

## Environmental Hazards and Business Mitigation Strategies: Results from Ogoja, Obudu and Obanliku, Cross River State, Nigeria

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**Citation and Acknowledgement** Daniel Buckles and Ugah Godwin Unimke. 2016. Environmental Hazards and Business Mitigation Strategies: Results from Ogoja, Obudu and Obanliku, Cross River State, Nigeria. Unpublished report, YouLead-Cuso International.

The authors wish to acknowledge the contributions of Mr. Johnson Awogbemi and Emilia Eyo, who helped facilitate the workshops to a successful end.

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**Context** The YouLead project in Cross River State (CRS), Nigeria, seeks to increase opportunities for employment, including business development, for young women and men in rural and urban parts of the state. The focus for the project is sustainable economic activity related to agriculture (crops and livestock), fisheries, forestry and tourism. It promotes a “green economy” perspective, that is, one that seeks social and economic development while significantly reducing environmental risks and ecological scarcities. This recognizes the vulnerability of the natural environment upon which economic activity depends – the land, water, air, livestock genetic diversity and other resources that make up and support the livelihoods of Nigerians in CRS. In December, 2015 YouLead organized a series of three workshops with young entrepreneurs who had recently completed entrepreneurship training. While they had detailed plans for businesses of interest to them, little attention had been given to the potential environmental hazards associated with these businesses or viable mitigation strategies. This gap prompted the development of a workshop that could raise awareness of environmental hazards and engage entrepreneurs directly in discussion of means to address them.

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## Purpose

Raise awareness of the environmental hazards of businesses in the natural resource sector and launch discussion of mitigation strategies.

## Process Summary

The workshops took place in community centres in three Local Government Areas in the Northern Senatorial District of Cross River State. Each workshop was a day long, held on the 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> of December in Ogoja, Obudu and Obanliku respectively. The workshop approach was participatory and action oriented. A total of 456 young women and men (231 males and 225 females) participated, most of whom had recently completed entrepreneurship training with the Mobile Entrepreneurship Development Centre. They organized themselves into small groups based on their business interests (goat raising, poultry, fisheries, cassava, honey and rice) and different phases in value chains (input supply, production, processing and marketing). Each group listed potential environmental hazards and rated them using two criteria: the severity of the danger posed by the hazard (to the environment and/or human health) and the probability of the hazard presenting itself in the context of businesses currently operating in the local government area. Ratings for danger were from low to high, and for probability from rare to common. This supported detailed discussion of the hazards and the selection of 2 or 3 of the more dangerous or more likely hazards. Participants then developed potential mitigation strategies for use by business owners, by YouLead and by policy makers within the Local Government Area. A detailed description of the methodology is available with the authors, and could be used to support further assessments with experienced business owners and technical experts in different economic sectors.



## Analysis

In all, 18 groups were formed around 12 business types:

1. Poultry input supply and production;
2. Poultry processing and marketing;
3. Fisheries inputs supply and production;
4. Fisheries processing and marketing;
5. Rice input supply and production;
6. Rice processing and marketing;
7. Goat input supply and production;
8. Goat processing and marketing;
9. Honey input supply and production;
10. Honey processing and marketing;
11. Cassava input supply and production;
12. Cassava processing and marketing.



Each group identified and rated several environmental hazards. Some were unique to a particular LGA, although most were mentioned in all three settings. The most dangerous hazards usually involved the disposal of waste materials during the production and processing stages of different value chains. For example, improper dumping of dead animals from goat, poultry and fish production was rated as a very dangerous hazard and one which happens commonly. Improper drainage of pond water was flagged as a very dangerous hazard in the fisheries production stage because the stagnant water can become a breeding ground for mosquitos and the transmission of malaria, a situation participants rated as very common in their area. Improper disposal of poultry dung and goat dung were rated as common and moderately dangerous hazards. Water pollution from the improper management during cassava processing, fish processing and poultry processing were also flagged as very dangerous and very common hazards. Honey producers noted that both production and processing can bring serious hazards for human health, especially from the poor disposal of bee combs during the harvest period and the high risk of passers-by being massively stung by bees. Rice producers were mainly concerned about the dangers of wild fires during land preparations and the improper use of agro-chemicals, potential environmental hazards also mentioned by cassava producers. Annex I provides a complete list of the hazards and ratings given by each group.

