



# INTERSECTORAL CASE STUDY

## ADDRESSING DETERMINANTS OF HEALTH THROUGH INTERSECTORAL COLLABORATION: FISH FARMING PROJECT IN SOUTH IMENTI CONSTITUENCY IN MERU COUNTY, KENYA

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Addressing determinants of health through intersectoral collaboration: fish farming project in South Imenti constituency in Meru County, Kenya

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## SUMMARY

Globally, the fisheries industry plays an important role in economic, social and health development. In Kenya, this industry contributes to local incomes, subsistence and nutrition, which are all important determinants of health. Addressing determinants of health will have positive consequences for population health outcomes, health equity and yield greater and sustainable returns, including accelerating achievement of the Millennium Development Goals (MDGs). The fisheries industry supports over one million people and provides livelihoods to many other Kenyans. The Government of Kenya in its governance role is committed to the policy of sustainable development and its citizens' well-being, as demonstrated in the Poverty Reduction Strategies (PSR), the Economic Recovery Strategy (ERS) for Wealth and Employment Creation, as well as the social pillar of the Kenya Vision 2030 and the Economic Stimulus Programme policies. In particular, the intersectoral Economic Stimulus Programme (ESP) was launched to address food insecurity and mitigate the effects of the 2007 post-elections violence and the global economic and financial crisis. Therefore, cross-government action was required to tackle determinants of health and action on health equity.

The ESP was allocated KES 22 billion, which were committed to numerous projects per constituency, in order to bring benefits to other sectors. The sectors that benefited from the funds allocated were education, health and sanitation, environment, local government, industrialization, food production and fisheries. The projects in these sectors were intended to address several social and economic determinants of health by providing basic services to its citizen. These services included water, food, health, and education, creation of business and job opportunities and security.

Among the numerous intersectoral programmes introduced was fish farming or aquaculture. The focus of fish farming (aquaculture) was to improve food and nutrition and create over 120 000 employment and income opportunities. Hence, this case study explores the extent to which fish farming has improved food security (impact on nutrition of household members) and impacted on household employment and income levels.

The findings of the study showed increased food security and improved nutrition. The fish farming project also created employment and generated income for participating households. Of the study participants, 42.4% reported an increase in food availability, 57.6% reported improved household nutrition, 56.1% reported employment opportunities, while 43.9% received income from the fish farming project. The ESP programme has had a positive impact on the underlying determinants of health. Other findings include strengthened intersectoral collaboration as a result of the Economic Stimulus Programme in Kenya, which also enhanced public private partnership in food security initiatives. The study has demonstrated how intersectoral collaboration can have positive consequences, particularly when supported by a political willingness.

## 1. Introduction

Globally, the fisheries industry plays an important role in economic and social development. In Kenya, this industry contributes to local incomes, subsistence and nutrition, which are all important determinants of health. Food and livelihood security can accelerate the Millennium Development Goals (MDGs) in Kenya. These and other determinants of health have positive consequences for population health outcomes and yield greater and sustainable returns. For example, the fisheries industry supports over one million people and provides livelihoods to many other Kenyans. The export of fish and fishery products earns the country an average of USD 70m (KES 5.3 billion) annually and could increase if aquaculture or fish farming potential were well tapped. The fishery industry presently contributes about 5% to the National GDP and has the potential to rise to 8% by 2015.

The Government of Kenya in its governance role is committed to the policy of sustainable development as demonstrated in the Poverty Reduction Strategies (PSR), the Economic Recovery Strategy (ERS) for Wealth and Employment Creation, as well as the social pillar of the Kenya Vision 2030 and the Economic Stimulus Programme. In particular, the intersectoral Economic Stimulus Programme (ESP) was launched to address food insecurity and mitigate the effects of the 2007 post-elections violence and the global economic and financial crisis. The ESP was introduced through the 2009/2010 budget, entitled 'Overcoming Today's Challenges for a Better Kenya Tomorrow' (Government of Kenya 2009). The ESP was allocated KES 22 billion, which was committed to numerous projects for each constituency. Each constituency received over KES 100 million funding, aimed at supporting intersectoral local development projects. According to the MOF, intersectoral collaboration and stakeholder participation in identifying and implementing projects allows prioritization of social and development needs and design of home-

grown interventions to address their respective challenges (Government of Kenya 2011). The sectors that benefited from the ESP funds allocated were education, health and sanitation, environment, local government, industrialization, food production and fisheries. The projects in these sectors were intended to create employment, provide essential services, jobs and business opportunities, including ensuring enough food at the constituency level (Government of Kenya 2009).

