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RSB Food Security Guidelines

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Note on the use of this document

These guidelines have been prepared to help the operator to assess the level of food security in the area of operations and evaluate potential impacts of operations on food insecurity.

It describes key aspects to be investigated during planning of new projects or ongoing activities in order to identify potential impacts that biofuel operations may have on local food security. It also describes good practices that can be adopted to minimize these potential impacts.

The guidelines should be used by all RSB participating operators that are operating in a region of food insecurity. However, where a food security impact assessment is required, as determined against Principle 6 of the RSB Principles & Criteria (RSB-STD-01-001, these guidelines should be used to help develop the scope and carry out the impact assessment process.).

These guidelines can be used by the auditors to assist with quality aspects of documentation.

This document does not serve as the basis for verification of compliance and audits of operators. This document is not a normative RSB document.

These guidelines were developed in collaboration with:

Kimetrica International Limited
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PURPOSE OF THE GUIDELINE

These Guidelines and Toolkit for Assessment and Mitigation of Food Security Impacts of Biofuels have been developed to enable feedstock farmers and biofuel producers and processors wishing to acquire RSB certification. They have been written to help operators comply in particular with Principle 6 of the RSB standard.

The guidelines must be used in association with the RSB principles, criteria and indicators.

The food security principle focuses on local and regional impacts on food security of biofuel producers and processors, who might, for instance, use food, or land which could be used to grow food, to produce biofuels. At this point, indirect impacts that may be felt on food prices from far afield of the biofuel production seeking accreditation cannot be assessed accurately enough to be included in the current standard. In time, however, guidelines for these impacts may be added to the standard. For now, biofuel production will be assessed on the basis of the impacts that the particular operation seeking accreditation may have on local food security; it will be based on actions within their own direct influence.

This document provides an easy-to-use toolkit that farmers, producers and food security assessment professionals can use to assess compliance with this principle. The guidelines contained in this document provide information on risk assessment, mitigation of any risks, and strategies to enhance local food security.

Biofuels producers are encouraged to understand and assess the risk to their operations that food security may create. There is much being made in the media of this risk, and while individual biofuels producers are relatively powerless to have much impact on large global scale impacts, they can avoid risk to their own operations and impacts on the local communities affected by their own operations. These risks are not merely that the local people are food insecure but that this food insecurity will result in a backlash to the biofuels development or biofuels in general. Government may withdraw permits based on community distress, communities could make operations unworkable. It is thus in the interest of biofuel producers to adequately deal with the risks that their own operations may pose. This principle is targeted at areas where food security is demonstrated to be an issue, but it also deals with improving food security where this is seen to be a significant issue. Enhancement of food security is seen to be a local requirement, as the risk to any biofuel operation may increase if it is surrounded by a community where food insecurity is a big issue. The section in these guidelines that deals with mitigation can be used as guidelines for enhancing food security in the locality or “foodshed” of the operations.

1. HOW TO USE THIS GUIDE

These guidelines should be used in conjunction with the RSB standard. While the guide is written for the general reader, conducting food security assessments requires practical skills. We have set out the steps and methods required to assess food security impacts, but the interpretation of assessment results requires an analyst with an understanding of the underlying dynamics of food security and the ability to analyze both qualitative and quantitative data to establish an understanding of impacts and way forward to mitigate adverse effects.

The guidelines are general. While food security in the abstract is the same for all people, each situation is unique and the approach and especially the interpretation of information and data has to take into account the local context and the greater food security environ.

The guideline is about assessing impacts in a biofuel production and processing catchment area (what we call foodshed). It is important to stress that while the scope of impact analysis may be on the population living within the catchment area, food security factors extend way beyond catchment borders, as markets and income sources are almost certainly regional and national in nature.

2. BACKGROUND TO BIOFUELS PRODUCTION AND FARMING

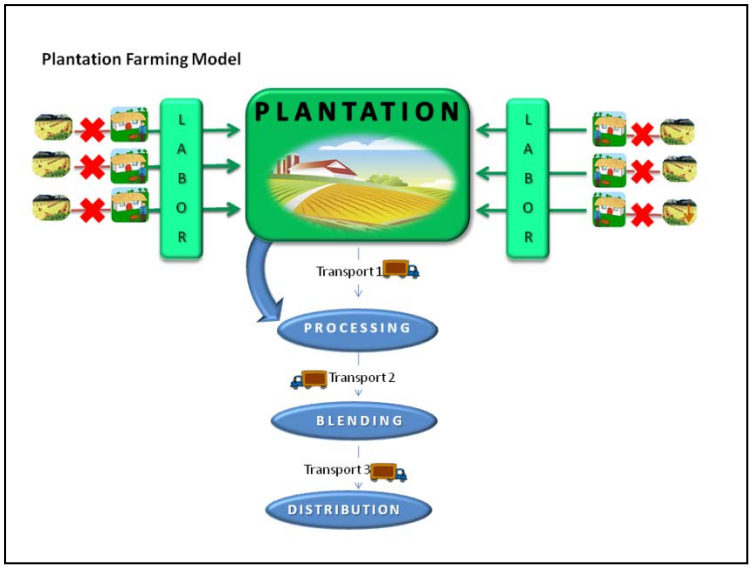
The RSB Standard is applicable to a vast diversity of production models, from smallholder production for household and local consumption to multinational export agricultural production of biofuel feedstock to processing and blending of finished liquid biofuels. The standard covers a range of tropical and temperate biomes and products, ranging from industrial estates of biodiesel or bioethanol feedstocks to smallholder production of feedstock for liquid biofuels. In addition to biophysical factors, socioeconomic and political variables and aspects of tenure and governance vary widely, with a range of tangible and specific effects on local and regional food security.

From a technical perspective, this guideline considers the food security impacts of first generation biofuels (biomass to liquid biofuels), but does not consider the proposed development of second generation ligno-cellulose biofuels, to be based on digestion of lignin and cellulosic materials as an ethanol feedstock – a process which is not currently technically viable, but may have longer-term implications mitigating current food security impacts of ethanol feedstock production from cereals.

2.1 Intervention Typology

For the purposes of assessing impacts on food security from biofuel developments, three basic production models are defined: **plantation** / estate (by individual, cooperative or corporate), **outgrower** (by contract or independent farmer), and a **hybrid** model consisting of a mixed plantation with integration of outgrower schemes.

Figure 1: Plantation Farming Model



The Plantation (Estate) Production Model

The plantation or estate model of production is characterised by large-scale production, often in monoculture, with reciprocal levels of mechanisation and paid labour (by contract or piece-work). The plantation model is based on economies of scale and maximal efficiency of production in terms of inputs and outputs. Plantation agriculture is often based on monoculture of a single variety or cultivar, which increases risks of pests and disease impacts, necessitating intensive management with tillage, fertilisers, pesticides, herbicides and other chemical inputs.

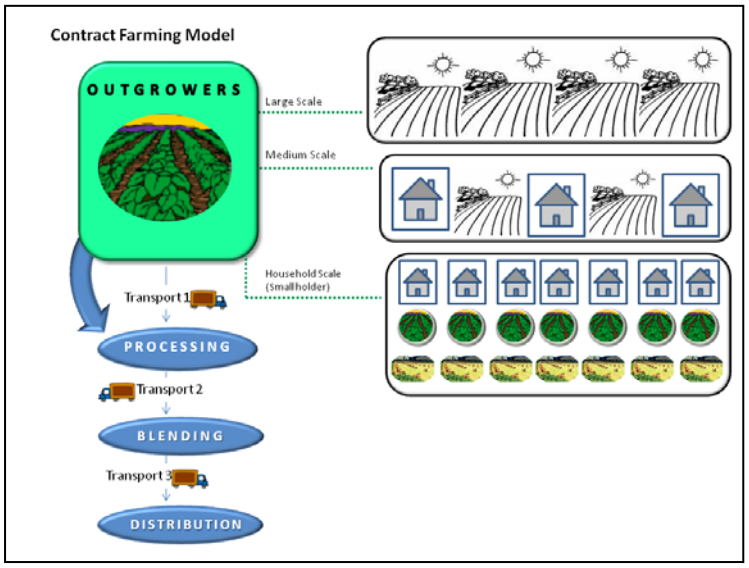
The scale of plantation operations may result in large-scale and longer term food security impacts on the foodshed and neighbouring communities in the following ways. Irrigated production may draw from local water resources including the water table, which may also be affected by runoff of chemical residues further downstream and rural people often rely on this water for production, subsistence or for sale to local markets. As rural labour is drawn from agriculture to employment, there are opportunity costs in terms of agricultural labour (and production) foregone at the household level. Wage labour may increase food access, but only if food is available (and affordable) on local and regional markets; thus market-level impacts of substitution of land and labour from food cultivation to biofuel production must be assessed.

Land tenure issues may arise prior to establishment of the plantation, including possible dispossession of informal owners or users of land, some or all of whom may subsequently be taken up as plantation labour. This is dealt with under principle 12, but all of these factors can impact in one way or another on household level food security.

The Outgrower (Contract Farming) Model

Outgrower or contract farming covers a range of forms and scales, from large-scale mechanised production to smallholder plots alongside subsistence and other crops, and a range of contractual arrangements. While outgrower systems are currently considered more inherently 'sustainable' from a social and environmental perspective, it is important to consider hidden costs of independent production, including food security impacts of agricultural land and labour foregone from food production, water depletion, soil nutrient depletion, erosion and downstream impacts at the watershed level, as well as the risks of invasive species and potential risks from genetically modified organisms.

