

# Market Development in the Niger Delta (MADE)

## Business Case

## Assessment of Value Chain Options



**Department for International Development  
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## Abbreviations

CPP	Crop Protection Product
DADTCO	Dutch Agricultural Development Trading Company
HQCF	High Quality Cassava Flour
FFB	Fresh Fruit Brunch (Oil Palm)
GDP	Gross Domestic Product
GESS	Growth and Enhancement Support Scheme
GHC	Ghana Cedi
ENABLE	Enhancing Nigerian Advocacy for a better Business Environment
IFDC	International Fertilizer Development Centre
IITA	International Institute for Tropical Agriculture
MADE	Market Development Program in the Niger-Delta
NCD	Newcastle Disease
NGN	Nigerian Naira
NIOMR	National Institution of Oceanography and Marine Research
NVRI	National Veterinary Research Institute
PIC	Presidential Initiative for Cassava
PIND	Foundation for Partnerships in the Niger-Delta

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RSPO Roundtable for Sustainable Palm oil

TPO Technical Palm oil

USAID United States Agency for International Development

RSSDA Rivers State Sustainable Development Agency

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## 1.0 INTRODUCTION

As indicated in section 3.2 of the main report, the value chains chosen for MADE to begin work on were palm oil, poultry, aquaculture and fisheries, smoked fish and agricultural inputs. Those not selected for implementation at this stage were cassava and recycling. The detailed assessments of these sectors are set out in separate documents, and are summarised in this Annex.

## 2.0 THE SELECTED VALUE CHAINS

The chosen value chains are palm oil, aquaculture and fisheries, smoked fish and poultry.

### 2.1 Palm oil

*Background:* Palm oil is the main vegetable oil consumed in the country and the Niger Delta region produces more than half the country's total output. In the Niger Delta region in 2012, an average estimate of 380,000 metric tons of palm oil was produced by smallholders for household consumption – valued at about 119 billion naira (£442 million) – and about 60,000 metric tons of palm oil for industrial use – valued at about 13 billion naira (£48 million). The sector provides employment and a primary source of income for not less than 954,000 smallholder plantation owners, smallholder processors, wholesaler and retailers in the Delta region spanning production, processing and marketing functions. This comprises about 498,000 men who are mainly involved in leasing of wild grove, small scale oil palm production and processing and 457,000 women who are mainly involved in harvesting, processing and marketing.

Among the four core oil producing states, Akwa Ibom and Rivers states have the largest areas under oil palm production, as shown in Table 3.

**Table A.1: Area under Oil Palm Production in the Niger Delta, 2009**

State	Area ('000 Ha)	State	Area ('000 Ha)
Akwa Ibom	275	Edo	103
Imo	178	Abia	184
Delta	80	Rivers	165
Cross River	296	Bayelsa	43
Ondo	111		
<b>Total for the nine states ('000 Ha)</b>		<b>1,435</b>	

Source: Omoti (2009) in PIND Oil palm Value Chain Analysis

There is a high demand in Nigeria for palm oil, resulting in a large shortfall in supply of 150,000 – 300,000 metric tons annually of domestic cooking oil (valued at about 70 billion naira) and over 400,000

metric tons of industrial grade palm oil (valued at about 80 billion naira). This is currently being bridged by imports despite the 35% tariff on imported palm oil. There are extensive informal imports from neighbouring countries.

### 2.1.1 Strategic constraints

The fundamental problem with palm oil production in the Niger Delta is that it is not very profitable and has been carried out primarily as a low input, low output crop. The main constraining factor contributing to the shortfall in local supply is the current use of inefficient processing technologies with low extraction rates (5-10% compared to global standard of 24%) by small holders. The processing is so inefficient that the actual production of oil has been a breakeven activity for most farmers, only making a profit on the sale of the main by-product – the cracked kernel. This low yield of oil pushes down the price of fruit, limiting the incentives for farmers to invest in production or supply of Fresh Fruit Bunch (FFB). The result is low yields, low output and low earnings.

The major systemic constraints are:

- a. Availability of appropriate technologies –
  - i. Fabricators have not taken up manufacture of more appropriate processing equipment because they do not understand the market
  - ii. Limited availability of reliable new planting material that farmers can trust
  - iii. Cost of harvesting is high as modern harvesting technologies either not in use or available for use
- b. Value chain linkages and relationships
  - i. Very few industrial scale oil mills operating profitably in the Niger Delta following the collapse of most major government owned mills. These are just now coming back into production following privatization, and are just re-engaging with local producers
  - ii. Limited linkages between farmers and vertically integrated industrial scale mills
  - iii. Limited linkages between existing small/medium scale mills and the secondary processors who are main drivers into the more formal industrial markets for palm oil
  - iv. Limited linkages between the Nigerian Institute for Oil Palm Research (NIFOR) and researchers to the equipment fabricators. NIFOR has good technologies, but no outreach.
- c. Flow of information on markets, technologies
  - i. Weak flow of information on availability of technologies and their value propositions
  - ii. Weak flow of information on good agricultural practices to farmers
  - iii. Weak flow of information on markets to the farmers and the millers
- d. Production practices lead to low yields
  - i. Weak application of good agricultural practices for weeding, pruning, applying fertilizer, herbicides, etc.
  - ii. Improper harvesting of fruit (how to identify when the bunch is ripe)
- e. Access to additional supporting services
  - i. Lack of access to credit for smallholder farmers and processors limiting the purchase of improved equipment and upgrading of the plantations.

Addressing the systemic constraints of the sector will increase the profitability of palm oil production (fruit and oil) by up to 50 per cent, creating opportunities for increased production of oil palm for smallholder plantation owners and palm oil sales for small scale processors and traders from the Niger Delta region.

### **2.1.2 Potential interventions**

MADE's intervention in the palm oil value chain will be driven by a strategy to encourage growth for small scale production. Increasing the productivity of farmers and processors in the Niger Delta region towards world standards will lead to increased profitability for small businesses, driving more substantial investments by small scale plantations to meet demands for household and industrial palm oil and increase income for farmers.

The broad strategy for achieving the vision will focus on addressing the key constraints of (a) lack of access to improved processing machines by small scale processors and (b) limited linkages between smallholder producers/processors and large scale processors.

**Lack of access to and adoption of improved processing machines by small scale processors** - in the short term, increased access and use of improved processing machines will provide a 50% increase in Technical Palm Oil (TPO) from the same amount of fruit for wholesalers/oil merchants, increasing the profitability to small farmers and small scale processors. With more oil regularly available, some processors will start identifying new markets, including joint marketing of better quality palm oil by functional processors' associations to secondary processors. These processes will increase the demand for FFB from small scale plantation farmers and incentivise farmers to supply more FFB through effective harvesting methods and improvements in productivity of existing plantations in the short term and expansion of area under production in the long term.

