

POLICY DYNAMICS, TRENDS IN DOMESTIC FISH PRODUCTION AND IMPLICATIONS FOR FOOD SECURITY IN GHANA

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1.0 Introduction

The fishing industry in Ghana started as an artisanal fishery with very simple and low efficient gears and methods operating in very near coastal waters, lagoons, estuaries and rivers. Through government and private efforts to promote production, the fishing industry continued to improve over the years with the development of new gears and methods that had been more efficient than the previous ones. Through government schemes, the use of outboard motors on canoes, introduced in 1959, was very successful and went a long way to create a modern sub-sector of the canoe fisheries. These schemes, particularly the charter party scheme (a hire purchase scheme), also encouraged fishermen to purchase larger fishing boats and gear which they paid for over a period of four years at very low interest rates (Lawson and Kwei, 1974).

This paper examines major policy regimes since Ghana's independence and relates them to trends in domestic fish production. Domestic production is then linked to the implications for food security. There is no doubt that fish is an important commodity in the country's food security, particularly when the latter is defined beyond availability and accessibility to encompass the nutritional content of a meal that is required to provide a balanced diet and to ensure a minimum daily intake of 2,300 calories. Where food consumption is not balanced from the standpoint of nutrition, some diseases and improper physical developments emerge, such as stunting, underweight and wasting in children, particularly, under-5 years of age. Fish is consumed by many households and among all income groups everywhere in Ghana, largely to supply protein requirements in the diet.

Data for the paper are largely from secondary sources. Reliance is placed mainly on secondary data from some sector ministries and departments, notably, the Ministry of Food and Agriculture and its relevant Directorate of Fisheries as well as the Fisheries Research Unit. Secondary data were supplemented with survey data from the Ghana

Living Standards surveys (GLSS). The methodology of the paper is largely tabular and graphical analysis in which simple ratios and figures have been relied upon to give descriptive statistics of the main issues at stake.

2.0 Policy Regimes

The period of Ghana's independence since 1957 has been conveniently divided into three major dynamic policy regimes. The period 1957 to 1982 is classified as the pre-structural adjustment programmes (pre-SAP) era. The era of structural adjustment programmes (SAP) is from 1983 to 1992, while the remaining period, 1993 to 2000 is the post structural adjustment programmes (post-SAP) era. However, data limitations have limited the trend analysis in the pre-adjustment period to 1971 as the commencement year for the analysis. Further more, the analysis on the implications for food security is further restricted to the period 1981 to 2000, the period in which full data are available for the variables that are discussed. In addition, micro-level evidence is restricted to the Ghana Living Standards Survey (GLSS) rounds.

2.1 Pre- Structural Adjustment Era

The pre-structural adjustment era was characterized by heavy state intervention. Since independence, governments of Ghana have intervened in agriculture on the supply side to encourage productivity by subsidizing inputs, credit, research and extension services; and by setting up specialised agencies to distribute specific inputs.

The fisheries sub-sector was a major area of government intervention, especially after the introduction of outboard motors into the artisanal fisheries in 1959 (Seini, 1980). For a long time, many purchased fishing inputs were imported and distributed almost exclusively by the Ministry of Food and Agriculture (MOFA). The government gave grants, which it acquired mainly through external grants and loans, to the MOFA for the importation and distribution of fishing inputs. At the behest of government, the MOFA did not take advantage of its monopoly situation to charge exorbitant prices. Fishing input prices were controlled and subsidized by government. The Fisheries Department is,

however, the line agency in MOFA that is responsible for implementing government policies on fisheries.

The artisanal canoe fishery benefited enormously from this government controlled market organization. In particular the fishery took advantage of subsidized prices of outboard motors and nets to modernize the industry. Motorization of the canoe fishery was rapid and by 1974, 87 percent of canoes were motorized (Seini, 1995). Motorization was accompanied by the acquisition of bigger canoes and the construction of larger fishing nets, thus modernizing the fishery.

Nevertheless, government recognized the formidable task of providing food for the fast expanding urban population and arresting the increasing dependence on food imports in the face of declining agricultural exports and therefore embarked on a bold attempt to transform Ghana's agriculture in the 1960s. The main feature of this attempt was that production and distribution of agricultural produce became a primary field of state intervention (Beckman, 1981). The United Ghana Farmer's Council (UGFC) was formed and given the responsibility of organizing the small-scale farmers for mechanized agriculture through co-operative efforts. The State Farms Corporation (SFC) was formed to undertake large-scale mechanized farming, while the Food Distribution Corporation was established to undertake the distribution of food throughout the country. In the fisheries sub-sector, the Ghana State Fishing Company (GSFC) was formed and equipped with a fleet of large fishing vessels, cold storage facilities and vehicles to catch and distribute fish throughout the country. In the 1970s, government intervention was intensified through the Operation Feed Yourself (OPY) and Operation Feed Your Industries (OPYI) programmes.

