land. Thus, land availability is critical to these farming communities' production and economic growth.

The study also revealed that 76% of farmers participate in off-farm activities to earn an additional income, whereas only 24% invest fully in farming activities. Besides, 21% of farmers sell their agricultural products to earn income. However, one of the main challenges that all rural farming communities encounter is the ability to compete and reach the potential markets to gain an economic benefit from their production. Figure 2 demonstrates that only 25% of the farmers can access the market, while the rest of the interviewed farmers do not have it. Standards and market policies restrict them from selling their products along with the large, commercialized farm. As a result, most produce is used for consumption [3]. Unfortunately, the sophisticated certification and quality requirements prevent these family farming communities from earning a proper income. Also, most are marginalized due to high transport costs in reaching market points. The low income these farmers gain from their farming activities pushes them to do off-farm activities such as construction, fishing, and tourism-related jobs, further exacerbating the situation of poor-quality low production. The focused study reveals that the number of individuals who participate in farming activities is subjected to 2 people from each family as the family members must depend on other sources of income to meet the family's needs, such as health, education, and security. Lack of good hands to work on fields lead to poor production and mismanagement of the farms. According to reports and studies, more workers per hectare and

smaller farm sizes allow easier supervision, giving them a productivity advantage over larger farms.

Figure 2 also shows that 30% of the Maldivian family farmers suffer from unavailable inputs. In particular, agricultural land productivity is greatly determined by water accessibility. In this regard, irrigation plays a significant role in increasing productivity. The research findings reveal that only 1% of the family farmers have access to irrigation systems, and only 5% of the farmers have access to running water and electricity. It explains the poor growth and economic performance of these farming communities. Farmers use ground dug wells, and petrol pumps to collect water for watering their crops. 95% of the family farmer communities do not use automatic machinery. Farmers use manual watering cans and manual methods in digging and drenching the fields where most of the farmers' time is spent on unproductive activities. A study on South Asian family farming communities shows that irrigation and automatic machinery maintain higher-quality production with reduced crop failure. In particular, Nepali farming communities generate twice more revenue per hectare with access to irrigation and technology [3].

Figure 2 illustrates that 15% of the farmers have said that unstable climatic conditions challenge their farming activities. These farmers fall within the group of islands where agricultural lands are near the coastal open area. Most of these farms are open land areas not protected from the sudden rise of big waves, strong winds, and a high gush of rainfall. Some land soil system is so loose that a small amount of rain leads to leaching all the soil nutrients out of the field soil [24]. The conducted research also reveals that the fluctuating climatic condition of the country has a devastating impact on the production of these family farming communities. It is estimated that child malnutrition in developing countries will increase by 20% by 2050 compared to the year 2000 due to unpredictable climatic conditions, as this will decrease calorie availability.

With the unstable climatic condition, accessing inputs and financial resources has become more challenging due to fluctuating interest and inflation rates. According to the Figure 2, 30% of the farmers said they have no access to finance. Though loans and credit facilities are available to family farmers, the focus group discussions showed that the extent of nuance they must go through in acquiring these loans stops them from even considering it as an option. Moreover, their lack of creditworthiness and unawareness of how to manage finance further prevent them from

acquiring these financial supports. The World Bank data shows that for 2017—2021 the interest rate increased from 10.2% to 11.6%. According to Maldives central bank statistics, the country's inflation rate spiked 5.2%, marking a seven-year high for the whole country. By May 2022 the inflation rate was 2.5% which increased to 5.2% in June 2022. External shocks such as COVID-19 and international conflicts are raising fuel prices, negatively impacting the country's economy [25]. The consequent increase in prices of inputs further marginalizes family farmers. One of the primary fertilizers used by all the Maldivian farming communities is "cow dung". Due to the high inflation, its price went up from \$4.34 to \$5.77, where the transport cost also increased as the fuel price spiked. Most of the chemicals and pesticides used by farmers also went up by \$1, including the transport cost. The price of seeds increased twofold. For example, the price of watermelon seeds raised from \$2.34 to \$5.77 as these seeds are mainly imported from Thailand. Rural farmers who live in faraway islands must pay additional transport costs for high-priced agricultural inputs. They have to pay a double price even to get access to seeds regardless of their quality. The inaccessibility to farming inputs and their high price leaves the farmer's farmland barren for an extended period without being able to carry out any farming activities. This drives the farming communities to both social and economic instability.