**Limited linkages between small scale plantation owners and large scale integrated mills** – a better, transparent and guaranteed offer of pricing and payment above prevailing rates for processed oil palm products will incentivise supply of FFB by small scale plantation farmers to large scale mills, thus incentivising small scale processors to offer higher prices for FFB and maximise output and earnings through use of improved processing machines.

The following interventions will be developed to achieve these aims:

- Awareness creation and demonstration of value of improved processing technologies and practices to small scale farmers and processors

- Strengthening fabrication and marketing capacities of fabricators for prompt supply of functional improved processing technologies to farmers

- Fostering linkages between secondary processors and small scale processors for supply of oil based on secondary processors' requirements

- Provision of information to large mills on possible clusters and aiding a transparent pricing and payment mechanism for supply of FFB by smallholders

- Maintaining a watching brief on the development of centralised out grower smallholder schemes that may help achieve the above objectives, with some possibilities for facilitation

- Strengthening the capacities of small holder groups to qualify for Round Table for Sustainable Palm Oil (RSPO) certification in order to organize supplies of FFB to large mills.

Political economy and potential conflict factors will need to be investigated in developing these interventions, particularly in relation to the access and use of land and to access to credit by small holders.

**2.1.3 Evidence base:** Very strong. The size of the potential market for palm oil is clear; there is extensive evidence for the impact of improved processing and linkages on incomes. Oil extraction rate is a major determinant of the level of profit that can be attained in palm oil production business depending on the type of processing technologies employed. In a study by Orewa et al., it was reported that the use of the

improved processing machine with 15% extraction rate yielded a 20.5% returns on investment;<sup>1</sup> whereas Ekine and Onuh (2008) revealed that the semi-mechanized processing machine with 6% extraction rate yielded a 2.21% returns on investment: so the improved machine produces an almost ten-fold increase in the return on investment.<sup>2</sup> Damoa, in a study of the effects of a supply scheme between smallholder oil palm farmers and a large oil mill in Ghana, found that incomes of farmers were improved significantly through their participation in the scheme: farmers were generally earning an income of GH¢150 per harvest, but this increased to about GH¢300 after they joined the scheme. These incomes had translated into higher access to health care, education, and food security for the households of smallholders.<sup>3</sup>

## 2.2 Poultry

**2.2.1 Background:** Demand for chicken meat and eggs in Nigeria substantial and growing at more than 20% per annum, as incomes rise and new marketing outlets are appearing. The government-imposed ban on poultry imports has raised the price of chicken meat and provides a strong window of opportunity for local production. The market for chickens is dominated by the live bird markets, where small farmers in the Niger Delta sell their chickens, but the number of fast food and institutional buyers is increasing rapidly. The bird population is dominated by traditional village or backyard production, raising mostly traditional birds, which accounts for 94% of chickens in the country. The “modern” chickens raised in commercial and industrial production<sup>4</sup> account for only 6% of the current population, but since they are slaughtered much more frequently, they still account for an important part of total production. Modern birds are bred for their specific functions, differentiated by “layers” (with a 2 year lifespan) and “broilers” (with a 6-8 week grow out period).

Modern chicken raising is fairly new to the Niger Delta, with most industrial broilers and many of the eggs consumed in the Niger Delta coming from the Southwest of Nigeria. The scarcity of commercial hatcheries to produce day old chicks for raising into broilers, and good processing facilities that meet international health standards, have limited the development of the broiler industry in the Niger Delta. Egg laying, which is less dependent on the steady supply of day old chicks, is gradually increasing in the Niger Delta.

In the Niger Delta approximately 3 million households – 44% of the households in the region – keep local chickens, with an average flock size of 11 per household. The four core oil producing states (Akwa Ibom, Bayelsa, Delta and Rivers) are estimated to account for 44% of households with chickens, and 50% of the chicken population, in the Niger Delta. Women are an integral part of traditional poultry value chain across Nigeria. They can be found at all levels of the value chain, primarily as producers who dominate the household production, but also as collectors, retailers in weekly markets, and retailers in daily markets, as well as in the provision of supporting services.

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<sup>1</sup> S.I Orewa, B. Adakaren, C.O. Ilechie and S. Obulechei, (2009); An Analysis of the Profitability of using the NIFOR Small Scale Processing Equipment (SSPE). *American- Eurasian Journal of Agronomy* 2 (3): 192-200,2009. <http://www.idosi.org/aeja/2%283%2909/13.pdf>. Accessed on 5<sup>th</sup> October, 2013

<sup>2</sup> Ekine, D.I. and Onuh, M.E. (2008) Economics of Small Scale Palm Oil Processing in Ikwerre and Etche Local Government Area of Rivers State, Nigeria. *Journal of Agricultural and Social Research*.2008, 8 (2) 150-158.

<sup>3</sup> Damoah, A.R. (2012). The effects of Benso oil palm plantation (BOPP) smallholder farmers’ scheme on rural poverty reduction in the Mpohor Wassa east district of Ghana” <http://dspace.knust.edu.gh:8080/xmlui/bitstream/handle/123456789/4922/Arthur%20Robert%20Damoah.pdf?sequence=1> Accessed on 5<sup>th</sup> October, 2013

<sup>4</sup> The FAO classifies commercial production as units with 2,500 to 10,000 birds and industrial production as units with more than 10,000 birds.

These traditional birds, though not reared with a specific commercial intent, provide a safety net for rural households, and serve several purposes; they provide a store of wealth and occasional income, add to the household protein consumption, and are used in meeting traditional obligations such as gift-giving during festive seasons. In a typical flock in a rural household, strong males and female chickens are retained for breeding, while the surplus is either sold for income (53%), kept for household consumption (39%), used for ceremonial, ritual, or other purposes (8%).

Opportunities to catalyze pro-poor growth in the Niger Delta's traditional poultry sector exist in breeding, vaccination, feed, housing, commercialization, and technical information. An analysis of the feasibility of different opportunity areas by the MADE team led to the conclusion that vaccination should be the initial area of focus, because that is the area with the largest initial boost to productivity in the sector. One of the major constraints on output from local chickens in rural areas is Newcastle's Disease (NCD), which has a high mortality rate of over 30% for the Niger Delta's local chicken population costing the sector about 8 billion Naira per annum in the Niger Delta. Deaths from NCD can be greatly reduced through vaccination.