Among the numerous intersectoral programmes introduced was the fisheries development programme. The programme consisted of construction of fish ponds in 140 constituencies in Kenya and stocking them with fingerlings. The main aim of introducing fish farming was to improve nutrition and create over 120 000 employment and income opportunities. Imenti South constituency was one of the beneficiaries of the Government ESP fish farming or aquaculture initiative. Culturally, Meru communities are not known to practise fish farming or consume fish. Therefore, the purpose of this case study was to explore the extent to which fish farming in Imenti South had improved food nutrition of household members and impacted on household employment and income – the underlying determinants of health. The case study covers a period of three years (2010-2013), so as to capture the period between the project implementation phase and first wave of enterprise development.

## 2. Methodology

The study is descriptive in nature and it adopted a multiple-methods design, combining both qualitative and quantitative data collection approaches to explore the questions of interest.

### 2.1 Study design and setting

Data were collected in the Imenti South constituency, located in the Eastern part of Kenya and specifically in Meru County. The constituency was chosen because historically it did not engage in fish farming. Imenti South has around 197 604 people and their dependants. Coffee and tea are the main cash crops and sources of income in the district. Data were collected from four purposefully selected divisions out of the six (Mitunguu, Igoji East, Igoji West, Abogeta East, Abogeta West and Nkuene) in the constituency. Fisheries officers and community leaders were consulted about their views on the selected sites, to ensure that there was a buy-in for the study, to maximize participation and ensure cooperation with research staff.

### 2.2 Data collection methods

Data presented in this paper aims to explore the extent to which fish farming in Imenti South, had an impact on nutrition, employment and income of household members, hence reducing inequities associated with these important determinants of health in Kenya. Quantitative data was collated using a questionnaire to explore the variables of interest. A total of 132 fish farmers were sampled out of the 200 benefiting from the initial GOK Programme. Qualitative data involved six in-depth interviews (n=six) conducted with key informants (consisting of two fisheries officers, two community leaders and two community health officers). Imenti South constituency was purposefully selected for two reasons: 1) the constituency was one of the beneficiaries of the GOK fish farming ESP; and 2) traditionally it was not known to engage in fish farming until the introduction of the ESP. The selection of participants was undertaken in consultation with the Kenya Ministry of Fisheries and Imenti South constituency key stakeholders. All 200 households engaging in fish farming in the selected divisions were mapped and given a unique identification number. A total of 33 households per division were then randomly selected from a complete list of 200 households. All selected households were contacted with the help of fisheries officers and consented to participate in the study. The questionnaire was then administered by two researchers within a period of three weeks. Key themes included in the questionnaire were: household fish consumption (impact on nutrition), sales of fish (livelihood security), creation of employment due to fish farming, fish ponds management training, knowledge of fish farming and behaviour change.

In-depth interviews were conducted separately and were audio-recorded and field notes taken. Quantitative data was analysed using Microsoft Excel and qualitative data was transcribed and typed into Microsoft Word and transferred to Nvivo 8 for analysis. Data were analysed using the thematic framework approach.

### 2.3 Methodological limitations

Due to time constraint, the researchers were not able to include a larger sample size. It was also not feasible to explore the extent to which fish farming and consumption might have contributed to narrowing morbidity and mortality among beneficiaries of the GOK programme in Imenti South constituency. A more detailed study would be recommended to investigate the extent to which fish farming has had an impact on population health outcomes, hence reducing health inequities.

## 3. General Background

### 3.1 Kenya Context

The republic of Kenya lies astride the equator on the Eastern seaboard of Africa and has an estimated 38.7 million population (KNBS 2010), with a projected annual growth rate of 2.9 per cent. Administratively, Kenya is divided into 47 counties according to the new Constitution (National Council of Law 2010). In common with many developing countries, the population structure is young, with about 60% under the age of 20. Life expectancy, which has been on the decline, is estimated to be 54.2 years (Table 1.0) and is expected to fall further due to the rising incidence of HIV (Government of Kenya 2009; UNDP & WHO 2009) and poverty levels. Even though poverty in Kenya declined from 56% of the population in 2000 to 47.2% in 2009, extensive differences still remain across the different regions of the country. The areas that are less fortunate economically are also those underserved by health resources. The criteria used previously for allocating resources did not explicitly correct to favour underserved areas, and tended to leave those in poor areas with very limited protection. This has resulted in persisting historic inequities in health outcomes between different population groups. As demonstrated in Table 1, only 32% of the population had sustainable access to improved sanitation and 59% had access to improved drinking water sources in 2008. Infant mortality rates (IMRs) were 57 IMRs per 1,000 live births for the richest quintile compared to 66 in the poorest quintile. The under-five mortality rate (U-5MR) among the richest quintile was 13 per 1,000 live births compared to 34 reported in the poorest quintile (KNBS and ICF Macro 2010).