2.2 Era of Structural Adjustment

Given the general low situation of the country, the government of Ghana in 1983 initiated the Economic Recovery Programme (ERP) in a serious attempt at addressing the issues relating to the proper management of the macroeconomic and structural adjustment

policies that have since gone through various phases. However, macroeconomic policy reforms under the different phases, no doubt, have included the following measures:

- Reduction of trade distortion and trade liberalization;
- Reduction or abolition of product market distortions such as consumption subsidies, production taxes and subsidies;
- Re-organisation of parastatal agencies;
- Reduction of capital market distortions such as interest rate ceilings and exchange controls;
- Re-targeting public investment towards exports and import-substitution sectors; and
- Privatisation of public sector organisations.

These macroeconomic policy reforms were targeted at absorption reduction as well as improving the supply side by “getting the prices right” (Sarris, 1987). Sector policy reforms followed the broad measures outlined. Thus policy reforms in the agricultural sector evolved around four main central themes:

- Price decontrol of agricultural commodities;
- Removal of subsidies on agricultural inputs;
- De-linking the state from production and marketing of agricultural inputs and produce; and
- Reducing taxation on the farmer.

Price decontrol and the removal of subsidies of agricultural commodities were particularly visible on the supply side of the fishing industry as it affected inputs used in fishing. On the institutional front, practical efforts were made by government to shift the function of procurement and distribution of agricultural inputs to the private sector. In the more general area of reform of public agricultural institutions, the main initiative had been in reducing the budgetary costs to the government of large parastatals and a drastic redundancy programme for these parastatals. Thus, there were massive redundancies in the State Fishing Corporation, the largest parasatal in the fishing industry, which was eventually broken down into sections and privatized.

The reforms were intended to generate efficiency and development of the agricultural sector as a whole. Nevertheless it has been generally argued that adjustment policies have neither generated rapid development of the agricultural sector nor has it enhanced the sustained economic growth of the economy that is necessary to enhance food security. Macroeconomic and sector reforms are therefore, at best, only part of the solution to the economic problems of Ghana and of Africa in general (Sahn et.al., 1997; Armstrong, 1996).

2.2.1 Inputs for Domestic Fisheries

Policy reforms particularly impacted on inputs for domestic fisheries. The strategy under policy reforms was to ensure the availability of improved inputs aimed at improving agricultural production and productivity in order to improve both availability and access to food. On the procurement and distribution of major agricultural inputs such as fertilizer, seeds, premix fuel (for fishermen), the strategy encouraged the private sector to take over from government agencies and to promote competition in the input markets. Unfortunately, the response of the private sector has been judged to be slow and has resulted in decreased availability and high prices of purchased inputs (Adutwum, 2001).

Indeed, rapid policy reforms in the agricultural sector were epitomized by trade liberalization in 1990 in which agricultural input markets were liberalized, permitting private sector participation with no entry conditions. The expectation of the policy reforms was mainly to establish a competitive market for both the demand and supply side. On the supply side, policy reforms were expected to provide agricultural input markets with the characteristics of competition and other effects which include the following (Nyanteng, 200):

- Large number of private firms importing and distributing the inputs;
- Increased supply of the inputs in the domestic market;
- Availability of inputs closer to production points for easy access by farmers and fishermen;

- Improved performance of the input market with respect to availability in volume, quantity, timeliness in place and time, etc;
- Reduced prices (in spite of the removal of subsidies) as a result of competition.

With respect to fishing inputs, it is doubtful as to whether the desirable competitive market characteristics and effects have been established following the policy reforms, given the current state of the structure, conduct and performance of the input markets even though markets for fishing inputs were liberalized earlier before other agricultural inputs.

Apart from the dugout canoe, almost every other fishing input is imported. These include outboard motors, premix fuel, marine gas oil and the fishing nets. The importers of these inputs have always been very few in the country. Three large companies, namely, the Agricultural Development Bank (ADB), Christian Traders Company and AFKO Imex Limited are the major importers of outboard motors and nets. Thus in terms of numbers, the market for these inputs can be described as oligopolistic (Seini, 2000). Tema Oil Refinery (TOR) enjoys a monopoly over the production and wholesaling of both premix fuel and marine gas oil. A number of smaller companies and individuals also occasionally bring in spare parts, outboard motors and fishing nets on an irregular basis.

It is pertinent to observe that the ADB seems to have taken on the role of the Fisheries Department in this era of liberalization. With the support of government loans and grants meant for the development of the fishing industry, the ADB is the largest importer of fishing inputs. As a result of past experience with poor loan recovery, the ADB now insists mainly on cash sales for its inputs and institutional credit to artisanal fishermen in particular is almost non-existent. An efficient input market should ultimately lead to the lowering of prices of the inputs to the producers. Seini (2000) however argues that, judging from the cost build up for the major inputs in fishing it is doubtful whether the performance of the input markets has led to the lowering of fishing input prices following macroeconomic and sector reforms.

2.3 Post Structural Adjustment Era: 3Competition Through Trade

An essential feature of government strategy for food security is the encouragement of competition in the production of agricultural commodities through Ghana's trade liberalization policy. The idea is to make Ghana's agricultural sector part of the global economy so that, through trade, farmers and fishermen can produce and export the commodities in which the country has the comparative and competitive advantage and import those that cannot be produced locally. It is important to note, however, that left on its own, food imports can have serious implications for income and employment with adverse effects on food security.