### **2.2.2 Strategic constraints around traditional bird production**

The assertion that NCD is causing tremendous financial loss in the traditional poultry sector is not new. The problem has been known to agricultural policy-makers for years, but thus far mitigation approaches have not been successful, partly because they have been predicated on government patronage through vaccine donation, rather than the establishment of a market-driven approach which can deliver vaccination to low-income households in rural communities at feasible rates. However, commercializing the rural value chain for vaccination is a challenge that has been difficult to overcome in many countries, and in this case too, certain constraints will have to be overcome:

Absence of a rural distribution channel for vaccines.

The need for a change in farmer attitudes and practices: farmers in rural households do not consider the breeding of local chickens to be an enterprise, and are generally comfortable with the low-input low-output system

Access to information: changes in farmer behaviour can only take place if they have access to affordable and relevant technical information, reinforced by availability of the solution (vaccine).

Vaccine supply constraints: the National Veterinary Research Institute (NVRI) is presently limited in the amount of thermo tolerant ND 12 vaccines it can produce. NVRI unable to supply the quantity required by the whole industry. The gap is met by imports from Israel, China, India, Malaysia, and other countries by private companies, who then distribute the vaccine through networks of sales representatives and small-medium sized private distributors in states across Nigeria, but these are focused on the larger producers.<sup>5</sup>

Capacity of Private Sector Partners. Even if the business case is accepted by private vaccine distributors, their capacity to move vaccines through their distribution channels, and effectively establish and operate a link to rural areas will have to be carefully evaluated.

Regulatory constraints. Veterinary regulations impose restrictions on who can administer and apply vaccines.

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<sup>5</sup> Some of the leading companies are: Turner Wright, Animal Care, Talacolo, Global Organics, Global Vet and Agriproject Concepts International

### 2.2.3 Potential Interventions

Given these circumstances, MADE has begun to explore the feasibility of market-based solutions which can extend the supply of NCD vaccination to the Niger Delta's rural areas in an affordable, pro-poor manner. Given the virtually total absence of a market currently, the difficulties of such an intervention should not be underestimated.<sup>6</sup> For such a system to be established, two elements need to come together.

First a business case (value proposition) has to be presented to the vaccine distribution community, which can convince it of the potential of this formerly untapped market.

Second, the demand for vaccination amongst rural farmers has to be catalysed, by convincing them that the benefits of vaccination far outweigh the costs.

However, experience from a similar initiative in poultry health currently underway in Northern Nigeria under the Propcom Mai-Karfi project, while successful, has highlighted the challenges of establishing such a market system. Modifications have been identified which could potentially make the intervention model more feasible in the Niger Delta. Three key recommendations for consideration are to structure the pricing mechanism so that adequate revenue flows to private actors, to consider a one month 'campaign' model, versus a year-round supply chain, and to consider the provision of technical information on for example housing, feed, and breeding at the time of inoculation.

Moving ahead MADE is engaging in a rapid rural appraisal in a select sample of villages to document anchor points for a potential vaccine intervention. Based upon this, refined intervention prototypes with accompanying financial analysis can be developed. These should then be used to engage with the community of vaccine distribution companies, to explore opportunities for partnership as MADE moves towards the pilot testing phase.

The political economy assessment commissioned by MADE concludes that there is a relatively limited risk that state governments will actively seek to block MADE's work. MADE's activities are unlikely to be perceived to be an immediate threat to vested interests, and they do not prevent state governments from engaging in business as usual agricultural programmes. In this case, however, it will be important to establish a dialogue to ensure that the relevant authorities support, or are at least not opposed to, the development of a market based approach.

While MADE's initial focus is on the traditional bird sector, it will also continue to explore opportunities for addressing the constraints to the broiler industry in the Niger Delta.

**Table A.2: Poultry value chain's alignment with the critical success factors**

<b>Potential to generate increases in income</b>	MADE's analysis shows that if such a supply could be established, it could boost monthly household earnings for an average farmer (who maintains a flock of ten birds) by up to ten per cent (about NGN 7,900 per year).
<b>Benefits for women</b>	Given the high density of female involvement in the sector, such a change would have a direct positive impact on the economic position of women.
<b>Impact in core states</b>	The impact of the programme is likely to be greatest in Delta and Rivers States, where flocks are much larger than the average in the rest of Niger Delta region

<sup>6</sup> On the positive side, the absence of a market means that the attribution of results to the MADE intervention will be clear.

<b>Feasibility</b>	The Propcom Mai-Karfi intervention has demonstrated the feasibility of this type of intervention, suitably modified to suit conditions in the Niger Delta.
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<sup>6</sup> On the positive side, the absence of a market means that the attribution of results to the MADE intervention will be clear.

**2.2.4 Evidence base:** Strong. There is strong evidence from Propcom Mai-Karfi and elsewhere of efficacy of vaccination against NCD in raising income levels, and the desire to enter the market by agrovet firms. A MADE analysis of the Propcom project gives a strong basis for designing modifications that can make the programme feasible in the Niger Delta.

## 2.3 Aquaculture and fisheries

**2.3.1 Background:** The fisheries sector—comprised of both cultured and wild capture fish—is one of the most important sectors in Nigeria, with a wholesale value of more than US\$ 1 billion. The increased awareness of consuming fish over other forms of protein as well as population growth has created a strong market demand for fresh fish. The current supply of fish products is about 1.5 million metric tonnes from local and imported sources and the unmet demand is estimated at 1.16 million metric tonnes. With the appropriate support the Niger Delta aquaculture industry has the potential to increase production significantly meet part of that excess demand. In the Niger Delta, the sector is an important contributor to employment, livelihoods, and food security, particularly for the sector’s participants including pond farmers and fisher-folk, as well as pond fish producers, distributors, marketers, transporters, credit service providers, and boat, and net repairers.

The fresh fish market is dominated by cultured fish, which represents approximately 85% of total supply, while the smoked fish market is dominated by wild capture fish, which represents approximately 95% of total supply. The two value chains provide separate opportunities for interventions by MADE: the fresh fish project will focus on aquaculture, though not to the exclusion of wild fish capture; the smoked fish project will focus on wild capture fisheries, though not to the exclusion of aquaculture.

The aquaculture sector is valued at N70 billion and contributes some N22 billion to the regional GDP. Importantly the aquaculture sector has seen strong growth trends, with production jumping more than tenfold from 16,619 tonnes in 1995 to 200,535 tonnes in 2010. In terms of employment, the aquaculture sector directly supports an estimated 12,000 pond fish farmers in the Niger Delta of whom about 3,000 (25%) are female. The number of fish farmers has been growing steadily over the past decade in the Niger Delta.