RECOMMENDATION AND PROSPECTS OF FURTHER INVESTIGATIONS

The study reveals that Maldivian family farming communities need a tremendous amount of support and development work to achieve sustainability of these communities. To begin with, farmers require more natural resources. That is, they need access to irrigation systems and land. The government should implement policies that support these farming communities in building their farms or provide subsidized loan programs to foster the farms' production capacity. Government should also prioritize allocating more land for farming as the country is highly dependent on imports. External shocks such as disasters and the outbreak of diseases could adversely affect the nutrition and food security of the family farming communities which will, in turn, affect the calorie availability of the whole nation.

Market risks of the farming communities may to be addressed by removing barriers such as logistical hurdles and high transport costs. Farmers need to gain sufficient economic benefit from their

products for income stability. Ways and channels should be established to connect the farmers with the market, and transaction costs must be reduced.

Investments in farm capital, especially machinery, ought to be prioritized. This will increase the per capita income in family farming. In return, farmers will contribute more time and effort to earn more from agriculture, reducing off-farm activities. Bringing innovation and technology to the family farming communities is a way of attracting youth in agriculture. Building resilient farming communities can ensure sustainability, food and nutrition security, climate change adaptation and rural development. Policies and strategies must be formulated and agreed upon between government institutions and agricultural stakeholders to support family farmers in building up their farming activities by helping them to tackle the challenges.

The above recommendations are inconclusive, yet these are the main key areas and issues that must be addressed to improve the condition of the family farming communities. Further research must be carried out on how these recommendations can be implemented by tailoring them to the Maldivian context of agriculture.

Література:

1. Van, D.M., Morley, T., Rau, M.L. A meta-analysis of projected global food demand and the population at risk of hunger for the period 2010—2050. *Nature Food*. 2021. № 2. P. 494—501. URL: <https://doi.org/10.1038/s43016-021-00322-9> (дата звернення 10.03.2023).
2. Lowder, S.K., Skoet, J., Raney, T. The Number, Size, and Distribution of Farms, Family Farms, and Family Farms Worldwide. *World Development*. 2016. № 87. P. 16—29. URL: <http://dx.doi.org/10.1016/j.worlddev.2015.10.041> (дата звернення 10.03.2023).
3. Joaqui, A., Alpizar, K., Avalos, I. et al. Risk Management for Family Agriculture in Latin America and the Caribbean. *Bulletin ECLAC, FAO, IICA*. 2015. № 4. 24p. URL: <https://doi.org/10.13140/RG.2.1.1215.2402> (дата звернення 10.03.2023).
4. Food and Agriculture Organization of the United Nations. Country Gender Assessment of Agriculture and the Rural Sector in Maldives. 2019. Male. P. 15—31. URL: <https://www.aesanet-work.org/country-gender-assessment-of-agriculture-and-the-rural-sector-in-maldives> (дата звернення 10.03.2023).
5. Food and Agriculture Organization of the United Nations. Maldives Country Programming Framework 2013—2017. 2012. Male. P. 13—18.

URL: <https://www.fao.org/3/bp579e/bp579e.pdf> (дата звернення 10.03.2023).

6. Blum, M.L., Sulaiman, R. Tailoring rural advisory services for family farms. *FAO and Global Forum for Rural Advisory Services*. 2016. Rome. P. 11—52. URL: <https://www.fao.org/3/i5704e/i5704e.pdf> (дата звернення 10.03.2023).

7. Abdulla, N., Vasylieva, N., Volovyk, I. Key regional problems of the contract farming in the Republic of Maldives. *Modern Economics*. 2022. № 35. P. 6—12. URL: [https://doi.org/10.31521/modecon.V35\(2022\)-01](https://doi.org/10.31521/modecon.V35(2022)-01) (дата звернення 10.03.2023).

8. Trading Economics. Maldives Imports. 2023. Male. URL: <https://tradingeconomics.com/maldives/imports> (дата звернення 10.03.2023).

