AQUACULTURE BUSINESS DEVELOPMENT PROGRAMME

INNOVATIONS BULLETIN

Christopher Murithi - Nyeri County

Background and Introduction

Christopher, a fish farmer from Nyeri County, Mathira East Sub-County, ventured into aquaculture in 2019 after learning about the ABDP program from community members. Encouraged by the initiative, he sought guidance from Nyeri County field extension officers, who advised him on pond construction. He initially had dug a large pond measuring 24m by 23m. Three months later, he received fingerlings, but had a setback; water spillage, yielding only 80 kgs of fish. In his second cycle, he improved his production to 176 kgs. Extension officers then recommended dividing his pond into two smaller ones for better management. This adjustment significantly increased his harvest, reaching 386 kgs in the third cycle and 880 kgs in the fourth.

In 2024, Christopher faced a setback due to delays in acquiring fingerlings. To address the challenge of sourcing quality fingerlings, he deliberated with members of the Muthea Farmers Association and decided to establish a hatchery. The ABDP mission team visited him the same year and encouraged him to fully commit to fish farming. Additionally, he identified fish feed availability as a major constraint and decided to rear ornamental fish for extra income. He sold 300 catfish at Ksh 200 each, earning Ksh 60,000, which he invested in ornamental fish farming.

Inspiration to Venture into Aquaculture

Christopher was drawn to aquaculture due to its relatively low labor requirements and high profit margins. He highlights the nutritional benefits of fish as a source of white meat and values the sustainability of the practice, as pond water can be reused for irrigating maize and avocado crops on his farm.

His financial progress has been steady:

- 2021: Earned Ksh 24,000 from fish sales.
- 2022: Increased earnings to Ksh 61,600.
- 2023: Expanded his fish farming, earning Ksh 154,000 and later Ksh 181,000 in October.
- 2024: Earned Ksh 40,000 from ornamental fish in January to support him in sourcing fish feeds and later Kshs. 176,000 later in the year.

Christopher's production cycle typically lasts 6-8 months, depending on feed quality and feed availability.

Participation in ABDP and Changes Observed

Christopher attributes his growth in fish farming to ABDP's support, which provided him with training, exposure visits, and business development skills. He received high-quality fingerlings and feeds through the program, enabling him to improve his yields. With the proceeds from fish farming, he purchased a submersible pump, which allows him to extract 3,000 liters of water per hour. This ensures a steady water supply for both his ponds and farm, benefiting his crops and neighboring farmers during dry seasons.

His farm also serves as a field school where students and fellow farmers learn about aquaculture. Additionally, 50% of his fish is supplied to a female entrepreneur who does value addition and sells to students around Karatina University. Christopher has also created employment opportunities by hiring workers when needed for pond management, feeding, and security.

Sustainability and Future Goals

To maintain productivity, Christopher creates affordable fish feed using rice bran, maize bran, and Ochong'a. Through his online research, he discovered an innovative method for supplementing fish feed with high-protein worms sourced from elephant dung. He collects this dung from Mt. Kenya Forest and occasionally collaborates with forest rangers who reserve some dung for him. By incubating the dung in ponds for 2 to 3 weeks, he can produce worms that serve as a nutritious supplement for fingerlings. He notes that the more dung he has, the greater the production of the worms.

Recognizing the high cost of quality fingerlings, Christopher now has a hatchery with four tanks, each holding 15,000 fingerlings.

His hatchery utilizes a Recirculating Aquaculture System (RAS), which continuously filters and reuses water to minimize water consumption and reduce environmental impact. By maintaining a controlled environment, the system optimizes water quality, temperature, and oxygen levels, promoting healthier and faster-growing fish. Additionally, the recirculating aquaculture system (RAS) allows higher stocking densities than traditional methods, enabling more production within a smaller space. This innovative technology plays a vital role in providing a sustainable and reliable source of fingerlings.

Christopher envisions expanding his hatchery operations, aiming to supply quality fingerlings to other farmers. He seeks to leverage opportunities provided by the government and ABDP to scale his venture further. His farm remains a hub for training new farmers, with a focus on empowering youth and promoting gender inclusivity in aquaculture.

Advice to New Farmers

Christopher encourages aspiring fish farmers to embrace aquaculture as a profitable and sustainable venture. He emphasizes the importance of investing in quality feeds, water management, and proper pond structures. Furthermore, he advocates for research and innovation, such as alternative feed sources, to reduce operational costs. According to him, fish farming is not only a viable source of income but also a key contributor to food security in Kenya.



Aggrey Swegenyi's - Kakamega County

Background and Introduction

Aggrey Swegenyi Kipande, a resident of Nangili Ward in Likuyani Sub-county, Kakamega County, embarked on his fish farming journey after attending a fish farmers meeting at the sub-county offices. Intrigued by the potential of aquaculture, he committed himself to learning and strengthening his skills. Initially, he faced significant challenges, particularly access to water. To overcome this, he dug a small pond, but water availability remained a problem.