**2.3.2 Strategic Constraints:** To realise the opportunities presented by the sector for poor fish farmers in the Niger Delta, the following underlying strategic constraints must be addressed:

1. Poor production knowledge and practices by farmers leading to large wastage of feed and poor water quality —resulting in a high production cost for catfish farming.<sup>7</sup>
2. Poor business management knowledge to understand the concept of profitability and inability to present a loan application that meet financial institutions requirements.
3. Low quality and reliability of fingerlings from hatcheries, whose supply is not very well matched to the timing of the demand for fingerlings.
4. Low awareness of the market opportunity for potential feed sales by some feed companies, leading to low market penetration.
5. Weak relationships between the value chain actors at different functional levels (producers to wholesalers) and within the enabling environment and supporting services.

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<sup>7</sup> Given that the majority of cultured fish in the Niger Delta is catfish, the pond demonstration will focus on the production of catfish.

6. Pond farmers have weak knowledge of markets beyond their immediate buyers; this limited understanding of demand for a broader range of products or their specifications limits farmer negotiating power in the value chain.

These constraints result in a high cost of growing out fish and limited markets. Addressing this constraint is particularly important given that as more fish farmers have entered the sector; the price of farmed fish has slowly decreased. In order to remain profitable and increase incomes, farmers must reduce their cost of production and increase their potential market outlets.

### 2.3.3 Potential interventions

MADE has chosen initially to leverage and replicate the work of PIND, which has successfully piloted demonstration ponds in Ekpan, Delta State. A recent assessment of PIND's demonstration ponds found that impacted pond farmer's on average increased their gross profit margin from 5% to 27% through improvements in pond productivity. Given the success of the PIND intervention in Delta State, MADE has decided to pilot the pond demonstration in Rivers State.

In piloting the pond demonstration, there are three models which MADE has the option to adopt.

**Model 1:** Collaborate with a feed company<sup>8</sup> to identify and select a local technical service provider who would manage the farmer training and demonstration ponds during the first production cycle. The technical service provider would simultaneously train the feed companies' staff to train and manage the demonstration pond, with the expectation that in the second production cycle feed company staff would be responsible for the training of farmers and management of ponds.

**Model 2:** Collaborate with a feed company to identify and select a local technical service provider who would immediately conduct a technical and enterprise development 'training of the trainer' course with feed company staff. Feed company staff would then train and manage the demonstration pond from the first production cycle.

**Model 3:** Utilise government extension workers to train farmers and manage the demonstration pond. In this model, a feed company would cost-share with MADE to train government extension workers to manage farmer training and demonstration ponds.

MADE has chosen to adopt **Model 1**, which puts feed companies at the centre of the intervention, increasing the replicability of the intervention as the demonstration model is incorporated into the marketing efforts of feed companies. The first model ponds will be developed in Rivers State, which has a large aquaculture sector conveniently located for the MADE headquarters and which appears to have the most promising potential partners. There is also a favourable enabling environment in the state, in view of the stated aim of the Rivers State Sustainable Development Agency (RSSDA) to make Rivers State the "Fish Basket of Nigeria" and its on-going efforts to achieve this goal. After piloting the demonstration pond in Rivers State with a feed company, MADE will attempt to replicate and scale-up the demo pond model in key states with other feed companies.

A demonstration pond is a "model" fish pond that is utilised to train fish farmers on the technical and managerial aspects of a successful fish farming business. In order to implement a demonstration pond, MADE must undertake the following major activities in roughly three phases: the set-up, involving the identification and negotiation with pilot partners (feed companies, hatcheries, technical service providers and producer associations) and facilitating the Rivers State Sustainable Development Agency

<sup>8</sup>Feed represents up to 60% of the cost of growing out fish; feed companies are thus heavily incentivised to better penetrate the market using demonstration ponds.

(RSSDA) to sponsor the physical pond infrastructure; the roll-out of the demonstration pond; and the knowledge dissemination process.

The initial demonstration pond activities will be the first step in a larger series of activities to increase access to quality fingerlings, strengthen association capacity to support their members, and open up new marketing channels. The exact mix of these further interventions will be partly determined by the lessons learnt during the pilots.

From a political economy perspective, as in the case of poultry, it will be important to ensure that the relevant authorities support, or are at least not opposed to the proposed approach – including, in this case, the initial choice of feed companies as partners rather than the use of government extension workers.

**Table A.3: Aquaculture value chain’s alignment with the critical success factors**

<b>Potential to generate increases in income</b>	Fish feed constitutes more than 65% of the pond operation cost; inefficient management of the fish feeding regime currently greatly impacts on the cost of growing out the fish. An improvement in the fish feeding regime will therefore have a significant impact on the income of fish farmers. A further improvement will result from tackling the current problem of inferior fingerlings being bought by fish farmers from unscrupulous hatcheries in this unregulated market.
<b>Benefits for women</b>	It is estimated that 3,000 of the 12,000 pond fish farmers in the Niger Delta are women. In addition, some 18,000 people, of whom 98% are women, are involved in the wholesale and retail trade in fish products in the region. As competitive supply increases, these traders will be able to sell more.
<b>Impact in core states</b>	Aquaculture is largest in Delta, Rivers, Bayelsa and Abia states, with potential for expansion into Akwa Ibom. But it can be applied anywhere in the region, and so can be a driver across the Niger Delta.
<b>Feasibility</b>	The successful use of the demonstration pond approach by PIND in Delta State has demonstrated the feasibility of this technique. There are a number of promising potential partners in Rivers State, especially feed companies, as well as a favourably disposed RSSDA.

**2.3.4 Evidence base:** Strong. PIND’s pilot demonstration programme in Delta State, for example was comprised of eight demonstration ponds. At the end of the six months growing period, participants recorded on average an increase from 5% to 27% gross profit margin, while the feed company also reported an increase in sales. In terms of practice adoption rates, follow-on PIND surveys found that eight of the nine key fish farming practices taught through the demonstration pond curriculum were adopted by over 50% of the participants. Feed companies are already asking for support to replicate the model in other states.

## 2.4 Smoked Fish

**2.4.1 Background:** As indicated above, the smoked fish market is dominated by wild capture fish, which represents approximately 95% of total supply. Furthermore, 95% of wild captured fish is smoked. The smoked fish project will focus on wild capture fisheries, and include promotion by the kiln manufactures to the smokers concentrating on aquaculture.