9. Panta, N. Raising awareness on SDGs. A multi-stakeholder approach. *Organizations and Performance in a Complex World*. 2021. P. 217—221. URL: <https://www.researchgate.net/publication/347614807> (дата звернення 10.03.2023).

10. The United Nations Development Program. The Sustainable Development in action. What are SDG's? 2023. URL: <https://www.undp.org/sustainable-development-goals> (дата звернення 10.03.2023).

11. Food and Agriculture Organization of the United Nations. FAO's Work on Family Farming Preparing for the Decade of Family Farming (2019—2028) to Achieve the SDGs. *Global Action Plan*. 2017. Rome. P. 12—36. URL: <https://www.fao.org/3/ca1465en/CA1465EN.pdf> (дата звернення 10.03.2023).

12. Food and Agriculture Organization of the United Nations. Putting family farmers at the centre to achieve the SDGs. 2019. Rome. P. 12—28. URL: <https://www.fao.org/3/ca4532en/ca4532en.pdf> (дата звернення 10.03.2023).

13. Lorencowics, E., Uziak, J. Sustainable Agriculture — Developing Countries Perspective. *International Journal of Agriculture and Rural Development*. 2017. № 70. P. 338—394. URL: https://www.researchgate.net/profile/Jacek-Uziak/publication/324075722_Sustainable_Agriculture (дата звернення 10.03.2023).

14. Plana-Farran, M., Gallizo, J.L. The Survival of Family Farms: Socioemotional Wealth (SEW) and Factors Affecting Intention to Continue the Business. *Agriculture*. 2021. № 11(6):520. P. 1—16. URL: https://www.researchgate.net/publication/352115781_The_Survival_of_Family_Farms_Socioemotional_Wealth_SEW_and_Factors_Affecting_Intention_to_Continue_the_Business (дата звернення 10.03.2023).

15. Calus, M., Van Huylenbroeck, G. The Persistence of Family Farming: A Review of

Explanatory Socio-economic and Historical Factors. *Journal of Comparative Family Studies*. 2010. № 41 (5). P. 639—660. URL: <http://www.jstor.org/stable/41604397> (дата звернення 10.03.2023).

16. Food and Agriculture Organization of the United Nations. *Towards Stronger Family Farms*. 2014. Rome. P. 8—39. URL: <https://www.fao.org/3/i4171e/i4171e.pdf> (дата звернення 10.03.2023).

17. Even, M.A., Sourisseau, J.M. Agricultural transformations and family farms: some challenges highlighted during the International Year of Family farming. *Cah Agric*. 2015. № 24 (4). P. 204—205. URL: <https://www.cahiersagricultures.fr/articles/cagri/pdf/2015/04/cagri2015244-p204.pdf> (дата звернення 10.03.2023).

18. Family Farms. Family and Small Farm Programs. National Institute of Food and Agriculture, the United States Department of Agriculture. 2023. URL: <https://www.nifa.usda.gov/grants/programs/family-small-farm-program/family-farms> (дата звернення 10.03.2023).

19. Weersink, A. Canada's Disappearing 'Average Farmer' Means One-Size-Fits-All Policies No Longer Work. University of Guelph News. Posted August 15, 2022. URL: <https://news.uoguelph.ca/2022/08/canadas-disappearing-average-farmer-means-one-size-fits-all-policies-no-longer-work> (дата звернення 10.03.2023).

20. Baliwada, H. Family Farming: Status and Strategies. *New Age International Journal of Agriculture Research & Development*. 2018. № 2 (1). P. 21—31. URL: <https://krishi.icar.gov.in/jspui/bitstream/123456789/56345/1/article-ff.pdf> (дата звернення 10.03.2023).

21. Gasith, M. Archeological analysis of Maldivian agricultural system to improve nutrient management. *Swedish University of Agricultural Sciences, Department of Biosystems and Technology*. 2018. URL: <https://stud.epsilon.slu.se/13784/> (дата звернення 10.03.2023).

22. Ministry of Economic Development. *The Impact of COVID-19 Pandemic on Employment in the Maldives*. 2020. Male. P. 14—33. URL: <https://www.trade.gov.mv/uploads/14/newweb/reports-and-publications/impact-of-covid-on-employment.pdf> (дата звернення 10.03.2023).

