International Journal of Agricultural Extension and Rural Development ISSN 2756-3642 Vol. 12 (1), pp. 001-005, May, 2025. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Aquaculture the New Way of Creating Sustainable Livelihoods Among Rural Populations in Africa. An Example from Zimbabwe's Seke Rural District

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Accepted 29 May, 2025

One of the agricultural sectors in Zimbabwe that is expanding the fastest right now is aquaculture; if you happen to glance at social media, you will see advertisements for aqua farming service providers. Due to their heavy reliance on fish, particularly in East Asia, where prawns, fish, and calamari are raised, aqua farming is widespread in Asian cultures. The Nile tilapia is the most widely raised fish in aquaculture in Africa. In Africa, where the majority of people live in rural areas and depend on antiquated farming practices and subpar equipment, food sustainability has been a major issue. This poses a hurdle to crop output. This paper's primary goal is to examine how aqua farming, also referred to as fish farming, has benefited rural communities' ability to support themselves, with a particular emphasis on Seke in Zimbabwe. The study will examine the deficiencies that farmers encounter as a result of both natural and man-made factors while the project is being carried out. A sustainable alternative to horticulture-based economies, such as Seke District, has become necessary due to Zimbabwe's recent recurrent droughts. Aqua farming also helps to supplement the community's diet because fish is a highly nutritious food that can be used in place of red meat, which is more susceptible to disease. The study will demonstrate the part that aqua farming service providers have played in giving farmers the skills they need to manage the projects effectively and in supplying the supplies needed to complete the projects. The author will also focus on job development because aquaculture has improved our rural communities, particularly for the young people who are mostly in charge of excavating and building the ponds. The advantages and disadvantages of aqua farming will be demonstrated by this study. To bolster conclusions, the inquiry will make use of participant observation, data collection methods, and interviews.

Key words: Aquaculture, construction, farming, horticulture, sustainable livelihood, rural populations.

INTRODUCTION

In sub-Saharan Africa, where the majority of people live below the poverty threshold, the sustainability of food has been a significant issue. Monetary institutions and the World Food Programme have increased their financial incentives for agriculture in an effort to boost food production in Africa and reduce poverty. The fastest-growing agricultural sector in Africa is aquaculture, which has helped boost fish populations that had started to decline due to oil mining and other hazardous human activities in the oceans. In most regions, aqua fish farmers use fish ponds for small-scale aqua farming. In contrast to Asia and Europe, where aqua farming includes the cultivation of plants (such as seaweeds and freshwater macrophytes) and animals (such as crustaceans, finfish, and mollusks), the majority of farmers in Africa focus exclusively on fish farming. Zimbabwe's economy is still centered on agriculture, despite the fact that many farmers, particularly those on communal lands, have recently been negatively impacted by unfavorable weather conditions. Commercial farming was one of Africa's breadbaskets prior to the Fast Track Land Reform Program, but it has since seen a decline in agricultural output. Many farmers who are

looking for sustainable livelihoods have found respite in aqua farming since it is simple to manage and does not depend on rainfall. In Zimbabwe, aqua farming is conducted in both urban and rural settings, and ponds don't care about space because they may be built on any side. Because fish is high in protein, fish farming has helped people supplement their diets. The project doesn't require a lot of time because feeding doesn't take long, and there are less routines involved in fish farming than in projects like chicken farming, which include cleaning the fowl run, heating the area in the cold, and providing water. Due to their heavy reliance on rainfall, Zimbabwe's communal farmers typically only work their fields for three months out of the year. As aqua farming is a continuous process rather than a seasonal one, the invention of fish farming has created an opportunity to use the land all year round. Due in large part to government backing for agricultural colleges, graduates of Zimbabwe's agricultural institutes have been leading the aqua farming efforts. As this paper will demonstrate, the government has played a part in enabling aqua farming to be implemented and practiced on communal lands in Zimbabwe, particularly in protecting wetlands from destructive human activities that devastate the ecology. The farmers in Seke Rural District provide fresh vegetables to Mbare and Chikwanha markets, which are 40 kilometers from Harare, the capital of Zimbabwe, with its primarily horticultural industry. Though communal lands can only be sold at the president's discretion under the Communal Lands Act of 1981, the land's closeness to Harare has made it appealing to home seekers fleeing the exorbitant prices of land in urban areas. This has resulted in conflict with farmers who are losing grazing lands and wetlands to land barons who are collaborating with traditional leaders to sell land. Compared to traditional crop farming, where the land is excellent for nearly half of the year, aqua farming can help safeguard the lands since it uses the land throughout the year, which is why malevolent actions of land sale occur. My study focuses on the villages of Mhindurwa, Munatsi, Murape, and Muzorori, where fish farming has emerged as the new gold and is giving young people work. The majority of the protein ingested by the populace in Zimbabwe's rural areas came from hunting, rod runner chicken farming, goat farming, and cow farming; but, because of growing