Figure 1: Contract Farming Model

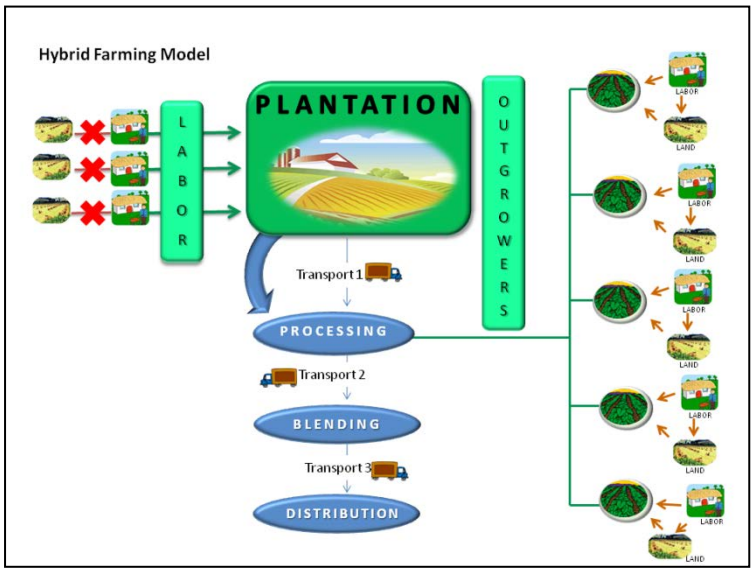


The Hybrid Production Model

Hybrid production models may grow from, or around, a plantation, where production of feedstock is consolidated for bulked processing or shipping. Hybrid models may combine the efficiency benefits of intensive production with the sustainability benefits of outgrower production, but the risks or negative impacts of both must be assessed realistically and managed by the operator.

If managed properly, plantation operations may provide technical support to outgrowers in order to maximise the efficiency of production and help farmers to meet sustainability criteria and safeguard or enhance their food security at the household level.

Figure 2: Hybrid Farming Model



In terms of sustainability, each of the developers of these models may monitor impacts to food security within their respective catchment area, and may implement mitigation measures as necessary, but a distinction should be noted between the parameters of agricultural / environmental and social sustainability.

Whereas outgrower models are seen as more supportive of food security, despite substitution of land and labour to production exported from the micro-level system, integration of cash and food crops provides benefit of intensification and diversification of cultivation , reducing risks from pests and diseases to which mono-cropped systems are more susceptible. Reduced risk may mean that the farmer could potentially make more cash, thus improving her/his risk to food security.

3. ASSESSING IMPACTS: CONCEPTS AND DEFINITIONS

Before exploring specific methods for assessing potential food security impacts of biofuel production and processing, it is important to provide a foundation on critical definitions and terms that are important to understand when assessing food security impacts.

3.1 What is Food Security

While there are many definitions of food security, all agree that a person, household or community, region or nation is food secure when all members have physical and economic access at all times to buy, produce, obtain or consume sufficient, safe and nutritious food to meet their dietary needs and food preferences for a health life.

For the purposes of these guidelines, the definition of food security shall be that of the World Food Summit held in 1996: "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life."

For the purposes of these guidelines, the definition of right to adequate food shall be that of the International Covenant on Economic Social & Cultural Rights (ICESCR): The right to adequate food is a human right, inherent in all people, "to have regular, permanent and unrestricted access, either directly or by means of financial purchases, to quantitatively and qualitatively adequate and sufficient food corresponding to the cultural traditions of people to which the consumer belongs, and which ensures a physical and mental, individual and collective fulfilling, and dignified life free of fear."

Food security is generally assessed according to four component concepts:

- Food Availability
- Food Access
- Food Utilization
- Food Stability (*versus* Vulnerability)

In the context of potential food security impacts on biofuel production, it is important to ask the question- "is food available in the biofuel production and catchment area"? Even if food is available, do households have access to it? And if so, do they have the means to utilize it?

3.2 Fundamental Definitions: Food Availability, Access, Utilization and Stability

Food Availability means that food is physically present because it has been grown, processed, manufactured, and/or imported. For example, food is available because it can be found in markets and shops; it has been produced on local farms or in home gardens; or it has arrived as part of food aid. This refers to all available food in the area, and includes fresh, as well as packaged, food.

Food availability can be affected by disruptions to the food transport and production systems, due to blocked roads, failed crops or a switch from food crops to cash crops, changes in import and export tariffs, amongst other factors. Such occurrences can influence the amount of food coming into an area. In addition, food availability is dependent upon seasonal patterns in food production and trading.

Food Access refers to the way in which different people obtain available food. Normally, we access food through a combination of means. This may include: home production, use of left-over stocks, purchase, barter, borrowing, sharing, gifts from relatives, and provisions by welfare systems or food aid. Food access is ensured when everyone within a community has adequate financial or other resources to obtain the food necessary for a nutritious diet. Access depends on a household's available income and its distribution within the household, as well as on the price of food. It also depends on markets.
Food access can be negatively influenced by unemployment, physical insecurity (e.g. during conflicts), loss of coping options (e.g. border closures preventing seasonal job migration), or the collapse of safety-net institutions which once protected people on low incomes.

Food Utilization is the way in which people use food. It is dependent upon a number of interrelated factors: the quality of the food and its method of preparation, storage facilities, and the nutritional knowledge and health status of the individual consuming the food. For example, some diseases do not allow for optimal absorption of nutrients, whereas growth requires increased intake of certain nutrients.

Food utilization is often reduced by factors such as endemic disease, poor sanitation, lack of appropriate nutritional knowledge, or culturally-prescribed taboos (often related to age or gender) that affect a certain group's or family member's access to nutritious food. Food utilization may also be adversely affected if people have limited resources for preparing food, for example due to a lack of fuel or cooking utensils.

Additional Definitions

Food Consumption

- Number of meals per day
- Average meal composition
- Household expenditure distribution
- Total Expenditure
- Food Expenditure
- Share (%) of food in expenditure

Food Stability

- Food Prices
- Recent increases in staple food prices
- Perceived and actual effects on food expenditure

Right to Food

- A Human Right inherent in all people
- To have regular, permanent and unrestricted access either directly or through market purchases

Value Added Food Products

- All food has a higher value when they have been processed.
- Value added food products include foods such as corn-soya blend and processed meats

Staple Foods

- A food that can be stored for use throughout the year or produced fresh at any time of the year
- They are typically starchy foods, such as cereals, root vegetables and pulses

Affordable Nutrition

- Food security is linked directly to nutrition and food utilization.
- Affordable nutrition is about understanding the range of foods which are easily available and affordable within a community and provide a well balanced diet.

Food Stability: To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The

concept of stability can therefore refer to both the availability and access dimensions of food security.

Food insecurity generally occurs when one or more of the above factors are imbalanced.

3.3 Food Security Impacts and Biofuel Production

Biofuel production having direct impacts on food security can occur from a reduction not only in cultivated crops, but also in the diversity of crops cultivated, with negative impact on dietary diversity but also the diversity of the agricultural system, which has been widely identified as a measure of long-term resilience in terms of productivity (particularly in response to biotic and abiotic stressors), household food and nutritional security, and security of household livelihoods and assets. The picture may be mixed in outgrower systems, serving to increase cropping diversity to some extent, as well as providing reliable cash cropping, but attention should be given to measuring crop and dietary diversity as an overall measure of food security (Ruel 2002).

By contrast, in addition to these geophysical and chemical impacts, plantation agriculture of biofuel feedstock removes labour from food cultivation, and may in some cases involve permanent removal or dispossession from ancestral lands formally held by the state, or leased to local, parastatal or foreign business interests. While cash income to the employees of the plantation may be assumed to benefit the food security of worker households, assessment of the food security impacts of biofuel production based on plantation agriculture must take into account the opportunity cost of labour removed from cultivation of food and cash crops for household subsistence and cash income.

Food security impacts may be overall positive, or they may present a positive face tempered by structural complexities. Positive impacts on food security from biofuel production include not just employment and capital, but may also involve technical 'spill-over' effects of techniques and technologies Arndt et al. 2008), e.g. for intensification of agricultural production at the household and community level, but this must be facilitated by investment in technical extension and training in 'best practices' or Good Agricultural Practice in order to be sustainable over time.

Negative food security impacts are likely to arise from competition between land use systems, i.e. agricultural versus biofuel feedstock production. While the feedstock production represents one level of complexity, a processing facility may purchase or toll production from a much larger catchment area than a plantation or consolidator, with a commensurate responsibility for tracking production impacts across the production areas of origin, as well as documenting market distortions or anomalies noted on 'downstream' local, urban and regional markets. For diagnostic tools on local- and market-level food security impacts, see Annex 1, Data Collection Instruments).

3.4 Assessing Social, Economic and Market Impacts of Biofuels on Local Food Security

The socioeconomic impacts of biofuels production, considered in the context of the global food crisis of recent years, have been identified by many recent sources as a one of the 'current and future drivers of food price volatility' (IAASTD 2008), not least because large-scale mono-cropping of feed

stocks – whether heavily subsidised or not – is largely based on petroleum based agricultural inputs tied to global petroleum markets.

The data on net energy, environmental and economic benefits of biofuel production and use, including reduction of greenhouse gas emissions, is unclear and contested. These technologies have been shown to divert significant crop output from food markets, thereby contributing to higher food prices. In the longer term, new generations of biofuel technologies could make a limited but useful contribution to energy markets and, with targeted investments based on a comprehensive assessment of the social and environmental benefits and costs (e.g., increased land and food prices, water availability, and deforestation), could offer new income opportunities to small-scale farmers and rural entrepreneurs.