Participation in ABDP and Changes Observed

Aggrey first heard about ABDP through his group, Kongoni Aquaculture Field School. Recognizing the program's potential benefits, he eagerly registered and participated in various training sessions. Through ABDP, he received essential training in pond construction, topography assessment, fish feeding, stocking techniques, weighing and sampling, and water quality and volume testing.

Before joining ABDP, Aggrey lacked proper training and knowledge in fish farming, which led to inefficiencies in production. However, with the skills gained from the programme, he improved his farming techniques, leading to better fish growth and survival rates. With support from ABDP, he received 1,000 tilapia fingerlings, a pond liner, and eight bags of 25 kg fish feed. This support significantly boosted his production capacity and set him on a path to sustainable fish farming.

Economic and Social Impact

Fish farming has positively impacted Aggrey's household income. During his initial cycle, he successfully harvested and sold 600 fish, of which his family consumed 400. He does partial harvesting because he has observed that different customer groups have varying preferences, for instance, teachers and civil servants prefer larger fish, priced at KSh 300 each. This flexible selling approach ensured a steady income.

Additionally, Aggrey invested in value addition by frying fish, a skill he learned from the sub-county fisheries officers. His daughter-in-law does the frying and packaging of the fish for sale. Each week, they sell approximately 50 kg of fried fish. The income from fish farming has allowed him to diversify his investments, including purchasing a freezer for fish storage, drilling a borehole as a water source, and expanding his farm operations.

Aggrey's fish business has also provided employment opportunities for the local community. He hires youths in the community to assist in fish harvesting, paying them KSh 300 per day. His daughter-in-law earns from the value addition job, while casual laborers assist in other farm activities.

Sustainability and Future Goals

To ensure sustainability, Aggrey has taken measures to secure water supply, which has historically been a major challenge. He dug a storage pond to collect water, especially during the dry seasons. He also maintains proper record keeping to track his sales and expenditures, ensuring financial sustainability.

In addition to fish farming, Aggrey has diversified his farming activities. He grows maize, which he stores and sells when prices are favorable, supplementing his fish farming income. With earnings from fish and maize sales, he invested in connecting drilled water to his ponds, ensuring a stable supply of water. He has also leased additional land with KSh 30,000 earned from fish farming.

His farm incorporates integrated farming practices, including poultry farming, piggery, and a kitchen garden that supplies vegetables to the market and is also consumed by his family. Additionally, he has invested in coffee farming, using Ksh 4,000 from fish sales to pay laborers to dig 1,000 coffee holes at Ksh 40 each.

Aggrey envisions a future where he can increase production and stock more fish. With water challenges now addressed, he plans to construct more ponds and empower his daughter-in-law to have her fish pond. He believes fish farming is a profitable venture that requires patience and dedication.

Innovation and Advice to Farmers

One of Aggrey's most notable innovations is the adoption of a solar-powered drying machine for fish preservation. He can dry fish efficiently, even in unfavorable weather conditions, thanks to the machine that runs on a generator and solar energy. This innovation has helped him reduce post-harvest losses and expand his market reach.

His advice to aspiring fish farmers is to seek knowledge and proper training before venturing into aquaculture. He emphasizes the importance of integrating fish farming with other farming activities to maximize returns. Additionally, he encourages farmers to join cooperatives to access financial resources and market opportunities.

Aggrey appreciates the support he has received from ABDP, the county government, and the national government, which have played a crucial role in his growth. His journey is a testament to the transformative power of aquaculture, demonstrating that with the right training, determination, and innovation, fish farming can be a sustainable and profitable business.

Harrison Karanja - Kajiado County (on the left)

Kajiado County is a Cosmopolitan County hence has a high market potential for both fish and fish products. Amboseli eco farm was started on Jan 2011 with one pond holding tilapia. The farm currently has 4 Azolla ponds,2 duckweed ponds,2 cat fish ponds, a BSF unit and a simple hydroponic system. The farm success has been due to favorable parameters and intervention from the County Government and ABDP

When the farm started Harrison Karanja the owner of the farm was using commercial feeds of which he realized that they were not easy to come by since he comes from the southern part of Kajiado about 222 Kms from Nairobi and on the same note he realized that the feeds were expensive hence the venture could not break even. This drove this young mind to start searching for a way of solving this puzzle and that's when he learnt of Black Soldier Flies (Larvae) a high and cheaper source of protein. 'Just a small unit constructed using locally available material and collection of organic waste from the market is an easy task' Lamented this jobless young man.

Eventually Harrison learnt and invested on growing of Black Soldier Fly Larvae (BSFL) that has 40% to 60% optimum content of crude protein that is essential for rearing fish. He set up a cage where the adult Black soldier fly lays eggs which are incubated and after three days, the eggs hatch. After hatching, larvae are transferred to trays where they are fed. The larva feeds on market waste which he collects from Kimana town main markets a known agricultural town and kitchen waste which he sources from his house hold and neighborhood. The waste mainly consists of food remains, fruits, vegetables and other organic wastes. The waste is broken down to organic manure that the farmer is using to grow a variety of vegetable that creates more revenue.