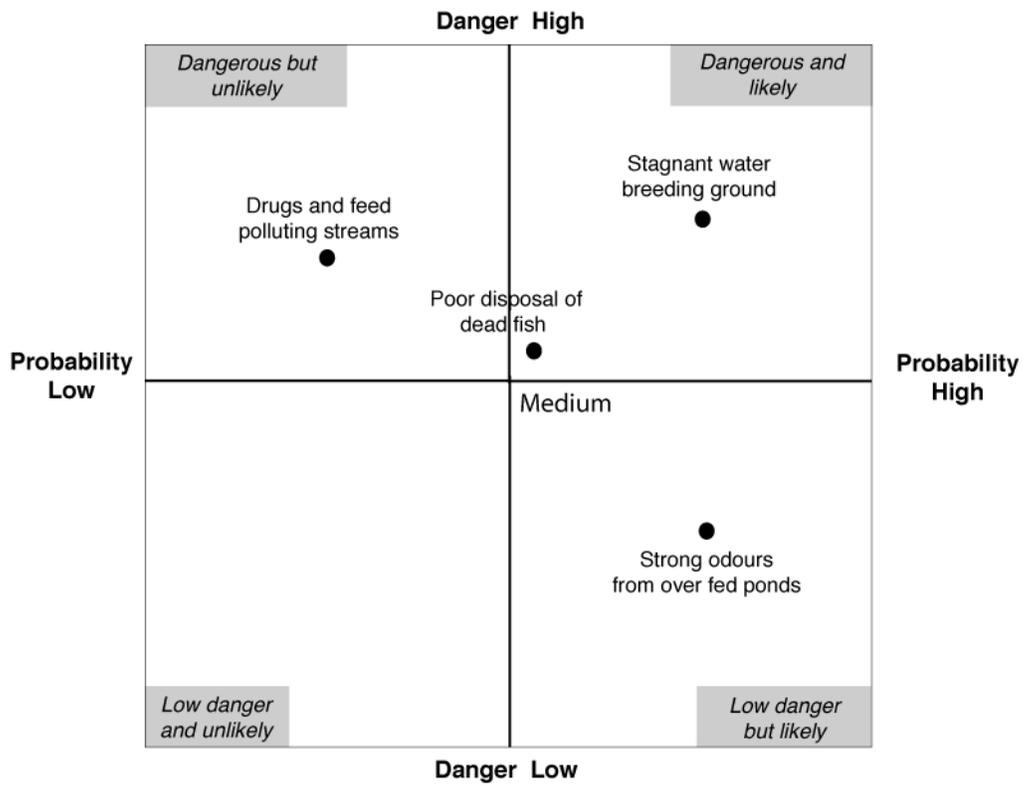
Among the various potential environmental hazards identified, groups selected 1 or 2 they considered priorities based on some combination of severity and probability. Hazards rated highly dangerous and very likely were placed in the upper right quadrant of figure 1. Hazards rated highly dangerous but improbable were placed in the upper left quadrant. Hazards rated as very probable but only somewhat dangerous were placed in the lower right quadrant, while rare hazards with low levels of danger were placed in the lower left quadrant. Hazards with moderate scores occupied the middle area of the figure. The distribution of hazards varied for each group, and supported selection of 1 or 2 priorities for discussion of mitigation strategies.

Participants discussed possible solutions or mitigation strategies (Annex II). Construction of drainage channels, separating waste such as dung for compost-making, use of a carbon disinfectant to control odours, afforestation of dumping sites, recycling of bee combs for candle-making, were among the ideas discussed that entrepreneurs could undertake independently as part of their normal business operations. Discussion also turned to financing these strategies as part of the overall business plan and loan application developed by the young entrepreneurs.

