MARKET
DEVELOPMENT
IN THE NIGER DELTA

DFID Department for International Development

Funding for this programme
is provided by the United Kingdom's
Department for International
Development (DFID)

Monograph Series Vol. 5

# CLIMATE AND ENVIRONMENT ASSESSMENT

**CONTACT**:
13B ONTARIO CRESCENT
MAITAMA, ABUJA
Tel: +234 818 800 5248
DAISERVICES@DAI.COM

MARKET
DEVELOPMENT
IN THE NIGER DELTA

# CLIMATE AND ENVIRONMENT ASSESSMENT

April 2014

# Table of Contents

## 1.0 REPORT SUMMARY

In line with DFID requirements, Developing Alternatives Incorporated (DAI) Europe Ltd. has carried out a climate and environment assessment as part of the Business Case for the **Niger Delta Market Development Project (MADE)**.

The MADE project is designed to address increasing incomes in the Niger Delta by working in four to six different market systems (sectors). The desired results are to reach 150,000 primarily economically active poor, to increase their incomes by 40 - 50 percent over the life span (4 - 5 years) of the project. Women are expected to be half of the target population. The MADE project will concentrate on the core states of the Niger Delta (Delta, Rivers, Akwa Ibom, and Bayelsa) where the greatest incidence of poverty and conflict exist.

The Climate and Environment Assessment of this Business Case defines the climate and environment context; applies a Climate and Environment Sensitivity Analysis (to identify climate and environmental impacts and opportunities); assigns an overall categorisation for risks and opportunities; and, additionally, a Climate and Environment Assurance note has been drafted.

The activities for the selected interventions have been rated. Regarding risks, all interventions were rated as posing medium risks, category B, to the climate and environment. This rating is mainly due to the already fragile environment of the Niger Delta. If these interventions were undertaken in a less vulnerable ecological location, they would pose very little climate risk. The project has taken care to ensure that interventions selected have minimal impact on climate change and the environment. For those interventions where medium or low risks exist, relatively low cost measures to mitigate against them have been highlighted. Moreover, given the livelihoods sensitive focus, limited scope, scale, and duration of the project, the chances of any sustained climate or environmental damage are remote.

The impact of climate and environmental factors on the programme's implementation and outcomes is significant for most of the sectors in view of the sensitivity of the Niger Delta region to these, where flash floods and oil pollution in particular pose outstanding overarching environmental concerns, which might variously impact on any or all proposed activities. Although these high and medium risk impacts can in the main be minimised through the effective implementation of international best practices and environmental safeguards, nonetheless this was felt to be a significant overall Category B risk.

All interventions were rated as medium B for opportunity. The main opportunity for all of the interventions lies in their capacity to diversify livelihood options, increase household income, and in so doing to reduce vulnerability and increase climate resilience. This potential impact should not be underrated. Some interventions also offer direct ways where there may be an opportunity for positive environmental impact (for example improved fish smoking technology), but as with risks, the small scale and limited geographical scope and coverage of the project mean that the chance of this being more than a localised impact are small.

> *Note to readers: Climate and Environment Assessments are used to ensure that climate and environment risks and opportunities are considered as part of the process in developing new DFID Business Cases.*

# 2.0 SECTION 1 CLIMATE AND ENVIRONMENT CONTEXT

## 2.1 The Niger Delta Environment

With now well-recorded rising sea levels in the Niger Delta, significant coastal erosion is predicted[1]. Flooding of low-lying areas in the Niger Delta region has been observed, and some settlements in the coastal region have been forced to relocate[2]. The inundation will increase flooding problems, and in addition the intrusion of sea-water into fresh water sources – combined with rising temperatures and changing rainfall patterns - will destabilise existing ecosystems such as mangrove swamps, and reduce biodiversity[3]. Extreme weather events are becoming more common and rainfall patterns are changing, becoming more erratic. These changes will adversely affect agriculture, fisheries and the capacity of local smallholders to sustain a livelihood[4].

The Niger Delta is richly endowed with natural resources - primarily oil and gas. The region contains the world's third largest wetland, consisting of diverse ecosystems of mangrove swamps, fresh water swamps, and rainforest which give rise to its rich biological diversity. The majority of its population have livelihoods which are dependent on the environment, mainly through agriculture, especially crop farming and fisheries. The region has a rapidly growing population, estimated to be over 30 million people as of 2005, accounting for about 24% of Nigeria's total population[5]. Its population density is also among the highest in the world with 265 people /km2 [6]. This has resulted in the creation of an urbanised enclave with no accompanying economic growth to provide jobs.

There are a myriad environmental problems in the Niger Delta, resulting from large-scale unsustainable exploitation of oil and gas in the region, include direct oil pollution, land degradation, surface and groundwater contamination, and air pollution from flares. A lack of appropriate sanitation, inadequate natural resource management including land, coastal and marine resources, are some of the other environmental concerns in the region. Nigeria lacks a responsive environmental management framework and suffers from weak regulation and institutional capacity. This means that the implementation and enforcement of environmental laws is below normally required standards. Though there are well established institutional frameworks including those of the Federal and States Ministries of Environment, and agencies such as DPR, NESRA and NODSRA, the lack of coordination, funds and well trained personnel have stalled efforts by these institutions to effectively protect the environment of the Nigerian Delta region.

---

[1] Nzeadibe, Thaddeus C., et al. "Indigenous innovations for climate change adaptation in the Niger Delta region of Nigeria." Environment, Development and Sustainability 14.6 (2012): 901-914.

[2] Uyigue, E. and Agho, M. (2007). Coping with Climate Change and Environmental Degradation in Niger Delta of Southern Nigeria. A publication of the Community Research and Development Centre, Nigeria

[3] Ogunwusi, A. A., and A. P. Onwualu. "Influence of Climate Change on Biodiversity Conservation in Nigeria." Agricultural Extension Strategies For Climate Change Adaptation: 34.

[4] A.O. Akinro , D.A. Opeyemi and I.B. Ologunagba , 2008. Climate Change and Environmental Degradation in the Niger Delta Region of Nigeria: Its Vulnerability, Impacts and Possible Mitigations. Research Journal of Applied Sciences, 3: 167-173.

[5] PIND (2011) Report on Economic Opportunities in the Niger Delta.

[6] Ike, P.C. and U.N. Uzokwe (2011), Estimation of Poverty among Rural Farming Households in Delta State, Nigeria. Int. J. Agric. Food Sci. Technol., 2(1):11-21. Cited in The Role of Economic Development in Peacebuilding by Pius Ike, Paper presented at PIND's Niger Delta Development Forum – Supporting Poverty Reduction through Partnership, Held at Novotel, Port-Harcourt, 21 -22 November 2012

The benefits of oil and gas to the Nigerian State and its people is not in question, but the massive spillages caused by the incessant oil pollution perpetuated by the oil industry in the Niger Delta have resulted in destruction of farmlands, sources of drinking water, fishing grounds and a decline in fish and fisheries catches[7]. As a result, rural agricultural populations are suffering livelihood and income loss due to land degradation and pollution of water bodies. Other challenges include deforestation, unsustainable agricultural practices and lack of access to farm inputs. The poor and most vulnerable living in the Niger Delta have suffered disproportionately from industrial pollution and environmental degradation. This is exacerbated in the core States of the Niger Delta (Delta, Rivers, Akwa Ibom, and Bayelsa) where the greatest incidence of poverty exists and frequent conflicts are recorded.

The environmental challenges in the Niger Delta have been persistent largely due to the inability of regulating agencies to effectively enforce prevailing regulations. It is also unlikely that these issues will be resolved in the near future, until such time as the agencies concerned have built appropriate capacities, in addition to enhancing cooperation amongst the different regulating agencies and regional bodies.

## 2.2 Linkage between Poverty and Marginalised Groups in the Niger Delta

Nigeria's agro-ecological zones (AEZs)[8] can be classified into (i) mangrove forest and coastal vegetation; (ii) freshwater swamp forest; (iii) tropical high forest zone and (iv) derived Guinea Savannah[9]. The mangrove forests are permanently water-logged, and soils high in salt content are not cultivated; ecosystems and biodiversity are much threatened by rising sea levels, changing rainfall patterns and rising temperatures. Freshwater swamps are further inland but lie below 30 metres asl, and are very susceptible to sea level rise, with areas now no longer beyond the reach of tidal waters. Fishing and fibre products are the important sources of livelihoods for these communities[10]. The tropical high forest zone is characterized by a prolonged rainy season, resulting in high annual rainfall above 2000mm. An environment already drastically degraded by human activity, this area is increasingly under threat from climate change through increasingly erratic rainfall. Derived Guinea Savannah describes the transition zone between tropical rainforest and guinea savannah zones. The savannah has enormous potential for food production in the country, but its reliance on rainfed agriculture places it under threat from more erratic rainfall patterns[11]. AEZs correspond closely to livelihood zones, as the manner by which people make a living within them is reasonably homogenous, whilst between AEZs there is more diversity.

It is estimated that about 1.2 billion people world-wide live in absolute poverty which is unacceptably high[12] and some 70% of these people depend on natural resources for all or part of their livelihoods[13].

---

[7] Kadafa, Adati Ayuba (2012), Environmental Impacts of Oil Exploration and Exploitation in the Niger Delta of Nigeria. Global Journal of Science Frontier Research Environment & Earth Sciences Volume 12 Issue 3 Version 1.0 Year 2012. Online ISSN: 2249-4626 & Print ISSN: 0975-5896

[8] ; http://www.fao.org/ag/agp/AGPC/doc/Counprof/nigeria/nigeria.htm

[9] http://agriculturenigeria.com/introduction/agro-ecological-zone

[10] Adewumi, M. O., et al. "The profitability analysis of artisanal fishing in Asa River of Kwara state, Nigeria." International Journal of Development and Sustainability (2012).