In the fisheries sub-sector, the official policy of government is to increase the production of fish for domestic consumption and for export. Government also aims at alleviating poverty in the fishing communities. However, Ghana's fisheries are predominantly operated by private companies, the role of government in achieving the policy objectives is to concentrate on the provision of public services and infrastructure in support of the sub-sector.

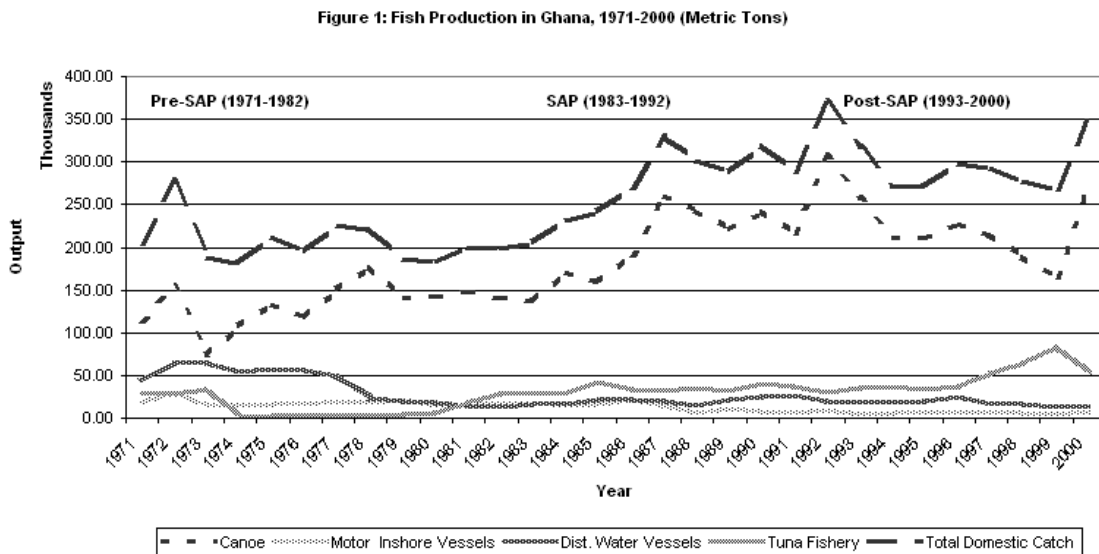
The strategy for achieving government policy objectives in fisheries is to strengthen the development and management of all fisheries, namely, inland and aquaculture as well as marine fisheries. The strategy also includes the strengthening of fisheries research and also public institutions that deal with fisheries research and development. In addition government has taken steps to reinforce the surveillance, monitoring, control and the enforcement of fisheries laws. These policies and strategies are designed to make the fishing industry more competitive and efficient than before. Fish therefore plays a major role in the trade statistics of Ghana in terms of imports and export that eventually affect net domestic supply of fish.

Under Ghana's fishery sector development project (1995 to 2000), a lot of emphasis was placed on the development of inland fisheries and aquaculture in particular. Efforts were made to strengthen extension activities with the goal of achieving sustainable yields. Also

dialogue was established with fishermen and traditional authorities with the aim of controlling fishing activities, particularly on the Volta Lake. The Yeji landing port on the Volta Lake was developed into a major inland fish market.

3.0 Trends in Domestic Fish Production

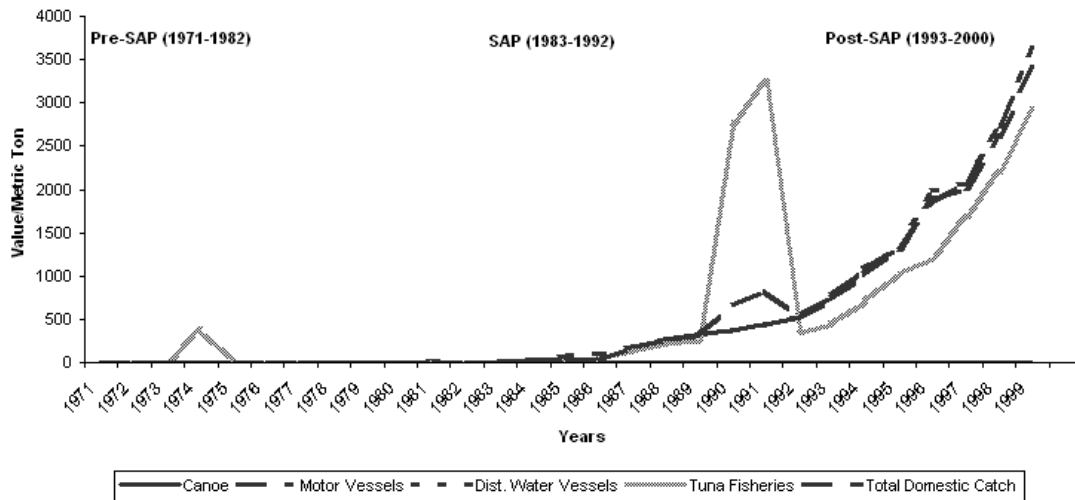
The trends in domestic fish production in figure 1 show fluctuating patterns of domestic fish production. The general trend does not appear to exhibit any visible relationship between fish production and the policy regimes defined in this paper. What is clear in figure 1 is the fact that trends in domestic fish production are heavily dictated by trends in canoe fishery production.