Smoking is deployed in the Niger Delta primarily for two reasons. Firstly, in the absence of widespread cold chain storage, smoking is the dominant way in which fresh fish is preserved. Secondly, the smoking of fish is a means of product differentiation, geared towards a different local and regional market. Consumer demand for smoked fish in Nigeria has fuelled strong growth in the sector. The smoked fish market in 2010 was 324,617 tonnes, valued at about NGN 396.908 bn (£1.475 bn). There are about 241,000 fisher folk in the Niger Delta, of whom 38% are women. While the men engage in finfish fishing, the women are mainly engaged in shellfish fishing. The sector also directly supports over 16,000 smokers (99% of whom are women) located in urban and rural smoking clusters.

In the Niger Delta, smoking activities are concentrated in fishing settlements (fishing beaches) that depend on wild captured fish and around some fish ponds. Rural fishing settlements where smokers live and work together are termed community clusters. The rural clusters at the fishing beaches use inefficient traditional altar smoking technology in grass thatched huts/sheds. These grass sheds occasionally catch fire – destroying the product within – and burning neighbouring smoking sheds. In urban areas, smokers operate in non-communal clusters, often at the markets, and rely primarily on farmed fish. Non-communal clusters are locations where smoking equipment (usually drum technology) is concentrated for use by smokers.

Clusters can be the work-site for anywhere between 15 and 30 people, who typically own the drums which they use to smoke fish. Smokers kill, gut, and prepare the fish prior to smoking as well as tending to the fish and firewood during the smoking process. Traditionally, smokers worked in community clusters on smoking platforms or altars. However, in urban areas smoking is now even done at the home with the drum technology.

Smokers can be differentiated into ‘smoking mammies’ and small-scale smokers. Smoking mammies control the sale of fish from specific boats; thereby securing a steady supply of fresh fish which they then go on to smoke at scale. ‘Smoking mammies’ are often employers, hiring women to prepare and smoke fish. Small-scale smokers are relegated to either buy smoking mammies’ excess fresh fish (fish that they do not have the capacity to smoke) or directly from fisher-folk at beach markets. The small-scale smokers are constrained by working capital to purchase more fish and by the length of time it takes to traditionally smoke fish.

#### **2.4.2 Strategic constraints**

The key strategic constraints to profitability and growth in the sector are:

1. High post-harvest losses on the part of both fisher-folk and smokers: losses can be as high as 14% on board the boats and 20% on shore.
2. Traditional smoking methods, the dominant form of smoking, are inefficient (requiring up to three days and much fuel wood) and can present a health hazard and a fire hazard.
3. There is virtually no marketing of commercially available improved smoking technology. Two improved technologies are Chorkor Oven, which is built of red earth and brick that is unavailable in many parts of the Delta and the National Institute of Oceanography and Marine Research (NIOMR) smoking kiln, which is relatively costly (prices range from NGN 110,000 for a 25kg kiln to 510,000 for a 500kg kiln, plus transportation and installation costs).
4. Lack of awareness of the value proposition for improved smoking technology by the smokers, and of the market size and how to sell by the kiln manufacturers.

**2.4.3 Potential Intervention:** The key intervention to develop the smoked fish market is to promote the roll-out of improved smoking technology. There are several models that MADE could adopt in rolling out the smoking technology during the pilot phase. The extent to which the models deployed during the pilot phase gain traction will dictate which model(s) are utilised during the implementation phase.

**Model 1:** MADE facilitates a smoking kiln manufacturer to deploy a smoking kilns in a number of community smoking clusters; with MADE organising the demonstration of the smoking kiln in collaboration with a smoking mummies. Smoking mammy will most likely manage the smoking kiln as a separate business, selling smoking services to other smaller smokers. This would help demonstrate the increased efficiency, quality, and profitability of smoking kilns to both smoking mummies and smaller smokers.

**Model 2:** MADE facilitates smoking mummies to purchase **and promote** improved smoking kilns to operate as a separate business, designed to sell smoking services to small-scale smokers. **This might include loan or grant finance for the purchase through the National Institution of Oceanography and Marine Research (NIOMR), assisting the smoking mammy to develop marketing materials and running awareness programmes alongside her.**

**Model 3:** MADE facilitates an independent service provider to deploy the smoking kilns in a community smoking cluster.

**MADE** is still negotiating with the different market actors to determine in which of these models there is the greatest interest and which is most applicable in a given market (for example, the possibility of NIOMR sponsoring the deployment of smoking kilns, with MADE sponsoring the training).

MADE believes that **Model 2** is most appropriate or the pilot phase in Akwa Ibom. However, moving forward both Model 1 and Model 3 remain applicable, with their adoption depending on the geographic location and socio-economic status of the community. In Bonny, Rivers State, for example, Model 3 would be more appropriate given the location and economic circumstances of the community.

**The current and potential economic power of the smoking mummies is likely to be a key focus of the political economy analysis undertaken in developing this intervention.**

**Table A.4: Smoked fish value chain's alignment with the critical success factors**

<b>Potential to generate increases in income</b>	The new technologies will reduce costs and losses, while speeding up processing in producing smoked fish in a sector in which there is strong growth potential driven by market demand for smoked fish products. This will benefit a large number of wild capture fishermen and smokers who derive a livelihood from the sector.
<b>Benefits for women</b>	99% of the smokers are women, whilst 37.47% of the fisher folk are women, mainly collecting shellfish
<b>Impact in core states</b>	The majority of wild capture fishermen are based in the coastal communities of Delta, Akwa Ibom, Bayelsa, Cross River and Rivers States. In those coastal communities an estimated 80% of residents are engaged in fishing activities and dominate the smoking of wild capture fish. The smokers associated with pond fishing are located near to all the ponds.
<b>Feasibility</b>	The feasibility of the intervention stems from the existence of technology partners that produce appropriate mechanised smoking kilns required to improve smoking efficiency in the sector to increase productivity and reduce post-harvest losses.

**2.4.4 Evidence base:** Strong/medium. There is strong evidence that the kilns improve output and reduce health and fire hazard: the USAID MARKETS II programme is already considering rolling out this technology. The evidence for the effectiveness of the chosen rollout model is medium: the method of *facilitating smoking mammies to purchase kilns is untested, but its potential effectiveness is sufficiently supported by the detailed research to justify testing it at the pilot stage.*

## 2.5 Agricultural inputs

### 2.5.1 Background:

For the Niger Delta's poor, agriculture is a critical sector, employing 11.1 million people, of whom 53% are women. This represents about 52% of the Niger Delta's total labour force and provides a livelihood for about 90% of the rural population. It accounts for 24% of the Niger Delta's contribution to the national GDP. According to the NBS, 30% of crop farmers in the Niger Delta are women, as shown in Table 8.

The incidence of poverty is highest among households in which the head is engaged in agriculture as the main source of income. Underpinning the high incidence of poverty in households engaged in agriculture is their low input/low output production model, characterised by a dominance of small farm units, soil fragility, rain-dependence, use of minimum inputs and poor yields. An increase in the Niger Delta's agricultural productivity through improved access to farm inputs usage holds enormous potential to raise incomes and reduce poverty.