**TABLE 1: COUNTRY ECONOMIC AND HEALTH INDICATORS**

<b>Economic Indicators</b>	
Total population (million) - 2008	38.8
Population growth rate – 2008	2%
GNI per capita, \$ PPP - 2008	1560
Population below 1\$ PPP per day - 2005	19%
Rural population - 2008	78%
Agriculture, value added (% of GDP) - 2008	26%
<b>Food Consumption</b>	
Undernourished population - 2005/2007	31%
Cereal share in total dietary energy consumption - 2007	49%
<b>Health Indicators</b>	
Pop. with sustainable access to improved sanitation - 2008	32%
Life expectancy at birth (years) both sexes - 2008	54
Pop. with access to improved drinking water sources - 2008	59%
Prevalence of HIV among adults aged >= 15 years - 2005	6%

Source: World Bank, 2008; Food and Agriculture Organization, 2007; World Health Organization, 2008

Access to affordable healthcare is a challenge for many Kenyans due to poverty. According to the Household and Health Expenditure Report 2007, 44% of Kenyans who fell sick did not seek healthcare services due to lack of finances. The study on Well-Being in Kenya also indicated that over 40% of the poor population undertook self-diagnosis when sick (KNBS 2007a), due largely to inaccessibility and affordability of health services. In Kenya, inequities in health sector financing persist. For example, government health expenditures as a percentage of total government expenditures declined from eight per cent in 2001/02 to 4.6 per cent in 2009/10 (Government of Kenya 2010; KNBS 2010) despite government commitment to increase the health budget to 15% (WHO 2010).

The health sector in Kenya continues to be predominantly financed by private sector sources, mainly households' out-of-pocket spending, which is well-recognized as an inequitable and inefficient means of funding healthcare (WHO 2005; WHO 2010). Although the poor spend less in absolute terms than the better-off, a larger share of their household expenditure is devoted to meeting their healthcare needs. Currently, the Government of Kenya has made a commitment to prioritize health in the Vision 2030 (Government of Kenya 2010) and Economic Recovery Strategy (Government of Kenya 2003). In addition, Kenya made a commitment to the Abuja Declaration 2001, to increase health allocations to 15 per cent of total government expenditure on health (WHO 2005). With political willingness, this increase can be achieved through increased fiscal space for health, given that Kenya is one of the few countries in Africa that has recorded tremendous improvement in tax revenue. It did this by strengthening the tax administrative system, when there was a change in government in 2002 (KRA 2010).

As a result of growth in revenue in the last 10 years, the Kenyan government has achieved key milestones, including revival of trade, tourism and agriculture sectors, which are all determinants of health. In particular, the government adopted a strategy to expedite commercial fish farming (aquaculture) growth through a collaborative and participatory approach, involving both public and private sectors under Public-Private Partnership (PPPs). This intersectoral collaboration strengthened the total quantity of fish produced in the country to 149.0 thousand tonnes from 140.8 thousand tonnes in 2010, a 5.8 per cent increase. The quantity of fresh water fish produced increased by 6.2 per cent to 140.5 thousand tonnes from 132.3 thousand tonnes in 2010. Production from fish farming increased significantly from 12.2 metric tonnes in 2010 to 19.3 metric tonnes in 2011. This was attributed to an increase in area of farmed fish as a result of the government-funded fish farming through the Economic Stimulus Package (ESP). Under the programme, 27 392 fish ponds were constructed in 140 constituencies and stocked with over 23.5 million fingerlings, thereby increasing the area under aquaculture to 14 076 hectares in 2011 (Government of Kenya 2009; KNBS 2010). The aim of the project was to address the broader determinants of health related to nutrition, improving food security, creating employment and increasing household income generating activities. One of the constituencies to benefit from the intersectoral government ESP programme was Imenti South, Meru County.

### **3.2 Meru County Context**

Meru County is located in Eastern Kenya bordering Isiolo County to the North and North East, Tharaka County to the South, Nyeri County to the South West, and Laikipia County to the West. It covers an area of about 6936 km<sup>2</sup>. In 2009 the population was estimated at around 1 356 301 million with a density of 196 people per square kilometre (Government of Kenya 2009). Imenti South constituency population structure is young, with about 40% under the age of 15 comparable to the national level. The proportion of the population aged 65 years and above is about 4.4%. The sex distribution is slightly in favour of females (50.6%). In terms of a health indicator, infant mortality rates (IMRs) are 39 per 1,000 live births (KNBS and ICF Macro 2010). According to the Kenya Integrated Household Budget Survey (KIHBS) 2008, the poverty rate was estimated at 28.3% compared to 47.2% for national level (KIHBS 2008).

Administratively, Meru County is divided into seven (Imenti North, Imenti Central, Tagania West, Tagania

East, Igembe North, Igembe South and Imenti South) constituencies, each of which is sub-divided into a number of wards or divisions. The main economic activities in Meru are Miraa trade, tobacco, tea and coffee farming and fish farming. This case study focuses on fish farming in Imenti South Constituency and explores the extent to which fish farming has had an impact on nutrition, improved food security, created employment and increased household income.