However, trends in the real value of domestic fish production in figure 2 reveal an interesting picture. Real value per metric ton of domestic fish has taken an upward trend since the structural adjustment period and has continued in this direction in the post-SAP period. This is to be contrasted with the pre-SAP period in which the real value per metric ton was close to zero. The trends in the real value of domestic fish production

seem to suggest that the removal of structural rigidities in the SAP period and trade liberalization and competition in the post-SAP period have worked in the interest of the domestic fishing industry.

Figure 2: Real Value of Fish Production, 1971-200 (Cedis/Metric Ton)



Data Source: Fisheries Department, Osu, Accra.

3.1 Sources of Domestic Fish Production

Ghana has, from time immemorial, had a tradition of a very active fishing industry. A coastline of about 550 kilometres and a total continental shelf area of approximately 24,300 square kilometers support a marine fishing industry. There is also a rapidly developing inland fisheries, based mainly on the resources of the Volta reservoir, tributaries of the Volta river system, medium sized reservoirs, numerous small reservoirs, lagoons and one natural lake (Bosomtwi). There are, therefore, two main sources of domestic fish production, namely, marine and inland fisheries.

The marine fishery is the main source of domestic fish production and is for that matter the largest component of Ghana's fishing industry. The fishery has a well established traditional expertise for exploiting coastal fisheries by canoe fishermen. The marine fishing industry is classified into four main sectors by the Fisheries Department, namely, the artisanal, semi-industrial (inshore), industrial (deep sea) and tuna.

The artisanal marine fishery is the largest of the fishing sub-sectors in Ghana. As shown in table 1, it contributes the highest to national marine fishery production. The canoe fishery contributes more than 60 percent annually to marine fish production. The fishery actually contributed an average of about 75 percent annually to marine fish production between 1986 and 1995.

The inshore fishery is made up of a number of locally built boats with wooden hulls. They are used both for trawling and purse seining. Though both methods of fishing are carried out throughout the year, purse seining is usually intensified during the sardinella season, July to September. The inshore fishery contributes the least to marine fish production as shown in table 1. The fishery bloomed in the late 1960s and early 1970s and declined rapidly with the general economic decline in the country. The relative contribution of the fishery continues to decline due in part to the heavy indebtedness in the fishery and to a large extent diminishing stocks of fish species that the fishery is accustomed to (Koranteng et. al., 1994; Seini, 2003).

The industrial fishery, also known as deep-sea fishery, is made up mainly of imported long distance vessels that specialize in trawling and shrimping. Originally, the industrial vessels operated in more productive waters outside Ghanaian waters but the extension of the Exclusive Economic Zone to 200 nautical miles by other countries along the coast of the Gulf of Guinea restricted these vessels to operate solely in Ghanaian waters where the continental shelf is rather narrow and coastal upwelling lasts for a maximum of about five months. Nevertheless, table 1 shows that the contribution of the industrial fishery to marine production continues to grow steadily since 1981. From an average of over 7 percent between 1981 and 1985, the fishery contributed an average of about 22 percent to national marine fish production between 1996 and 2000. The growth in the fishery is perhaps attributable to the generally favourable macroeconomic situation in the country that has made unavailability of basic inputs and much needed spare parts a thing of the past.

Table 1: Average National Marine Fishery Production, 1981 - 2000

Period	<i>Sources of Marine Fishery</i>									
	<i>Canoes</i>		<i>Inshore Ves.</i>		<i>Industrial Ves.</i>		<i>Tuna Ves.</i>		<i>Total</i>	
	Qty (‘000 mt)	%	Qty (‘000 mt)	%	Qty (‘000 mt)	%	Qty (‘000 mt)	%	Qty (‘000 Mt)	
1981 – 1985	152	67.6	17	7.6	17	7.6	39	17.3	225	
1986 – 1990	232	74.8	17	5.5	26	8.4	36	11.6	310	
1991 – 1995	289	76.3	9	2.4	36	9.8	43	11.7	369	
1996 - 2000	257	62.2	7	1.6	91	22.0	59	14.3	413	

Source: Computed from Department of Fisheries Data, MOFA, 2001

The tuna vessels operate further off-shore from the other fisheries that operate in about the same area of 15 to 75 metre depth domain. The tuna fishery is operated mainly by joint-venture companies between Ghanaian and foreign investors. Until the last five years (1996 to 2000), the tuna fishery was the second most important in terms of contribution to the marine fisheries as shown in table 1. In the second half of the 1990s, the fishery contributed an average of over 14 percent to domestic marine fish production annually. Unlike other species of fish in Ghana’s marine fishing grounds, the tuna species do not pose any danger of depletion as the International Commission for the Conservation of Atlantic Tunas (ICCAT) is involved in their management. Of the three species of tuna that occur in Ghanaian waters (Yellow Fin, Bigeye and Skipjack), the Skipjack has the highest potential for increased exploitation (Fisheries Department, 1992).