Groups also identified actions that could be undertaken either by YouLead as a project, most of which focused on further technical description and training on how to implement mitigation strategies and support for access to financing for implementation. Ideas for action by officials in the Local Government Area included creating designated spaces for waste disposal, zoning for industrial land uses (such as site selection for fish ponds and rice processing factories) and regulatory frameworks and enforcement needed to reduce environmental risks from businesses.

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Figure 1: Risk assessment for fisheries businesses.



## Actions

The analysis of potential environmental hazards by young entrepreneurs shows that businesses being promoted by YouLead pose serious environmental and health risks that need to be recognized and reduced. Further analysis of these hazards, especially in collaboration with mature businesses in the various value chains, should be undertaken to validate and further prioritize the hazards in terms of their severity and probability. YouLead could then focus attention by technical institutions on the development of cost-effective mitigation strategies for priority environmental hazards.

Some of the environmental hazards, such as waste manure and honey comb, provide significant business opportunities as yet undeveloped in the CRS context. YouLead could engage technical institutions and small businesses in research and development for these products (manure, compost tea, candles, etc.). Consideration could also be given to green products such as carbon filters and solar lights that help to reduce ecological scarcities associated with specific environmental hazards.

Work on environmental hazards with mature businesses and technical institutions could be consolidated into a value-chain specific Fact Sheet, listing priority hazards and mitigation strategies, and providing estimates of the costs associated with mitigation that entrepreneurs could build into their financial plans.

Fact-sheets, and the overall approach to environmental risk assessment used in this study, could also be incorporated into the entrepreneurial, technical and financial training provided through YouLead support to the EDC, technical institutions and microfinance institutions.

From a policy perspective, YouLead has the opportunity to engage with LGAs in the development of practical steps to reduce environmental risks and ecological scarcities within their jurisdictions. This can be done through zoning lands for particular purposes, regulatory and financial support to mitigation strategies and promotion of environmental responsibility among business owners. Ministries at the state and national level could play a guiding and supporting role to the LGA level work where environmental risks are actually experienced by local populations

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## Observations on the Process

The exercise took about 3.5 hours to complete, and seemed to be effective at raising awareness of the potential environmental hazards of businesses and launching discussion of mitigation strategies. This was sufficient given the purpose of the workshop, and stage in development of the YouLead strategy for promoting environmentally responsible businesses. The young entrepreneurs were able to share practical experience with different environmental hazards but further technical input from mature business owners and technical specialists in different value chains is needed to enrich the discussion of mitigation strategies. The use of Fact Sheets described above in future workshops might provide scope for estimating costs and building environmental considerations into business plans and financing options.

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## Annex I

### Potential Environmental Hazards

#### Poultry input supply and production (Ogoja)

- Poor disposal of vaccines: very dangerous, but rare
- Dumping the poultry waste: moderately dangerous, and very common
- Rapid changes in weather (hot to cold): moderately dangerous, and moderately common

#### Poultry processing and marketing (Ogoja)

- Dumping chicken intestines and dead animals: moderately dangerous and very common
- Dumping hot water used to dress the chickens: moderately dangerous, and moderately common
- Dumping the poultry waste: very dangerous, and very common
- Strong odours in the markets from chicken droppings: moderately dangerous and very common
- Selling spoiled frozen chickens: very dangerous, but rare

#### Fisheries input supply and production (Ogoja)

- Dumping dead fish: very dangerous and moderately common
- Adding too much feed to the pond water: moderately dangerous, but rare
- Deforestation when siting a fish farmer: low danger, rare

#### Fisheries input supply/production (Obudu)

- Improperly drained and stagnant pond water creating a breeding ground for mosquitos and transmission of malaria: very dangerous and very common
- Offensive odours from unchanged pond water: moderately dangerous and very common.
- Noise from production mills: moderately dangerous and rare.

