INTEGRATED FISH FARMING: A VERITABLE TOOL FOR POVERTY ALLEVIATION/HUNGER ERADICATION IN THE NIGER DELTA REGION.

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ABSTRACT:

Integrated fish farming is a system that focuses diversified agricultural production with emphasis on fish. It has a capacity of bridging the wide gap between fish demand and supply. The fish integrated culture is discussed emphasizing it s importance and relevance to poverty alleviation/hunger eradication. It s potential is yet to be fully exploited in concrete terms of increased fish production from aquaculture.

The traditional role of women in fish marketing and processing is reviewed and a need for improvement from the present state of poverty identified. Women and youths are vulnerable group in the Niger Delta and indeed in Nigeria that need to be more sensitised in aquaculture production through integrated fish farming. However the promotion of this venture is only feasible with empowerment of this group. Various empowerment strategies are discussed and recommendations made on empowerment of women and youths for the promotion of integrated fish farming in review of its potential for increased fish production in Nigeria to bridge the wide gap between fish demand and supply.

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INTRODUCTION:

In the world 80 to 90 million more people have to be fed each year and most of them are in the developing countries. The most reliable source of protein for many is and must continue to be fish. Yet millions of people who depend on fish to live are every day, faced by the fear of food shortage (world fish center 2003).

Among countries in the developing world, Nigeria inclusive, the people in the fishing sectors are some of the poorest and most neglected. This is very true of the fisher folks in the Niger Delta of Nigeria.

While there is a growing appreciation that fish is a healthy source of protein, calcium and vitamin A and essential fatty acids as well as of other elements crucial to good nutrition (particularly in the case of pregnant women), fish are increasingly at the mercy of pollutants, from the land and chemicals added to farmed aquatic resources apart from the regular occurrence of oil spillage in the Niger Delta region. So while fish is desperately needed to feed the world poorest people, contaminated fish can be dangerous source of food.

Employment in the primary capture fisheries and aquaculture production sectors in the 1998 is estimated to be 300 million people world wide while the number of people dependent on fisheries as an income was estimated at 200 million. Of these the vast majority cannot even afford to eat fish they catch and handle. Fishers are often demeaned and exploited by those who can afford to buy their crops, which leads to the disintegration of traditional communities and increasingly marginalized rural societies. Consequent upon this there was massive rural-urban drift leading to youth migrating to urban centres for "greener pasture" leaving the old people in the rural area. Unfortunately gainful

employment is increasingly scarce in the cities. This has in no small way created social problems and in fact to the level of social unrest in Nigeria and the Niger Delta region in particular.

Integrated fish farming is the blending of various compatible agricultural enterprises into a functional or unified whole farming system for the purpose of sustainability. It is a No WASTE, low cost and low energy production system in which the by-products of one enterprise is recycled into another as input. Various types of livestock and crops have been integrated with fish farming. Integrated culture system is quite compatible with the earthen pond culture, which in Nigeria is the most popular fish farming system particularly in the rural areas. This is due to expansive natural ecosystem the earthen pond offer, which ensures fast degradation of the organic wastes. For example livestock manure commonly used in phytoplankton bloom generation, ensures natural oxygen supply through photosynthetic activities and also serves as natural feed source. The pond dykes are suitable for vegetable production. In swampy areas where rice cultivation is practiced, the large area needed for rice serves as a potential area for both semi-intensive and extensive fish culture.

While maximizing land use, integrated farming approach reduces cost of input, diversifies\protein production, encourages enterprise combination to improve profitability and therefore farmers socio-economic status. Integrated fish farming systems proven in Nigeria include fish cum poultry (broiler and layer), fish cum piggery and fish cum rice and vegetables. The impact of livestock integration with fish increases productivity by manure loading from animal's wastes.

Efficiency in resources use is also shared by integrating fish farming with irrigation system as well as by utilizing inland surface waters and flood plains for cage culture, fish cum vegetable/crops integrated culture system. New forms of integrated culture system that can effectively respond to resources and environmental challenges need to e developed. In this connection attention should be given to resolving the economic and environmental challenges of stock enhancement and ranching as

AQUACULTURE DEVELOPMENT

Nigeria needs about 1.5million mt 1.8 million mt fish annually to satisfy her fish demand in order to meet the 13.2kg per capita global requirement for fish consumption. Prospect for private sector investment in capture fisheries is presently not encouraging due to scarcity of inputs and high operational cost apart from declining fishery resources. Nigeria with a potential of a least one million metric tonnes o fish annually from aquaculture alone produces about 25,000 tonnes/annum. The potential is hardly tapped. Aquaculture currently generates less than 3% of fish production in Nigeria whereas with appropriate promotional strategies, it could match capture fisheries output and cost effectiveness.