[11] Oyenuga, V.A. (1967). Agriculture in Nigeria. Food and Agriculture Organization of the United Nations). FAO, Rome, Italy. 308 pp.

[12] UNDP-UNEP (2013) Poverty-Environment Initiative Brochure June 2013.

[13] Green Economy Coalition, 2012.

In the Niger Delta an estimated 70% of the region's population live below the poverty line according to the UN's HDR [14], or 45% using World Bank's income poverty figures of less than $1/day. This is aggravated by the fact that the majority of the poor live in rural areas and are mainly dependant, to some degree, on subsistence agriculture. Poverty is endemic across all AEZs discussed.

There are important links between natural resource management and poverty[15]. Many poor people, particularly in developing countries, rely on natural resources for their livelihood, and are very vulnerable to any deterioration in such resources. This has been demonstrated tragically by the recent famines in sub-Saharan Africa, and less dramatically by the declining living standards of fishing communities in the Niger Delta, which have suffered from the destruction of fish habitat in the mangrove zone and highly persistent contamination of many creeks, making them unsuitable for fishing.

Climate change, biodiversity loss, land use change, and chemical pollution continue to impede sustainable human development and the achievement of the MDGs. Environmental conditions and access to natural resources are intimately linked to people's livelihoods, health and vulnerability, especially for people living in poverty. Expanded public and private investment to improve the access of people living in poverty to these environmental assets can generate strong returns for poverty reduction and contribute to pro-poor growth. Yet, despite their critical importance, environmental assets continue to be degraded at an alarming rate. Unsustainable patterns of consumption and production increasingly risk surpassing known limits.

Poverty levels in the Niger Delta region have declined in recent years, from 78% living on less than a 1$ per day in 2004 to 45% living on less than 1$ per day in 2007[16]. By this measure (income) poverty in the region is slightly below the national average; however stark inequalities impact perceptions of poverty and have led to tensions within communities.

## 2.3 MADE responses

The MADE project has been designed to be equitable and inclusive to the concerns and contributions of marginalized groups. Women are currently under-represented in politics, government, economic and educational institutions and smallholder agricultural businesses. At the community level women are excluded from decision making, and have a weaker voice in most community affairs. They have less access to land and other factors of production. Women in the Niger Delta region tend to be employed informally and experience relatively high levels of under-employment. Key sectors involving female labour are predominantly farming (e.g. cassava and plantain) often at a subsistence level; and agricultural processing (e.g. cassava and fish processing).

Environmental degradation and climate change are key challenges for the Niger Delta region, particularly for poorer farming communities (mostly women) who are the key target beneficiaries of the MADE Project.

[14] UNDP Nigeria, 2006, Niger Delta Human Development Report.., quoted in the PIND Report on Economic Opportunities in the Niger Delta May 2011.

[15] Ebegbulem J. C, Ekpe D., Adejumo T. O (2013), Oil Exploration and Poverty in the Niger Delta Region of Nigeria: A Critical Analysis. International Journal of Business and Social Science, Vol. 4 No. 3; March 2013 Pp 282. Centre for Promoting Ideas, USA. www.ijbssnet.com.

[16] Heady, C. (2000). Natural Resource Sustainability and Poverty Reduction. Environment and Development Economics. 5, 3, 241-258.

# 3.0 SECTION 2 CLIMATE AND ENVIRONMENT ASSESSMENT

## 3.1 Climate and Environment Sensitivity Analysis

An extensive Climate and Environment Sensitivity Analysis has been undertaken for eleven possible interventions. Four of the options were discounted early in the development of the Business Case (refer to the full Business Case for details of this selection process), so whilst the sensitivity analysis table considers all 11, this section only deals with generic issues and highlights key risks and opportunities for the seven interventions selected. The full list of options considered for this CEA is as below. Those selected for project work are marked in italic:

*Option 1 - Palm oil*
*Option 2 – Aquaculture*
*Option 3 – Dry fish processing*
*Option 4 - Cassava*
*Option 5 – Traditional and Small scale Poultry*
*Option 6 - Fertilizer*
*Option 7 – Crop protection products (Agro chemicals e.g. Pesticides)*
Option 8 - Potable water
Option 9 - Konkri women
Option 10 – Fabricators
Option 11 – Bio-remediation

The analysis identified the expected impacts, both positive and negative, on climate change and the environment and the findings are discussed below in terms of the effect of (i) the intervention options on climate change and the environment; and (ii) climate change and the environment on the proposed intervention options. MADE's strategies for mitigating against these risks and capitalising on opportunities are outlined in the discussion.

### *3.1.1 Effect of the intervention options on climate change / the environment*

Expected Risks: possible negative impacts from intervention options:

In this section, a number of generic issues are covered first, followed by some more specific environmental issues that pertain to individual interventions.

**A) Water pollution**[17]
Potential for water pollution exists, especially from the run off from poorly administered fertilizer and crop protection products.

Mitigation: MADE will work with its partners to ensure beneficiaries are aware of proper application and use of these products. Demonstration plots and field days will focus on building awareness (see Inception Report). Hazardous waste including used pesticide containers will be segregated and

[17] See UNEP. This report focuses on oil pollution but also covers wider environmental and water pollution issues. http://www.unep.org/science/chief-scientist/Activities/DisastersandConflicts/OilPollutionintheNigerDeltaNigeria.aspx

disposed of by trained waste management professionals, ensuring that containers are never used for domestic purposes.

Aquaculture can also result in increased water pollution, especially if the discharge is returned to fresh water sources. This is particularly sensitive given the risk of flooding in the Niger Delta.

Mitigation: MADE's focus will be to work with existing businesses, providing little potential for increased water pollution. However, MADE will make every effort to support and encourage international best practice. For example, discharges from fish farms will be used to irrigate farm lands and vegetable gardens where possible.

**B) Destruction of habitat**

Poor land management practices of palm oil producers in Malaysia and Indonesia have resulted in significant loss of habitat and increases in greenhouse gas emissions. These activities have created a very adverse political climate. Many organisations have deplored the practices observed in Malaysia and Indonesia[18], which have involved the burning down of rainforests and primary forests to clear space for palm oil plantations.

Mitigation: MADE's philosophy and approach seek to improve the palm oil yields that existing small land holders extract from their current production. This will be primarily achieved by increasing the number of privately managed ameliorated oil presses present in the Niger Delta. These presses could increase oil extraction by up to 50% (see project's Palm Oil Strategy Brief and Palm Oil Intervention Justification).

The theory of change indicates that in the medium and long term, small land holders will be incentivized to expand the amount of Fresh Fruit Bunches (FFB) that must be pressed in order to extract palm oil. This will be done primarily through increasing the current low productivity on existing plantations, not by opening up new land. Given the limited capital of small land holders and the difficulties in acquiring land in the Niger Delta, it is likely that this will first occur by planting improved palm varieties that produce more FFB. If producers do seek to expand their overall plantation size, the project will ensure that they are aware of the best farming practices as outlined by the Roundtable on Sustainable Palm Oil (RSPO).

Interventions will not create the widespread loss of habitat and biodiversity that has earned the sector the opprobrium of the international community. Evidence of poor environmental practices by a partner will lead to termination of support for the company or individual involved.

A similar approach will be taken to all interventions that involve agricultural land use, such as cassava. In addition, cassava is processed primarily at the local artisanal level (see MADE Cassava Strategy Brief), which requires the use of firewood. If there is a noticeable increase in demand for cassava products made from *gari*, the need for firewood would increase, thereby exacerbating loss of habitat.

**C) Loss of biodiversity**

Monoculture reduces biodiversity, and there is thus a risk in the palm oil sector. Mitigation: though the Dura palm is endemic to West Africa, the Tenera Palm and Dura-Tenera palm hybrid has been

[18] Numerous; see WWF http://wwf.panda.org/what_we_do/footprint/agriculture/palm_oil/environmental_impacts/

proven to result in higher yields[19]. It is the palm promoted within the area by organizations such as the Nigerian Institute for Palm Oil Research (NIFOR). Whilst there is an increased risk linked to monoculture, the Dura is endemic to West Africa, and the introduction of a hybrid type does not represent a large threat to biodiversity.

In the case of aquaculture, catfish and Tilapia are the most commonly farmed species in the Niger Delta. Flood risks could result in the dispersion of the farmed species within mangrove swamps and other natural habitats.

Mitigation: since any loss of a fish represents loss of income, pond owners are well aware of the risks associated with flooding and are active in flood prevention. The project's focus is on improving productivity, which includes limiting such losses.

**D) Green House Gases (GHG) emissions**

A number of interventions have the potential to increase GHG emissions to a minor degree.

There will be some very minor increase in GHG associated with project activities in the palm oil sector, as many of the ameliorated palm oil presses rely on gas powered engines. However, they will be often replacing hand current inefficient systems, so the amount of GHG emitted per litre of palm oil produced will decrease. Regardless, the impact will be small and localised.

The poultry intervention will also have a minor impact on the increased emission of GHG. The aim of the poultry intervention is to reduce poultry deaths linked to Newcastle's disease, and the number of birds present in the area should increase. It is important to note that as a whole, large levels of GHG from the poultry value chain come from the production of feed. Since more feed is required for raising broilers, their rearing produces more GHG.[20]

Mitigation: the project's activities will target traditional and small scale poultry (see Traditional Poultry Intervention Justification). Traditional backyard poultry is generally more concerned with egg production, so it will already have low GHG emission. Therefore, total increase in bird population will be limited and not have the impact that large scale industrial poultry has on the environment.

Improved fish smokers are another intervention. Smoking has an impact on GHG emissions, and on loss of habitat as smoking requires wood as a primary input.