#### Fisheries input supply and production (Obanliku)

- Destruction of soil structure during pond construction: moderately dangerous and very common
- Improperly drained and stagnant pond water creating a breeding ground for mosquitos and transmission of malaria: very dangerous and very common
- Offensive odour causing cancer of lungs, asthma, death: moderately dangerous, and moderately common
- Drugs and feed polluting water drained into streams and rivers: Very dangerous and rare

#### Fisheries processing and marketing (Obudu)

- Improper drainage or channelling of the pond water (polluting the streams): very dangerous and very common
- Poor management of pond water resulting in odours and difficulties breathing: moderately dangerous and very common

#### Fisheries processing and marketing (Obanliku)

- Water pollution due to dumping of fish waste into running water: very dangerous, rare
- Disease upon intake and air pollution due to poor preservation: moderately dangerous and moderately common
- Poor hygiene from fish disposal (cartons, bones): a little dangerous, and very common
- Deforestation and air pollution due to smoking of fish: very dangerous and very common

### Rice input supply and production (Obanliku)

- Bush burning: very dangerous and very common
- Improper use of agro-chemicals: very dangerous and rare
- Soil erosion: a little dangerous and moderately common
- Deforestation during cultivation: very dangerous and very common

### Rice processing and marketing (Obanliku)

- Air pollution from factories: very dangerous and very common
- Soil pollution from rice husks: moderately dangerous and moderately common
- Fire outbreak (due to poor electrical installation): very dangerous, but rare
- Noise pollution from factories: dangerous and very common

### Goat input supply and production (Ogoja)

- Poor disposal of dead kids: very dangerous and moderately common
- Failure to clean around the pen: a little dangerous, but very common
- Poor disposal of vaccines: a little dangerous, but very common
- Dumping of goat dung: moderately dangerous, but very common

### Goat processing and marketing (Ogoja)

- Degradation of the soil at the goat roasting site: a little dangerous but very common
- Excessive noise from poor management of goat processing equipment: a little dangerous, and moderately common
- Deforestation for fuel wood: moderately dangerous and moderately common

### Honey input supply and production (Obudu)

- Poor bee comb disposal during harvest period: very dangerous (people can be massively stung) and very common.
- Restriction of movement by people residing around: moderately dangerous (hassle to people) and very common.
- Reduction in farmland reducing forest land (unclear problem): very dangerous and moderately common

### Honey Processing and marketing (Obudu)

- Air pollution (smoke) from machinery used in processing and packaging: moderately dangerous and very common
- Attraction of many bees (large bees) to the processing unit: somewhat dangerous and very common
- Failure to maintain vehicles used to transport leading to air pollution: moderately dangerous and moderately common

### Cassava input supply and production (Obudu)

- Erosion on sloping land: very dangerous and very common.
- Burning by neighbours crossing the boundary of the field in the dry season: very dangerous and moderately common
- Pests and diseases on plants affecting growth: very dangerous and moderately common

### Cassava input supply and production (Obudu)

- Deforestation: very dangerous and very common

- Wild fires from bush burning: very dangerous and moderately common
- Improper use of herbicides: a little dangerous and moderately common
- Improper/excessive fertilizer application: a little dangerous and rare.

#### Cassava input supply and production (Obanliku)

- Destruction of trees leads to deforestation: very dangerous and moderately common
- Bush burning pollutes the environment: moderately dangerous, and moderately common
- Pollution of water source by herbicides: very dangerous and very common
- Noise pollution by tractors: a little dangerous and rare

#### Cassava Processing and Marketing (Obudu)

- Cassava processing sewage disposal (water): moderately dangerous and very common
- Noise and air pollution from the grinding machines: moderately dangerous and moderately common
- Disposal of waste bags after sale or use: a little dangerous (garbage) and moderately common
- Odours from fermenting cassava (akpo/garri): a little dangerous and moderately common

#### Cassava Processing and marketing (Obanliku)

- Poor management of cassava water causing water pollution: very dangerous and very common
- Lack of proper maintenance from machine causing noise pollution: a little dangerous and rare
- The use of fire wood producing black smoke causing air pollution: very dangerous and common
- Improper dumping of cassava peels causing pollution: moderately dangerous and rare