The bulk of aquaculture production is from small-scale holders, which are basically located in the rural areas.. Large scale and medium scale commercial aquaculture production is basically difficult if not impossible in rural areas due to inefficiency or lack of electricity and ready source of water for intensive aquaculture. In view of this situation farmers have difficulty in accessibility of inputs in aquaculture production such as feed and fingerlings. Revitalization of aquaculture in

the rural area b integration with other agricultural products as a means of turning around the fortune of fish production is urgent and crucial. Effective policy action on economically viable aquaculture production and sound technological packages can result in significant gain in food supply.; this must be with the objective of seeking optimum long-term contribution of aquaculture to self-sufficiency in fish supply and indeed food security in Nigeria. This has therefore called for sustainable aquaculture development, which involves management and conservation of the natural resource base and orientation of technological and institutional changes in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such package must as of necessity include integrated fish farming with other agricultural production

TECHNICAL AND SOCIO-ECONOMIC CONSIDERATIONS IN INTEGRATED FISH FARMING

Socio-economic conditions should is important when developing integrated fish farming system (NACA Technical Manual 7). The development of a diversified economy depends on the harmonies interaction among socio-economic\conditions, agricultural production and environmental conditions. The technical factor of importance in fish farming integration is compatibility. The agricultural enterprises to be combined and their level of intensity determine the types of integration considered for adoption. The system of production for both fish and livestock could be extensive, semi-intensive or intensive. The semi-intensive earthen, pond fish culture is the most suitable integrated aquaculture system because of the natural eco-system that can conveniently accommodate both crop and livestock production. It is not uncommon however to find intensive fish farming integrated with poultry whereby wastes in poultry processing become a major inputs in fish feed production. However social and cost benefits form the major factors. Variety of crops provides an opportunity for the availability of balanced diets particularly in the rural area. The revenue generated enhances farmer's income. Idle time is well utilized in crops cultivation as these crops are harvested continuously e.g. vegetables and here is the relevance of woman and youths in improving the economy of the family.

The dykes of earthen pond can be used for the cultivation of non-perennial crop. Feed biodegrading of livestock wastes used in pond fertilization. Livestock offal's i.e. chicken guts and other wastes products of meat processing i.e. bones can form part o fish feed ingredient. Another example of compatibility is readily observable in rice fish culture where only fish species that can tolerate shallow and turbid waters i.e.
Tilapia as well as high water temperatures associated with rice cultivation can be integrated with the later.

The system of integration is suitable for resource poor farmers with remarkably similar low expenditure pattern and continuous low spending for food and other dietary requirements.

WOMEN/YOUTH AND AQUACULTURE DEVELOPMENT

The significant role women play in fisheries is overlooked. Already suffering from greater poverty than men in virtually every society, women are not recognized for the vital role they play particularly in the post harvest processing and marketing. Women are frequently a major percentage of the labour force in the processing and marketing sectors, working under conditions of great inequality ad frequently receiving little direct remuneration for their work. The problem of declining fish stock is often compounded within families. Often fish provides a livelihood for the whole family, a lower catch means less to process and market, and none is left over for the family to eat. This has called for the urgent need to develop aquaculture more vigorously and woman empowered for active participation than ever before. Certainly women are capable of playing more roles in integrated fish farming than only marketing and processing.

It was reported by Moehl (2003) that it is well acknowledged that women are key players in Africa's agricultural sector and that their participation is critical to achieving food security and economic well being. However most fish farming systems are non-traditional and gender delineation less well documented. According to Moehl (2003) a large percentage of both market oriented and non-market oriented aquaculture systems in the region rely heavily, if not exclusively on family labour. Although this labour may be somewhat segregated along gender lines, with management and women marketing, aquaculture is typically a family affair with particular reference to rural aquaculture. All family members contribute to pond management and harvesting including children. Family-run units are often administratively attributed to the of the household as customary ownership and benefits can have gender exclusive.

However, it is interesting to note that there are few examples of women involved in profitable semi intensive aquaculture production in Nigeria. One of the cases in point is an integrated fish farm owned by Dr (Mrs.) Marcus, in Alakotomeji of Badagry Local Govt. area of Lagos State. The farm is involved in fish farming integrated with poultry and plantain production. It is a big employer of labour. Another example is David's farm at Eneka near around Port Harcourt area involved in fish integrated farming with piggery. There are some other women investors in fish integrated farming system in the Niger Delta region. There are however many young University and secondary graduates both male and female engaged in fish farming who are either employed by their parents or established small units of their own.