Mitigation: the project's aim is to improve productivity, reducing the need for and associated cost of wood. Ameliorated smokers will improve the efficiency of smokers (decreasing post catch loss), the time required to dry fish, and the total amount of fuel input required per fish. It is also important to note that these are self-contained machines without open flame, the new smokers also reduce the amount of smoke, reducing health hazards, as well as the risk of fire in the community.

Project staff travel and office energy use will directly result in an increase in GHG emissions. This risk is assessed as low impact given the limited number of staff and expected trips. In line with international best practice for local travels, appropriate journey management will be put in place to

[19] Poku Kwasi (2002), Small-Scale Palm Oil Processing in Africa, FAO Agricultural Services Bulletin 148, 2002 [20] MacLeod, M., Gerber, P., Mottet, A., Tempio, G., Falcucci, A., Opio, C., Vellinga, T., Henderson, B. & Steinfeld, H. 2013. *Greenhouse gas emissions from pig and chicken supply chains – A global life cycle assessment.* Food and Agriculture Organization of the United Nations (FAO), Rome.

ensure journeys are clustered where necessary. Training of 'Change Agents' will be conducted in groups to minimise repeat events and associated carbon emissions related to travel to training venues (group training will also additionally minimise cost). Video-conferencing and other means of electronic communication will be used wherever possible to minimise travel in line with DFID's environmental safeguards[20].

Some of the specific environmental issues relating to selected interventions are as follows:

**E) Palm oil production[21]**

Some of the risks associated with palm oil production have been referred to above (see destruction of habitat)[22]. As previously stated, primary focus is to improve yields of current small holder plantations, so the climate and environment risks associated with large palm oil plantations in Indonesia or Malaysia will not be present. It is likely that the projects impact on the environment will be minimal. If farmers seek to expand to new areas, MADE will encourage the use of methods as per the RSPO recommendations.

**F) Aquaculture [24] [23]**

There is potential for aquaculture to have an impact on and pollute the environment. The destruction of sensitive coastal habitats, threats to aquatic biodiversity and significant socio-economic costs must be balanced against benefits. Intensive fish culture can lead to eutrophication[24] - an excess of nutrients from fish feed, leading to an abundance of plant growth and algae, depleted oxygen levels, fish death and reduction in aquatic biodiversity. Antibiotics and other chemicals used in aquaculture can also pollute, leaching into water tables, and in riverine areas this can occur quickly and easily. In Asia, many thousands of hectares of natural habitat – mainly mangrove swamp – have been cleared for aquaculture, and this also presents a risk in the Niger Delta, where the loss of even a small part of this sensitive habitat is difficult to justify.

**G) Dry Fish Processing[25] [26]**

There are potential environmental hazards associated with the smoking process. The most important of these are the harmful effects of smoke both on the environment and human health (respiratory problems and burns), and the destruction of forest and natural habitat (very often mangrove forests in fishing areas) to supply fuel to burn.

---

[20] DFID How to Note on CEA for the Business Case, page 3, specified that DFID has also a legal obligation to comply with international environmental laws and standards, as well as those in the countries of work.

[21] http://www.pindfoundation.org/wp-content/plugins/download-monitor/download.php?id=28.

[22] Obidzinski, K., R. Andriani, H. Komarudin, and A. Andrianto. 2012. Environmental and social impacts of oil palm plantations and their implications. Ecology and Society 17(1): 25. http://dx.doi.org/10.5751/ES-04775-170125

[24] Aquaculture Impacts on the Environment (Released December 1999 ) by Craig Emerson. http://www.csa.com/discoveryguides/aquacult/overview.php

[23] Cole D.W. et al, 2008. Aquaculture: Environmental, toxicological, and health issues. Department of Preventive Medicine and Community Health, University of Texas Medical Branch USA.

[24] Dai-She, Wuxiong, Qing, and D. U. Jun-Yi. "Study on the Eutrophication by Aquaculture." Jiangxi Science 4 (2009): 036.

[25] http://www.woaj.org/man_pdf/ISE-118.pdf. A Technical and Economic Appraisal of Artisanal Smoking/drying Ovens in Niger-Delta, Nigeria.

[26] There have been previous attempts to introduce fish smokers and dryers in the 1960s/70s, which proved unsustainable. However, the market conditions were much different then, including the larger availability of fresh fish.

Mitigation: the project's focus on working first with existing smokers to demonstrate and upgrade the technology will mitigate against these risks.

**H) Poultry production[27]**

There are a number of environmental risks associated with poultry production. The main source of concern is with poultry manure, which is high in nitrates and other potential contaminants. There is considerable potential for these to leach through into surface or groundwater, thus affecting aquatic ecosystems and drinking water, and the close proximity of water tables to the surface in the Niger Delta make this a particular hazard. Eutrophication of surface water may occur. Chickens also produce GHGs in the form of carbon dioxide and nitrous oxide. Further pollution may be caused by the leaching into surface water of antibiotics and other pollutants. Odour, flies, rodents and the possibility of diseases being carried are further concerns.

Mitigation: these risks are associated largely with larger-scale production, and not small and traditional poultry producers which is to be promoted by the project.

**I) Fertiliser and pesticide supply[28]**

There are a number of environmental concerns involved in increasing the intensity of input use anywhere, and these are of particular concern in a sensitive environment such as the Niger Delta where the potential for leaching into water bodies is considerable, and where the potential harm to the natural habitat (mangrove and freshwater swamp, tropical rainforest, wetlands) is strong. Leaching of fertilizer into inland surface waters (ditches, rivers and lakes) and coastal waters can result in eutrophication, causing disruptive changes to the biological equilibrium including fish kills. Contamination of groundwater also occurs as a result of leaching, especially by nitrates, and this is now well documented[29]. In all countries groundwater is an important source of drinking water, and this may become polluted to the extent that it is no longer fit to be used. The immediate, direct effects on human health effects are caused by skin contact (handling of pesticide products), inhalation (breathing of dust or spray) or ingestion (pesticides consumed as a contaminant on/in food or in water). However, much longer-term effects are caused by a broad range of organic micro pollutants that have ecological impacts, caused by pesticide runoff. The two principal mechanisms causing damage are called bioconcentration and bio-magnification, where increasing effects are felt up the food chain in question. There are risks associated with supporting an intervention that encourages increased use of chemicals proven to be harmful, and this is made more uncertain owing to the sensitive delta environment[30].

Mitigation: the project plans to offer extensive awareness building and extension training to its participating farmers, which will aim to ensure proper, responsible use of chemicals.

[27] P. Gerber, C. Opio and H. Steinfeld. Poultry production and the environment – a review. Animal Production and Health Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, 00153 Rome, Italy

[28] Foley, Jonathan A., et al. "Global consequences of land use." science 309.5734 (2005): 570-574.

[29] http://www.fao.org/docrep/w2598e/w2598e06.htm. Chapter 3. Fertilisers as Water Polutants.

[30] http://www.fao.org/docrep/w2598e/w2598e07.htm#TopOfPage. Chapter 4. Pesticides as Water Pollutants.

**J) Cassava production**[31]

The increasing area under cassava production globally has resulted in a loss of biodiversity, although the cultivation of export crops such as groundnut, oil palm, coffee, cotton and cacao have probably had a much greater impact. Cassava processing, especially in areas where the industry is concentrated, is polluting and causes destruction of natural resources. Some forms of processing, particularly for starch, are water intensive. Cassava processing for starch extraction produces large amounts of effluent high in organic content, which is stored in stagnant effluent ponds which emit a strong smell. Cassava is often perceived as contributing significantly to environmental damage and water deficit. The effect of cassava processing on forest resources is a further environmental concern. Wood is the principal energy source where heat is required in small-scale cassava processing, e.g. boiling, drying or toasting. This use of wood is likely to contribute to the destruction of forest and natural habitat in the Delta.

Mitigation: The project's main focus is to increase productivity while fostering market linkages. In the cassava sector, this would likely worker with current farmers to improve the yields from plots under cultivation, then linking them to buyers. This in itself mitigates a large part of the environmental risk described above, as the major risks come from putting new lands under cultivation. In the unlikely possibility that small land holder farmers have the capital and desire to expand their surface under production, the project plans to offer extensive awareness building and extension training to its participating cassava farmers, which will aim to ensure improved environmentally neutral processing methods.

### *3.1.2 Expected Opportunities/Benefits: possible positive impacts from intervention options*

Generic benefits are discussed below, and also one intervention-specific benefit. Ways in which the project will seek to capitalise on opportunities offered are included in the text.

**A) Addressing vulnerability**

The most important opportunity for MADE lies in the programme's capacity to diversify livelihoods, increase household income, and in so doing, reduce vulnerability and increase climate resilience. This applies to all of the project's proposed interventions. The project's objective is to increase incomes by 40 to 50 percent for 150,000 poor people. The links between climate change, the environment and vulnerability, and methods of increasing climate resilience through enhanced livelihoods, are now well established[34].

Many individuals are involved in agriculture and exposed to climate and environment change risk, and improving general productivity will help to limit risk in other ways:

- As agriculture and weather patterns are cyclical, improved productivity (and therefore income) in one season can help to offset losses during another. This can help poor individuals in coping with climate change losses;

[31] http://www.fao.org/docrep/007/y2413e/y2413e0d.htm. Impact of cassava processing on the environment. [34] Heltberg, Rasmus, Paul Bennett Siegel, and Steen Lau Jorgensen. "Addressing human vulnerability to climate change: Toward a 'no-regrets' approach." Global Environmental Change 19.1 (2009): 89-99.
Lobell, David B., et al. "Prioritizing climate change adaptation needs for food security in 2030." Science 319.5863 (2008): 607-610.