Aqua farming has the advantage of helping to fill the nutritional gap left by other natural factors, such as urbanization and mining, which have diminished due to human activity.

Using Aquafarming to Create a Sustainable Living

The majority of rural settlements are now characterized by poverty, and rural residents frequently depend on food contributions from nonprofit organizations, particularly during dry spells and harvests that are subpar. Aqua farming has emerged as a means of enhancing Seke's ongoing endeavors to establish sustainable livelihood. One of the highest rates of youth unemployment is found in Zimbabwe, and the growing number of aqua farming projects that have begun to be implemented has contributed to job creation through farmer training, an initiative that is being carried out by individual service providers with the aim of educating farmers. Since 100g of cooked fish contains roughly 18–20g of protein, fish has a high nutritional content and is therefore healthy to eat (Arino A 2013). In addition to the nutritional benefits of fish farming in the Seke Rural District, the farmers are now able to support themselves through the projects by selling and eating some of the fish that are harvested. Despite the fact that nearly 90% of the fish that humans eat are wild species that are obtained through hunting (Ackefors H 1979), aqua farming has increased recently as a result of the decline in fish populations brought on by oil mining and fishing by multinational corporations that do not consider the environmental effects of their operations. The majority of people in the Zambezi basin who depend on fishing for a living would suffer as a result of the events of 2023, when Lake Kariba, Zimbabwe's largest dam, experienced low water levels (Kawanza S 2023); therefore, aqua farming through fish ponds, as done in Seke Rural District, is crucial because it supports the traditional fish suppliers during emergencies. Projects aimed at promoting sustainable lives are not new in Seke Rural. While I was employed there in 2013, Oxfam International and US Aid financed sustainable livelihood initiatives under the Seke Rural Home-Based Care program. Because of the Oxfam project's success, Seke's economy is still based on horticulture. The initiative provided horticulture farmers with training, seedlings, and the money they needed to begin and continue their operations. The NGO's location served as a practical training ground. In order to provide self-sufficiency for the children who were recipients of the US Aid school fees scheme in the event that the organization failed to pay the fees in the future, the NGO donated to chicken projects in nine schools in the district under the US Aid program. Aquafarming's introduction and growth in the Seke Rural District can be viewed as a new wave of initiatives that will help the peri-urban rural area's economy. The fish farmers benefit from Seke's close proximity to Harare and Chitungwiza because it gives them easy access to a sizable market. If farmers in Seke, particularly those from economically disadvantaged backgrounds, are encouraged and trained to engage in aqua farming, the drought that struck Zimbabwe in 2024 can be avoided. Their participation in the expanding sector would also alleviate the burden of household-level donor reliance. In contrast to chicken farming, which requires extensive attention to detail in order to maximize revenues, fish farming is inexpensive to operate and has a low mortality rate, making it a viable solution to Seke's prostitution and theft problems. Aqua farming is perfect for both men and women because it doesn't demand the use of strength. The 6-month cycle of fish farming, particularly for breeding fish, is sustainable since it may be continued for years because the fish regularly produce fingerlings every three months.