**Table A.5: Crop farmers in the Niger Delta**

State	Men	Women	Total
Abia	187,175	122,023	309,198
Akwa Ibom	423,734	122,023	545,757
Bayelsa	106,423	72,114	178,537
C Rivers	348,050	183,956	532,006
Delta	369,791	219,050	588,841
Edo	321,018	113,033	434,051
Imo	349,172	126,288	475,460
Ondo	321,421	111,414	432,835
Rivers	455,663	176,986	632,649
<b>Total</b>	<b>2,882,447</b>	<b>1,246,887</b>	<b>4,129,334</b>
Per cent	70%	30%	100%

Across the Niger Delta, small scale farmers' access to and usage of agricultural inputs (fertilizer, seed and crop protection products) remains limited. In the fertiliser market, small-holder, rural farmers are often unable to access fertiliser at the right time, in appropriately sized packaging (appropriate defined by technical and cost considerations), in close proximity to their homesteads. In addition, when fertiliser is available, the lack of understanding regarding its benefits and proper application limit its use and corresponding positive impact on yields.

In 2012, the Federal Government, in recognition of the negative impact of government interference in the fertiliser market, introduced the Growth and Enhancement Support Scheme (GESS); a new smart-

subsidy scheme that removed government from the distribution of fertiliser. 65% of the targeted smallholder farmers were actually reached by the subsidised price in the first year of the programme – a massive improvement as compared to the 10 – 12% uptake by targeted smallholder beneficiaries in the old subsidy scheme. However, the GESS has not entirely addressed the challenges in the sector; the primary problems of timeliness of delivery and farmers understanding of how to use fertiliser still persist. In addition, the structuring of the GESS – which uses large distributors who are incentivised to exclude other smaller market actors (agro-retailers) as the distribution points – is not promoting the extent of market development that could be expected.

In contrast, the crop protection product (CPP) market in the Niger Delta is relatively robust, experiencing steady growth in the past four decades. The increased use of CPP over the past four decades has been primarily driven by active marketing – an outcome of the intense competition in their industry—on the part of CPP companies. In addition, the CPP market has enjoyed limited government interference in the procurement and distribution of CPPs. The benefits of CPPs, however, are compounded when used in conjunction with fertiliser and improved farming techniques.

MADE has selected the agricultural inputs market, therefore, because of the importance of CPPs and fertiliser to agricultural productivity, crop yields, and if marketed and linked, conversion to income. Seeds are not the primary products of the major agricultural input supply companies, but can be added into the sales basket for the agro retailers.

### **2.5.2 Strategic constraints**

The total amount of fertilizer sold in the Niger Delta is only about 64,000 MT per annum: with 4.2 million farmers in the region, that represents less than 15 kg per farmer. The fertiliser market was dominated by the public sector channel, but the GESS subsidy scheme is designed to stimulate crowding-in of private sector players. The new system is reaching more end customers using new and opportunistic distributors, but it is crowding out more village-level retailers from the market place. Retailers are being displaced because participating agro-dealers (distributors, retailers) have to have the cash flow to be able to afford to buy at least 30MT of fertiliser, sell to farmers at 50% of the market price before claiming back it from government. The latter can take two to four months. While CPP use is more prevalent in the Niger Delta, the CPP companies' limited understanding of market opportunities in the Niger Delta has stifled their expansion and marketing efforts in the region.

Some of the constraints facing farmers in having access to are:

1. Poor understanding of farmers' needs and purchasing patterns by the fertiliser companies. There is the misconception that farmers can only afford subsidized fertilizer; while they may indeed be too poor to buy large bags at market rates, they can afford smaller volumes of product at unsubsidised prices; and farmers who do not access the subsidized fertilizer need and want to buy at least some quantity of market-priced fertilizer.
2. Inappropriate farm usage of agricultural inputs. Many farmers lack knowledge on correct dosages and application techniques.
3. Inappropriate packaging compared to farmers purchasing power. Fertilizers are commonly sold in 50kg bags for N3,500-5,500. Such an investment is far too high for most smallholders and is inappropriate for the amount of land they want to fertilise.
4. Government influence. Access of smallholders to fertilizer supply in Nigeria is problematic. GESS (subsidized) fertilizer supplies often arrive late, after the fertiliser application window has passed.

5. Retail markets for fertilizer are located in urban centres, far from the rural farming communities, thereby significantly increasing acquisition costs for farmers.
6. Weak fertiliser company marketing strategies. Fertiliser companies tend to be unaware of what happens to the fertiliser after it leaves the company stockroom. The primary concern of the fertiliser companies is that the distributors are buying it – not the placement or promotion tactics of the distributors. Fertiliser companies do not perform the market research to become aware of what poor farmers need or buy, and retailers and distributors do not feed market information back up the value chain to the fertiliser companies.
7. Inaccurate knowledge by farmers about the effects of fertiliser. There are various myths about the use of fertiliser and its effect on crops. Farmers in the Niger Delta, for example, generally believe that inorganic fertilisers cause tubers to rot i.e. reduces the shelf life of harvest tubers.
8. Poor understanding of crop farming locations in the Niger Delta. The CPP companies are not expanding into the Niger Delta because of they know little about crop farming in the Niger Delta.
9. Limited knowledge of market opportunities for CPP usage in the Niger Delta.

### **2.5.3 Potential interventions**

MADE proposed to promote market driven relationship between agricultural input companies and crop farmers where farmers have access to appropriate farm inputs and improved farming technology to increase productivity.

The MADE team will initially target the states of Edo, Delta and Cross Rivers. The first reason for targeting these states is the strong presence there of major CPP and fertiliser companies: the interventions could be through either a regional company office or a major distributor/retailer of a company, or, in the case of Rivers State, the presence Notore's fertiliser blending facility. Secondly, the proportion of farmers that have access to government subsidised fertiliser in these states is low compared to other Niger Delta states. Thirdly, these states produce, in high quantities, cash crops from which farmers derive an income. Those crops include: cocoa, maize, rice, fruit (in particular pineapple) and vegetables – as well as oil palm, a priority crop for MADE. Field work has highlighted that farmers are more likely to apply fertiliser and CPPs on crops from which they derive an economic benefit.

The MADE intervention will aim to facilitate the development of distribution systems that profitably supply of fertilizer in suitable package sizes at an affordable price points. The programme will work with fertiliser and CPP companies to embed good agricultural practice into the selling process agricultural inputs, through existing functional farming input distribution network, including:

**Suitable pack sizes:** Focus on the packages sizes of fertilizer that resource poor farmers can afford and that is of commercial value to the farmers.