This information data citing women fish farmers are limited largely to women-headed households and may not take into consideration the management responsibilities where women are raising fish as part of a mixed-sex family entity. To a very large extent the role of women is more in marketing than in production. Men are essentially involved in production. The question "is there any limitation to women involvement in integrated fish farming production"? The answer is No. The main constraint is in funding of the production system hence the need for empowerment. What are then the options for women and youth empowerment? As regards to the youth involvement in fish farming venture, they are to a very large extent involved but there is the limitation of scope due to financial constraints. Integrated fish farming has enormous potentials for job creation particularly for the restive youths in the Niger Delta region that has drifted to urban centers for employment that are not in existence. Women socio-economic situation in the society can be tremendously

EMPOWERMENT OF WOMEN AND YOUTHS

There are various strategies of agricultural empowerment by the Federal Government to attack poverty alleviation/eradication through agriculture such as food security project. The effect is not yet realized because poverty and hunger is still pervasive in both rural and urban areas. Women and youths are the worse for it. Empowerment of these groups of people is very important to turn around fish production in Nigeria through fish integrated farming system, more so that Nigeria is the largest importer of frozen fish in the world. The question is why are women and youths not the targets of empowerment programme in Nigeria? Is it because they are not naturally endowed to engage in integrated fish farming? The answer is NO. Women have al what it takes to make success of integrated fish farming i.e. patient, observant energetic, perseverance etc. Their involvement right now is limited mostly to marketing and limited in the aspect of management through family involvement. Fish integrated farming must be regarded as a strong tool for job creation hence poverty alleviation/eradication. The seemingly neglect of women and youths in various empowerment programmes must be redressed.

WHAT ARE THE FEASIBLE EMPOWERMENT OPTIONS AND THEIR PRESENT STATUS?

(i) Family investment: This is in the practice as of now but limited in scope because families' capability in terms of affordability to invest in fish farming is limited. In many cases men who invest in fish farming may not deem it necessary to involve their wives. Youths have an advantage in this aspect because men investors involve their male children with the cope of passing down the business at old age. Women folks are not very much at advantage in this aspect although few families establish the business for the management of the "mother of the house". It is still a very important empowerment tool but limited in scope to turn around the situation.

(ii) Cooperative society: The cooperative societies generally are major empowerment strategies of practice throughout Nigeria. However it has limited application to integrated fish farming. However recently few cooperative societies were established for the empowerment of their members in integrated fish farming. A case in point is Ebute Afue in the Epe Local Government area of Lagos State. To a very large extent the empowerment of women and youths is quite feasible so much so that they attract assistance from some non-Governmental organizations. This is therefore a veritable means of empowerment of women and youths particularly in the rural areas. Ebute Afuye in Lagos State is a very good model for empowerment of women and youths in integrated farming for the rural areas. It is possible that there are other such cooperative societies but the practice is not well documented.

(iii) Empowerment through credit facility: this is entirely of limited application in scope in Nigeria because of the high cost of credit. At the present level of 20% interest rate in agricultural loan in commercial banks is not feasible to establish a viable project on integrated fish farming venture with at least a gestation period of 3 years. Efforts therefore must be put in place to achieve a credit facility with a single digit interest rate to target these vulnerable groups of the society (women and youth). If Nigeria is to be liberated from the shackle of important of frozen fish the various Governments should vigorously pursue this aspect of empowerment. In fact the programme of the Agricultural bank for

cooperatives and rural development should focus its attention on the empowerment of these groups with special attention on fish integrated farming system. For a meaningful impact the credit interest should not be more than 5%.

(iv) Empowerment through Niger Delta Development Commission (NDDC): One of the reasons for so much unrest in the Niger Delta region is poverty and unemployment o women and young school leavers. Substantial part of the funding of NDDC should be allocated to these groups for the purpose of investment in integrated fish farming. This can be done through the empowerment of cooperative societies or professional groups such as National Association of Fish Farmers and Aquaculturists (NAAFA). While the empowerment is not recommended to be interest free but it should attract an interest rate o fat most 5%. With involvement of Local Government Councils and State Government through Fish farm Estate system, Niger Delta region alone can provide enough fish need of the whole country.

(v) Empowerment trough Training: the project is doomed to fail without adequate human resource development in all aspects of integrated fish farming i.e. farm/pond design and construction, pond management, processing, other agricultural production etc. Back up service to ensure proper operation of the farm and good returns is crucial. The African Regional Aquaculture Centre (ARAC) of the Nigerian Institute for Oceanography and Marine Research (NIOMR) strategically located in the Niger Delta region is very much available to render this important service. It has an excellent human resource capacity to take care of every need in all aspects of integrated fish farming.

CONCLUSION

Integrated fish farming is a veritable means of poverty alleviation/eradication through food security. All aspects of its technology are fully developed and ready for adoption by the interested users. Vulnerable groups in our society are women and youths are not fully involved in this productive sub sector of agricultural production. To be released from the shackles of massive fish importation, which is a major, drain on foreign exchange, the empowerment of women and youths is very important. The empowerment options of choice are through cooperative societies, credit facility of less 10%, interest rate fish farm estate funded by NDDC, Local Government and State Government. ARAC of the NIOMR at Aluu is available with appropriate human resource for the human resource development empowerment.