The inland or fresh water fishery is dominated by the Volta Lake even though other rivers, ponds, dams and a lake also provide grounds for inland fishing. Aquaculture involves small-scale cultivation of tilapia and catfish in ponds. The technology used is semi-intensive, combining fertilization of ponds and supplementary application of unformulated feedstuffs that are mainly by-products from agro-industrial sources, such as brewery wastes, various oil cakes, wheat and rice bran.

Table 2: Average National Inland Fishery Production, 1981 – 2000

Period	Total Domestic Prod. ('000 Mt)	<i>Sources of Inland Fishery</i>					
		<i>Volta Lake</i>		<i>Rivers, Ponds & Dams</i>		<i>Total</i>	
		Qty ('000 Mt)	% of Inland	Qty ('000 Mt)	% of Inland	Qty ('000 Mt)	% of Domestic Prod.
1981 – 1985	267	42	-	-	-	42	15.7
1986 – 1990	359	46	80.7	11	19.3	57	15.8
1991 – 1995	378	45	78.9	12	21.1	57	15.1
1996 - 2000	453	68	83.4	13	16.0	81	17.8

Source: Computed from data of the Department of Fisheries, MOFA, 2001

As shown in table 2, the Volta Lake contributes the highest to inland fishery production. The Volta Lake was the only significant source of fresh water fish production up to the mid-1980s. Even thereafter, it continues to produce over 80 percent of inland fisheries production, annually. From table 2 it can be observed that the share of inland fisheries in total domestic production had been relatively constant at over 15 percent per annum from 1981 to 1995. In the second half of the 1990s, however, the share of inland fisheries in total domestic production increased to about 18 percent per annum. This probably was the result of close attention paid to the sub-sector in this period.

4.0 Fish and Food Security

Access to food in sufficient quantity and quality for every individual in society is generally regarded as a basic need that cannot be overlooked. Food security entails a continuous integration of supply, distribution and consumption of nutritionally balanced food in the society. Thus, food security is often defined as access by all people to sufficient food in terms of quality, quantity and diversity for an active and healthy life without risk of loss of that access. There are three core pillars underpinning food security:

- Food Availability: This entails ensuring sufficient food is available for all people through production or trade.
- Food Access: This implies reducing poverty and improving food markets.
- Food Utilisation: This requires ensuring good nutritional outcomes.

Food availability requires investments in agriculture and distribution systems, both domestic and international, to ensure that an adequate supply of food is available in local, regional and national market places. Both availability and access imply the integration of rural and urban markets as well as an ability to accommodate intra- and inter- year fluctuations in production. In any case having sufficient food will not necessarily ensure favourable nutritional outcomes if poor health results in frequent sickness or if women are too overburdened to invest sufficiently in their children or they fail to recognize the nutritional needs of children in vulnerable stages (Alderman, 2001). Thus building the food utilization pillar means investing in nutrition education, health care, safe water provision, and sanitation as well as working with communities and families to improve child-care.

Fish in the food security of Ghana is discussed in terms of fish balance sheet and the level of self-sufficiency as indicators of supply and availability; consumption by various groups as indicators of access and utilization by them; and fish prices as indicators of affordability.

4.1 Fish Balance Sheet and Level of Self-Sufficiency

Based on a per capita requirement of about 40kg per person, the national requirements of fish is estimated to be around 735 metric tons of fish per annum in the second half of the 1990s as shown in table 3. This estimate represents the latent demand for fish in the country. Pitched against the net supply of fish or fish that is available for consumption, there are wide gaps between supply and demand. Thus the balance sheet for fish in Ghana is negative and runs into hundreds of thousands of metric tons as shown in table 3.

Table 3: Average Balance Sheet for Fish in Ghana, 1981-2000

Period	Domestic Prod.	Imports	Export	Available for Consumption	National Requirement	<i>(in '000 mt)</i>	
						Balance/Deficit ('000mt)	%
1981-1985	267	2	29	240	478	-238	49.8
1986-1990	359	13	31	341	550	-210	38.2
1991-1995	378	24	28	374	639	-265	41.5
1996-2000	453	32	51	434	735	-301	41.0

Source: Computed from Data of the Department of Fisheries, MOFA, 2001

Table 4: Average Per Capita Consumption of Fish and Self-Sufficiency, 1981–2000

Period	National Consumption ('000 Mt)	Population (in Millions)	Per Caput Consumption (in Kg)	% Self-Sufficiency
1981-1985	240.03	11.94	20.1	55.8
1986-1990	340.65	13.76	24.7	65.3
1991-1995	373.95	15.98	23.5	59.2
1996-2000	434.11	18.37	23.3	61.2

Source: Computed from Data of the Department of Fisheries, MOFA, 2001

The fish supply deficit was about 50 percent of national requirements per annum in the first half of the 1980s and improved appreciably to 38 percent per annum in the second half of the 1980s. Since then the fish supply deficit has stabilized at around 41 percent per annum.