**Target marketing:** Develop suitable marketing and education curriculum that are easy to understand by the resource poor farmers and women and that generates good product offtake.

**Embedded services:** Make good agricultural practices a central message of the selling process. Establish knowledgeable village-based agro retailers that sell and teach farmers improved farming practices and techniques.

Suitable blends: as a secondary activity, MADE may also facilitate relationship-building between the fertiliser companies and soil experts that will lead to a better understanding of the agronomic (fertiliser) needs of Niger Delta farmers.

The programme will seek to increase the direct linkages between the companies selling fertilizer and CPP and the clients at the retail level, which will build trust, information, and a solid foundation of clients. It will add more products to the items being demonstrated and marketed by the retailers and village level extension agents.

Finally, MADE will work to advocate to government for modifications to the GESS which will include all actors in the value chain (especially retailers) and increase the competition among government accredited distributors, and enforce a closer relationship with the end consumers of their products.

**Table A.6: Agricultural inputs value chain's alignment with the critical success factors**

<b>Potential to generate increases in income</b>	There are over four million crop farmers in the Niger Delta and the sector employs 11.4 million people. The incidence of poverty is highest among households in which the head of household is engaged in agriculture as the main source of income, and there is great scope for raising incomes and reducing poverty by increasing agricultural productivity through improved access to agricultural inputs.
<b>Benefits for women</b>	30% of crop farmers are women (i.e. 1.2 million farmers), and women also represent 53% of the 11.4 million people employed in the sector.
<b>Impact in core states</b>	43% of crop farmers in the Niger Delta are located in the three core states that are included in six states in which MADE will be working on agricultural inputs. <sup>9</sup>
<b>Feasibility</b>	The approach to be taken to improving access to and use of agricultural inputs is tried and tested, and there are good potential partner companies that are willing to work with MADE on the intervention.

**2.5.4 Evidence base:** Strong. There is very strong evidence for the success of the proposed approach in other parts of Nigeria, particularly the highly successful Propcom fertiliser cooperation with Notore, but also including programmes in relevant areas by IFDC, PIND and ENABLE. The MADE assessment of conditions in the Niger Delta provides strong evidence that these techniques will also work in this region.

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<sup>9</sup> Bayelsa State, with 178,537 crop farmers, has only 4% of the crop farmers in the region

## 3.0 THE VALUE CHAINS NOT TO BE PURSUED AT THIS STAGE

The feasible value chains not chosen for the programme at this stage are cassava and recycling.

### 3.1 Cassava

**3.1.1. Background:** Nigeria is the biggest producer of cassava in the world and cassava is the most important source of starch consumed by Nigerians. The Niger Delta produces 14 million tonnes of cassava a year, accounting for a third of national cassava output, contributing about 34% to total household income for cassava farmers in the region. The production of cassava in the Niger Delta is dominated by over three million small producers, with a few medium and large-scale producers. Mirroring production, there are more cottage and micro-processors than medium and large-scale processors. The sector provides employment for farmers, farm labourers, processors, traders, and transporters; over 80% of the region's rural poor derive some benefit from the cassava value chain in one capacity or another.<sup>10</sup> Cassava is important from the perspective of household food security as well as a major source of cash income for producing households. In comparison to other cash crops, cassava, provides a source of income to a larger percentage of households, contributing positively to poverty alleviation.

The smallholder farmers (who produce cassava primarily (95%) for the traditional food market)<sup>11</sup> produce on an average land-holding of less than two hectares, rely on family labour, underutilise agricultural inputs, and rely on little or no mechanisation. In addition, access to markets remains a challenge as a result of both infrastructure (there are few access roads to small-holder farms) and weak linkages to processors.

Most large cassava processors operate at low levels of capacity utilization because they cannot access the needed supply of the cassava within the required timeframe from harvesting (48 hours) to processing.

The function of the value chain for cassava is to meet the predominant demand from consumers for garri and fufu. However, overall demand for cassava in the consumer segment is not growing, as consumers switch to other commodities such as rice or potatoes as their incomes increase. Opportunities to increase demand focus on links to the industrial markets for starch or High Quality Cassava Flour (HQCF), which could consume an additional 2-3 million tons of cassava per year. This has made cassava one of the focal commodities in the Federal Government's Agricultural Transformation Agenda, which is investing in large-scale cassava production and processing.

Many cassava programmes have been tried over the years with no sustainable success and outreach, at least in part as a result of political economy or conflict issues. Most have been supply led by government or other donors, which have not taken into consideration the demand factors associated with consumption of the new production or the economic viability of processing operations. The examples of the Presidential Initiative for Cassava – PIC – and the USAID funded, IITA implemented, Cassava Enterprise Development Project, stand out for increasing production and for processing, respectively. Another more commercially driven programme, the Dutch Agricultural Development Trading Company (DADTCO) which utilizes a proprietary technology for primary processing into wet cake, has floundered on cash flow problems.

<sup>10</sup><http://www.pindfoundation.net/wp-content/plugins/download-monitor/download.php%3Fid%3D14>

<sup>11</sup><http://www.dadtco.nl/nigeria-largest-cassava-producer>

### 3.1.2 Strategic Constraints.

**High fragmentation and weak relationships** between the cassava value chain actors makes it difficult for larger scale processors to establish supply contracts with small farmers. Local processors who pay higher prices for smaller quantities distract small farmers, who are highly price sensitive, from honouring agreements to sell to large processors.

**Few and generally weak industrial processing companies** limit the current demand for cassava for industrial processing. Their weak cash flow often constrains their ability to purchase cassava when they need it. In addition, they are competing within parameters established by the international markets for starch and other industrial products restricting the prices they can offer to the farmers.

**High costs of harvesting cassava.** Cassava is a very heavy, low value/ton, crop, which is often intercropped with maize. In addition, the typical farmer's plots are not necessarily contiguous. This makes it difficult to apply technological solutions for harvesting.

**High transport costs.** Given its heavy weight, moving cassava from deeper rural areas to the market is onerous and expensive. This reduces the return to the farmer who must absorb this cost.

**Availability of appropriate agricultural inputs and application of good agricultural practices.** Improved varieties of cassava have been developed but do not have distribution channels to get them to the small farmers on a sustainable basis. Availability and use of fertilizers are limited, both by the limited supply into the region and the appropriate size of packaging for small farmers.

**Low profitability of processing cassava into HQCF.** The prices paid by the large flourmills for HQCF have been set at NGN 80,000 per ton, which is at or below the breakeven price for small-scale HQCF processors.