Land utilisation

Because of its large amount of underutilized land, Zimbabwe's potential has long been constrained, which is a legacy of colonial times. Through patriarchal ancestry, the land with rural areas generally referred to as communal dwellings has been passed down through the centuries. The area has primarily been used for crop farming and livestock rearing, making it less expensive to manage than commercial land because it does not require fees or transportation. Although other crops including beans, sweet potatoes, groundnuts, and sunflower are also grown, maize is one of the main crops grown in rural Zimbabwe. The farmer works six months a year to prepare the ground, plant seeds, pull weeds, and harvest crops. Rural agriculture has always been seasonal. Since farming is typically their primary source of income, the land in rural areas sits idle most of the time, and farmers suffer the most during years of drought. Small-scale poultry farming, goat ranching, and cattle ranching have long been features of rural Zimbabwean environments. Because vast tracts of land are kept as grazing pastures, particularly wetlands, cattle eat the most land in rural places. Households have suffered greatly as a result of the failure of the majority of rural farmers, as the majority of them live in poverty despite owning property because it is underutilized. The most common aqua farming approach in rural Zimbabwe employs fish ponds that are excavated close to homesteads for security reasons. Aqua farming, also known as fish farming among the locals, has emerged as an ideal economically feasible option to use land and have a yield that is all year round. Using inexpensive tools like picks and shovels, the unemployed youngsters in the communities primarily dig the fish ponds by hand. Fish aquaculture is not a danger to cattle feeding grounds because it does not require a lot of area. As demonstrated in Seke village of Muzorori, where retired diplomat Dr. Chipfakacha is engaged in fish farming near a wetland that serves as his ancestral garden, the Environment Management (EMA) Act's Section 97, which forbids the draining of wetlands, can be easily managed if aqua farming is conducted there. The fish ponds' water supply is augmented by springs. Using previously great terrain that was used during the rainy season, the farmer intends to build three 20-by-10-meter ponds to house an estimated 10,000 fish seedlings. It had been difficult for the farmer to use the area where the ponds were constructed because it would flood with water during the rainy season. However, now that they have water ponds that use polythene plastic to contain the water, the land is used instead of when he used to worry that the plants would perish from too much water. Because it preserves the ecological chain of the environment in which it is practiced, aqua farming can aid in land rehabilitation. Frogs are fish's best friends, and fish ponds have given them a place where they can live freely. Additionally, the presence of oxygen in the water from plantains has given animals a place to live. With the assistance of traditional leaders, Seke has been fighting against land barons who have been selling stands illegally. The villages of Munatsi, Mhindurwa, Murape, and Muzorori are the only ones where wetlands have not been sold; aqua farming aids in the preservation of the wetlands because the land barons are unable to sell land that is in use. At a time when the government wants to combat land barons who are dividing up rural land in what are known as sabhuku deals, aqua farming has emerged as a solution. Fish farming will help landowners use their land instead of selling it to make money because it uses a small amount of land but produces a lot of yield per hectare when compared to other agricultural activities. Land deterioration in the Seke Rural District can be mitigated by the introduction of fish arming, which helped make use of some of the pits made by brick molders. becoming obsolete since the pits can be transformed into ponds, which will restore the soil.