The deficit in fish supply is reflected in the low per capita consumption of fish as shown in table 4. Per capita consumption of fish is fairly stable at around an average of 24 kg per person per annum since 1986. This level of consumption represents 60 percent of estimated annual requirements and reflects a downward trend in fish consumption in Ghana. Lawson and Kwei (1974) noted rapid increases in fish consumption in Ghana after the Second World War. Available data showed that per capita fish consumption was about 10kg. in 1960. This increased significantly to 30 kg. and 50 kg. in 1970 and 1974

respectively. Thus average per capita fish consumption for the second half of the 1990s was less than 50 percent of the level of per capita consumption in 1974.

The last column in table 4 gives the average level of self-sufficiency if consumption was restricted to domestic production. Although the average level of self-sufficiency has varied from period to period in response to changes in domestic production relative to high average rate of population growth, the average level of self-sufficiency from 1981 to 2000 is about 60 percent.

4.2 Fish Consumption by Agro-Ecological Zone

Traditionally, the major animal products in the diet of Ghanaians differed significantly among the three main agro-ecological zones in the country, namely, the coastal zone, the forest zone in the middle of the country and the northern savannah zone. The traditional pattern of consumption of animal products was due primarily to availability and consequently, acquired taste. The coastal zone is noted for fish consumption which is eaten with *kenkey*, prepared from fermented maize dough and hot pepper source. In the forest zone, *bushmeat* was mainly used in the predominant diet of *fufu* and soup. The *fufu* is a combination of either plantain and cassava or cocoyam and cassava pounded into a sticky dough and served with soup. In the northern savanna zone beef, smaller ruminants and poultry meat are the dominant sources of animal protein consumed.

The situation has been changing with fish consumption becoming increasingly important in the forest and the northern savanna zones. With the fast depletion of wildlife due partly to rapid deforestation, rampant and widespread bushfires and excessive hunting, the consumption of beef, goat meat, mutton and fish has increased quite a bit in the forest zone. Fish also now features quite prominently in the preparation of some meals in the northern savannah zone, such as in the soup that accompanies *tuo zaafi* prepared from corn, sorghum or millet flour.

4.3 Fish Consumption in Rural and Urban Households

Historical data indicate that the consumption of fish is higher in the rural households than their counterparts in the urban areas of Ghana. This is reflected in the proportion of household food budget that is spent on fish.

Table 5: Household Expenditure on Fish and Meat Products, 1987-1999 (%)

Period	Fish		Meat	
	Urban	Rural	Urban	Rural
1987/88	17.1	24.9	6.6	6.1
1988/89	18.9	28.9	6.6	5.3
1991/92	15.5	24.2	9.4	6.4
1998/99	13.3	16.8	5.8	3.4

Source: GSS (series) GLSS Reports, Accra

Table 6: Food Budget Shares of Animal Products by Locality (%)

Animal Product	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savanna	Country
Fish	14.2	14.6	20.9	19.1	12.2	16.4
Meat	5.6	6.4	2.2	4.5	6.8	5.2
Poultry/ Products	4.3	4.1	2.1	2.6	2.8	3.2
Dairy Products	3.2	2.1	1.4	1.2	0.5	1.7
Total	27.3	27.2	26.6	27.4	22.3	26.5

Source: GLSS Round Four, 1993/94

The data collected in four rounds of Ghana Living Standards Surveys over the period 1987 to 1999 indicate the proportion of the average household food budget on fish ranging from 13% to 19% in urban areas and 17% to 29% in rural areas (table 5). In the rural areas, however, the proportion of the household food budget allocated to fish consumption was highest in the coastal areas (21%), followed by the forest (19%) and the savannah (12%) areas in that order. The reverse is observed in the consumption of meat and poultry products (table 6).

With respect to household budget on animal products, the consumption of fish formed about 53% in the urban households in 1998/99 and in the rural households, the proportions ranged from 55% to 79% in the three agro-ecological zones (table 7). The expenditure on meat, the second most important animal products consumed in Ghanaian households formed over 23% of the budget on animal products in the urban areas. In the rural coastal areas the proportion was over 8%, over 16% in the rural forest area and about 31% in the rural savannah zone. The household expenditures on fish and meat products in the rural areas are consistent with the traditional consumption pattern of these animal products in the three agro-ecological zones discussed earlier.

Table 7: Share of Animal Products in Household Budget on Animal Products by Locality (%)

Animal Product	Accra	Other Urban	Rural Coastal	Rural Forest	Rural Savanna	Country
Fish	52.0	53.7	78.6	69.7	54.7	61.9
Meat	20.5	23.5	8.3	16.4	30.5	19.6
Poultry/ Products	15.8	15.1	7.9	9.5	12.6	12.1
Dairy Products	11.7	7.7	5.2	4.4	2.2	6.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: GLSS Round Four, 1998/99

4.4 Fish Consumption by Income Groups

An important factor that determines the pattern of fish consumption is income. Up to a point, the larger the consumer's income the more would be the quantity demanded of a normal commodity. The demand for fish is noted to be highly income elastic. For example, Oracca-Tetteh and Nyanteng (1980) report that estimated elasticity of expenditure for fish in urban and rural centers of Ghana were 0.77 and 0.79, respectively. This indicates that people in the rural areas would spend a little more on fish with an increase in income. Thus, projects that aim at reducing rural poverty and raising rural incomes are likely to increase fish consumption and improve upon their food security situation, through better nutrition.