**Large millers bypass the mandated requirements for HQCF.** While the government has mandated a 10 % inclusion rate of HQCF into wheat flour, the wheat flour milling industry (dependent on imports) is tightly controlled by a few companies, which do not have an incentive to mix in HQCF. These are resisting its adoption by setting prices for the HQCF that are below the costs of production for most HQCF processors.

### 3.1.3 Potential Interventions

Any successful set of market driven interventions leading to a sizeable increase in the production of cassava must respond to potential increased demand. Simply producing more cassava without ensuring a rapid uptake will lead to continued frustration. Therefore, linkages must tie into the demand side for either industrially processed or cassava processed for the local market.

Linkages to large processors to establish regular supply between farmers and a known demand. This guaranteed uptake will lead to the adoption of new technologies. In order to create a real market for the needed inputs and services, the experience has shown that the intervention would need to focus on medium scale farmers, initially, gradually evolving to smaller farmers.

Increasing the efficiency of processing and the effectiveness of marketing in the cassava food market. This could be at two levels, by stimulating the market for labour saving technologies for peeling, grating, and primary processing of cassava to bring down the cost of processing, or for increasing the production of packaged products for niche markets.

- While these technologies have been around for years, adoption has been limited and there is not a vibrant fabrication market for them. These would remain oriented to the very local market
- Focus on processing for the small niche markets of food starch, packaged garri and fufu for the supermarkets. This would have small outreach and would concentrate on limited communities around the smaller mills, but might demonstrate some useable pilots.

The detailed appraisal, however, led to the conclusion that none of these options is considered to be currently feasible in the context of **the political economy of** the Niger Delta. Cassava is a highly political crop and is heavily influenced by government policy. This has led to heavily subsidized programmes that severely distort the market. To date, despite more than US\$100m spent over the last 10 years, there have been no major successful programmes to stimulate cassava production in Nigeria that have led to sustainable increases in market demand. There are indications that there may be further developments in the Government's role in cassava in the near future, which may open up future potential for a MADE intervention. Currently, however, successful linkages programme would need to focus initially on larger scale farmers, with little demonstrated outreach to smaller farmers, and would therefore not have the required impact on poverty within the timescale of MADE.

However, there have been several large investments in flour and ethanol plants in other parts of the country, which are stimulating the demand for cassava in those regions. It is possible that an opportunity may arise at some point for MADE to develop an effective, pro-poor intervention in this very important value chain, so the cassava sector should not be written off. MADE management will keep the cassava market under constant review so that MADE does not miss an opportunity to work successfully in cassava.

**Table A.7: Cassava value chain's alignment with the critical success factors**

<b>Potential to generate increases in income</b>	MADE's analysis shows that the main potential for additional demand for cassava tubers is to service the industrial sector, which could increase production by up to 600,000 tons in the Niger Delta (valued at \$17 million per annum)
<b>Benefits for women</b>	Given the high level female involvement in the sector as producers and processors, increasing the demand for and a supply response to a direct positive impact on the economic position of women.
<b>Impact in core states</b>	The impact of a successful programme would reach across most of the states of the Niger Delta
<b>Feasibility</b>	As indicated above, it is not currently feasible to develop a programme that would have the required impact on poverty within the timescale of MADE

**3.1.4 Evidence base.** Strong. The experience of the PIC was that it led to overproduction and wastage of millions of tons of cassava. The recent PIND experiences with Thai Farms and MARKETS II experiences with MATNA, have demonstrated the need work with larger scale farmers and the risks of working with unsophisticated processors.

## **3.2 Recycling**

### **3.2.1 Background**

Recycling of plastic (PET) and aluminium for reprocessing employs about 42,000 people in the Niger Delta. This includes about 10,000 poor women who collect cans and bottles to supplement their incomes. Global demand is strong and nearly all recycled materials are exported from Nigeria, with most going to China. Aluminium ingots account for the bulk of recycled exports (over \$100 million in

2012). Meanwhile, about 5,600 tons of PET were recycled in 2011 in Nigeria, accounting for about 25% annually produced plastic bottles<sup>12</sup>.

The value chain is comprised of actors including primary collectors, secondary collectors, traders, and processing plants. Women are mainly involved at the primary and secondary levels of collection, focusing on the lighter materials (cans and bottles), while men focus on the much heavier and more lucrative aluminium sheeting and metal recycling. The sector is structured with associations of recyclers, which govern the access to the dump sites and dictate roles for men and women.

A new initiative with Alkem, funded by Coca Cola, has driven the uptake of PET recycling, by setting up Collection Centres in various waste disposal sites. While there are currently three of these in the Niger Delta, Alkem is dependent on a buy-back subsidy to purchase more PET bottles, and has not been willing to invest in the outreach beyond what will be subsidized.

### **3.2.2 Strategic constraints.**

Transport is the major cost associated with the collection of recycled materials. Aluminium can be compressed relatively easily, but given its bulky nature the major constraint to increasing collection of PET is the requirement.

Working capital at the secondary collection level is the second major strategic constraint for women traders.

There are policy issues facing women's access to the waste disposal sites to collect recyclables at the most concentrated points.

The recent ban on Okadas (motorcycle transport) in most towns has negatively affected the ability of women to cost effectively transport the items they have collected.

### **3.2.3 Potential interventions**

The main points of leverage for collecting recyclables are at the waste disposal sites and large industrial sites (such as oil company offices and sites).

Work with Alkem, or other company, to develop a profitable business model to establish collection centres in major dump sites in the Niger Delta without requiring the buy-back subsidy.

Advocate for greater role by women in the associations and lobby for increased access to dump sites by women collectors.

**Table A.8: Recycling value chain's alignment with the critical success factors**

<b>Potential to generate increases in income</b>	Improving the ease of crushing PET materials could add about \$2 per day of income to a limited number of women (about 50 per collection centre). It would have limited scope for expansion, as lead firms are focusing on getting subsidy from big bottling companies to drive growth.
<b>Benefits for women</b>	The activity would concentrate on women only in the collection centres.
<b>Impact in core states</b>	This could be replicated across each of the states in the Niger Delta, but on a limited scale.
<b>Feasibility</b>	This initiative has been subsidized by Coca Cola as a CSR activity. Coca Cola which is now seeking additional sponsors to participate in the buy-back programme, restricting the market development aspects.

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<sup>12</sup> Post-consumer PET bottle recycling project in Nigeria

**3.2.4 Evidence base.** Medium. Alkem has demonstrated that, with the buy-back subsidy scheme, this is a profitable business. They are not yet willing to discuss operating it without the buy-back scheme, as this would cut off their source of subsidy.