- As weather patterns change and modify agricultural practices, good agricultural practices will be increasingly valuable for small land holders. Access to agricultural inputs, be it fertilizer or improved varieties (such as the Tenera-Dura palm), will help small land holders to adapt better to changes in climate;
- As losses linked to weather and climate change (e.g. increased flooding) are known, practices can be put into place to limit income loss related to these.

**B) Decreasing water pollution**

By improving aquaculture pond management, the risk of liquid discharges finding their way back into fresh water supplies will be lessened. Improved methods of fertiliser application will help reduce the risk of chemical run offs. Waste produced by traditional poultry will be reused either as compost, or possibly fish feed. These practices will ensure that project interventions will be neutral in terms of decreasing water pollution.

**C) Rehabilitation of habitats**

Aquaculture should reduce the demand for the capture of fresh fish, and support the process of natural replenishment of fish stocks within the mangroves of the Niger Delta. By decreasing the amount of wood required for smoking fish, there will be a positive localised impact on reforestation. Project interventions will be largely environmentally neutral in terms of rehabilitation of habitats.

**D) Decrease in GHG emissions**

The project may have a small impact on decreasing GHGs. The improved smoking kilns for fish drying should reduce GHGs, but on a small local scale. Some palm oil effluent can possibly be reused as briquettes and fertilizer. Improved market linkages are also likely to minimise usage of vehicles, for example by ensuring that trucks coming to collect produce or fish have fewer collection points to visit in order to acquire a full load. These improvements will be small.

**E) Drying/smoking Fish**

This work will encourage the use of energy efficient kiln dryers for fish smoking. The use of efficient Kiln dryers will minimise $CO_2$ emissions and potentially reduce deforestation, since traditional drying methods use firewood. The practice of smoking fish has significant advantages in addition to improving food flavour, including longer conservation periods, better storage, packaging, transport and marketing. This option is one which offers direct environmental benefits in terms of reducing destruction of natural habitat. The other main opportunity under this option is in increasing household incomes of beneficiaries, thereby allowing them to build livelihood assets and increase resilience.

### *3.13 Effect of climate change / the environment on the intervention*

Possible risks to the project:

The impact of climate and environmental factors on the programme's implementation and outcomes is a potential problem given the sensitivity of the Niger Delta region to these, where flash floods and oil pollution in particular pose outstanding overarching environmental concerns, and which might variously impact on any or all proposed activities. Natural resource based activities are susceptible to risks associated with environmental pollution. The Niger Delta is increasingly polluted by the

oil/gas industry, by industrial activities and municipal waste, from dredging and draining in particular of extensive wetlands, from agricultural waste and run-off of fertilizers and pesticides, and from overgrazing/deforestation and erosion.

There is a possibility that extreme weather events (heavy rain fall, floods etc.), of possible climate change origin, could disrupt field work or data collection by causing loss of project infrastructure or data. Severe flooding was witnessed in the Niger Delta in 2012[32]. The flood claimed many lives, in addition to destroying farm lands and social infrastructure. Major cities in the Niger Delta are particularly vulnerable to flooding.[33] Given the fact that major markets and demand for many of the agricultural products supported by MADE are either sold or transit via cities, heavy flooding could impact on the project's objectives. Though the Niger Delta is subject to perennial flooding[34], extreme weather events such as those experienced in 2012 are still rare. However, since extreme weather events are expected to rise globally, this risk is considered overall to be high impact and of medium likelihood, and has been rated as a Category B risk.

There remains also an indirect risk of longer term climatic events or environmental degradation negating the positive benefits expected from the interventions. Similarly, extreme drought would negatively impact the interventions, but these are unlikely in the Niger Delta[35].

Mitigation measures are set out in Annex 1, climate and environment checklists.

Possible benefits or opportunities to the project:

Climate change/environment issues may provide indirect opportunities for raising the awareness of the benefits of improved management of natural resources, or of any impacts proven effective in tackling climate change through project interventions.

Climate change and the environment can directly affect the performance of many sectors, especially agriculture and natural resources. The project can take this opportunity to assess any patterns of linkage between environmental/climate change and programmes designed to enhance the socio-economic status of the poor, especially women.

This opportunity is rated as of low impact and low likelihood as it is not within the current direct scope of the project.

## 4.0 RISK ASSESSMENT USING CLIMATE AND ENVIRONMENT (C & E) CHECKLISTS

**Table 1 Categories for Climate Change and Environment Risk Categorization**

[32] Richard Eyers, Chituru Obowu and Bola Lasisi (2013), Niger Delta Flooding: Monitoring, Forecasting & Emergency Response Support from SPDC. FIG Working Week 2013 Environment for Sustainability Abuja, Nigeria, May 2013

[33] Efe, Sunday (2012), Climate Change and Flood Hazards in the Niger Delta Region of Nigeria, May 2012

[34] Ologunorisa, E T (2004) An Assessment of Flood Vulnerability Zones in the Niger Delta, Nigeria. International Journal of Environmental Studies, Vol. 61, No. 1, pp. 31- 38. 2004

[35] Sahel Drought Report (10), World Bank, Washington D.C. September 2012

| | |
|---|---|
| A | High potential risk / opportunity |
| B | Medium / manageable potential risk / opportunity |
| C | No / Low potential impact / opportunity |
| D | Core contribution to a Multilateral Organisation |

The DFID How to Note on CEA for the Business Case[36] provides C & E checklists, which are to be used as a framework when carrying out C & E Sensitivity analysis for projects which are graded Category B for either risks and/or impacts or for benefits and opportunities. Accordingly, the checklists have been completed and are provided as **Annex 1**.

The summary of climate and the environment sensitivity analysis is presented below:

[36] Technical Note: Climate & Environment Assessment for the Business Case. How to Note. Latest Revision: June 2013. 23 pp. Annex B.

## Table 2: Summary of the Impacts of the Intervention on Climate Change and Environment

| | Option 1: Palm oil | | Option 2: Aquaculture | | Option 3: Dry fish processing | | Option 4: Cassava | |
|---|---|---|---|---|---|---|---|---|
| **Negative Impacts** | | | | | | | | |
| *Is the proposed intervention likely to contribute to:* | | | | | | | | |
| Climate change | Minor GHG emissions from use of ameliorated oil press Minor GHG emissions from local and international travels and office energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels and office energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels, office energy use and dry fish processing (Kiln dryer) | Low impact / high likelihood | Minor GHG emissions from local and international travels, office energy use and cassava processing | Low impact / high likelihood |
| Environmental degradation | Potential in the long term of small land holder expanding area under cultivation while respecting RSPO rules | Low impact / high likelihood | Water use, effluent discharge and solid waste generation from project activities. Possibility of destruction of natural habitat in case of flood. However, would occur anyway and project will mitigate against negative outcomes | low impact / high likelihood | Solid waste generation from project activities (mainly fish remains); Wood fuel for burning in fish drying kilns leading to environmental degradation | Low impact / high likelihood | Minor resource use and waste generation from project activities. Potential of increased use of firewood if processing increases | Low impact / high likelihood |
| increased vulnerability of communities to climate change/ environmental degradation and shocks | Small potential linked to expanding of areas of cultivation by small land holders | Low impact/ high likelihood | Improper effluent discharges might lead to contamination of water bodies | high impact / low likelihood | Negligible impact | No Impact | Negligible impact | No Impact |
| **OVERALL RISK RATING** | **Low potential impact** | **C** | **Medium potential impact** | **B** | **Low potential impact** | **C** | **Low potential impact** | **C** |
| **Positive Impacts** | | | | | | | | |
| *Could the proposed intervention help:* | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ▯ tackle climate change | Opportunity exists in the use of palm process waste to form briquette for processing and domestic cooking | Low opportunity/ low likelihood | No significant opportunity | No opportunity | Opportunities in both the use of efficient drying kiln, for both $CO_2$ emission and deforestation reduction Localised and small scale | low opportunity/ high likelihood | No significant opportunity | No opportunity |
| ▯ improve environmental management | Opportunity exists in reducing the use of firewood for processing and domestic cooking | low opportunity / low likelihood | Opportunity exists in the use of effluent to sustain farm areas and vegetable gardens. Dead fishes may also be composted for manure | Low opportunity / low likelihood | Opportunity exists in reducing the use of firewood for fish processing. This enhances the protection of forest areas, but it remains small scale | low opportunity/ high likelihood | No significant opportunity | No opportunity |
| ▯ reduce vulnerability and/or build resilience and adaptive capacity to climate change/environmental degradation and shocks | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood |
| **OVERALL OPPORTUNITY RATING** | **Medium opportunity** | **B** | **Medium opportunity** | **B** | **Medium opportunity** | **B** | **Medium opportunity** | **B** |