The farmer did not stop on BSF only but embarked on exploring different avenues that could be used to obtain fish feeds at reasonable costs and of good quality. This led to establishment of 4 Azolla ponds (On a

dry weight basis, azolla has 25-35% protein content, 10-15% mineral content, and 7-10% comprising a combination of amino acids, bio-active substances and biopolymers) and 2 duckweed ponds (used for water treatment and produce a valuable, protein-rich biomass as a by-product. Depending on the wastewater, the harvested crop may serve as an animal feed, a feed supplement supplying protein/energy and minerals, or a fertilizer)

As Ben Johnson said 'Refuse what you do not need; reduce what you need; reuse what you consume; recycle what you cannot reuse; and compost the rest' the farm now produces 250Kgs of BSF and 2 tons of waste, 50Kgs of Azolla per week and 30Kgs of duck weed per week used to feed fish and selling to other farmers. Apart from family labor 5 young people are engaged in waste collection and other farm activities hence creating employment. Karanja the farm owner, attended a cottage feed producer training in Sagana by ABDP hence giving him capacity to train others famers. Through the water treatment system by the duck weed, a hydroponic unit have been set up to ensure maximum utilization of farm resource and realizing more income as well as improving community nutrition. All these innovations go hand in hand with Bill's gate statement that 'Innovations that is being guided by smallholder farmers, adapted to local circumstance and sustainable for the economy and environment will be necessary to ensure food security for the future'

Samuel Njenga - Kajiado County

Samuel Njenga embarked on his fish farming journey in 2010 and is currently a member of Darubini Fish Farmers. His dedication to aquaculture has been instrumental in overcoming challenges and embracing opportunities within the industry. Samuel's farm has seen significant growth over the years, marked by innovative techniques and sustainable practices. He actively engages in sharing knowledge with fellow farmers, contributing to community development and food security. Samuel's commitment to aquaculture reflects a passion for sustainable farming and the transformative impact it can have on livelihoods. As he continues to expand his operations and share his expertise, Samuel exemplifies the positive outcomes achievable through perseverance and dedication in fish farming. Samuel has 3 ponds; 1 liner pond culturing wolffia that has 28% protein, 1 concrete pond growing dark weed that has 50 % protein and an earthen pond for his fish.

Challenges before

Before receiving support from ABDP, Samuel Njenga faced several challenges in his fish farming venture. One major obstacle was his lack of knowledge about fish farming practices. Without adequate expertise in this field, Samuel struggled to effectively manage his farm and optimize production. Additionally, he encountered difficulties in sourcing quality fingerlings, which are essential for successful fish farming. The absence of reliable information on suitable fish feeds further complicated his efforts, impacting the growth and health of his fish stock. These challenges underscored the critical need for training and support in aquaculture, highlighting the transformative impact that initiatives like ABDP can have on aspiring fish farmers like Samuel.

ABDP Support:

Samuel Njenga learned about ABDP when the program's extension officers actively sought out farmers to empower in fish farming. Recognizing the potential benefits, Samuel was selected as a beneficiary and received comprehensive training, including feed formulation techniques. As a result, he now cultivates and produces organically grown feeds using alternative sources such as dark weed, azolla, and wolffia plant. In addition to training, Samuel was supported with a pond

liner and 1000 tilapia fingerlings. However, the fingerlings provided were mixed species, leading to varied results in his harvests. Over time, Samuel has successfully harvested three times, with recorded weights of 500 grams, 350 grams, and 700 grams for the fish produced. From his records at least 600 fish weighed 1 kilogram when harvesting. These experiences highlight Samuel's journey in fish farming and the impact of ABDP's support in improving his practices and outcomes.

Significant change:

Following the training he received, Samuel Njenga has successfully cultured azolla, dark weed, and wolffia, expanding his aquaculture operations to include two ponds—a nursery pond and a breeder pond. Utilizing these resources, Samuel has sold fish to the local community and other fish vendors, generating proceeds that have allowed him to make significant investments. Notably, Samuel has acquired a solar system valued at KES. 177,000 that powers aeration and general utilities at the pond, contributing to sustainable operations. Additionally, the income from fish harvesting has supported his family's basic needs. Samuel further leverages the pond water for irrigation purposes, benefiting his maize crops. Samuel also engages in poultry farming(150 chickens), selling poultry and related products, which in turn funds the management of his fish ponds. This diversified approach indicates Samuel's approach to farming and highlights the integration of his farming activities.

Samuel Njenga has extended his expertise by offering consultancy services on hatchery management, successfully guiding three local farmers in adopting his knowledge. Looking ahead, Samuel aims to expand his ponds in the future to boost fish production and further contribute to sustainable aquaculture practices within his community. His commitment to sharing knowledge and expanding shows his dedication to advancing aquaculture and supporting fellow farmers in their ventures.

An innovation of pond aeration using perforated pipe