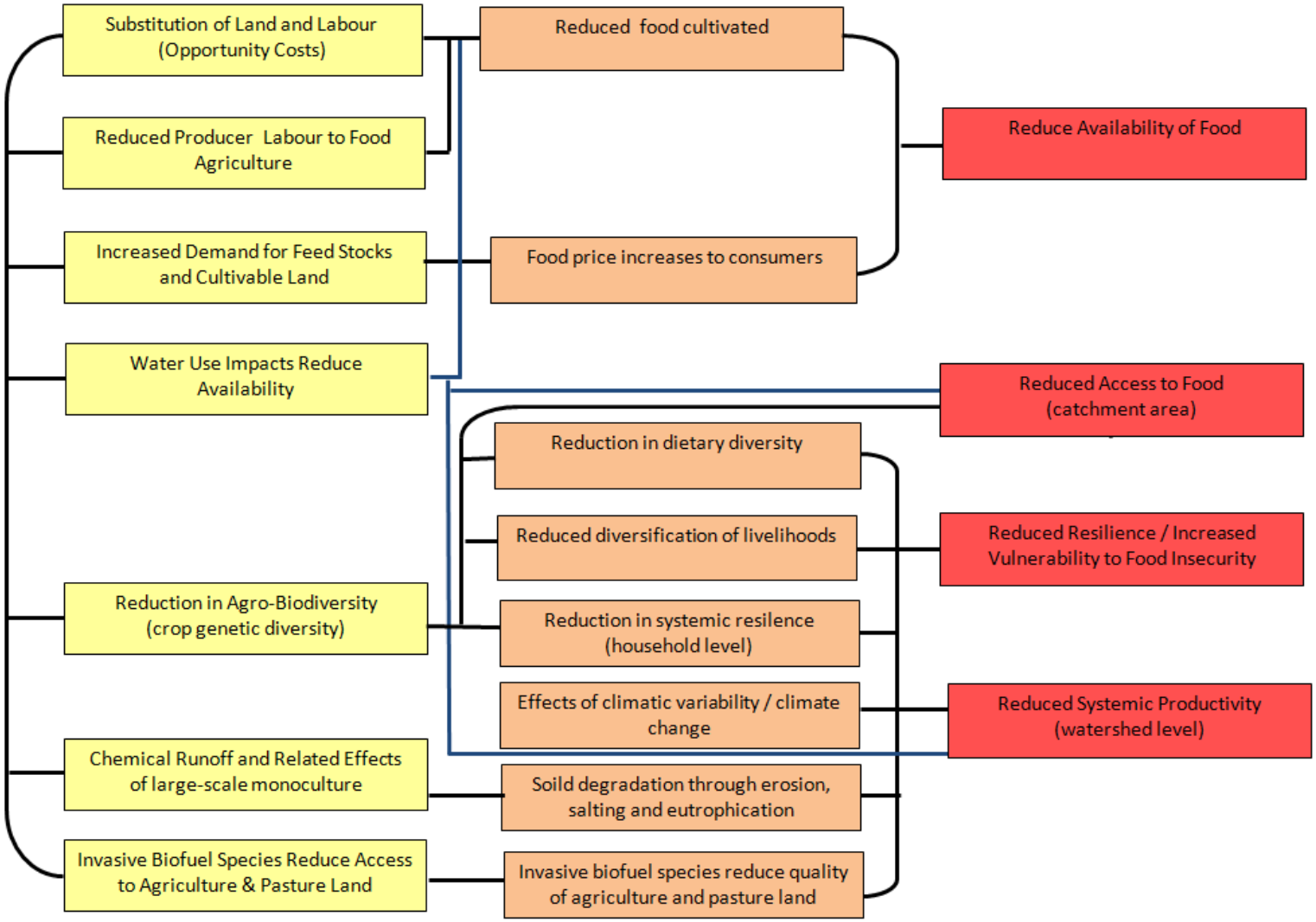
The socioeconomic impacts of biofuels are complex, and are directly related to nutritional impacts, as price factors (food and labour) affect availability and consumption.

4. CRITICAL PATH RISKS ANALYSIS

Based on consideration of the above risks to local food security from biofuels production and processing, including factors both geophysical and socioeconomic, we can construct a schematic flow chart to describe (in broad terms) the inter-relation of basic factors, vastly different though the contexts of various operations will be in the real world.

Figure 4 illustrates critical risk pathways from the farm level to impacts of household food security.

Figure 4: Critical Path Risks Analysis



Notes to Impact Pathway Analysis by Production Model

Impact pathways differ according to production model (plantation, outgrower or hybrid) and scale of the operation.

Any removal of people from land where people are utilising that land for subsistence purposes can create a food security issue for that person and thus scale and size o operations cannot be the only criteria used to determine impacts. However, it is required under the RSB standard to mitigate local impacts as a result of biofuel operations.

1. Plantation / Estate Model (Intensive)

- What is Affected: Landscape and Watershed
- Who is Affected: Resident Community and Labour Pool
- Where is the impact: Watershed, local and regional levels
- What are the positive effects (opportunities): Income and investment opportunities, generation of rural employment opportunities, diversification of livelihood strategies
- What are the negative effects (risks): Land degradation at watershed and landscape level, including downstream fisheries; dispossession of informal land-holders

2. Outgrower Model (Contract Farming)

- What is Affected: Smallholder farms; Landscape and Watershed
- Who is Affected: Smallholder farmers and farming communities
- Where is the impact: Local and national levels
- Positive effects (opportunities): Income and investment opportunities, generation of rural employment opportunities, diversification of livelihood strategies, intensification of smallholder agriculture
- Negative effects (risks): Soil and water depletion, land fragmentation, onerous credit terms, risks borne and overheads costs paid by smallholder farmer (including land as collateral)

3. Hybrid Model (Plantation + Outgrowers)

- What is Affected: Smallholder farms; Landscape and Watershed
- Who is Affected: Smallholder farmers and farming communities
- Where is the impact
- Positive effects (opportunities): Income and investment opportunities, generation of rural employment opportunities, diversification of livelihood strategies, intensification of smallholder agriculture through technical 'spill-over' (Arndt et al. 2008).
- Negative effects (risks): Dispossession of informal land-holders; land degradation (soil and water depletion) at farm, watershed and landscape levels (including downstream fisheries); land fragmentation, onerous credit terms, risks borne and overheads costs paid by smallholder farmer (including land as collateral)

5. BIOFUELS AND FOOD SECURITY IMPACT ASSESSMENT

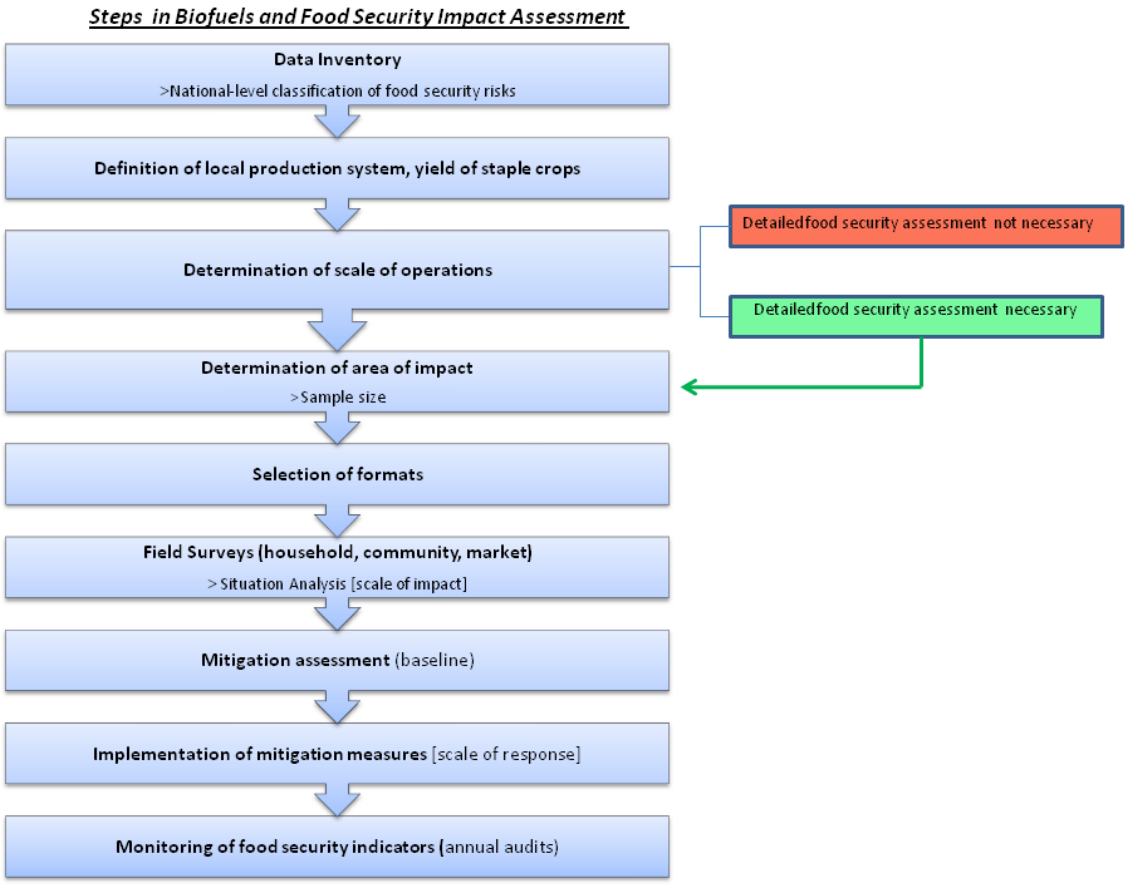
In general, a food security assessment is a process to understand the food security situation in order to make decisions to mitigate potential food insecurity. A food security assessment focuses on how

successful people are in maintaining a secure food environment for themselves. The general objective of a food security assessment is to understand the severity of the situation. This includes identifying those who are food insecure and those vulnerable to becoming food insecure, and to determine whether or not there is a need to intervene in the short and or long term.

In assessing the potential food security impacts of biofuels production and processing, it is important to assess various groups of people within the biofuels catchment area. The assessment will help in understanding how people make a living. It will also need to understand the assets available to them – for example, farm tools, land, business license, etc. We need to understand who has access to these resources and whether this access changes over time. We also need to know how people meet their food needs, including from their own production and from market purchases.

The following chart defines the steps to be undertaken in assessing and monitoring food security impacts of liquid biofuels production and processing:

Figure 5: Steps in Biofuel and Food Security Impact Assessment



As the effects of different variables impact interest groups differently, particularly under different production models, indicators should be selected which are simple, measurable and widely applicable.

Food security impacts from liquid biofuels feedstock production are expected to include food deficits and reduced dietary diversity as farmers reduce food production in order to devote more land and

labour to biofuel feedstock, or leave household cultivation (either entirely, or to their spouse) for paid employment on a biofuel feedstock plantation.

As a result of competition between biofuel feedstocks at the community or landscape level, there may be temporary or chronic food shortages on local and regional markets, leading to increases in food prices for the urban poor, as indicated in Figure 6 (below).