Aquafarming Service Providers

As I often say in my arguments, "it is easy to start something, but it is hard to reach your goal without proper management," knowledge plays an equally important role in project management as the project itself. Aqua farming, despite being inexpensive, simple, and manageable, appears to require knowledge to be carried out. For one to reap what they sowed, the role of suppliers and service providers cannot be understated. While there are many aquafarming service providers in Harare, Ian Kadzingi's Agrimarine stands out in my opinion. He will likely be referred to as the godfather of aqua farming in the years to come due to his training workshops across the nation and his expansion drive, which has seen aqua service provision reach other cities outside of Harare. Potential customers can take advantage of Agrimarine's quarterly fish farming trainings, which are led by knowledgeable agriculture graduates. In contrast to other fraudulent service companies that many farmers have come across that lack a permanent address, Agrimarine has a fixed aboard address at 182 Samora Machel, which is why it has captured my attention. Additionally, they employ organizations that have expertise in aqua farming in the villages where I study in the Seke rural district. One such organization is Pearson Tawonekwa, a graduate of Midlands State University's Agricultural Economics program who has led numerous projects in the villages of Murape, Mhindurwa, Munatsi, and Muzorori. When it comes to aqua farming, Mr. Tawonekwa's knowledge has proven invaluable in helping farmers in the villages overcome their challenges. Mr. Tawonekwa has been in charge of the construction of more than 15 fish ponds since January 2024, excluding the previous year's siting. Because of his connection to Aquamarine Solutions, he has been primarily responsible for fixing and supplying, and once the project is underway, he also provides consultation services. As with female agencies, Aquamarine Solutions has not fallen behind in advancing gender equality. Rapture Mwenda, a Midlands State University alumnus, is also noteworthy. Mr. Tawonekwa told me in an interview that Aquamarine Solutions had connected him to a

local NGO that wanted his assistance in building fish ponds in Binga. This highlights the significance of collaboration between the public and private sectors in establishing food sustainability.

Challenges faced by Aquafarming farmers

Due to the overabundance of products on the market, many Zimbabwean farmers have hastily jumped from one farming product to another since the fast-track land reform initiative. Some farmers have now given up and quit farming. The agriculture sector received significant government financing during Ian Smith's unilateral declaration of independence, and the results made Rhodesia a bread basket—a designation that Zimbabwe inherited after independence. The government has recently attempted to support the agricultural industry, although with little to no success; in most cases, only elite politicians have produced, but some seem to leave their farming boots in their former titles after leaving office. Farmers were the pride of the country. Patience and enthusiasm are essential in the agricultural industry. Despite its many economic and health benefits, aqua farming, like any other agricultural enterprise implemented in Zimbabwe, has the potential to fade into obscurity. One element that may have an impact on aquafarming is the availability of water. Because fish ponds need water and the water is changed every cycle, areas like Chilonga in Chiredzi and other hot, dry places would not benefit from such an operation. Fish farming also confronts difficulties since consumers run the danger of purchasing fish seeds that are not suitable for growing in their regions. As Zimbabwe's economy deteriorates, the country has turned into a refuge for scammers who entice the public with low-quality product imitations. During the height of the potato farming craze, many farmers in Harare's Mbare Musika fail because they purchased seeds that would only yield a few potatoes and flowers. By establishing connections with approved providers of aquafarming products, community leaders and other stakeholders can safeguard those who wish to pursue fish farming from thieves who would try to steal from them. Fish pond construction presents additional difficulties because some farmers construct them at random.

constructed without the necessary understanding, as the author saw with one of the fish ponds in Muzorori village that was set up in a thicket. This is bad because a lot of dangerous items could end up in the pond, putting the fish in risk. In certain cases, the fish pond is constructed without taking the local wind conditions into account. The fingerlings primarily swim in shallow waters, thus it is necessary to teach farmers how to dig fish ponds properly. One farmer, Mr. Blessing Nyamutumbu, constructed a pond that was two meters deep, making harvesting difficult. The absence of plantains in the water, which had the color of borehole water yet green water is best for fish farming, may have contributed to the author's finding that the fish in Munatsi village were not growing. According to Mr. Munatsi, who I interviewed, had no prior aqua farming training and had obtained seed from a friend in Murape village who also faces the same problem of fish not fully developing even when they reach the harvesting stage, the fish's lack of growth may be the result of his ignorance of how to feed them. Funding is still a problem in fish farming. Mr. Muzambia, the first farmer in Mhindurwa village to engage in aquafarming, has since stopped doing so, citing a lack of funds because the Zimbabwean economy has left many people with little money, which means that farmers may not be able to continue farming after harvest and sale because the money is being used for other household needs. Additionally, at the Chipfakacha ponds in Muzorori village, one of the ponds had three-week-old fingerlings die. Based on my research, this was caused by the workers feeding the fish too much, which poisoned the water because it contained too many nutrients and suffocated the fish's oxygen supply. The author came to this conclusion after witnessing the fish gasping for oxygen in the morning and hearing a confession from one of the workers. The majority of farmers in Seke are heedlessly cultivating for profit at their sites, despite the fact that the full six months leading up to harvest are crucial to guarantee the best results. Another problem is the farmers' carelessness in monitoring the water's pH level, which has a significant impact on the fish. According to a survey I conducted at Chikumbamarara Growth Point, which connects the four villages I studied, of the 20 people I spoke with (10 of whom were over 40 and were split between the sexes), they believed that aqua farming was a crucial step in ensuring food sustainability, particularly during drought years. They also suggested that the government should support aqua culture by funding and offering trainings to a greater extent, as they saw it as a way to reduce juvenile delinquency. Seventy percent of the ten young people, both male and female, that I polled felt that it was a sham for the elderly since they pointed out that the land was primarily given to the elderly and bemoaned the length of time it took to harvest. The 70% also mentioned that there was no easily accessible market because they would need to rent a vehicle in order to sell their produce. Among the thirty percent, they expressed excitement and talked about how building ponds had generated revenue. They also mentioned the necessity of government assistance for rural livelihood sustainability, which they said would help President Mnangagwa's vision 2030 plan come to fruition.