23. Amjath-Babu, T.S., Riadura, S.L., Krupnik, T.J. *Agriculture, Food and Nutrition Security: Concept, Datasets, and Opportunities for Computational Social Science Applications. Handbook of Computational Social Science for Policy*. 2023. Springer Cham. P. 215—229. URL: https://doi.org/10.1007/978-3-031-16624-2_11 (дата звернення 10.03.2023).

24. Aryal, J.P., Sapkota, T.B., Khurana, R., Sapkota, T.B., Rahut, D.B. Climate change and agriculture in South Asian: adaptation options in family farms production systems. *Environment, Development and Sustainability*. 2020. № 22. P. 5045-5075. URL: <https://doi.org/10.1007/s10668-019-00414-4> (дата звернення 10.03.2023).

25. One News. Maldives inflation rate rises to seven high. Posted August 23, 2022. URL: <https://oneonline.mv/en/65854> (дата звернення 10.03.2023).

References:

1. Van, D.M., Morley, T. and Rau, M.L. (2021), "A meta-analysis of projected global food demand and the population at risk of hunger for the period 2010-2050," *Nature Food*, vol. 2, pp. 494—501. <https://doi.org/10.1038/s43016-021-00322-9>.

2. Lowder, S.K., Skoet, J. and Raney, T. (2016), "The Number, Size, and Distribution of Farms, Family Farms, and Family Farms Worldwide," *World Development*, vol. 87, pp. 16—29. <http://dx.doi.org/10.1016/j.worlddev.2015.10.041>.

3. Joaqui, A., Alpizar, K., Avalos, I. et al. (2015), "Risk Management for Family Agriculture in Latin America and the Caribbean," *Bulletin ECLAC, FAO, IICA*, vol. 4, 24 p. <https://doi.org/10.13140/RG.2.1.1215.2402>.

4. Food and Agriculture Organization of the United Nations (2019), "Country Gender Assessment of Agriculture and the Rural Sector in Maldives", Male, pp. 15—31, available at: <https://www.aesanetwork.org/country-gender-assessment-of-agriculture-and-the-rural-sector-in-maldives> (Accessed 10 Mar 2023).

5. Food and Agriculture Organization of the United Nations (2012), "Maldives Country Programming Framework 2013-2017", Male, pp. 13—18, available at: <https://www.fao.org/3/bp579e/bp579e.pdf> (Accessed 10 Mar 2023).

6. Blum, M.L. and Sulaiman, R. (2016), "Tailoring rural advisory services for family farms", *FAO and Global Forum for Rural Advisory Services*, Rome, pp. 11-52, available at: <https://www.fao.org/3/i5704e/i5704e.pdf> (Accessed 10 Mar 2023).

7. Abdulla, N., Vasylieva, N. and Volovyk, I. (2022), "Key regional problems of the contract farming in the Republic of Maldives", *Modern Economics*, vol. 35, pp. 6—12, available at: [https://doi.org/10.31521/modecon.V35\(2022\)-01](https://doi.org/10.31521/modecon.V35(2022)-01) (Accessed 10 Mar 2023).

8. Trading Economics (2023), "Maldives Imports", Male, available at: <https://tradingeconomics.com/maldives/imports> (Accessed 10 Mar 2023).

9. Panta, N. (2021), "Raising awareness on SDGs. A multi-stakeholder approach", Organizations and Performance in a Complex World, pp. 217—221, available at: <https://www.researchgate.net/publication/347614807> (Accessed 10 Mar 2023).

10. The United Nations Development Program (2023), "The Sustainable Development in action. What are SDG's?", available at: <https://www.un-dp.org/sustainable-development-goals> (Accessed 10 Mar 2023).

11. Food and Agriculture Organization of the United Nations (2017), "FAO's Work on Family Farming Preparing for the Decade of Family Farming (2019—2028) to Achieve the SDGs", Global Action Plan, Rome, pp. 12—36, available at: <https://www.fao.org/3/ca1465en/CA146-5EN.pdf> (Accessed 10 Mar 2023).

12. Food and Agriculture Organization of the United Nations (2019), "Putting family farmers at the centre to achieve the SDGs", Rome, pp. 12—28, available at: <https://www.fao.org/3/ca4532en/ca4532en.pdf> (Accessed 10 Mar 2023).