### **3.3 Fish Farming in Kenya**

Fish farming in Kenya began in 1920 and until the mid-1990s, the activity followed a pattern similar to that observed in many African countries, characterized by small ponds, subsistence-level management, and very low levels of production (Ngugi C, Bowman J.R et al. 2007; Mwangi M.H. 2008). In 1960, the government helped increase the popularity of aquaculture through the “eat more fish” health promotion campaign. As a result, Tilapia fish farming expanded rapidly with the construction of many small ponds. Nonetheless, the initiative failed in the 1970’s due to inadequate fish farming services, lack of quality fingerlings and insufficient training of fish farming workers. By the 1990’s there emerged small-scale fish farming (aquaculture) at different levels in Kenya for subsistence (Gitonga and Achoki 2003). Since then, aquaculture in Kenya has taken many different forms, ranging from the small hand-dug ‘kitchen ponds’, to large earth ponds of 1000 m<sup>2</sup>. Dams and other impoundments used for storing water are often stocked with fish and the most common species farmed are tilapia, catfish, trout and goldfish. The different aquaculture systems used in Kenya vary considerably, according to technological advancement and the level of investment and management.

According to FAO (2004) aquaculture was able to make an important contribution to poverty alleviation, food security, and social well-being, i.e. as a source of income (FAO 2004). Aquaculture, the farming of aquatic organisms, including fish is often cited as an efficient mechanism for increasing food production. Fish provides a good source of protein and essential micronutrients and thus plays an important role in the prevention of many human diseases (Williams M.J. and Poh-Sze C. 2003; FAO 2008). Fish farming also reduces fishing pressure on our oceans, lakes and rivers (FAO 2009).

Overall, the government of Kenya recognized that development of aquaculture could play a leading role in accelerating the Millennium Development Goals, particularly in poverty reduction and as a source of alternative fish, instead of relying on the natural ecosystem, which is in decline (Gitonga and Achoki 2003). Fish farming improves human well-being in a number of ways that support the Millennium Development Goals (MDGs) and tackle the social and economic determinants of health. The direct benefits associated with fish farming include: greater food security, improved nutrition, supplemental income, and livelihood options. The approach can bring significant indirect benefits as well, by contributing to economic growth, easing pressure on increasingly scarce stocks of fish in the wild, improving health and empowering marginalized population groups, particularly those residing in rural areas. Currently, the “eat more fish” health promotion campaign has been renewed through multisectoral collaboration, involving the Ministry of Health, Ministry of Agriculture, Livestock and Fisheries, Ministry of Planning, Ministry of Finance and private stakeholders in Kenya. The next section describes the ESP policy initiation and governance structures put in place to ensure accountability and monitoring and evaluation of the intersection programme

## **4. The Intersectoral Economic Stimulus Programme initiation and governance structures**

The Economic Stimulus Programme (ESP) was introduced by the Government of Kenya, Ministry of Finance as the lead sector. ESP was intended to be a short- to medium-term, high-intensity and impact programme, which was meant to jump-start the economy towards long-term growth and development, by securing the livelihood of Kenyans and addressing the challenges of regional and inter-generational

inequity. The programme was intersectoral and focused on sectors that will generate maximum benefit, restore confidence and help the business community to weather the storm, while protecting the livelihood of poor populations and creating jobs for the youth (Government of Kenya 2009). Some of the activities covered under ESP included: expansion of irrigation-based agriculture, construction of wholesale and fresh produce markets and fish ponds.

Key objectives of ESP included: boosting the country's economic recovery and returning it to the envisioned medium-term growth plan, investing in long-term solutions to the challenges of food security, expanding economic opportunities in rural areas for employment creation, and promoting regional development of equity and social stability. These objectives were to be achieved through intersectoral collaboration consisting of public-private partnerships. In particular, aquaculture was implemented collaboratively and the intervention was intended to improve nutrition and create employment and income opportunities. Over 200 fish ponds were constructed in each constituency at an estimated cost of KES 12 million per constituency including Imenti South. In each constituency potential fish farmers were allocated a seed funding of about KES 40 000 thousand to construct a pond and were provided for free with one thousand fingerlings and fish feed. The farmers were also empowered with the relevant technical information and educated on which fish species were best suited to their sites and how to care for the fingerlings to ensure fish farming was a sustainable venture in the region. They received continuous support relating to fish marketing channels, improvement of infrastructure, and information provision. The next section depicts the process of intersectoral actions by the GOK through the economic stimulus programme.

#### **4.1 Process of intersectoral actions**

Different government sectors (health, housing, employment, economic development, trade and industrialization, finance, environment and sustainability, social security, education, urban planning, gender and agriculture) influence health (CSDH 2008). The GOK acknowledges that problems of poverty, hunger, poor health, lack of education, social and economic inequalities and environment are commonly interconnected and an intersectoral approach in healthy public policy formulation would be necessary to ensure sustainable improvements to the health and well-being of the disadvantaged population (Government of Kenya 2010). For example, the GOK Economic Stimulus Programme was a comprehensive, mutually-supportive policy, designed to achieve agreed goals through an intersectoral approach and stakeholder participation. Involvement of different sectors in implementing public policies advances the broader determinants of health and acknowledges that good health is instrumental for achieving social and economic development goals. The failure of public policies to involve relevant sectors and citizens in wider development strategies may cause underdevelopment. In particular, public policies that aim to improve population health ought to be integrated with transformative economic and social development policies that can be more effective in addressing health determinants (Leppo K., Ollila E. et al. 2013). The fisheries project adopted a strategy to expedite commercial fish farming growth through a collaborative and participatory approach, involving both public and private sectors under Public-Private Partnership (PPPs).