Figure 6: Potential Negative Effects of Small Scale Farmers' Abandonment of Food Growing for Biofuel Crop Farming

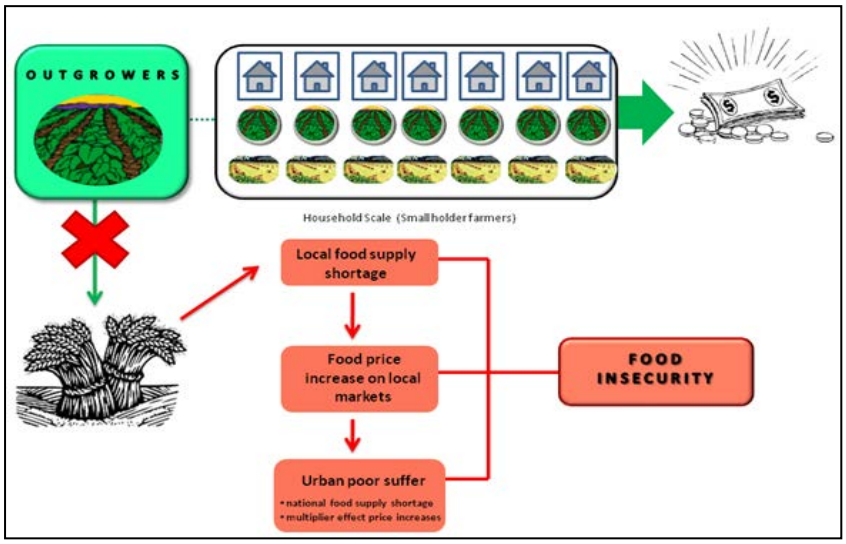
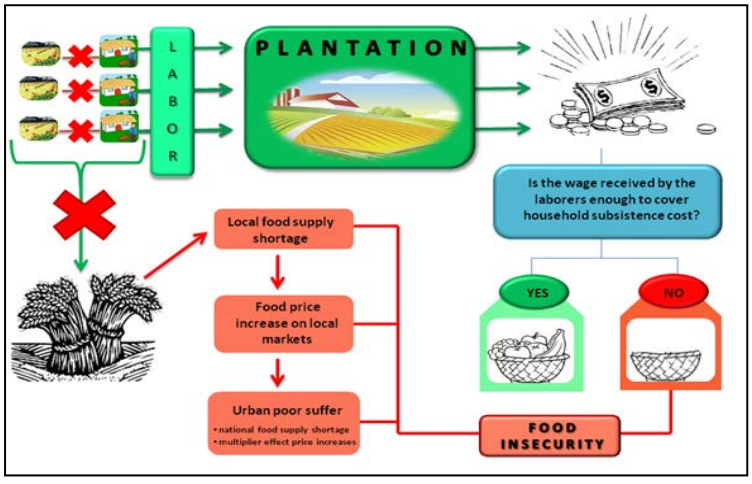


Figure 7: Potential Negative Effects of Small Scale Farmers' Abandonment of Food Growing for Biofuel Employment



Food security impacts may be gendered, in that men and women have disproportionate roles and responsibilities as regards household maintenance and food security. If rural men leave the household farm for employment on a biofuel feedstock plantation, they may leave their spouses with a greater burden in maintaining household food security through cultivation.

5.1 Preliminary Data Inventory: Due Diligence

In order to assess the current status and recent trends in food security at the national and sub-national levels, operators and auditors must assemble all available data on local, national and regional food security and agriculture in the country, region and locality of impact from public domain, including relevant United Nations bodies (*e.g.* FAO, ILO, UNDP, UNICEF) and other specialist and support institutions (FEWSNET, regional and sub-regional economic blocs). Data collected should include indices of poverty, statistics on food production and marketing, crop yields and productivity, availability and cost of foodstuffs, seeds and agricultural inputs (including labour).

This baseline desk study will allow the analyst to track impacts over time in order to determine if food insecurity becomes a problem in due course, in order that appropriate mitigation measures may be proposed and undertaken.

Examples of national-level indicators of food security may include:

- Proportion chronically undernourished (measured by prevalence of stunting amongst children under five years old)
- Adult literacy, particularly female
- Proportion of household income directed to food
- Population growth
- GDP growth per capita
- Agricultural contribution to GDP
- Health expenditure as a proportion of GDP
- Proportion of adults infected with HIV
- Number of food emergencies
- UNDP Human Development Index
- Degree of import and/or export dependence
- Domestic food production (food availability)
- Purchasing power (food access)
- Access to water and sanitation facilities (food utilization)

FAO (2008)

It is important to note that while a desk study is important to gain an understanding of the social, economic and food security issues that may be affected by biofuel development, these data are often not updated regularly. This makes secondary data good for baseline and background information but nearly impossible to use for impact assessments.

5.2 Definition of Local Food Production System

Following data inventory (consisting mostly of regional- and national-level data), local food production systems of the catchment area should be defined, including staple crops and varieties, their volume of production and their average yields, and their seasonal price and supply fluctuations over the typical agricultural year.

This information should afford average household production requirements for subsistence and surplus production, based on relevant regional FAO dietary and nutritional guidelines.

5.3 Determination of Scale of Operations

According to the intervention typology discussed in Section 3.1 (above), producers and processors should determine the number and location of production units (plantation area planted and location, or outgrower area planted and production and location).

5.4 Determination of Catchment Area (Area of Food Security Impact)

Monitoring impacts and mitigation measures will be conducted based on a definition of the specific area or region of influence (catchment area) of a given operation in terms of food security, respective of trade patterns and trade routes within a market, political framework at the local, national and sub-regional levels.

From an agro-ecological perspective, the catchment area should comprise the relevant watershed/foodshed and area that may be impacted upon. This will be measurable in terms of an estimated radius, but it must also take into consideration trade patterns and commodity flows in order to track downstream impacts on food security at the community and regional level, including impacts of large-scale operations on regional food markets.

Monitoring of the catchment area should also be based on market indicators (supply and price of food commodity flows over time), reflecting the total production area of origin in outgrower schemes and industrial purchase points which may cover multiple administrative and political jurisdictions), or the geographical basis of the labour pool serving large scale (intensive) feedstock cultivation based on plantation or estate-based production models.

Producers should determine the radius defining the area of impact from operations, including all production areas, their environs, and adjacent markets (e.g. local, downstream urban and regional). Processing operations, by contrast, need to look further upstream to include all production areas, and further downstream to capture regional-level market anomalies of food price and supply resulting from operations.

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5.5 Selection of Formats (Diagnostic Tools for Field Assessment)

Following the inventory of all available data, and preferably prior to any implementation of a given project (as a component of a project feasibility assessment, for instance), the operator should select an appropriate methodology for baseline assessment of food security within the catchment area affected by the operation, including the geophysical area (watershed) as well as the administrative or political area, and the market radius affected by the operation.

For the purposes of this guideline, we have provided specific data collection instruments, which are presented in Annex 1.

Diagnostic formats are proposed at the following levels:

Household: Independent or contracted outgrower farmers, plantation workers

Community: Watershed and landscape level, downstream communities and markets

Market: Local, urban, national and regional markets if food balance deemed to be in deficit based on disruption of former market chain for foodstuffs.

Key Informant: (e.g. agricultural extension staff, local government / administration)

5.5.1 Assessing Magnitude and Likelihood of Risks

The food security assessment methods must address the **availability of food, access to food, utilisation of food,** and **stability** of food security. To do the assessment well, a baseline survey should conducted prior to the establishment of biofuel production or processors. The baseline will be used as a basis for regular monitoring and follow-on impact assessments.

Scale of Operation is an important consideration when assessing food security impacts

Biofuel feedstock producers will need to determine if their feedstock replaces existing food streams, and if it does, to identify where the impacts may be found.

Biofuel processors are likely to have a wider impact, possibly on a regional level, as they collect feedstock from further afield. They will thus need to determine how far their impact may extend and what the impact may be, based on the origin of the feedstock they process.

As a starting point, the zone of potential impacts on local food security must be defined, to include:

- Area of direct substitution of agricultural land for feedstock production, on plantation and at the outgrower farm level.
- Direct impacts on local food availability and prices, based on anomalies on local and regional markets.
- direct impacts on the food security of contract labourers and outgrower farmers producing biofuel feedstock.

5.5.2 Summary of Parameters and Indicators of Study

Availability:

1. Crop production survey (area and yield by crop type), seasonality
2. *Indicator*: household food production and crop diversity
3. Scale: Household and community levels

Access:

1. Household consumption survey opportunity cost of land, labour and yield - soil as a fixed asset
2. Indicator: percentage food expenditure to total household expenditures
3. Scale: Household and community levels

Utilisation:

1. Water, health and sanitation survey on access to services, including female education and infrastructure, access to cooking fuel
2. Indicator: Degree of access to services
3. Scale: Household and community levels

Stability:

1. Market monitoring- trade patterns and infrastructure, price and supply of key commodities
2. Indicator: Stability of food prices and supply
3. Scale: Community and key informant levels

6. METHODOLOGY FOR DATA COLLECTION

6.1 Introduction

The tools developed to assess the impact of biofuels production and processing on food security are intended to be useful to all the stakeholders involved directly or indirectly in biofuels production. There intent is to assess the potential impact on food security to inform mitigation efforts to limited adverse impacts.

The methodology is driven largely by the objective of assessing the impact of biofuel production on food security at local level and in different settings.

6.2 Mapping and identification of study site

Food security impact pathways differ according to production model (plantation, outgrower or hybrid) and scale of the operation.

Once the geographic location of the study area has been identified, it will be necessary to obtain a map. The map showing the administrative boundaries and key administrative centres can be obtained probably from the Centre's of Survey and mapping in the country where the assessment is done. The map should also show the market centre as this will be quite important locations for food stores or local traders. Other important points for the maps include locations of food stores. Maps can also be obtained in the local administrative headquarters such as district or provincial headquarters.

A key informant or the local leaders in the study site such as the area agricultural extension officers, district officers or a key person involved in biofuel production management where production is done in large scale can be quite instrumental in identification of all the stakeholders for the study. Agricultural extension officers, for example, can identify individuals for FGDs for both plantation and small scale farmers. In order to breakthrough into the community and the assessment to go smoothly, key administrative leaders who will serve as a link between the researchers and the community should be contacted and briefed on the study. Their goodwill is quite important for the success of the assessment.

6.3 Sampling

A sample is a finite part of a statistical population whose properties are being studied to gain information about the entire population. Sampling will involve the process of selecting a suitable sample for the purpose of determining parameters or population characteristics.

There are several ways to establish the sample size for a food security assessment. For these guidelines we have offered standard sampling guidelines for each assessment tool. The availability of funding always affects the size of population to be sampled. We have endeavoured in this guidance to keep the sample size and frequency of sampling to a minimum to reduce costs but, at the same time, the sample methods presented are sufficient for credible results.

6.4 Sources of data

Data will be drawn from primary and secondary sources as described below.