## Annex II

### Solutions/mitigation strategies

#### Disposal of dead kids (Ogoja):

- Producers: proper disposal of dead kids by burying; taking maximum care to reduce the incidence of death
- YouLead: provide knowledge on proper disposal; provide with vaccine to reduce death rate
- LGA/state: educate goat farmers on proper disposal; create policies guiding goat farmers on environmental sanitation

#### Disposal of waste after goat processing and marking (Ogoja):

- Producers: having a definite site for dumping of waste; proper waste management system (arranging dung, bones, dirty water). Dirty water to septic pit/leaching pit.
- YouLead: training on waste disposal
- LGA/state: provision of a dumping site for surplus waste, not treated on own site; regulations and policies (on dumping waste and on water use and treatment)
- Provision of waste disposal van: willing to pay for service

#### Disposal of poultry waste (Ogoja):

- Producers: cleaning of the environment; waste should be kept a good distance from poultry and people; waste should be packaged in bags for easy access in case farmers want to purchase, or burned.
- YouLead: organize a one day training on disposal of waste; help us inform the government to provide a place for waste dump
- LGA/: Gov. can help us to work with the use of sophisticated materials (truck, waste site, etc.) to dispose of waste properly and avoid pollution; employ workers to carry waste to waste site; place for treatment of poultry waste for fish feed.

#### Odour from chicken droppings during processing and marketing (Ogoja)

- Producers: use of carbon as disinfectant to reduce odour; carried out every six months
- Youlead: provide training on ways to manage odour; ensuring training is put into use by farmers through monitoring;
- LGA/state: give grants to poultry farmers to purchase carbon and disinfectants. Ensure grants given are used for purpose expected (monitoring)

#### Discarding of dead fingerlings and fish from production (Ogoja)

- Producers: acquire proper skills (from training or experts); ensure always properly discard dead and contaminated product; choose suitable dump location and do afforestation (queen of night, banana, orange); make compost
- Youlead: mentorship and training; advise/carry out impact assessment on best modalities to discard contaminated product; outline on choosing a suitable location for pond building
- LGA: training on quantity of feed to use; creating awareness on the importance of reforestation; state waste disposal scheme should be functional.

#### Poor management of pond water results in air pollution (smelly environment, difficulty breathing) (Obudu)

- Business owner: change pond water regularly; remove dead fish from the pond; maintaining good feeding methods (not over feeding as this contaminates the pond)
- YouLead: workshops on this hazard
- LGA/State: assist with providing water for regular changing in fishponds; provide grant/loan for proper maintenance of the pond.

Improper draining or channelling of the pond water during water change, results in pollution of streams and rivers (Obudu)

- Business owners: proper channelling.
- Youlead: training on proper channelling
- LGA: provide grant/loan for proper maintenance of the pond.

Improperly disposed stagnant pond water breeding mosquitos (Obudu)

- Business owners: prepare drainage channel;
- Youlead: training on drainage channels; regular monitoring of business owners to ensure compliance
- LGA: Provision of equipment and funds; send qualified sanitary officer to monitor water and waste disposal

Noise from mills (Obudu)

- Business owners: locate mills far from where people are living
- Youlead: training on location of mills
- LGA: provide proper town planning to separate mills from residential areas

Poor bee comb disposal during harvest period (Obudu)

- Business owner: acquire knowledge of adequate disposal; acquire disposal equipment; recycling bee comb (candles)
- YouLead: training in bee comb disposal, provide access to equipment for this, coordinate owners and government for proper disposal
- LGA: empower farmers with funds to purchase adequate equipment for disposal; provide centralized point for disposal or provision of dumping site; create a monitoring team for proper disposal.