The overall ESP was implemented with an aim of tackling underlying determinants of health and members of the public had a responsibility to monitor public development projects to evaluate how well public resources were being used and how to improve performance. In particular, the ESP ensured maximum intersectoral stakeholder and community participation to ensure transparent identification and implementation of the projects, that funds were managed accountably, and projects were completed and governed effectively to benefit the targeted communities (Government of Kenya 2011).

Governance and leadership of the intersectoral ESP was provided by the Ministry of Finance (MOF) and Ministry of Fisheries. This was done to ensure accountability and community participation in the intersectoral ESP projects were managed at the constituency level by the District Infrastructure

and the Stimulus Project Management Committee (SPMC), whose responsibility it was to identify the appropriate project location, make payments recommendations in consultation with relevant and technical ministries and monitor implementation of ESP projects. The intersectoral SPMC team consisted of a Member of Parliament as the patron, the District Commissioner, District Development Officer, District Public Works Officer, Community Development Fund Committee (CDFC) Chairperson, Secretary and Treasurer, District Accountant, heads of all departments, non-governmental and religious organizations representatives, two men and women representatives from the constituency, two youth representatives, the CDFC Fund Account Manager and Constituency Projects Technical Committee (CPTC) and the Kenya Private Sector Alliance (Government of Kenya 2010; Republic of Kenya 2010). The role of the Ministry of Health (MOH), in collaboration with other stakeholders, was first and foremost to promote fish consumption benefits through local health facilities and outreach activities particularly during market days. To ensure effective implementation and monitoring of the ESP programme, intersectoral and stakeholders meetings were held twice a month at the national (coordination and monitoring) and constituency (implementation) level.

According to the MOF, intersectoral and stakeholders' participation in the project's identification and implementation allowed prioritization of social and development needs and the design of home-grown interventions to address their respective challenges (Republic of Kenya 2011) mainly health determinants. This study aimed to investigate the extent to which intersectoral ESP fish farming projects, identified as one of the key activities that could contribute to food and livelihood security and poverty alleviation in rural Kenya, had achieved their objectives. The next section presents the study findings.

## 5. Results

### 5.1 Socio-demographic characteristics

Table 1 presents an overview of the socio-demographic and economic characteristics of the respondents interviewed. A total of 132 households participated in the cross-section survey with 66% sampled from each of the four divisions. In each household a single individual was interviewed. The majority (72.7%) of fish farmers were men, with only 27.3% women. The majority of the respondents were males who represented 72% of the total sample taken, while women comprised 27%. This may be an indicator of who controls the units of ownership and family income. Most people were aged over 30 years (70.1%). About 56.1% of fish farmers had primary level education, 34.1% had secondary level education, and 11% had been educated to polytechnic level. Only 2% of the fish farmers had university level education. Among 33.3% of fish farmers interviewed, the main source of income was fish farming, while 11.4% was cattle and 55.3% from other sources (e.g. employment, coffee, tea). The most popular method of fishing adopted by farmers was pond (80.3%).

**TABLE 2: SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS**

Variable	Number (%)
<b>Four division households interviewed in Imenti South</b>	
Mitunguu	33 (66%)
Igoji East	33 (66%)
Abogeta West	33 (66%)
Nkuene	33 (66%)
<b>Total</b>	<b>132 (66%)</b>



<b>Gender distribution of fish farmers</b>	
Male	96 (72.7)
Female	36 (27.3)
<b>Total</b>	<b>132 (100)</b>
<b>Highest education level among fish farmers</b>	
Primary school	74 (56.1%)
Secondary school	45 (34.1%)
Polytechnic	11 (8.3%)
University	2 (1.5%)
<b>Total</b>	<b>132 (100%)</b>
<b>Main source of income of fish farmers</b>	
Fish farming	44 (33.3%)
Cattle	15 (11.4%)
Other (Coffee, Tea etc)	73 (55.3%)
<b>Total</b>	<b>132 (100%)</b>
<b>Fishing method adopted by fish farmers</b>	
Cage	24 (18.2%)
Pond	106 (80.3%)
Tanks	2 (1.5%)
<b>Total</b>	<b>132(100%)</b>

## 5.2 Fish farming as a source of food security and nutrition intake

All farmers participating in the survey reported that fish is a food of high nutritional value and source of quality protein, vitamins and minerals. Based on their experiences, though fish farming was not historically done in Imenti South constituency, since the inception of the Government of Kenya's ESP initiative, it has been widely practiced there and 42.4% thought that the activity had increased food security (food availability). On the other hand, 57.6% were of the opinion that the introduction of fish in the households' diet had an impact in family nutrition intake by introducing a different source of protein to many households in Imenti South constituency (see Table 3). Prior to commencing fish farming, farmers relied on beef as the main source of protein but that practice changed due to the accessibility of fish.