## Table 2: Summary of the Impacts of the Intervention on Climate Change and Environment Cont'd

| | Option 5: Poultry | | Option 6: Fertilizer | | Option 7: Crop protection products | | Option 8: Potable water | |
|---|---|---|---|---|---|---|---|---|
| **Negative Impacts** | | | | | | | | |
| *Is the proposed intervention likely to contribute to:* | | | | | | | | |
| Climate change | Minor GHG emissions from more birds surviving<br>Minor GHG emissions from local and international travels and project energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels and project energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels and project energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels and project energy use | Low impact / high likelihood |
| Environmental degradation | Minor resource use and waste generation from project activities. Management of chicken manure required to minimize risk of nitrate contamination. | Low impact / high likelihood | Hazardous waste generation and possibility of impact on land and water in event of improper use. To mitigate risk of improper use, project will raise awareness | Medium impact / high likelihood | Hazardous waste generation and possibility of impact on land and water in event of improper use. To mitigate risk of improper use, project will raise awareness | Medium impact / high likelihood | Water use for drinking and minor waste generation from project activities | Low impact / high likelihood |
| increased vulnerability of communities to climate change/ environmental degradation and shocks | Negligible impact | No Impact | Communities may be vulnerable in the event of land and water bodies contamination | Medium impact / low likelihood | Communities may be vulnerable in the event of land and water bodies contamination | Medium impact / low likelihood | Negligible impact | No Impact |
| **OVERALL RISK RATING** | **Low potential impact** | **C** | **Medium potential impact** | **B** | **Medium potential impact** | **B** | **Low potential impact** | **C** |
| **Positive Impacts** | | | | | | | | |
| *Could the proposed intervention help:* | | | | | | | | |
| tackle climate change | No significant opportunity | No opportunity | Opportunities exist for increase yields leading to increase $CO_2$ uptake. However, this is likely to be short term and insignificant | Low - Medium opportunity / high likelihood | Opportunities exist for increase yields leading to increase $CO_2$ uptake. However, this is likely to be short term and insignificant | Low - Medium opportunity / high likelihood | No opportunity | No opportunity |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| improve environmental management | Opportunity exists in the use of poultry droppings as organic manure to improve farm lands | Low opportunity / high likelihood | Increase yields may translate to better land management and utilisation | low opportunity / medium likelihood | Increase yields may translate to better land management and utilisation for a project beneficiaries | low opportunity / high likelihood | No opportunity | No opportunity |
| reduce vulnerability and/or build resilience and adaptive capacity to climate change/environmental degradation and shocks | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity / high likelihood | Opportunities exist to reduce vulnerability to diseases and improve community health and adaptive capacity to shocks. | Medium opportunity/ high likelihood |
| **OVERALL OPPORTUNITY RATING** | **Medium opportunity** | **B** | **Medium opportunity** | **B** | **Medium opportunity** | **B** | **Medium opportunity** | **B** |

## Table 2 Summary of the Impacts of the Intervention on Climate Change and Environment Cont'd

| | Option 9: Konkiri women | | Option 10: Fabricators | | Option 11: Bio-remediation | |
|---|---|---|---|---|---|---|
| **Negative Impacts** | | | | | | |
| *Is the proposed intervention likely to contribute to:* | | | | | | |
| Climate change | Minor GHG emissions from local and international travels and office energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels and project energy use | Low impact / high likelihood | Minor GHG emissions from local and international travels and office energy use | Low impact / high likelihood |
| Environmental degradation | Minor waste generation from project activities | Low impact / high likelihood | Minor scrap metal (waste) generation | Low impact / high likelihood | Minor waste generation from project activities | Low impact / high likelihood |
| increased vulnerability of communities to climate change/ environmental degradation and shocks | Negligible impact | No Impact | Negligible impact | No Impact | Negligible impact | No Impact |
| **OVERALL RISK RATING** | **Low potential impact** | **C** | **Low potential impact** | **C** | **Low potential impact** | **C** |
| **Positive Impacts** | | | | | | |
| *Could the proposed intervention help:* | | | | | | |
| tackle climate change | No opportunity | No opportunity | Production of efficient kiln dryers presents opportunities for reduction in $CO_2$ emission and the use of fire wood | Medium opportunity / high likelihood | Opportunity exists to clean up contaminated lands making them available for cultivation which will increase $CO_2$ absorption. However, the impact is still uncertain at best since project needs proper M4P methodology to achieve results, and even | High opportunity / low likelihood |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | then would likely be limited in scale | |
| improve environmental management | No significant opportunity | No opportunity | Opportunities exist for reduction in the use of fire wood, thus enhancing forest areas management | Medium opportunity/ high likelihood | Opportunity exists to clean up contaminated lands making them available for cultivation thereby improving land management | High opportunity / low likelihood |
| reduce vulnerability and/or build resilience and adaptive capacity to climate change/environmental degradation and shocks | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity/ low likelihood | Opportunity to raise incomes and reduce vulnerability. | Medium opportunity/ low likelihood | The project will enhance resilience and adaptive capacity to climate change/environmental degradation and shocks | High opportunity / high likelihood |
| **OVERALL OPPORTUNITY RATING** | **Medium opportunity** | **B** | **Medium opportunity** | **B** | **Medium opportunity** | **B** |

## Table 3 Summary of the Impacts of Climate Change and Environment on the Intervention

| | Option 1: Palm oil | | Option 2: Aquaculture | | Option 3: Dry fish processing | | Option 4: Cassava | |
|---|---|---|---|---|---|---|---|---|
| **Negative Impacts** | | | | | | | | |
| *Are the objectives of the project likely to be at risk from:* | | | | | | | | |
| Climate change | CC would only directly impact MADE project if an extreme climatic event disrupted project activities. Potential for reduction of outputs is low as oil palm is perennial | High impact / medium likelihood | Potential for reduction of outputs of some evaluated projects by extreme weather events (e.g. flood, pest/disease outbreak) | High impact / medium likelihood | Reduction of outputs of aquaculture projects by extreme weather events (e.g. flooding) will directly impact on dry fish processing | High impact / medium likelihood | Potential for reduction of outputs of some evaluated projects by extreme weather events | High impact / medium likelihood |
| Environmental degradation | Potential direct environmental risk to project objectives exist | Medium impact / medium likelihood | Potential direct environmental risk to project objectives exist | High impact / medium likelihood | Reduction of outputs of aquaculture projects by environmental risk (e.g. pollution) will directly impact on dry fish processing | High impact / medium likelihood | Potential direct environmental risk to project objectives exist | Medium impact / medium likelihood |
| **OVERALL RISK RATING** | **Medium potential impact** | **B** | **Medium potential impact** | **B** | **Medium potential impact** | **B** | **Medium potential impact** | **B** |
| **Positive Impacts** | | | | | | | | |
| *Could the outcomes of the intervention be enhanced by:* | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ▯ tackling climate change | No significant direct opportunities to enhance MADE project through tackling climate change, but <u>indirect</u> opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | low opportunity/ low likelihood | <u>Indirect</u> opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Low opportunity/ low likelihood | <u>Indirect</u> opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Low opportunity/ high likelihood | <u>Indirect</u> opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Low opportunity/ low likelihood |
| ▯ improved management of natural resources | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | low opportunity / low likelihood | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | Low opportunity / low likelihood | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | Low opportunity / low likelihood | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | Low opportunity / low likelihood |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | programmes. | |
| **OVERALL OPPORTUNITY RATING** | **Low opportunity** | **C** | **Low opportunity** | **C** | **Low opportunity** | **C** | **Low opportunity** | **C** |
| | **Option 5: Poultry** | | **Option 6: Fertilizer** | | **Option 7: Crop protection products** | | **Option 8: Potable water** | |
| **Negative Impacts** | | | | | | | | |
| *Are the objectives of the project likely to be at risk from:* | | | | | | | | |
| ▯ Climate change | Potential for reduction of outputs of some evaluated projects by extreme weather events | High impact / medium likelihood | Potential for reduction of outputs of some evaluated projects may be induced by extreme weather events | High impact / medium likelihood | Potential for reduction of outputs of some evaluated projects may be induced by extreme weather events | High impact / medium likelihood | Potential for reduction of outputs of some evaluated projects may be induced by extreme weather events | High impact / medium likelihood |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Environmental degradation | Potential direct environmental risk to project objective exist e.g. outbreak of Newcastle disease, or oil pollution might negate MADE project | Medium impact / medium likelihood | Potential direct environmental risk to agriculture due to risk of oil pollution | Medium impact / medium likelihood | Potential direct environmental risk to agriculture due to risk of oil pollution | Medium impact / medium likelihood | Potential significant direct environmental risk due to water pollution | High impact / medium likelihood |
| **OVERALL RISK RATING** | **Medium potential impact** | **B** | **Medium potential impact** | **B** | **Medium potential impact** | **B** | **Medium potential impact** | **B** |
| **Positive Impacts** | | | | | | | | |
| *Could the outcomes of the intervention be enhanced by:* | | | | | | | | |
| tackling climate change | Indirect opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Low opportunity/ low likelihood | Indirect opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Medium opportunity/ low likelihood | Indirect opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Low opportunity/ low likelihood | No significant opportunity | No opportunity |
| improved management of natural resources | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | Low opportunity / low likelihood | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | Low opportunity / low likelihood | Indirect opportunity to raise awareness of any proven impacts of improved NR management achieved through MADE programmes. | low opportunity/ low likelihood | No significant opportunity | No opportunity |
| **OVERALL OPPORTUNITY RATING** | **Low opportunity** | **C** | **Low opportunity** | **C** | **Low opportunity** | **C** | **No opportunity** | **C** |

**Table 3 Summary of the Impacts of Climate Change and Environment on the Intervention Cont'd**

| | **Option 9: Konkiri women** | **Option 10: Fabricators** | **Option 11: Bio-remediation** |
|---|---|---|---|
| **Negative Impacts** | | | |
| *Are the objectives of the project likely to be at risk from:* | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Climate change | Potential for reduction of outputs of some evaluated projects may be induced by extreme weather events | Medium impact / medium likelihood | Potential for reduction of outputs of some evaluated projects may be induced by extreme weather events | Medium impact / medium likelihood | Potential for reduction of outputs of some evaluated projects may be induced by extreme weather events | Medium impact / medium likelihood |
| Environmental degradation | No significant direct environmental risk to MADE is foreseen | Low impact / low likelihood | No significant direct environmental risk to MADE is foreseen | Low impact / low likelihood | No significant direct environmental risk to MADE is foreseen | Medium impact / medium likelihood |
| **OVERALL RISK RATING** | **Medium potential impact** | **B** | **Medium potential impact** | **B** | **Medium potential impact** | **B** |
| **Positive Impacts** | | | | | | |
| *Could the outcomes of the intervention be enhanced by:* | | | | | | |
| tackling climate change | No significant opportunity | Low opportunity/ low likelihood | No significant opportunity | Low opportunity/ low likelihood | Indirect opportunity to raise awareness of any proven impacts achieved by tackling climate change through MADE programmes | Low opportunity/ low likelihood |
| improved management of natural resources | No significant opportunity | Low opportunity/ low likelihood | No significant opportunity | Low opportunity / high Low opportunity/ low likelihood likelihood | Opportunity to raise awareness of proven impacts of improved NR management achieved through MADE programmes. | Low opportunity/ low likelihood |
| **OVERALL OPPORTUNITY RATING** | **No opportunity** | **C** | **Low opportunity** | **C** | **Low opportunity** | **C** |

| | |
|---|---|
| A | High potential risk / opportunity |
| B | Medium / manageable potential risk / opportunity |
| C | No / Low potential impact / opportunity |
| D | Core contribution to a Multilateral Organisation |