- The only busy time is the construction of fish ponds, wants the projects begin it is less demanding on the farmer.
- Feeding does not take long it only jas to be carried out at a strict time routine.
- The project unlike pig farming and chicken farming where one is required to clean regularly they is no cleaning only changing of water that can be done during harvest or after harvest.
- It does nor require to much labour unlike growing potatoes that require labour regurlaly.
- It can be easily managed as most of the work entails

feeding.

- It helps supplement diet with protein especially as an alternative to beef in Zimbabwe where for two years cattle have been dieng from deseases.
- Aqua farming does not utilise too much land that may affect our traditional communal farming.
- It is an answer to building rural economies and can help stop the pleg of land selling due to poverty in communal areas.
- It helps create a sustainable enviromenment by utilising wetlands.

CONCLUSSION AND RECOMMENDATION

Among the many advantages of aqua farming as a sustainable livelihood program are its financial and nutritional advantages. Fish is very nutritious since it contains a lot of protein. Since cattle are the main source of protein for most Zimbabweans and are dying from a number of diseases, fish farming may be a good way to complement beef in the diet. If the Seke success can be reproduced in most rural regions, aqua farming will help combat poverty and provide farmers across the continent with a steady source of income. In terms of food production, Africa has become a basket case, and aqua farming can help alleviate poverty and hunger on the continent by enhancing other agricultural methods. Fish farming is one method of using land, particularly wet lands that are forbidden by the Zimbabwean constitution to be used for building, since land use has been a major issue in Zimbabwe due to the underutilization of yield per hectare. Farmers can maximize income and reduce the risk of loss in aqua farming by using the different service providers to teach the public how to successfully raise fish. Compared to many farming products, fish ponds require a tiny amount of space but yield enormous earnings. Aqua is also inexpensive to maintain because plantains can be manufactured from the excrement of chickens and pigs. In comparison to the time-consuming process of tilling ground, less labor is needed during the fish circle period before to harvest.

- I recommend that the government put its full weight though the ministry of agriculture of Zimbabwe to help fund aqua farming in rural areas.
- The government should utilise on graduates from its agricultural colleges and those with agricultural degrees to help educate the rural population and service providers like Aquamarine solutions be subcontracted to drive the initiative.
- I recommend schools to start undertaking aqua farming as a taught practical subject so the young can know the benefits.
- The governments should subsidize aqua farmers in order to encourage them to practice it especially the youth as they are the muscles of the economy.
- Land should be redistributed to the youth especially those that have gone to agricultural colleges like what has happened in Burkina Faso since Ibrahim Traore took office.
- They should be a budget for rural farmers, the same way small scale entrepreneurs are considered this will help grow the rural economy independently.
- The young Africans should take initiative in participating in economic activities no matter the duration they take rather than always imagining rich quick schemes.

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