The available data on household food budget show that poor households generally consume relatively more fish in their diets than the non-poor households (table 8). It is also evident in table 8 that the poor households in rural areas allocate relatively higher proportions of their food budgets to fish consumption than their counterparts in the urban areas.

Table 8: Fish Consumption by Income Groups and Locality (%)

Period	Urban			Rural		
	Very Poor	Poor	Non-Poor	Very Poor	Poor	Non-Poor
1987/88	16.2	18.9	17.1	28.8	28.7	24.0
1988/89	24.8	21.2	18.4	34.2	31.9	27.7
1991/92	19.1	17.6	15.2	26.3	29.8	23.4

Source: Ghana Statistical Service (1995) The Pattern of Poverty in Ghana 1988-1992

4.5 Fish Prices

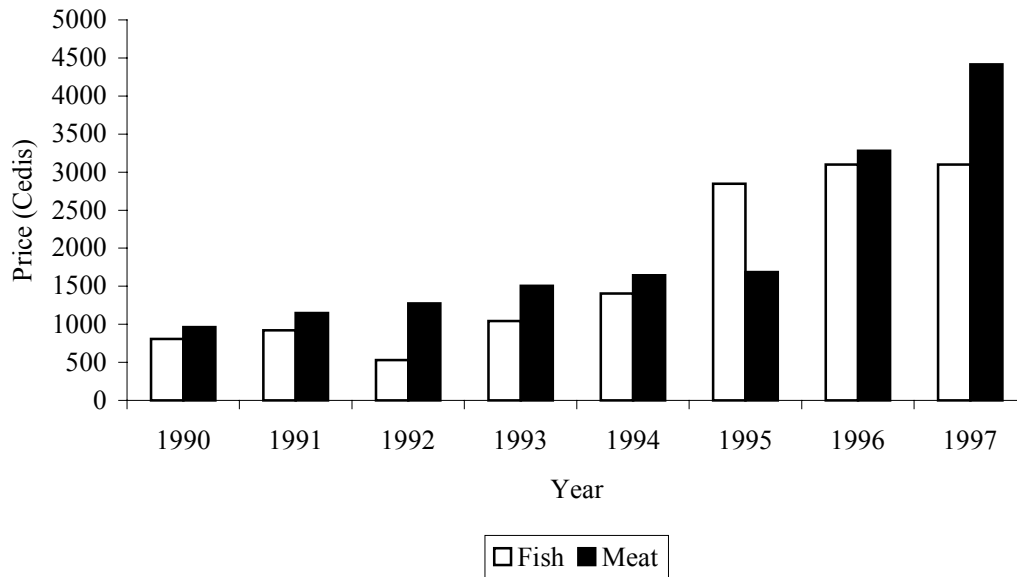
Some households in both urban and rural areas produce themselves, some of the food they consume. This therefore reduces the actual expenditures on such food commodities. Of the total purchased food budget, fish accounts for a very high proportion which was 15.5% in the urban households and 24.2% in rural households in 1991/92, for example (see table 3). The proportions of the household budget spent on other identifiable food commodities have been mostly below 5% in both the rural and urban areas (Seini et. al., 2002). Consequently, a substantial change in fish prices is likely to affect its consumption in both the rural and urban households.

Empirical evidence on fish consumption in Ghana is of the overwhelming view that fish is consumed more than other animal products mainly because of its relative cheapness. For example, Lawson and Kwei (1974) have pointed out that an important factor that brought about a rapid increase in fish consumption in the 1950s was the substantial fall in the retail or consumer price of fish. Their analysis showed that at 1954 constant prices, the retail prices of fish in 1959 were nearly half of those in 1954, making fish prices relatively low when compared with other animal protein food. This assertion was later corroborated by Oracca-Tetteh and Nyanteng (1980) whose survey results confirmed the importance of relative price level in the consumption of fish products in the country. In their survey, fish was the only animal product that was preferred by consumers because it was cheaper. Also, about 85 percent of respondents in their survey ranked fish as their first choice of animal product making fish the most common animal food that features more often in the diet of Ghanaians.

The most current data confirm that on the basis of volume, fish prices are generally lower than meat prices, particularly the prices of herrings and anchovy consumed mostly in the rural areas and among the poor income households (Figures 3 and 4). The available prices of herrings as a proportion of average prices of meat fluctuated widely in the 1990s. It ranged from about 42% in 1992 to 169% in 1995. Thus in 1995, the average price of herrings was higher than that of meat by as much as 69%. This is difficult to