**TABLE 3: FISH FARMING INCREASED FOOD SECURITY AND NUTRITION IN HOUSEHOLD**

Variable	Frequency	Percentage
Fish farming increased availability of food	56	42.4%
Fish farming source of nutritional intake (protein)	76	57.6%
<b>Total</b>	<b>132</b>	<b>100%</b>

## 5.3 Importance of fish farming as an economic activity

The fisheries sector in Kenya consists of three major sub-sectors, namely inland fisheries, marine fisheries and aquaculture. Aquaculture has remained at subsistence level since independence in 1963, but was recently boosted when the government listed fish farming as one of the key activities in the ESP (Aloo-Obudho 2010). However, not many farmers were initially interested in diversifying their farm activities due to negative perceptions about fish farming. According to fisheries officers, some households alleged that fish ponds would be a breeding ground for mosquitoes, but these views changed after the first pilot project was completed. Therefore, participants interviewed, indicated that

the ESP fish farming project created employment (56.1%) and boosted household income (43.9%) (see Table 4). Farmers explained that due to a lack of storage units for the harvested fish, fishing did not turned out to be as high an income earner as expected. However, the officers confirmed that the GOK, through Public- Private Partnerships, was in the process of constructing a storage facility in the constituency, which would benefit farmers and ensure their produce was appropriately preserved for sale.

**TABLE 4: FISH FARMING SOURCE OF EMPLOYMENT AND LIVELIHOOD SECURITY IN THE HOUSEHOLD**

Variable	Frequency	Percentage
Fish farming source of employment	74	56.1%
Fish farming income-generating activity	58	43.9%
<b>Total</b>	<b>132</b>	<b>100%</b>

#### 5.4 Farmers’ technical skills - fish management, handling, storage and preparation skills

The Fisheries Officers at the Imenti South constituency reported that most participants (78.5%) were adequately equipped with technical skills required for fish management, handling and storage. Training and refresher training was undertaken in collaboration with the Ministry of Education (MOE), while the MOH at local level facilitated fish preparation and consumption lessons, confirming that intersectoral partnerships contributed to the successful implementation of the project in Imenti South. A majority of participants (66%) also felt that field visits by the extension fisheries officer provided continuous technical know-how to farmers. In total 78.9% of the farmers attended refresher training on fish farming and disease prevention. However, only 56.4% were trained on marketing skills, which was a significant determinant of fish sales (see Table 5). Knowledge and technical skills were essential to ensure good pond management and sustainability of fish farming activity in the constituency.

**TABLE 5: FISH FARMING KNOWLEDGE**

Variable	Percentage
Fish farmers technical knowledge	78.5%
Farmers receiving adequate refresher training	78.9%
Fish marketing skills	56.4%

The Figure 1 below illustrates an extension fishery officer conducting onsite training to guarantee farmers were well equipped with the necessary knowledge and skills required to successfully manage fish farming.

**FIGURE 1: EXTENSION OFFICER TRAINING FARMERS ON POND MANAGEMENT SKILLS**



## 5.5 The host's community cultural practices that influence fish farming

Fish farming in Imenti South constituency was a new concept that required communities to change behaviour in terms of fish consumption. According to FAO (2004), one of the most important conditions for reliable consumer demand for fish products was a well-established culture of fish consumption in regions where fish were produced (FAO 2004). Surprisingly, development agencies, NGOs and national agricultural research organizations in many countries in sub-Saharan Africa have tried to introduce aquaculture to regions where there is no tradition of fish consumption, for example, the fish farming project initiated under the Government of Kenya Economic Stimulus Programme (ESP). In Kenya, many ethnic communities did not consume fish until as recently as 1980, but fish has now become part of household diet in almost all parts of the country (Ngugi C.C and Manyala J.O. 2009).

The fisheries officers interviewed observed that, in households with mostly males, it was a challenge to influence them to include fish in their traditional diets since all harvested fish would be sold to generate income. This was also to do with men not wanting to change their behaviour from what they had always eaten to fish. However, most communities have since changed behaviour and accepted fish as part of the household diet.

*“since we began the fish farming project in Imenti South, we have had to conduct “eat more fish focusing on health benefits” awareness campaigns to ensure communities adopted fish in their traditional diets, because this would create demand for fish in the constituency...one of the challenges faced involved men who were unwilling to support change in the household diet, preferring fish to ultimately be a source of income. But with intensive sensitization in collaboration with health centres, most families are consuming fish and appreciate the health benefits.” Extension officer1*

Other challenges involved cultural practices and eating habits. Some households were of the opinion that preparing fish meals and eating them was a lengthy procedure, hence preferring other meats. The strong fish odour was also a concern for some households. These sentiments were expressed particularly by the pastoralist communities and those who practised mixed farming.