Smoke and air pollution from honey processing equipment (Obudu)

- Business owners: Proper location of the facility; proper channelling of the engine pipes
- YouLead: training services, financial assistance
- LGA: provision of land; access to low emission engines

Attraction of many bees to the processing unit (Obudu)

- Business owner: proper use of protective clothes against bee stings; proper maintenance of processing facility; locate unit far from residential area
- YouLead: good training of business owners; financial assistance
- LGA: provision of land to assist, financial assistance

Erosion of cassava fields on sloping lands (Obudu)

- Business owners: channelling of drainage; blocking of drainage; (include in loan application)
- YouLead: financial support, agricultural implements, sensitize and train
- LGA: provision of land, awareness, loans scheme

### Deforestation (Obudu)

- Business owner: afforestation, sensitization, media communication awareness, common laws, bush fallowing/shifting cultivation
- YouLead: organization of farmers; workshops, media communication, formulation of environmental law
- LGA: government policy, workshops/seminars, motivational incentives to empower a task force, afforestation

### Bush burning for cassava production (Obudu)

- Business owner: instead of burning of grasses, use as manure; ploughing (green yard manure)
- YouLead: training on composting, provision of equipment
- LGA: organize awareness programs, implement policies or laws

### Noise pollution from grinding machine (Obudu)

- Business owners: Locate a little far from urban settlement; build structure around the machine, to reduce the noise
- YouLead: words of advice, financial support
- LGA: Mark out a space where we can locate our business, or cassava processing factory

### Poor sewage disposal from cassava processing (Obudu)

- Business owner: construction of pit, construction of drainage, regular cleaning of the area
- YouLead: training on sewage disposal, financial support
- LGA: create a mobile drainage system; provide recyclers; provide sewage disposal area; construction of drainage

### Pollution of water source by herbicides: very dangerous and common (Obanliku)

- Business owners: use of manual labour
- Youlead: funding to enable paying of labourers
- LGA: Gov. should organize workshop for farmers to discourage the use of herbicide

### Destruction of trees leads to deforestation (Obanliku)

- Business owners: pruning of trees with cutlass
- YouLead: Financial support for purchase of more labour and cutlass
- LGA: Should sensitize farmers on the effect of deforestation

### Poor management of cassava water during process causing water pollution (Obanliku)

- Business owner: construction of water channels into a covered pit.
- Youlead: provide business owners with the idea to construct drainage
- LGA: regular supervision of business premises by the sanitary officers

### The use of fire wood producing black smoke causing air pollution (Obanliku)

- Business owners: changing from traditional fire setting to an improved fire setting; smoke channel into pit
- Youlead: linking business owners to financial institutions where loans can be accessed
- LGA: provision of funds to business owners

### Breeding home for mosquitos through stagnant drained from ponds (Obanliku)

- Business owner: use of net across pond; constant sanitation of pond; effective disposal of water from pond; reservoir
- Youlead: finance to acquire nets, pipes for drainage, sensitization programs at grassroots, business environment and town hall meetings; treatment of reservoir water
- LGA: local councils should give operational permit; siting of ponds location by survey and planning; partnership with washroom for sanitation; enactment of legislative to regulate farmers

#### Deforestation and air pollution due to smoking of fish (Obanliku)

- Business owners: replant five trees for every one tree cut; use local oven for drying (coal); keep to government policy on the environment; sun drying
- Youlead: provision of modern technology for fish drying/processing; financial support; continuous capacity training
- LGA: financial support; make and uphold a definite policy on deforestation; ensure and provide a conducive environment for both NGO and farmers.

#### Deforestation during rice cultivation (Obanliku)

- Business owner: selective deforestation (logging); total deforestation and replacement with economic trees.
- Youlead: intensive training on effects of deforestation on environment
- LGA: provision of land for cluster farming; Gov. should enshrine laws for effect of deforestation; Gov. should provide extension officer for technical services

#### Noise pollution from rice processing factories (Obanliku)

- Business owners: fencing around the factory
- Youlead: financing for more effective silencers on the machins for milling
- LGA: industry location from residential areas

#### Air pollution from rice processing factories (Obanliku)

- Business owner: eliminate burning of rice husks
- Youlead: finance for the provision of nose guards
- LGA: industries should be sited away from residential areas