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Table 2: Operating/Recurrent input (₦)

ITEM	1ST	2ND	3RD	4TH	5TH
A. Fish Pond: Fish seed tilapia (4000x5)	20,000	20,000	20,000	20,000	20,000
Carp (4000x5)	20,000	20,000	20,000	20,000	20,000
Catfish (5000x20	100,000	100,000	100,000	100,000	100,000
Lime	5,000	5,000	5,000	5,000	5,000
Total	**145,000**	**145,000**	**145,000**	**145,000**	**145,000**

B. POULTRY

Pol chicken (100x500)	500,000	500,000	500,000	500,000	500,000
Feed (5x360x800) home mix	1,4440,000	1,4440,000	1,4440,000	1,4440,000	1,4440,000
Medication	12,000	12,000	12,000	12,000	12,000
Total	**1,9952,00**	**1,9952,00**	**1,9952,00**	**1,9952,00**	**1,9952,00**

C. GENERAL OPERATING COST.

Staff salary and allowance					
Manger	300,000	300,000	300,000	300,000	300,000
Attendants	180,000	180,000	180,000	180,000	180,000
Security	180,000	180,000	180,000	180,000	180,000
Driver	90,000	90,000	90,000	90,000	90,000
Running cost of 1 pick up van	100,000	100,000	100,000	100,000	100,000
Contingency (10% of A-C)	280,200	280,200	280,200	280,200	280,200
Total	1,130,200	1,130,200	1,130,200	1,130,200	1,130,200
Sub-total	3,227,200	3,227,200	3,227,200	3,227,200	3,227,200
Input grand total (capital and operating cost)	4,111,640	4,111,640	4,111,640	4,111,640	4,111,640

Table 3: Out put

A. Fish pond output projection for 5 years.

Tilapia adult less 50% of initial no 2000x400gx800kg) at N100 each	80,000	80,000	80,000	80,000	80,000
Carp adult less 10% of initial no (1800x1kg) 1800kgxN250	450,000	450,000	450,000	450,000	450,000
Catfish less 5% Clarias spp. (2375x1.2kg)2850xN350-	997,500	997,500	997,500	997,500	997,500
Heterobranchus spp. (2395x1.3kg) 3087.5xN350	1,080,625	1,080,625	1,080,625	1,080,625	1,080,625
Sub-total	**2,608,125**	**2,608,125**	**2,608,125**	**2,608,125**	**2,608,125**

B. Poultry out put project for 5 years.

Egg production at 85% for 11 months only at N400 per crate of 30 eggs.	3,740,000	3,740,000	3,740,000	3,740,000	3,740,000
Old layer less 10% mortality of initial no stocked (900x1.3kg) at N350 per kilogramme	409,500	409,500	409,500	409,500	409,500
Sub-total	**4,149,500**	**4,149,500**	**4,149,500**	**4,149,500**	**4,149,500**

C. Fish pond and poultry or succeeding 5 year period

(A) Out put (fish pond)	2,608,125	2,608,125	2,608,125	2,608,125	2,608,125
(B) Output (poultry	4,149,500	4,149,500	4,149,500	4,149,500	4,149,500
GRAND TOTAL, (A+B)	**6,757,625**	**6,757,625**	**6,757,625**	**6,757,625**	**6,757,625**

Table 4: repayment of 4,111,640 in 5 years at 22% interest rate.

Year	Total payment	Principal	Interest	Loan balance after payment
0	-	-	-	4,111,640
1	1726888.8	822,328	904560.8	3,289,312
2	1545976.6	822,328	723648.64	2466984
3	1365044.4	822,328	542736.48	1644656
4	1184152.3	822,328	361824.32	822328
5	1003240.1	822,328	180912.16	0
	6,825322.2	**4,111,640**	**2,713,682.2**	

Table 5 Depreciation of capital input

Total capital input = 1,068,440.

Year	Annual depreciation	Remaining balance
1	10% of 1,968,440 = 106,844	961596
2	10% of 961,596 = 96,159.6	865436.4
3	10% of 864,436 = 86,443.6	77992.4
4	10% of 777,992.4 = 7799.24	700193.16
5	10% of 700193.16 = 70019.316	630173.84

Depreciation for 5 years = 437,265.75

Profit = To (1+TR+DP)

Where To = Total output for years

T1 = total input for 5 years

TR = Total repayment over 5 years

DP = Depreciation of capital assets for 5 years.

To = 6,757,625+6,757,625+6,757,625+6,757,625+6,757,625

To = 4,111,640+324,4000+324,4000+324,4000+324,4000

= 17,073,240

TR = 6,825,322.2

DP = 437,265.75

Profit = 33,788,125 (17,073,240+6,825,322.2+437,265.75)

= 33,788,125

Profit = 9,452,298.