*“Fish farmers initially complained that cooking and eating fish takes a long time...the smell of fish was viewed as unpleasant... so it took us sometime to convince women particularly, on the many health benefits of eating fish for them and their children...we also taught them the most effective way of cooking fish and use of lemons to mask the strong smells and with time, they acquired the taste and started to experience the benefits...” Extension officer2*

According to health workers interviewed, the ESP fish farming initiative has contributed to remarkable improvement in health mostly among mothers and children. Although the Ministry of Health has not conducted a study to assess the effects of fish consumption on health, health workers in Imenti South constituency thought that the number of malnutrition cases had decreased significantly.

*“...we have seen health improvements as a result of fish being introduced in the family foods and the diet... the number of children suffering from malnutrition has gone down...we don't get as many cases as before...although we cannot say for sure it's because of fish farming...I believe fish is one of the contributing factors...I would like our Ministry of Health to conduct a detailed study in this region to find out whether the population's health has improved as a result of eating fish ...”Health workers.*

## 6. Discussion

This study set out to explore the extent to which the intersectoral fish farming project, identified as one of the key activities that could contribute to improved nutrition intake, food and livelihood security and

poverty alleviation in rural Kenya, was achieved. In this section, we discuss the main findings of this study and their implications on the Kenyan government's efforts to transform the economy through home-grown interventions.

The findings have demonstrated that there was significant improvement in food security and nutrition as result of households engaging in fish farming. 42.4% study participants were of the opinion that food availability had increased, while 57.6% reported enhanced nutrition intake. Food security and nutritional status are key determinants of health and at the national level, means that adequate supplies of food are available through domestic or imports to meet the consumption needs of everyone in a country. Food and livelihood security are known to contribute to economic growth in developing countries, as well as sustaining progress on the poverty reduction target. The United Nation's Food and Agricultural Organization (FAO) states that, food security exists 'when all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life' (FAO 1996). Food security is a function of food availability (dependent on natural and human resources), food accessibility (dependent on purchasing power or access to fertile land) and food utilization (nutritional uptake) (Ericksen P. 2008). The ESP fish farming project has to some extent addressed food availability, accessibility and utilization in Imenti South constituency. As a result, many participants were aware that fish farming addressed household food insecurity and nutrition requirements. Participants also understood that good nutrition was important to reach the health, education and economic goals the Government of Kenya was pursuing. The nutrition improvement fish farming programme has an essential role in tackling health determinants and health equity. It does this through protecting and promoting community and an individual's health, including reducing mortality, especially among mothers and children, and encourages and enables children to attend and benefit from school.

Overall, advancing food security and nutrition is fundamental to achieving the Millennium Development Goals (MDGs) and for promoting a sustainable development agenda. During the G8 and G20, world leaders acknowledged the significance of addressing food insecurity and nutrition in an effort to achieve development goals (DFID 2013). Furthermore, a healthy diet is an important means for preventing and controlling non-communicable diseases (NCDs), as stated in the High-level Political Declaration on the prevention and control of NCDs (United Nations 2011). The Food and Agricultural Organization also emphasizes the importance of promoting nutrition awareness among women, especially in rural areas and that ensuring greater household food security can all contribute to better maternal health (FAO 2009).

Regarding employment creation and income generation, it was clear that participants benefited from the fish farming programme. Despite initial negative perceptions about fish farming, households participating in the government project profited. For example, 56.1% of participants created employment within their households and externally and 43.9% deemed fish farming as a profitable income-generating activity. According to Mwangi (2008), fish farming was an important source of income and contributed significantly to the national economy through employment creation, foreign exchange earnings, poverty reduction and social well-being, particularly for rural communities in Kenya (Mwangi M.H. 2008). This implies that improvements in the productivity of agriculture and related sectors directly increased farm and rural incomes and household food security as demonstrated by the Government of Kenya ESP fish farming initiative. Growth in agriculture focused on small farmers (like the case of fish farming in Imenti South) promoted overall rural and non-farm employment and had a strong poverty-reducing effect. It also contributed to tackling determinants of health and narrowing of health inequities. Indeed, the fish farming public policy is a notable example of how such policies can have long-lasting effects on health determinants.