# 5.0 CLIMATE & ENVIRONMENT CATEGORISATION

## 5.1 Overview

On the basis of the climate and environmental assessment of the eleven options listed in the previous section. The final climate and environment categorisation of the options is presented in **Table 4,** below:

**Table 4 Final Climate and Environment Categorisation [14]**

| Options | Sectors/Markets | Climate change and environment risks/impacts | CC&E opportunities |
|---|---|---|---|
| 1 | Palm oil | B | B |
| 2 | Aquaculture | B | B |
| 3 | Energy efficient dry fish processing | B | B |
| 4 | Cassava | B | B |
| 5 | Poultry | B | B |
| 6 | Fertilizer | B | B |
| 7 | Crop protection products (e.g. Pesticides) | B | B |
| 8 | Potable water | B | B |
| 9 | Konkiri women | B | B |
| 10 | Fabricators | B | B |
| 11 | Bio-remediation | B | B |

## 5.2 Risks

Impact of project interventions on the environment

The findings show that interventions are expected to result mainly in low environmental and climate risks and impacts. These impacts are predominantly of low risk (C) partly because of their focus which is towards more sustainable livelihoods and household incomes, and partly because they are also limited in scope, scale, duration and can be managed with relatively low cost activities. Three interventions were felt to justify a B rating, owing to their potential to cause environmental damage mainly through leaching and infiltration into waterways, in the sensitive Delta environment.

Impact of climate change and the environment on the project

In view of the potential impacts of climate change and the environment on the project, in particular the potential risks posed by extreme weather events and resultant flooding, and environmental degradation (e.g. through oil pollution) all project interventions are at risk and an overall category B has been allocated.

## 5.3 Opportunities

The main opportunities that exist are through the capacity that MADE has through its interventions to create general improvements in the livelihood opportunities of poor people, and in so doing to raise their incomes, reduce vulnerability and raise their climate resilience. For this reason, all proposed interventions have been given a medium rating (B) under the section of the Sensitivity Analysis entitled "reduce vulnerability and/or build resilience and adaptive capacity to climate change/environmental degradation and shocks".

## 6.0 MANAGEMENT CASE

For Category B interventions, measures that are required to be built into the project design need to be identified, and methods of monitoring and evaluating climate and environment issues need to be addressed. For the MADE project both risks and opportunities components need to be taken into consideration.

**A. Oversight**

- The DFID Project Officer is responsible for all actions under the Management Case, in consultation with the Climate and Environment Advisor

**B. Management**

- Skills that are required to ensure the effective management of the intervention should be considered, and must include a Climate and Environment Advisor for Category (A and) B interventions. The ongoing level of engagement in the management of the intervention should be proportional to the size and significance of the intervention.

**C. Conditionality**

- Consider if it is appropriate to ask for conditionality, which ensures recipient country governments build climate and environment safeguards and or policies into national programmes and interventions.

**D. Monitoring and Evaluation**

- Ensure mechanisms are in place to monitor and evaluate the impact and effectiveness of climate and environment measures, including building these into the log-frame. The Project Officer is responsible for setting out the process for M&E of C&E as part of the overall monitoring and evaluation process for the project.

**E. Risk Management**

- Category B risks have been identified. Methods of mitigating against associated risks identified are outlined in annex 1. **F. Fostering Opportunities**
- Medium rated opportunities have been found to exist in MADE's interventions, and will need to be monitored closely. It is advisable for the evaluation team to include an environmental specialist to assist in identifying and evaluating any linkages between climate and environment issues and project purpose, assumptions, outcomes, and impacts of the evaluated projects and interventions.
- Such an approach would permit DAI to identify and document any climate change and environment-related lessons that may be derivable from the MADE project. However, for some interventions it is likely that a detailed climate change and environment narrative would emerge from the initial screening process, while in other cases no significant level of linkage may be found.

# ANNEX 1: ORIGINAL CLIMATE AND ENVIRONMENT CHECKLISTS

(Format from DFID How to Note, Annex B, June 2013)[15]

| **1. Impact of Climate Change on Intervention** | | | |
|---|---|---|---|
| **1.1 Positive Benefits** | **Yes / No** | **Detail** | **Measures to realize potential benefits** |
| 1. Opportunity for economic growth through development and dissemination of technologies | Direct: No<br>Indirect: Yes | Evaluate and include projects that can be shown to have demonstrated useful technological approaches to mitigation of or adaptation to climate change, or improved environmental management (e.g. Kiln dryer). | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future project enhancement.<br><br>For greater benefits also align sector objectives where possible i.e. objectives of aquaculture/fisheries sector can be aligned with the fabrication sector |
| 2. Opportunity for job creation | Direct: No<br>Indirect: Yes | Evaluate and include projects that can be shown to have created jobs through innovative approaches to mitigation of or adaptation to climate change, or improved environmental management | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future policy enhancement. |
| 3. Increased revenue generating opportunities | Direct: No<br>Indirect: Yes | Evaluate and include projects that can be shown to have created revenue opportunities through innovative approaches to mitigation of or adaptation to climate change, or improved environmental management. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future project |
| 4. Opportunity for new agriculture and livelihood options | Direct: No<br>Indirect: Yes | Evaluate and include projects that can be shown to have demonstrated useful approaches to mitigation of or adaptation to climate change or improved environmental management (e.g. adapting to new pest/disease resistant seed varieties). | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future project |

15

The DFID How to Note on CEA for the Business Case stipulates (page 5) that where a Category B rating is applied to an intervention as a result of Sensitivity Analysis, as in the present Business Case, a Risk Assessment must be carried out, which consists of "*a full scoping of climate and environmental issues using Climate and Environment Checklist (Annex B) in order to develop measures which maximise opportunities and mitigate risks*". *www.ids.ac.uk/.../**DFID**_HowtoNote_ClimateChangeand**Environmental***

| **1.2 Negative Impacts** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks** |
|---|---|---|---|
| 1. In a climate sensitive area | Direct: Yes<br>Indirect: Yes | **Direct**: potential risk of excess flooding can potentially damage palm oil press and other equipment, create run off in aquaculture ponds, infiltration of waterways from fertilizer.<br>**Indirect**: the Niger Delta region is a climate sensitive area (e.g. high vulnerability to flooding). Evaluation to include projects undertaken in the area which can be shown to have been impacted by climate change i.e. farming and aquaculture projects in some areas may be prone to flooding. If flooding hits primary markets<br>(cities) and transit points for goods supported by MADE, then income targets will be threatened | **Direct**: carry out risk assessment deploying interventions in field, ensure that run off risk is minimalized at aquaculture ponds, raise awareness of good fertilizer administration techniques and timings<br><br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future project enhancement. |
| 2. In an area subject to frequent climatic shocks / variability (floods /droughts /temperature) | Direct: Yes<br>Indirect: Yes | **Direct**: flood risk is a real threat, though extreme floods are not currently that common. See previous point **Indirect**: the Niger Delta region is a climate sensitive area. Evaluation to include projects undertaken in the area which can be shown to have been impacted by climate change | **Direct**: As previous point<br><br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 3. In an area where climate change could lead to conflict | Direct: No<br>Indirect: Yes | Although the Niger Delta is prone to conflict, it is however unlikely that the conflict may be exacerbated by climate change. Evaluation may include projects undertaken in such areas which can be shown to have been impacted by climate change-induced conflict | Screen project documents for evidence; evaluate outputs and assumptions/risks and, where appropriate, raise awareness and apply lessons for future projects |
| 4. Community has poor capacity to deal with or adapt to climate change or shocks | Direct: Yes<br>Indirect: Yes | Communities in the Niger Delta region have poor capacity to deal with or adapt to climate change or shocks. Evaluation may include projects undertaken in such areas which can be shown to have poor | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| | | | |
|---|---|---|---|
| | | capacity to deal with or adapt to climate change or shocks | |
| 5. Programme dependent on specific climatic condition (agriculture, aquaculture) | Direct: Yes<br>Indirect: Yes | **Direct**: Potential for reduction of outputs of some agricultural evaluated projects by extreme climatic conditions (e.g. flood, pest/disease outbreak).<br>**Indirect**: Evaluation may include projects undertaken in Niger Delta which can be shown to have been impacted by changes in climate conditions | **Direct**: examine incidents of flood, pest or diseases and evaluate potential impacts on agricultural projects output.<br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| **1.2 Negative Impacts (Cont'd)** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks** |
|---|---|---|---|
| 6. Climate sensitive policies / laws / regulations result in social / development impacts | Direct: No<br>Indirect: Yes | Evaluation may include projects where policies or laws (e.g. environmental protection of forests for carbon sequestration) can be shown to have adversely impacted the poor or women. | Screen project documents for evidence; evaluate outputs and assumptions/risks and, where appropriate, raise awareness and apply lessons learned for future policy. |