6.5 Secondary data

This comprises of data which has already been collected and analyzed – as described in the section on preliminary data inventory. Such data can be obtained from organizations with food security programs which collect and analyze data routinely or periodically or from previous surveys in the catchment area. The researcher in this case will have to be specific on the type of data needed and be able to identify where such data can be obtained.

6.6 Primary data collection

Primary data involves the data obtained directly from the respondents during the study period. When collecting primary data it is important to consider; whether the assessment is rapid / initial or in-depth (detailed), whether the tools to be used are structured or semi-structured questionnaires or both and the type of interviews to be used.

6.7 Rapid market assessment

Rapid assessment is carried out when information or data is required within a short time-frame for decision making. It is also used to generate initial market information in cases where data on the targeted population is not available or reliable and when all parts of the catchment area not accessible.

In the assessment of the impact of biofuel production on food security a rapid market assessment may be done to generate a general idea of the potential impact on the targeted population in the catchment area. This will include conducting FGDs, key informant interviews and a quick perusal of the existing secondary data. Participants of the FGDs should be drawn from a wide scale of stakeholders involved in biofuel production and representatives of the affected population. Participants of FGDs should be well informed members of the community.

Key informants for rapid appraisal would include local leaders, manager's multinational-or national organizations and agencies that support food insecure groups, representatives of the ministry of agriculture, managers of agencies involved in food aid programs and local traders in the catchment area. Agricultural extension officers can also be very resourceful when it comes to issues of crop production in the targeted areas.

It is important to note that in the context of interpreting the rapid market assessment information, it is advised that the secondary data collection exercise included an analysis of local, national and regional markets and market prices to understand the level of market integration and how production centres, imports and consumption relate to one another in the local, regional and national context. The bottom line here is that you need understand how markets in the area you are assessing relate to other markets outside of the assessment area.

6.8 Key Informant Interviews

This involves administering semi-structured questionnaires on knowledgeable community leaders in the catchment area with good understanding of food security issues. This could include agricultural extension officers, health facility managers and managers of support programs such as school feeding programs or managers of food aid support agencies in the catchment area. Health facility managers can give crucial information on the prevalence of signs of food insecurity such as hunger, malnutrition, a stunting growth in children and food related mortalities. Key informants are often purposively sampled.

6.9 Focused Group Discussions (FGDs)

This involves interviewing a group of people sharing at least one common characteristic.
They complement household surveys, because they can provide crucial information which not easily addressed in the most often structured household interviews.

The FGDs will elicit important information on how households obtain their staple foods and preference over biofuels and shed light on the possibility of the population in the catchment area being currently food insecure or being food insecure in the future, as well as on the impact of the biofuel production on their access to food in terms of availability and pricing. It comprises of 8 to 12 participants drawn from the distinct farming categories in the catchment area such as representatives from biofuel farmers and food crops farmers. In order to generate a wealthy of information, it would be ideal to organize FGDs comprising of plantation farmers only, and another for small scale farmers only. The researcher will have the discretion of choosing the number of FGDs to be done in the each catchment area. Representativeness of gender in the FGD will be important to consider.

In many contexts where division of household responsibilities and maintenance and other work tasks, access to and control over assets are broken down by gender lines, it is important to examine the actual or potential gender dimensions of the food security impacts of biofuels on farmers as well. In order to disaggregate such gendered impacts, it is recommended that FGD's take place with (seperatly) a group of men, a group of women, and then a mixed group. Womens group should be

facilitated by women. Information obtained can be examined separatly and together to gain understanding of impacts on both men and women.

6.10 Household Survey

This involves interviewing household representatives in the catchment area using structured or semi-structured interviews administered to a random or systematic sample. Assessment of food security at household level would yield information on food access, availability, utilization and vulnerability of the household to food insecurity. It would also yield relevant information on land and labour uses in relation to biofuel and food production.

A food security household survey collects information on consumption and expenditure and income. In addition, when looking at the potential impacts of biofuel production on household food security, it is important to look at the pattern of agricultural production and how it changes over time. Information on the characteristics that would suggest food insecurity such as reduced intake of food or consequences such as weight loss or hunger for both adults and children, stunting will be obtained in the household.

It is important to note that the definition of a household is crucial as well as in the identification of the household respondents. It would be ideal if the household head is the key interviewee, but where this is a man, it is ideal if he is accompanied by his wife, if applicable.

Households can be selected randomly from household lists – which are usually kept by local authorities. For consistency with follow-on surveys and examining changes in food security, it is recommended that follow-on surveys return to the same households that were previously sampled, in order to get measurements over time.

6.11 Sentinel Monitoring

Sentinel monitoring involves routine collection of data at selected sample points to monitor the changes in specific indicators or trends in the affected population in the catchment area. In this study, households sentinel points could include small clusters of households in the catchment area. Selected food stores or local traders and agricultural extensions offices in the catchment area can also serve as sentinel points in addition to the household clusters.

Periodic FGDs with plantation and small holder farmers and community group's discussion on knowledgeable individuals affected by the project and drawn from a diversity of representation can be used to obtain data that would supplement data from sentinel points.
When properly implemented, sentinel monitoring offers an effective method using limited resources and enable prompt and flexible monitoring of biofuel impact indicators. Food security problems can be detected early and plans for mitigation design.

6.12 Remotely Sensed Data

While unlikely to be used to assess impacts of biofuels on local food security, it is important to highlight the use of remotely sensed data for food security monitoring. This involves gathering of

information on a given object or area using a recording or real-time sensing wireless device, which is not in physical contact with the object or area of study. Such devices are often fixed in aircrafts and spacecraft or satellite and collects information by detection radiation emitted or reflected by the object or the surrounding area or by emitting energy that allows objects and areas of interest to be scanned. Remote sensing makes it possible to collect and transmit data on dangerous or inaccessible areas and provides an alternative for the costly and slow data collection on the ground. Data collected in this manner is processed and analyzed with computer software, known as a remote sensing application (http://en.wikipedia.org/wiki/Remote_sensing).

In monitoring the impact of biofuel production to food security, spatial and remote sensing technique can be used for estimation of crop acreage and crop yield for major crops in different seasons. It will then be possible to calculate approximate yields (crop yield forecasting) in that season hence predict food insecurity in the catchment area. One can also monitor land use and make estimations on the proportion of land used for biofuel cultivation verses that used for food crop cultivation in the catchment area.
(http://www.nass.usda.gov/Surveys/Remotely_Sensed_Data_Crop_Yield/index.asp).

7. ASSESSMENT INSTRUMENTS

In addition to establishing a baseline understanding of the biofuels catchment area through the analysis of secondary data and through the mapping exercise, the guideline recommends using five assessment instruments to establish baselines and monitoring potential food security impacts of biofuel production and processing. The instruments are intended to be light weight – in terms of the amount of information they collect – and easy to implement.

Details on the survey instruments are found in the Annex section.

Farm Household Level Baseline Questionnaire	
Purpose:	This is a detailed questionnaire focused on collecting quantitative data. It is intended to establish a baseline understanding of household characteristics and food security status.
When to do it:	The Baseline Household Survey Questionnaire should be conducted before biofuel production and processing begins. It will provide a baseline from which future surveys can be compared
Sample Size	2% of total farm households in the biofuels production and processing catchment area

Farm Household Sentinel Format	
Purpose:	The sentinel format should be used once or twice a year (depending on budgets) to measure changes in food security. The purpose is to identify food security problems

	early so that mitigation measures can be taken.
When to do it:	Ideally the sentinel survey should be conducted twice a year – during the peak period between harvests and once at the end of the harvest. If resources do not allow two annual sentinel surveys, one survey a year at the end of a harvest period is recommended
Sample Size	50 randomly selected households from households sampled from the baseline survey

Farm Household Level Impact Questionnaire	
Purpose:	The Farm Household Impact Survey is triggered if the Sentinel survey results show major changes in household food consumption and sources of income and perceptions on biofuel impacts on food security
When to do it:	Only when the Sentinel Survey triggers it
Sample Size	2% of total farm households in the biofuels production and processing catchment area

Market Assessment Survey	
Purpose:	To determine the impact of biofuels production on local markets and food security
When to do it:	Ideally the market survey should be conducted twice a year – during the peak period between harvests and once at the end of the harvest. If resources do not allow two annual market surveys, one survey a year at the end of a harvest period is recommended
Sample Size	Every market in the biofuels production and processing catchment area

RSB Focus Group Discussion	
Purpose:	To assess the impacts of biofuel production on food security at the community level.
When to do it:	The RSB Focus Group Discussion should be started after the first year of biofuels production and processing. It should then be conducted every six months.
Sample Size	One Focus Group Interview in each community within the biofuels production and processing catchment area

8. DATA ANALYSIS, MITIGATION MEASURES AND MONITORING

9.1 Determination of Mitigation Measures

Based upon analysis of data on the food security impacts of the operation, a specific program of mitigation measures will be determined by the auditors based on the particular details of the situation as defined in the Food Security Impact Assessment (FSIA) report.

As an established methodology, the FAO 'twin track approach' provides a framework for addressing both longer-term and immediate food security impacts:

Twin Track Approach	Availability	Access and Utilization	Stability
Rural Development / productivity enhancement	Enhancing food supply to the most vulnerable Improving rural food production, especially by small-scale farmers Investing in rural infrastructure Investing in rural markets Revitalization of livestock sector Resource rehabilitation and conservation	Re-establishing rural institutions Enhancing access to assets Ensuring access to land Reviving rural financial systems Strengthening the labour market Mechanisms to ensure safe food Social Rehabilitation programmes	Diversifying agriculture and employment Monitoring food security and vulnerability Dealing with the structural causes of food insecurity Reintegrating refugees and displaced people Developing risk analysis and management Reviving access to credit systems and savings mechanism
Direct and Immediate Access to Food	Food Aid Seed/Input relief Restocking Enabling Market Revival	Transfer: Food/Cash based Asset Redistribution Social Rehabilitation programmes Nutrition Intervention programmes	Re-establishing social safety nets Monitoring immediate vulnerability and intervention impact Peace Building efforts

FAO 2006

In general, the food security impacts of biofuel feedstock production and biofuel processing can be minimised in advance with attention to sustainability of production through intensified management practices which increase production efficiency:

1. **Using land that has not previously been used for food growing** where this does not involve forest clearance or other negative environmental impact;
2. **Integrating contracted outgrowers** in order to preserve a positive balance in terms of food production at the landscape level; and
3. **Increasing yields** through soil conservation and intensive management, as these will meet the requirement of other principles in the RSB standard, and these include:
    - Crop rotations that mitigate weed, disease, and insect problems; increase available soil nitrogen and reduce the need for synthetic fertilisers; and in conjunction with conservation tillage practices, reduce soil erosion;
    - Integrated pest management (IPM), which reduces the need for pesticides by crop rotations, scouting, timing of planting and biological pest controls;
    - Management systems to improve plant health and crop resistance to pests and diseases;
    - Soil-conserving tillage and mulching practices, including composting waste and by-products; and
    - Water conservation and water-harvesting practices.
    - Inter-cropping of leguminous crops and use of organic fertiliser or compost to improve soil fertility.