Addressing key determinants of health through intersectoral collaboration and promotion of healthy public policy leads to positive population health outcomes. As demonstrated by this study, advancing

healthy public policies, one of the five action areas of the Ottawa Charter (WHO 1986) implies that health is shaped by social, economic, physical and environmental factors that are outside the control of the health sector, such as housing, transport, environment, education, agriculture, trade etc., an outcome resulting from changes to the natural and built environments and to social and work environments (CSDH 2008; GOSA 2011). Hence, the Government of Kenya through the Vision 2030, acknowledges that for a healthier and happier Kenya it is necessary for all sectors to work towards a shared goal of addressing health determinants and inequities (Government of Kenya 2010). This means that policymakers and researchers can seize the opportunities presented by such policies to advocate healthy public policies<sup>1</sup> (WHO 1986) and a Health in All Policies approach, which is founded on health-related rights and obligations (Leppo K., Ollila E. et al. 2013).

## 6.1 Conclusions

Based on the findings of the study, the intersectoral ESP fish farming project in Imenti South constituency has had significant impact on food security, household nutrition, employment and income generation, which thus addressed key determinants of health. From the findings, it was evident that participants benefited from fish management training and nutritional knowledge and awareness. Clearly, effective nutrition education contributed to behaviour and attitude changes and nutrition awareness made significant contributions to reducing hunger and malnutrition even with improvements in food supplies and incomes. The study concludes that increased political willingness, as illustrated by the intersectoral Economic Stimulus Programme, contributed to the successful implementation of the fish farming project thus benefiting the participants in terms of increased food production and improved source of protein and essential micronutrients, which are all important for preventing many human diseases. The findings have also depicted the extent to which intersectoral collaboration involving different actors was strengthened.

## 6.2 Recommendations

1. There is need to promote healthy public policies in Kenya through intersectoral collaboration in order to achieve a Health in All Policies agenda and address the broader determinants of health, using lessons learned from the Government Economic Stimulus Programme in general, and the fish farming project in particular.
2. There is a need for government to support intersectoral collaboration in developing a new health promotion strategy in Kenya, which focuses on all sectors that impact on population health to promote citizens' well-being.
3. There is need for increased funding to the agriculture and fisheries industries considering the multiple roles of agriculture. The most important aspect of agriculture development is that it expands, enhances and sustains people's ability to acquire and utilize the amount and variety of food they need to be active and healthy.
4. It is important that interventions utilize participatory and community-based approaches to improve the nutrition and food security of the poorest and most vulnerable population groups within the context of securing sustainable livelihoods.
5. There is a need for government to construct more fish storage facilities closer to the farmers to reduce wastage of fish harvested.
6. There is a need to promote fish eating habits to communities and schools, which are not yet involved, taking into account the nutritional benefits.
7. There is a need for policymakers and researchers to document evidence of direct and indirect healthy public policies being implemented in Kenya, to support the way forward for a Health in All Policies agenda.

<sup>1</sup> Promotion of healthy public policies would facilitate equity through, enabling supportive environments to live, work and play in, improving standards of living, access to health services and addressing the broader determinants of health through multisectoral collaboration and partnerships.

## Areas of Further research

Based on the findings of this study, the following issues need to be investigated further:

1. The impact of the Economic Stimulus Programme on broader determinants of health and health equity, including environmental and health impact of digging fish ponds in homesteads and the social impact on the community as a result of fish farming in the area.
2. A detailed investigation to explore the extent to which fish farming has had an impact on reducing mortality and morbidity in Imenti South constituency.

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## Acronyms

CPTC	Constituency Projects Tender Committee
CDFC	Constituency Development Fund Committees
CPTC	Constituency Projects Tender Committee
ESP	Economic Stimulus Programme
ERS	Economic Recovery for Wealth and Employment Creation Strategy
FFE&PP	Fish Farming Enterprise Productivity Programme
GDP	Gross Domestic Product
GoK	Government of Kenya
HIV/AIDS	Acquired Immune deficiency Syndrome
PIU	Project Implementation Units
PPP	Public Private Partnership
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MDGs	Millennium Development Goals
MED	Monitoring & Evaluation Directorate
MGC	Ministerial Gender Committee
M&E	Monitoring and Evaluation
MPER	Ministerial Public Expenditure Reports
MTEF	Medium Term Expenditure Framework
MTP	Medium Term Plan
MOPND	Ministry of State for Planning National Development and Vision 2030
NGO	Non-Governmental Organization
NCDs	Non-Communicable Diseases
SPMC	Stimulus Project Management Committee

## Definition of significant terms

**Fish farming or Aquaculture:** are used interchangeably to refer to the growing of fish and other aquatic organisms in controlled environments, such as in artificial ponds.

**Economic Stimulus Programme:** It is a short- to medium-term, high-intensity and impact programme aimed at jump-starting the economy towards long-term growth and development, securing the livelihood of Kenyans through projects, such as fish farming. The government injected Kenya shillings (KES) 1.12 billion into the programme.

**Eating habits (or food habits):** refers to why and how people eat fish, as well as the ways people obtain, store, use and discard fish.

**Food security:** Situation where sufficient, safe and nutritious food is available at all times.

**Health in All Policies:** is an approach to public policies across sectors that systematically takes into account the health and health systems implications of decisions, seeks synergies and avoids harmful health impacts, in order to improve population health and health equity.