13. Lorencowics, E. and Uziak, J. (2017), "Sustainable Agriculture — Developing Countries Perspective", International Journal of Agriculture and Rural Development, vol. 70, pp. 338—394, available at: https://www.researchgate.net/profile/Jacek-Uziak/publication/324075722_-_Sustainable_Agriculture (Accessed 10 Mar 2023).

14. Plana-Farran, M. and Gallizo, J.L. (2021), "The Survival of Family Farms: Socioemotional Wealth (SEW) and Factors Affecting Intention to Continue the Business", Agriculture, vol. 11(6):520, pp. 1—16, available at: https://www.researchgate.net/publication/352115781_The_Survival_of_Family_Farms_Socioemotional_Wealth_SEW_and_Factors_Affecting_Intention_to_Continue_the_Business (Accessed 10 Mar 2023).

15. Calus, M. and Van Huylbroeck, G. (2010). "The Persistence of Family Farming: A Review of Explanatory Socio-economic and Historical Factors", Journal of Comparative Family Studies, vol. 41 (5), pp. 639—660, available at: <http://www.jstor.org/stable/41604397> (Accessed 10 Mar 2023).

16. Food and Agriculture Organization of the United Nations (2014), "Towards Stronger Family Farms", Rome, pp. 8—39, available at: <https://www.fao.org/3/i4171e/i4171e.pdf> (Accessed 10 Mar 2023).

17. Even, M.A. and Sourisseau, J.M. (2015), "Agricultural transformations and family farms:

some challenges highlighted during the International Year of Family farming", Cah Agric, vol. 24 (4), pp. 204—205, available at: <https://www.cahiersagricultures.fr/articles/cagri/pdf/2015/04/cagri2015244p204.pdf> (Accessed 10 Mar 2023).

18. Family Farms (2023), "Family and Small Farm Programs, National Institute of Food and Agriculture, the United States Department of Agriculture", available at: <https://www.nifa.usda.gov/grants/programs/family-small-farm-program/family-farms> (Accessed 10 Mar 2023).

19. Weersink, A. (2022), "Canada's Disappearing 'Average Farmer' Means One-Size-Fits-All Policies No Longer Work", University of Guelph News, posted August 15, 2022, available at: <https://news.uoguelph.ca/2022/08/canadas-disappearing-average-farmer-means-one-size-fits-all-policies-no-longer-work> (Accessed 10 Mar 2023).

20. Baliwada, H. (2018), "Family Farming: Status and Strategies", New Age International Journal of Agriculture Research & Development, vol. 2 (1), pp. 21—31, available at: <https://krishi.icar.gov.in/jspui/bitstream/123456789/56345/1/article-ff.pdf> (Accessed 10 Mar 2023).

21. Gasith, M. (2018), "Archeological analysis of Maldivian agricultural system to improve nutrient management", Swedish University of Agricultural Sciences, Department of Biosystems and Technology, available at: <https://stud.epsilon.slu.se/13784/> (Accessed 10 Mar 2023).

22. Ministry of Economic Development (2020), "The Impact of COVID-19 Pandemic on Employment in the Maldives", Male, pp. 14—33, available at: <https://www.trade.gov.mv/uploads/14/newweb/reports-and-publications/impact-of-covid-on-employment.pdf> (Accessed 10 Mar 2023).

23. Amjath-Babu, T.S., Riadura, S.L. and Krupnik, T.J. (2023), "Agriculture, Food and Nutrition Security: Concept, Datasets, and Opportunities for Computational Social Science Applications", Handbook of Computational Social Science for Policy, Springer Cham, pp. 215—229. https://doi.org/10.1007/978-3-031-16624-2_11.

24. Aryal, J.P., Sapkota, T.B., Khurana, R., Sapkota, T.B. and Rahut, D.B. (2020), "Climate change and agriculture in South Asian: adaptation options in family farms production systems", Environment, Development and Sustainability, vol. 22, pp. 5045—5075. <https://doi.org/10.1007/s10668-019-00414-4>.

25. One News (2022), "Maldives inflation rate rises to seven high", posted August 23, 2022, available at: <https://oneonline.mv/en/65854> (Accessed 10 Mar 2023).

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