As with any certification system, mitigation measures to be taken by operators and operations which are not in compliance with the RSB sustainability standard for Food Security will be case-specific and responsive to the particulars of each case. The user is referred to the RSB standard in full, to asses how mitigation measures may be aligned with the other principles' and criteria.

Wage employment on plantations and outgrower production provide a means of income, the equity of which may be determined by local conditions and criteria, but it is important to note that substitution of land and labour are likely to impact food production by local households and communities within the catchment area of operations, and 'downstream' to urban and regional markets normally served by production areas shifted to biofuel feedstock production.

Negative impacts on direct food production may be mitigated, in part, by an understanding and respect for the seasonal requirements of agricultural labour on household farms and (at a minimum) the kitchen gardens upon which dietary diversity and micronutrient nutrition is often based. Gender issues and traditional practices are important here as women are the traditional keepers of the household and may rely on additional income to support the family. In traditional communities men cannot be relied upon to contribute sufficiently to the household budget. A mitigation measure may be to employ more of the women when the land they rely on is being transformed for the production of biofuels.

Agricultural labour demands of a seasonal periodicity may be foregone to plantation labour, so the 'value proposition' of such employment for rural communities will need to balance the value of these wages (and such factors as benefits and job security, if applicable) against reduced household food production.

Mitigation may also include provisions of seeds, tools and other agricultural inputs for household food production, access to agricultural water supply or mechanisation, and support to local agricultural extension services.

Mitigation measures should be targeted at outcomes and impact indicators specific to a situation, and within a specific time frame to be proposed by the operator and acceptable to the certifying agency. Mitigation targets should be measurable (quantifiable) and verifiable according to objectively verifiable criteria.

Mitigation measures must also include impacts that can be found from non- production sources. An example of this is where a large feedstock processing plant withdraws large quantities of feedstock from the food market and diverts it to the production of biofuels. Impacts like this can be felt widely within a watershed. If the SIA indicates that risks are only likely as a result of certain events (such as droughts or floods) the biofuel producer must ensure mitigation measures that can be introduced rapidly to address these rare and unlikely events. These may, for instance, include providing food to the local community, or ceasing production until the risk has gone.

The SIA, in conjunction with these guidelines, must consider and look at all potential impacts that may arise over the lifetime of the project and consider options for mitigation. The RSB auditor will consider these mitigation options and decide if they will address the issue and reduce the risks to food security sufficiently for certification to be granted.

Examples of Food Security Mitigation

While it is difficult to generalise given the complex diversity of production models and their respective contexts, it is expected that the food security impacts from liquid biofuels feedstock production and proposed mitigation measures may include:

Figure 8: Relevant Food Security Impacts in Liquid Biofuels Feedstock Production and Proposed Mitigation Measures

Food Security Impact	Proposed Mitigation Measure
FOOD AVAILABILITY: **1. Household food deficits and reduced household dietary diversity** *Increased risk of household food deficits and reduced dietary diversity as farmers reduce food production in order to devote more land and labour to biofuel feedstock, or leave household cultivation (either entirely, or to their spouse) for paid employment on a biofuel feedstock plantation.*	• Hire local laborers for biofuel agriculture production and processing at equitable or minimum wages (where applicable) wages • Provide direct subsidies in the form of food, vouchers or cash

2. Challenges to household food production *Food security impacts may be gendered, in that men and women have disproportionate roles and responsibilities as regards household maintenance and food security. If rural men leave the household farm for employment on a biofuel feedstock plantation, they may leave their wives with a greater burden in maintaining household food security through cultivation. Additionally women may not have customary tenure but use the land for subsistence and thus if the land is converted to growing for biofuels they and the family may be at risk for food security*	• Respect local food production seasonality and offer maximum flexibility in attending to household cultivation requirements. • Provide agricultural extension assistance in improved farming techniques, including diversification of cultivated crops, post-harvest processing and storage • Establish and support farmer groups for both training and education • Provide flexible working hours that facilitate both family farm level subsistence growing and employment on the plantation/production facility • Farmer group training in commodity bulking and sales – allowing local farmer groups to compete in the regional and national market • Farm input subsidies – in fertilizer and improved seed • Investment in feeder roads from farming areas to markets • Invest in post harvest technologies – from warehousing to processing • Support local processing for added value to secondary market sales • Employment of more women in the production and processing activities • Set aside land for food production within the estate which is sold into the local market at affordable prices • Carry out awareness raising with the small holders to encourage a diversity of production including subsistence needs, to avoid future food security issues in the local community

2. FOOD ACCESSIBILITY: **Food shortages and/or price increases on local and regional markets** *As a result of competition between production of biofuel feedstocks and food at the community or landscape level, there may be temporary or chronic food shortages on local and regional markets, leading to increases in food prices for the urban poor*	• Skills training in non-farm technologies and small scale business – targeted to the market needs of the catchment area and country • Improve access to the value added processing and production activities to the local community to enable a diversification of activities and improvement in the local economic development • Establishment of micro-loans for small business establishment • Provide direct subsidies in the form of food, vouchers or cash • Reduction in biofuel production activities until the crisis abates
3. FOOD UTILISATION: *Lack of access to water, sanitation, health facilities and other infrastructure, and sources of cooking fuel may reduce the effective utilisation, consumption and uptake of available food*	• Invest in water and sanitation infrastructure (community boreholes, shallow wells or protected springs, ventilated improved pit (VIP) latrines • Invest in community afforestation projects establishing multi=purpose woodlots
4. FOOD STABILITY (OF SUPPLY): *Anomalies and distortions may be noted in trade patterns and access to infrastructure, price and supply of key commodities over time*	• Provide agricultural extension assistance in improved farming techniques, including diversification of cultivated crops, post-harvest processing and storage • Provide food subsidies or direct food aid distribution over the short term, as appropriate

9.2 Implementation of Mitigation measures

Implementation of the mitigation measures proposed in the FSIA report and management plan will be undertaken by the operator and by sub-contractors including community-based and non-governmental organizations, other civil society institutions or local authorities.

9.3 Monitoring of Mitigation Measures

Monitoring of technical progress toward objectives set in the management plan component of the FSIA will be undertaken by independent auditors appointed by the RSB or relevant certification body accredited to the RSB.

Progress and follow-up reporting and verification of compliance shall be required at 6-month intervals in order to capure seasonal dynamics of food production and availability, annual market proice cycles, and any noted anomalies or market distortions.

ANNEX 1: Data Collection Instruments

Farm Household Level Baseline Questionnaire	
Purpose:	This is a detailed questionnaire focused on collecting quantitative data. It is intended to establish a baseline understanding of household characteristics and food security status.
When to do it:	The Baseline /Impact Household Survey Questionnaire should be conducted before biofuel production and processing begins. It will provide a baseline from which future surveys can be compared
Sample Size	2% of total farm households in the biofuels production and processing catchment area

While we believe a formal baseline is important to capture impact, we also know that they are time consuming and expensive. If the organization chooses not to conduct a formal baseline, the sentinel survey can be used. It will not, however, provide the sensitivity to change that can be captured with a formal household survey

HOUSEHOLD BASELINE FORMAT

Basic Household Characteristics

- Household Number
- Interview Date
- Name of head of household
- Name of Interviewer

Household Member Details

- For each household member, give age, sex, relationship to household head, education level

Household Income and Consumption

- What are the main sources of food consumed at home?
    a. Broken down by food type – e.g, cereals, pulses, fruits, vegetables
    b. % from own production, market purchases, gifts/loans, food donations, etc.
- Detailed food and non food expenditure over the last one week
- Approximate total household monthly income by source

Farm Plot Details

- Size of plot in HA
- Type of plot – ownership type
- Total area under cultivation in HA
- How was plot watered – rainfed or irrigation

- Time spent – weeding and land preparation

Details of Cropping Patterns (for current year)

- List each crop
- Planted from to dates
- Total material of each crop planted in Kg
- Time spent planting
- Time spent harvesting
- For each crop, total amount produced in Kg

Agriculture Production Assets

- List stocks of assets such as hoes, ploughs , tractors, etc
- Change in asset ownership over last year

Livestock Assets

- List stocks of livestock ranging from cattle to goats to donkeys to chickens
- Change in asset ownership over last year

Household Assets

- List number of assets ranging from cooking pots to radios to bicycles to lamps, etc.
- Change in asset ownership over last year

Food Utilization and Markets

- Estimate (in Kg) how much of the harvested yield is used for livestock feed, seeds for planting and for industrial bio fuel processing?