| 2. Impact of Environment on Intervention | | | |
|---|---|---|---|
| **2.1 Positive Benefits** | **Yes / No** | **Detail** | **Measures to realize potential benefits** |
| 1. Dependent on environment / natural resources for success | Direct: Yes<br>Indirect: Yes | The evaluation may include some NR-based projects in which maintaining or enhancing the quality of the environment or natural resources (e.g. plantations) can be shown to have delivered enhanced project outcomes for local communities. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 2. Good governance of natural resources would improve likelihood of success | Direct: No<br>Indirect: Yes | The evaluation may include projects where good governance of NR can be shown to have enhanced project success (e.g. water user groups, community based resource management committees). | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 3. Improved revenue generating opportunities | Direct: No<br>Indirect: Yes | The evaluation may include projects in which maintaining or enhancing the quality of the environment or natural resources can be shown to have led to improved revenue generation. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 4. Improved environmental management could increase the number of benefits from intervention | Direct: No<br>Indirect: Yes | The evaluation may include projects where improvement in environmental management can be shown to have increased the number of benefits from the intervention. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 5. Environmental management offers peace-building opportunities | Direct: No<br>Indirect: Yes | The evaluation may include projects where environmental management enhancement interventions can be shown to have created conflict resolution or peace-building opportunities | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| **2.2 Negative Impacts** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks** |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. Dependent on environment / natural resources for success | Direct: Yes<br>Indirect: Yes | **Direct:** widespread floods (of the level of 2012) would severely hinder MADE activities and make it more difficult to achieve all improvements. These could potentially destroy fisheries, increase poultry losses, and oil press damage **Indirect:** The evaluation may include projects where communities, or their poorer members, or women, can be shown to have been over-dependent on environment/natural resources, leading to negative impact (resource depletion) on project outputs and impact. | **Direct:** seek to mitigate impact as much as possible with site location, but it is outside the ability of MADE to mitigate significant wide spread floods.<br><br>**Indirect:** Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 2. In an area subject to environmental degradation | Direct: Yes<br>Indirect: Yes | **Direct**: risk of disruption of project activities including reduction in farm/fisheries productivity<br><br>**Indirect**: the Niger Delta region is an environmental sensitive area with severe degradation challenges (e.g. deforestation, pollution, soil erosion and soil nutrient depletion). The evaluation may include projects where this can be shown to have impacted negatively on project outputs and impact. | **Direct**: carry out environmental risk assessment/appraisal before project implementation.<br><br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 3. In an area subject to frequent environmental shocks | Direct: Yes<br>Indirect: Yes | The Niger Delta region is subject to frequent environmental shocks, notably perennial flooding. However, these can be mitigated and do not have direct impact. The evaluation may include projects where this can be shown to have impacted negatively on project outputs and impact<br>However, in case of extreme weather events that lead to flooding, risks are high | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 4. Community lack capacity to deal with environmental degradation or shocks | Direct: Yes<br>Indirect: Yes | Some rural communities in the Niger Delta may lack capacity to deal with environmental degradation or shocks. The evaluation may include projects where this has impacted negatively on project outputs and impact. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| | | | |
|---|---|---|---|
| 5. Community dependent on natural resources for their livelihoods, which will be affected by the intervention | Direct: No<br>Indirect: Yes | A negative impact on community NR and livelihoods resulting from an intervention would suggest a failure of MADE safeguards. Nevertheless, the evaluation may include projects where an intervention can be shown to have impacted negatively on livelihoods and/or on project outputs and impact. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| | | | |
|---|---|---|---|
| 6. Property / land-rights are not well defined / governed | Direct: No<br>Indirect: Yes | In the Niger Delta there is inadequate protection for the land or land use rights of the poor and women (in many cases land is "owned" by the community). The evaluation may include projects where inadequate land rights can be shown to have impacted negatively on project outputs and impact. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| **2.2 Negative Impacts (cont'd)** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks** |
| 7. Environmental policies/laws/regulations result in social / development impacts | Direct: No<br>Indirect: Yes | There are instances where policies or laws (e.g. environmental protection for forests for carbon sequestration) may adversely impact the poor or women. The evaluation may include projects where laws or policies have impacted negatively on livelihoods and/or on project outputs and impact. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 8. In an area where natural resources are a potential source of conflict | Direct: No<br>Indirect: Yes | In the Niger Delta there have been several cases of conflict over resources (e.g. water, crop land). The evaluation may include projects where NR conflict has impacted negatively on security, livelihoods and/or on project outputs and impact. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| 3. Impact of Intervention on Climate Change | | | |
|---|---|---|---|
| **3.1 Positive Benefits** | **Yes / No** | **Detail** | **Measures to realize potential benefits** |
| 1. Increases mitigation capacity | Direct: Yes<br>Indirect: Yes | **Direct**: some project activities including use of efficient energy Kiln for dry fish processing will increase the mitigation capacity for CC **Indirect**: the evaluation may include projects where this can be shown to have impacted positively on project outputs and impact. | **Direct**: carry out pilot project to demonstrate the technology and build capacity / create awareness in local communities.<br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 2. Reduces $CO_2$ emissions | Direct: Yes<br>Indirect: Yes | **Direct**: some project activities including use of efficient energy Kiln for dry fish processing will reduce $CO_2$ emission<br>**Indirect**: the evaluation may include projects where this can be shown to have impacted positively on project outputs and impact. | **Direct**: build capacity / create awareness in local communities.<br><br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 3. Provides an opportunity to achieve low-carbon development | Direct: Yes<br>Indirect: Yes | **Direct**: project including use of efficient energy Kiln for dry fish processing and fabricators will provide these opportunities<br>**Indirect**: the evaluation may include projects where this can be shown to have impacted positively on project outputs and impact. | **Direct**: build capacity / create awareness in local communities.<br><br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| **3.2 Negative impacts** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks** |
| 1. Increases $CO_2$ emissions | Direct: Yes<br>Indirect: Yes | **Direct:** The project will cause a minor increase in $CO_2$ emissions from improved oil presses, higher survival rates among birds in the traditional poultry sector, and continued use of smokers for fish<br>**Indirect:** the evaluation may include projects which can be shown to have increased $CO_2$ emissions. | **Direct**: The impact of these $CO_2$ emissions will be small enough not to require mitigation.<br><br>**Indirect**: Project must make sure to remain focused on key project activities, and not diverge into large-scale commercial poultry production or large palm oil plantations. For expansion of small landholders with oil palms, ensure that RSPO procedures are met when expanding to new land |

| | | | |
|---|---|---|---|
| 2. Decreases mitigation capacity | Direct: No<br>Indirect: Yes | The evaluation may include interventions which can be shown to have decreased climatic change mitigation capacity (e.g. by deforestation, or replacement of perennial crops with annual crops). This is true in case of expansion of Palm oil plantations at the expense of natural habitat | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects<br><br>MADE's long term theory of change will result in the marginal increase of certain lands under cultivation. |
| | | | However, MADE seeks to improve productivity of existing and future areas under cultivation, thereby limiting the acreage required for new production. Also, by focusing on small land holders and pro poor growth, the amount of area that will be cultivated in the future by MADE beneficiaries will be small |
| 3. Does not support low-carbon development | Direct: No<br>Indirect: Yes | The evaluation may include interventions (e.g. use of fossil fuel technology) which can be shown not to have supported low-carbon development. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| 4. Impact of Intervention on Environment | | | |
|---|---|---|---|
| **4.1 Positive Benefits** | **Yes / No** | **Detail** | **Measures to realize potential benefits** |
| 1. Depends on natural resource use for its success | Direct: Yes<br>Indirect: Yes | Agriculture and aquaculture rely on NR – eg soils, water resources. The evaluation may include some NR-based projects (e.g. ecotourism) which have caused local communities to protect local natural resources (e.g. forest) because of their perceived value. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 2. Opportunity for improved environmental management | Direct: Yes<br>Indirect: Yes | **Direct**: project such as bio-remediation will provide<br>opportunity to improve environmental management<br>**Indirect**: the evaluation may include projects where this can be shown to have impacted positively on project outputs and impact. | **Direct**: build capacity / create awareness in local communities.<br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 3. Opportunity to achieve MDG7 (Sustainable Development) | Direct: No<br>Indirect: Yes | The evaluation may include projects where opportunities to contribute to achieving MDG 7 (sustainable development) can be shown to have been successfully implemented. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 4. Opportunity for co-financing of environmental management | Direct: No<br>Indirect: Yes | The evaluation may include projects where opportunities for co-financing of environmental management have been successfully executed. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| **4.2 Negative impacts** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks** |
| 1. Depends on natural resource use for success | Direct: Yes<br>Indirect: Yes | The evaluation may include NR-based projects which can be shown to have caused depletion of the resource base (e.g. overfishing) | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 2. In an environmentally sensitive area | Direct: Yes<br>Indirect: Yes | The evaluation may include projects which can be shown to have caused damage to a sensitive area (e.g. erosion caused by cultivation). | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| | | | |
|---|---|---|---|
| 3. Causes direct and significant impact on environment | Direct: Yes<br>Indirect: Yes | The evaluation may include projects which can be shown to have caused direct and significant impact on environment (e.g. deforestation). | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 4. Risks causing significant negative impact on environment | Direct: Yes<br>Indirect: Yes | The evaluation may include projects which can be shown to have significantly increased the risk of negative impact on the environment. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| **5. Impact of Intervention on Vulnerable Communities** | | | |
|---|---|---|---|
| **5.1 Positive Benefits** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks / realize potential benefits** |
| 1. Opportunity to reduce the vulnerability of communities to climate change | Direct: Yes<br>Indirect: Yes | **Direct:** The project will lead to a decrease in deforestation due to the use of efficient drying Kiln<br>**Indirect:** the project includes interventions which will reduce the vulnerability of communities to climate change, through diversifying livelihood opportunities and increasing incomes | **Direct**: build capacity / create awareness in local communities.<br>**Indirect**: screen field assessments/evaluations and project documents for evidence of best practice; evaluate outputs and impact and disseminate best practice and apply lessons learned as soon as possible, and for future projects |
| 2. Opportunity to build the capacity of communities to adapt to climate change | Direct: Yes<br>Indirect: Yes | **Direct:** MADE will have several opportunities to build the capacity of communities with projects such as dry fish processing and fabricators.<br>**Indirect:** the project includes interventions which will reduce the vulnerability of communities to climate change, through diversifying livelihood opportunities and increasing adaptive capacity through improved incomes and greater awareness about climate risks | **Direct**: use demonstrations to build capacity / create awareness in local communities.<br>**Indirect**: screen field assessments/evaluations and project documents for evidence of best practice; evaluate outputs and impact and disseminate best practice and apply lessons learned as soon as possible, and for future projects |
| 3. Opportunity to build the resilience of communities to climate change | Direct: Yes<br>Indirect: Yes | The project includes interventions which will reduce the vulnerability of communities to climate change, through diversifying livelihood opportunities, increasing incomes and thereby increasing climate resilience | Screen field assessments/evaluations and project documents for evidence of best practice; evaluate outputs and impact and disseminate best practice and apply lessons learned as soon as possible, and for future projects |