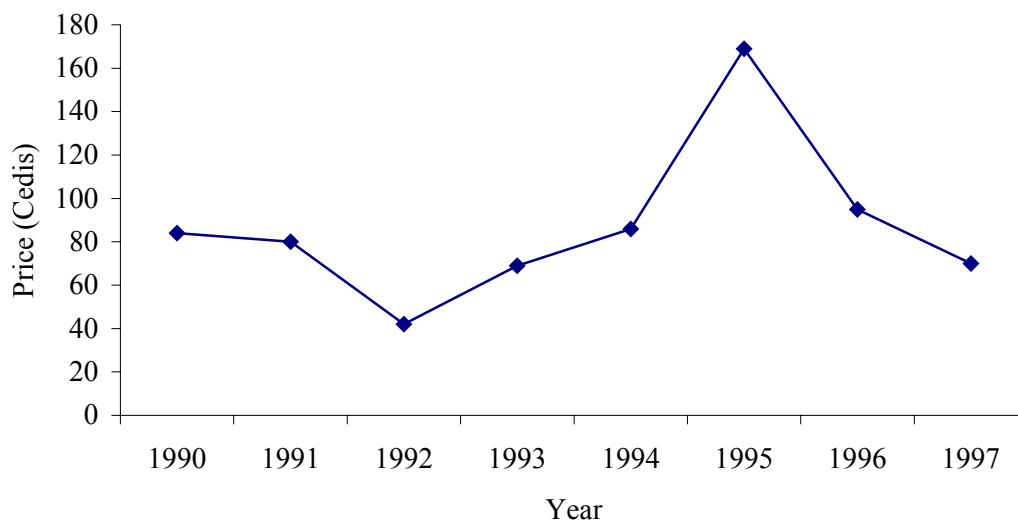
explain as the fish catch in 1995 was higher than in 1994 and the meat price did not change significantly from the level in 1995 compared with 1994.

Figure 3: Average Retail Prices of Fish (Herrings) and Meat in Accra, 1990-97 (Cedis/Kg)



Source: Ghana Statistical Service (1997); Quarterly Digest of Statistics

Figure 4: Retail Price of fish (Smoked Herrings) as Percentage of Meat Price in Accra, 1990-97



Source: Ghana Statistical Service (1997); Quarterly Digest of Statistics

5.0 Conclusions: Implications for Food Security

The analysis in this paper has three main implications for food security in Ghana. Fish supplies naturally augment food availability; consumption of fish improves on the utilization of food thereby ensuring good nutritional outcomes particularly of the poor and rural populations; and, the vast number of people engaged in the fishing industry earn incomes that improve upon their access to food.

5.1.1 Contribution to Fish Supply

The contribution of fish to food security starts from the supply side. Among the animal products, fish is the most important with respect to contribution to the average per capita daily intake of calories and protein. Fish supplies up to about 49 percent of calories and protein derived from animal sources. It is important to note the contribution of the artisanal fisheries in this respect as they contribute an average of over 77 percent annually to total domestic fish supply. Thus, the fisheries contribute significantly to the availability

of protein food in Ghana. However annual and seasonal variations in fish catches, accompanied by fish price fluctuations imply that access to fish is not even throughout the years and within the year. This may give rise to annual and seasonal transitory fish insecurity.

5.1.2 Nutrition of the Poor and Rural Population

Ghana is a tropical country in which refrigeration is not readily available and even if available is out of reach of the poor and rural populations. Thus the consumption of cured fish is popular among these groups of people. Fishing is almost invariably accompanied by the curing of fish in various forms to meet the demands of the poor and rural people. Cured fish is largely in the form of smoked fish. Other forms of cured fish include dried fish, dried-salted fish and fermented fish.

The role of artisanal fisheries has to be stressed here too. The poor and rural populations in Ghana often patronize smaller species of fish because those are what they can afford. Because canoe fishermen fish closer to the shore, they mostly capture smaller species of fish such as anchovies, herring etc. These are often smoked, dried or fermented and distributed mainly in rural market places. This makes fish readily available and accessible throughout the country. The popularity of cured fish, its relative cheapness, and the fact that it can store for a relatively longer period and thus reach large sections of the rural population makes it an important source of protein for the poor everywhere in the country. In terms of food security, this important source of protein ensures good nutritional outcome for the poor and rural populations.

5.1.3 Rural Employment and Income

The role of fisheries, particularly artisanal fisheries in generating rural employment and income cannot be overemphasized. Artisanal fishermen are based mainly in villages located along water bodies. The fishery therefore generates employment and incomes for

rural people not only through the fishing activity but also through processing, distribution and marketing activities.

Current statistics estimate a total of 123,156 canoe fishermen in the country (Bannerman et. al., 2001). This is to be contrasted with the estimates of 91,400 fishermen in 1989 (Koranteng, 1990) and 104,000 canoe fishermen in 1986 (Koranteng et. al., 1987). In addition to the fishermen, there are an estimated 1.5 million people who assist the fishermen in their fishing activities. These are largely the dependents of the fishermen and they include their wives and children. Such dependents and relations help in fishing activities that include offloading the fish from the canoe, sorting, marketing and processing. Apart from the canoe fishermen and their dependents, various estimates have also been made about labour force participation in the artisanal fishing industry. Lawson and Kwei (1974) for instance estimated that between 65,000 and 75,000 fish traders are involved in the industry.

The generation of employment for rural people, particularly women, has implications for food security. Income makes it possible for households to augment their food availability through trade. The staple foods that people engaged in the fishing industry do not produce can be purchased from the market. This therefore encourages the diversification of economic activities and the division of labour in the rural communities. Access to food is also ensured as incomes from fisheries can reduce poverty. Besides the processing and storage of fish helps to improve the market for fish and for that matter access to fish products all the year round.

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