Health (because food security is often tied to health factors)

- Has any of your children suffered from water and sanitation related diseases? Provide option list of diseases (hookworm, diarrhea, cholera, etc)
- Do you have access to proper sanitation facilities? Checklist of facilities

Farm Household Level Impact Questionnaire	
Purpose:	The Farm Household Impact Survey is triggered if the Sentinel survey results show major changes in household food consumption and sources of income and perceptions on biofuel impacts on food security
When to do it:	Only when the Sentinel Survey triggers it
Sample Size	2% of total farm households in the biofuels production and processing catchment area

HOUSEHOLD BASELINE FORMAT

Basic Household Characteristics

- Household Number
- Interview Date
- Name of head of household
- Name of Interviewer
- Location of household: geographic coordinates or some other identifier to facilitate return visits

Household Member Details

- For each household member, give age, sex, relationship to household head, education level

Household Income and Consumption

- What are the main sources of food consumed at home?
    a. Broken down by food type – e.g, cereals, pulses, fruits, vegetables
    b. % from own production, market purchases, gifts/loans, food donations, etc.
- Detailed food and non food expenditure over the last one week
- Approximate total household monthly income by source

Farm Plot Details

- Size of plot in HA
- Type of plot – ownership type
- Total area under cultivation in HA
- How was plot watered – rainfed or irrigation
- Time spent – weeding and land preparation

Details of Cropping Patterns (for current year)

- Is the farmer growing any biofuels? Type, source of seeds, information sources, intended buyer.
- List each crop
- Planted from to dates
- Total material of each crop planted in Kg
- Time spent planting
- Time spent harvesting
- For each crop, total amount produced in Kg

Agriculture Production Assets

- List stocks of assets such as hoes, ploughs , tractors, etc
- Change in asset ownership over last year

Livestock Assets

- List stocks of livestock ranging from cattle to goats to donkeys to chickens
- Change in asset ownership over last year

Household Assets

- List number of assets ranging from cooking pots to radios to bicycles to lamps, etc.
- Change in asset ownership over last year

Housing

- Type of material used for roof, walls, windows?
- Ownership status

Food Utilization and Markets

- Estimate (in Kg) how much of the harvested yield is used for livestock feed, seeds for planting and for industrial bio fuel processing?
- Accessibility to markets? Distance to main tarmac roads, presence of middlemen

Health (because food security is often tied to health factors)

- Has any of your children suffered from water and sanitation related diseases? Provide option list of diseases (hookworm, diarrhea, cholera, etc)
- Do you have access to proper sanitation facilities? Checklist of facilities
- Main source of drinking water for the household –rainy and dry season? Checklist of water sources

Farm Household Sentinel Format	
Purpose:	The sentinel format should be used once a year to measure changes in food security. The purpose is to identify food security problems early so that mitigation measures can be taken.
When to do it:	Ideally the sentinel survey should be conducted twice a year – during the peak period between harvests and once at the end of the harvest. If resources do not allow 2 annual sentinel surveys, one survey a year at the end of a harvest period is recommended
Sample Size	50 randomly selected households from households sampled from the baseline survey

HOUSEHOLD SENTINEL FORMAT

Basic Household Characteristics

- Characteristics of household members including household size, disability status, education level and main sources of income for each member.
- Gender of the household head

Food Consumption and Dietary Diversity

- What are the main sources of food consumed at home? This could be broken down by food type e.g. Staples, pulses, fruits and vegetables and response option list provided (e.g. Purchases from local market, own production, gifts or loans from relatives/friends, food donations etc).
- Dietary diversity checklist

Domestic Biofuels Production

- Is the household producing any bio fuels for home consumption? Types, quantities, use(*e.g.* Cooking)

Impact of Biofuel on Agricultural Production

- What is the total size of land in Ha under crop cultivation?
- What proportion of the total land cultivated is under biofuel crops?
- What proportion of the total land cultivated is under food crops?
- Compare the total income accrued from the sale of biofuel against food crops for the most recent season?
- Have you reduced food crop cultivation to focus on biofuel crop production? If yes, what motivated the shift? (Were incentives provided, or was it due to coercion, own decision because it is easier to cultivate or availability of a ready market etc)
- Do you think the introduction of biofuel species has reduced the quality of agricultural and pasture land? If yes, explain in detail how (for example increased soil erosion, land degradation and encroachment)?
- Do you think the cultivation of biofuel species is more profitable/ better than food crop cultivation?... why?

Food Utilization and Markets

- Do you think the introduction of biofuel crop production has caused an increase in input prices and food prices in the local market?
- If yes, compare the current prices of main food commodities and inputs with previous year prices
- What proportion of food products (as a % of the total yield) is used for livestock feed, seeds for planting and for industrial bio fuel processing by crop type?
- Accessibility to markets? Distance to main tarmac roads, presence (and margins) of market intermediaries.

Market Assessment Survey	
Purpose:	To determine the impact of biofuels production on local markets and food security
When to do it:	Ideally the market survey should be conducted twice a year – during the peak period between harvests and once at the end of the harvest. If resources do not allow 2 annual market surveys, one survey a year at the end of a harvest period is recommended

Sample Size	Every market in the biofuels production and processing catchment area

MARKET SURVEY

The market survey format will facilitate systematic analysis of local prices of agricultural commodities including inputs and market behaviors. It is based on interviews with local traders.

MARKET ASSESSMENT FORMAT – QUESTIONS POSED TO TRADERS

Market Basic Details

- Characteristics of the market, which includes the geographical location and the market name.

Market Prices

- Do you think the introduction of bio fuel crop production has caused an increase in input prices and food prices in the local market?
- If yes, compare current prices of main food commodities and inputs against the previous year prices
- What is the current retail price of food biofuel crops in the local market? Include the current prices and prices a year ago for the same commodity.
- Cost of hired labour - indicate the price now and price a year ago.

Biofuel Commodities Supplies

- Is there a steady and adequate supply of biofuel commodities in the area? If no, what are the reasons?
    a. High transport costs
    b. Poor road infrastructure
    c. Low market prices
    d. Low production for climatic reasons
    e. Low production for price or economic reasons
    f. Lack of market for produce
    g. Lack of proper storage facilities

- Is there a steady and adequate supply of food commodities in the area? If no, what are the reasons? (Option list as above)

RSB Focus Group Discussion	
Purpose:	To assess the impacts of biofuel production on food security at the community level.
When to do it:	The RSB Focus Group Discussion should be started after the first year of biofuels production and processing. It should then be conducted every six months.
Sample Size	One Focus Group Interview in each community within the biofuels production and processing catchment area

RSB FOCUS GROUP DISCUSSION

Focus group formats will be used to assess the impacts of biofuel production to food security at the community level. It will be administered to the community members including farmers and non-farmers.

Basic data

- Location details

Food Availability

- Do you have any food stock?
- Out of your food stock, how have you used it?
- Out of the total stock, what percentages have you or you intend to sale?
- Out of the total stock, what percentages have you or you intend to consume?

Food Access

- What are the average monthly/yearly estimates of income for families in the group from:
  - agricultural production,
  - employment and
  - Other additional source of income?

- What was the income of biofuel feedstock producers before the production period and after the production of biofuel?

Food Consumption and diversity

- How many meals do the following groups had/have per day before and after the biofuel production?

  - Adults
  - Children

- What is the percentage of the total expenditure on food (before and after the biofuel production)?
- Types of food consumed from different sources e.g. maize, sorghum, and beans etc.

Food utilization and sanitation

- What are your main sources of water?
- How many litres of water do one access per day?
- Do you have access to proper health and sanitation facilities?

Food Stability

- Has the biofuel production affected the food prices?
- If yes, is the staple food affected?
- Have you changed (increased/decreased) your expenditure on food for that matter? what is the % of decrease or increase?

Biofuel and agricultural production

- Do you produce any biofuel products? If yes, which type?
- What is the total area under cultivation?
- Out of the total area, what percentage is covered by biofuel feedstock?
- Which other type of crops do you have on your farm?
- Has the introduction of biofuels encouraged change of land use e.g. from cultivating one thing to the other or deforestation?
- How do you classify the following agricultural support systems;

    - Irrigation
    - transportation
    - Other Infrastructures

Environmental Sustainability

- Are there any soil/water conservation measures in place?
- What are the impacts of planting biofuel products on environment?

Land Tenure

- System of land tenure (community, individual, government land?)
- Who benefits from the production of biofuel products? (Small-scale farmers or large scale farmers?)
- Who benefits from the employment that comes from the production of biofuels?

Access to markets

- Where do you sell your products? (distance)
- Is there a high demand for these products?
- Is there any financing institution that promotes the production of biofuels in your locality?

ANNEX 2: INDICATOR DICTIONARY

This section provides an inventory or 'dictionary' of food security indicators used in different contexts and at different resolutions of detail.

FOOD AVAILABILITY

- Available food stock
- Use of food stock
- Percentage use for household consumption vs. traded surplus

FOOD ACCESS

- Household income
- Sources of income
- Agricultural production
- Employment
- Sources of additional income
- Income level comparison (biofuel feedstock production labourers/farmers)
- (Increase in) income before and after biofuel feedstock production

FOOD CONSUMPTION

- Number of meals per day
- Average meal composition
- Household expenditure distribution
- Total Expenditure
- Food Expenditure
- Share (%) of food in expenditure

FOOD UTILIZATION

- Access to potable water
- Access to sanitation and health facilities
- Level of female education

FOOD STABILITY

- Food Prices
- Recent increases in staple food prices
- Perceived and actual effects on food expenditure

PRODUCTION ASPECTS

<u>Type of biofuel feedstock</u>

- Biofuel production model (plantation / estate model, outgrower arrangements)
- Local consolidator/processor model
- Household model

Land area

- Total productive land area
- Total idle land area (governments have must clear and policy driven term definitions of what constitutes productive and idle lands)
- Total to be used for biofuel feedstock production
-

Agrodiversity

- Index of surface percentage of crops (ISPC)
- Crop agrodiversity factor(CAF)
- Genetic variability
- Surface variability (monoculture)

Agrosystem efficiency

- Yield and yield gap
- Cost-benefit ratio
- Parity index

Use of the land resource base

- Land availability/Land demand
- Land demand/Land used
- Cultivated land/Inhabitant
- Cultivated land /Deforested land
- Irrigated land/Irrigable land
- Degraded land
-

Water balance

- Water source
- Amount used
- Water effluent effects (watershed)

Agricultural support systems

- Infrastructure
- Irrigation
- Transportation

ENVIRONMENTAL SUSTAINABILITY

- Soil Conservation measures
- Water conservation measures
- Environmental impact
- Greenhouse gas and carbon emissions

SOCIAL SUSTAINABILITY

- Land rights and land tenure
- Land tenure policy for the protection of vulnerable communities

- Level of small holder participation in biofuel feedstock production
- Equity and gender risks
- Income distribution (gendered)
- Labour distribution, agricultural and employment (gendered)
- Labour conditions for workers (gendered)
- Access to land (gendered)
- Protection of the rights of women and children

ACCESS TO MARKETS

- Market information systems
- Output and input markets in rural areas (price and supply)
- Financing
- Microfinance
- Commercial financing systems for agricultural development

Figure 1: Indicator Dictionary: Food Security (FAO-FIVIMS)