| | | | |
|---|---|---|---|
| 4. Opportunity to mitigate climate change impacts for a community | Direct: Yes<br>Indirect: Yes | **Direct:** MADE will have several opportunities to mitigate climate change impacts for a community with projects like dry fish processing and fabricators.<br>**Indirect:** the evaluation may include projects which can be shown to mitigate climate change impacts for a community | **Direct**: build capacity / create awareness in local communities.<br>**Indirect**: screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| **5.2 Negative impacts** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks / realize potential benefits** |
| 1. Reduces adaptive capacity of a community to climate change | Direct: No | The evaluation may include projects which can be shown to have had a negative impact on adaptive capacity, but this is extremely unlikely given their scope and content. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 2. Reduces resilience of a community to climate change | Direct: No | The evaluation may include projects which can be shown to have had a negative impact on resilience , but this is extremely unlikely given their scope and content | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

| **5.2 Negative impacts Cont'd** | **Yes / No** | **Detail** | **Measures to mitigate or manage risks / realize potential benefits** |
|---|---|---|---|
| 3. Increases vulnerability of communities to climate change | Direct: No<br>Indirect: Yes | The evaluation may include projects which can be shown to have had a negative impact on vulnerability. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |
| 4. Reduces capacity of a community to mitigate climate change | Direct: No<br>Indirect: Yes | The evaluation may include projects which can be shown to have had a negative impact on capacity to mitigate climate change. | Screen project documents for evidence; evaluate outputs and impact and, where appropriate, disseminate best practice and apply lessons learned for future projects |

# ANNEX 2: CLIMATE & ENVIRONMENT ASSURANCE NOTE

| Intervention Details | | |
|---|---|---|
| **Title** | **Department** | **Budget** |
| Niger Delta Market Development (MADE) Project | DAI Europe Ltd | £ 15 m |

| Responsible Officers | | |
|---|---|---|
| **Title** | **Name** | **Department** |
| Project Owner | DFID | DAI Europe Ltd |
| Climate Change and Environment Advisor | | DAI Europe Ltd |

| Appraisal | |
|---|---|
| **Success Criteria** | **Sensitivity Analysis** |
| None | Climate and Environment Sensitivity Analysis carried out for eleven options |
| **Climate & environment category** | |
| ***Risks & impacts***<br>Selected Options – all B (impact of CC&E on intervention)<br>Aquaculture, pesticide and fertiliser use– B (impact of intervention on CC&E) | ***Opportunities***<br>Selected Options – all B |

| Management | | |
|---|---|---|
| **Risks and opportunities defined** | **Climate & Environment Measures agreed** | **Climate & Environment Measures in log-frame** |
| **Risks** | | |
| **Negative impacts of the intervention on climate change/the environment**<br>*The MADE project will only generate medium/ low and manageable risks given its limited scope, scale, duration and with relatively low cost activities. Impacts will be limited to:* | | |

| | | |
|---|---|---|
| □ Greenhouse gas emissions from local and international travels | ▪ Adopting carbon and environmental saving measures (e.g. economy class flights);<br>▪ Offsetting carbon emissions of flights through a verifiable carbon offset project;<br>▪ Using video-conferencing where possible.<br>▪ Put in place appropriate journey management for local trips (cluster journeys where possible) | None proposed |

| **Management** | | |
|---|---|---|
| **Risks and opportunities defined** | **Climate & Environment Measures agreed** | **Climate & Environment Measures in log-frame** |
| **Risks Cont'd** | | |
| **Negative impacts of the intervention on climate change/the environment**<br>*The MADE project will only generate manageable risks given its limited scope, scale, duration and with relatively low cost activities. Impacts will be limited to:* | | |
| □ Resource use and waste e.g. energy, water and paper use for office based activities. | In general, compliance with both national and DFID's environmental safeguards measures should minimise the intervention's footprint on the environment and global climate, including:<br>▪ Applying the waste hierarchy principles to minimise waste;<br>▪ Monitoring and minimising the use of paper, stationery, IT equipment, water, energy;<br>▪ Promoting green procurement (e.g. using recycled paper);<br>▪ Including compliance with these measures in tenders and contract(s) with service provider(s). | None proposed |

| | | |
|---|---|---|
| ▯ Improper use of crop protection products (agro chemicals and fertilizers), and generation of hazardous waste | ▪ Create awareness on the effects of agrochemicals due to improper use<br>▪ MADE should recommended only certified environmental friendly products for use<br>▪ Ensure only trained operators apply agro chemicals<br>▪ Ensure hazardous waste are segregated before disposal by professional waste managers<br>▪ Carry out assessment of nearby water bodies in an event of possible contamination | Screening & scoping of Climate change & Environment impacts for all evaluated projects to be added to the log-frame |
| ▯ Water use, effluent discharges and waste from fish farming | ▪ MADE should recommended appropriate fish farming methods depending on assessment of resource (water) availability<br>▪ In case of groundwater use appropriate assessment and test of groundwater should be conducted<br>▪ Pond discharges may be used to water farms or vegetable gardens in close proximity<br>▪ Solid waste should be composted and used as organic manure | Screening & scoping of Climate change & Environment impacts for all evaluated projects to be added to the log-frame |

| **Management** | | |
|---|---|---|
| **Risks and opportunities defined** | **Climate & Environment Measures agreed** | **Climate & Environment Measures in log-frame** |
| **Risks Cont'd** | | |
| **Negative impact of climate change/ environmental degradation on the intervention**<br>*The objectives and outputs of the MADE project are assessed to be low risk / impacts from climate change:* | | |
| ▯ MADE project activities including field work, data collection and travel may be at direct risk of disruption by seasonal weather extremes such as floods and severe weather conditions | ▯ Carry out risk assessment before implementation, including attention to seasonal weather expectations and forecasts. | None proposed |

| | | |
|---|---|---|
| ⍰ Across the entire portfolio of evaluated projects the risk that climatic and environmental events (e.g. floods, pollution) may reduce the expected investment benefits is considered to be of <u>high impact</u> <u>and medium likelihood</u> since the Niger Delta is a climate and environment sensitive area. | ⍰ Carry out risk assessments prior to project implementation. Screen project documents for evidence of impacts, evaluate outputs and assumptions/risks & where appropriate, raise awareness & apply lessons learned for future projects.<br>See Annex 1 for further detail. | Screening & scoping of Climate change & Environment impacts for all evaluated projects to be added to the log-frame |
| **Opportunities** | | |
| **Beneficial impacts of the intervention on climate change/the environment**<br>*Interventions aim to diversify livelihoods, increase household income, reduce vulnerability and increase climate resilience, rated as Medium Opportunity:* | | |
| ⍰ The project includes interventions which can be shown to have reduced the vulnerability of communities to climate change while increasing resilience and adaptation capacity. | ⍰ Screen project documents for evidence of impacts, evaluate outputs and assumptions/risks & where appropriate, raise awareness & apply lessons learned for future projects | Screening & scoping of Climate change & Environment impacts for all evaluated projects to be added to the log-frame |
| The project includes interventions which can be shown to have achieved one or more of the following:<br>✓ increased mitigation capacity<br>✓ reduced $CO_2$ emissions,<br>✓ provided opportunities to achieve low carbon development | ⍰ Screen project documents for evidence of impacts, evaluate outputs and assumptions/risks & where appropriate, raise awareness & apply lessons learned for future projects | Screening & scoping of Climate change & Environment impacts for all evaluated projects to be added to the log-frame |
| **Management** | | |
| **Risks and opportunities defined** | **Climate & Environment Measures agreed** | **Climate & Environment Measures in log-frame** |
| **Opportunities Cont'd** | | |
| **Beneficial impacts of the intervention on climate change/the environment Cont'd** | | |
| The project includes interventions which can be shown to have achieved one or more of the following::<br>✓ improved environmental management (with or without co-financing);<br>✓ conserved natural resources;<br>✓ contributed to sustainable development | ⍰ Screen project documents for evidence of impacts, evaluate outputs and assumptions/risks & where appropriate, raise awareness & apply lessons learned for future projects | Screening & scoping of Climate change & Environment impacts for all evaluated projects to be added to the log-frame |

| **Evidence** |
| --- |
| Relevant documents |
| Business Case and log-frame<br>See: Business Case of Climate and Environment Assessment of MADE Project, pp 1-25. DAI Europe Ltd.<br>Further links are provided in the cited CEA report |

**SIGNED OFF BY: Stephen Agagua Climate and Environment Advisor**

**DATE: 23/04/2014**