Economic Conditions	Data:
Changes in cereal production in LIFDCs	FAO
Cropped area as % of total area	FAO
Employment of population of working age (%)	ILO
Export price movements for wheat, maize and rice	FAO
Growth in cereal yields	FAO
Growth in GDP	WB
Growth in GNP per person	WB
Growth in staple food yields, by commodity	FAO
Informal sector employment as % of total employment	ILO
Ratio of five major grain exporters' supplies to requirements	FAO
Share of agriculture in GDP	WB
Volume of production, food use, trade and stock changes for major food commodities	FAO
Wages, by economic activity (real $ per year)	ILO
Yields per hectare for major cereals	FAO
Political Conditions	
Number of countries facing a conflict-related emergency	CRED

Socio-Cultural Conditions	
Adult literacy/illiteracy rate	UNESCO
Female illiteracy rate	UNSD
Girl net enrolment rate in primary school	
Literacy rate of 15-24 year-olds	WB
Net primary enrolment or attendance rate (%)	UNESCO
Percentage of population with access to primary health care	WHO
Percentage of pupils starting grade 1 who reach grade 5	
Risks, Hazards, Shocks	
National monthly rainfall index	FAO
Number of [countries facing] food emergencies	FAO
Land use change	WB
Percentage of population affected by droughts and natural disasters	CRED
Percentage of land with erosion risk	USGS
Rate of deforestation	FAO
Food Availability	
Animal protein supply per person	FAO
Cereals supply per person	FAO
Dietary fat supply per person	FAO
Dietary protein supply per person	FAO
Food production index	FAO
Food Access	
Consumer prices index	WB
Food prices index	WB
Gini Index of income distribution	WB
GDP and GNP per person	WB
GNP per person at Purchasing Power Parity	WB
Market density (number of markets per unit area)	
Paved roads as % of total road mileage	WB
People living below national poverty line (%)	WB
People living on less than $1 a day (%)	WB
Percentage of household income spent on food for the poorest quintile	
Percentage of income spent on food	UNDP
Poorest fifth share of national consumption	
Poverty gap ratio	WB
Road density (kilometers of road per unit area)	
Share of national income by percentile of population	WB
Stability of Food Supplies and Access	
Cereal import dependency ratio	FAO
Frequency of published or broadcast market information	
Index of variability of food production	FAO
Months of cereal self-provisioning capacity	
Variability of food prices	
Household Characteristics	

Average household income (only urban)	WB
Average household size	UN
Number of persons per room, or average floor area per person	UN
Ratio of dependants to wage-earners in average households	ILO
Health and Sanitation	
Contraceptive prevalence rate	UNDP
Estimated HIV adult prevalence rate (%)	WHO
HIV prevalence in pregnant women under 25 years of age (%)	
Percentage of 1 year old children immunised against measles	UNDP
Percentage of population with access to adequate sanitation	WHO
Percentage of population with access to primary health care services	
Percentage of population with access to safe water	
Care and Feeding Practices	
Number of meals eaten in a day	
Percentage of births attended by skilled health personnel	WHO
Percentage of children under 15 in the labour force	ILO
Weaning age	WHO

ANNEX 3

TERMS OF REFERENCE: FOOD SECURITY IMPACT ASSESSMENT (FSIA)

Following a rapid assessment which indicated a likelihood of significant impacts to local food security from the biofuels operation, the Food Security Impact Assessment (FSIA) will assess specific impacts on local food security in detail, and will provide an Impacts Management and Mitigation Plan (IMMP) by which these impacts may be addressed.

The primary objectives of this study will be:

a) To provide a detailed description of the socio-economic environment in and around the project area;
b) Analyse the actual and potential food security impacts (risks) of the proposed project;
c) Provide a specific plan of action for limiting negative impacts on local food security (risks), and optimising benefits on local food security from the proposed project; and
d) Provide a specific plan of action for mitigating negative impacts on local food security, and optimising benefits on local food security from the proposed project.

According to a rapid assessment of food security risks and impacts, it has been determined that the proposed project could result in the following impacts:

- Relocation of households may be required, which would impact on the livelihoods of affected households;
- The creation of employment opportunities, particularly during the construction phase of the project may increase local opportunities for new economic activities;
- Project related transportation may adversely impact the safety of other road users;
- A loss of land available for agricultural production and subsequent further decrease in food security;
- The loss of access to areas presently available for food production and alternative livelihood activities;
- The loss of communal resources (land or land tenure, access to natural resources and landscape-level environmental services); and/or
- A risk of long-term reduction in soil fertility (and hence productivity of the soil) following the development.

The specific terms of reference are as follows:

1. Define the catchment area or radius within which food security impacts are likely to be a risk to household food security, select research formats, sample and control populations to be sampled for impact evaluation;
2. Assess and describe local socio-economic values, dynamics and trends, trade patterns and flows of staple foods and other food commodities with particular reference to the productive resources or cash income from biofuels-related employment accruing to local communities directly affected by the project;
3. Having defined the affected area, obtain all available production and market data from relevant national, regional and international institutions

4. Determine the current and historical land-use practices, patterns and changes over time, describing trade-offs involved in biofuels feedstock production or processing within the development area that are likely to be affected;
5. Determine the number of households (and people) that need to be resettled as a result of the project, with consideration of the costs of relocation and commensurate compensation;
6. Assess the local social infrastructure (access to clean water and sanitation, health services and education, market access, community resources, cultural values and social capital);
7. Identify and map any sites of cultural and/or historical significance;
8. Describe the formal and informal governing structures, including local authorities and traditional structures as well as local and national government;
9. Document local division of gender-related livelihood domains, responsibility for domestic tasks and other relevant issues involving gender, tenure and resource access, roles and responsibilities, and relative levels of investment in household maintenance and acquisition of household assets;
10. Document household expenditures including food purchase as percentage of total household expenditure (weekly or monthly basis);
11. Identify household livelihood strategies, document household income and expenditure patterns and trends – current, recent and foreseen;
12. Describe the local historical, political and cultural context;
13. Describe land ownership, land-use and land management, including aspects of tenure, access and property rights, both private and communal;
14. Document all possible risks and documented impacts of the project on health, livelihoods, income levels, education levels and other factors relevant to the food security of the affected community;
15. Provide specific technical recommendations to mitigate negative impacts and optimise positive impacts; and
16. Define an annual (and renewable) plan of action for implementation, monitoring and external evaluation of mitigation measures undertaken, their inputs outputs, impacts and sustainability over time, and specific avenues for participatory feedback and technical follow-up within defined reporting limits.

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ACRONYMS

AFSR	Abnormal Food Stress Response
ALRM	Arid Lands Resource Management Project
BMR	Basal Metabolic Rate
CBO	Community-Based Organisation
CCBS	Country Cereal Balance Sheet
CFC	Common Fund for Commodities
CFSAM	Crop and Food Supply Assessment Mission
CGE	Computable General Equilibrium (model)
CGIAR	Consultative Group for International Agricultural Research
C & I	Criteria and indicators
CILSS	*Comité Inter-Etats de Lutte Contre la Sécheresse au Sahel*
CMR	Crude Mortality Rate
CPI	Consumer Price Index
CSI	Coping Strategies Index
CSO	Central Statistical Office
CSSWBM	Crop Specific Soil Water Balance Model
CWSI	Crop Water Satisfaction Index
DES	Dietary Energy Supply
DFID	UK Department for International Development
EC	European Commission
EDP	Extended Delivery Point
EFA	Emergency Food Assistance
EFNA	Emergency Food Needs Assessment
EMOP	Emergency Operation (WFP)
EU	European Union
EWFIS	Early Warning and Food Information System
FANTA	USAID Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
FAR	Food Assistance Requirement
FBOMS	Brazilian Forum of NGOs and Social Movements
FEWS	Famine Early Warning System (USAID)
FEWS NET	Famine Early Warning Systems Network.
FIVIMS	Food Insecurity and Vulnerability Information and Mapping Systems
FNPP	FAO/Netherlands Partnership Programme
FSAS	Food Security Analysis System
FSAU	Food Security Analysis Unit – Somalia
FSC	Foreign Stewardship Council
FSIA	Food Security Impact Assessment
FSR	Food Security Reserve
FX	Foreign Exchange
GAM	Global Acute Malnutrition
GHG	Greenhouse gas
GIEWS	Global Information Early Warning System
HEA	Household Economy Approach
HPG	Humanitarian Policy Group
IASC	UN Inter-agency Standing Committee
ICRAF	International Centre for Reesearch in Agroforestry (World Agroforestry Centre)
ICRC	International Committee of the Red Cross
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics

IDP	Internally Displaced Persons
IDS	Institute of Development Studies

ACRONYMS (continued)

IFAD	International Fund for Agricultural Development
IFAR	International Food Assistance Requirement
IFPRI	International Food Policy Research Institute
ILO	International Labor Organization
ILUC	Indirect Land-Use Change
IMF	International Monetary Fund
IMMP	Impacts Management and Mitigation Plan
INGO	International non-governmental organization
INTERFAIS	International Food Aid Information System
IPC	Integrated Food Security Phase Classification
ITTO	International Tropical Timber Organization
Kcal	Kilo calories
LAF	Livelihood Analysis Platform
LIFDC	Low-Income Food Deficit Country
LSMS	Living Standards Measurement Survey
LULCC	Land Use and Land Cover Change
MoA	Ministry of Agriculture
MUAC	Mid-Upper Arm Circumference
NAF	Needs Analysis Framework
NDVI	Normalized Difference Vegetation Index
NFBS	National Food Balance Sheet
NGO	Non-governmental Organization
ODI	Overseas Development Institute
OLS	Ordinary Least Squares
OSRO	Office of Special Relief Operations
RRA	Rapid Rural Appraisal
RMP	Risk Mapping Project
SCF	Save the Children Fund
SENAC	Strengthening Emergency Needs Assessment Capacity
SGR	Strategic Grain Reserve
SLA	Sustainable Livelihoods Approach
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SQE	Status Quo Estimate
TER	Total Energy Requirement
TFA	Targeted Food Assistance
UNAIDS	The Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNDRO	United Nations Disaster Relief Organization
UNFPA	United Nations Family Planning Agency
UNHCR	United Nations High Commission for Refugees
UNICEF	United Nations Children's Fund
UN/OCHA	United Nations Office for the Coordination of Humanitarian Affairs
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WFP	United Nations World Food Programme