

**Global Assessment of Biomass and Bioproduct Impacts
on Socio-economics and Sustainability**

Project No: FP7-245085



***Task 3.2 Identification of socio-economic impacts of
conversion chains***

***Introduction to
socio-economic impact analysis***

WP 3 – Task 3.2

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1 INTRODUCTION TO IMPACT ASSESSMENTS

1.1 Introduction

Each activity that takes place in a biomass conversion chain as well as each input and output has impacts. Raw materials, labour and capital are the classic ingredients needed for a factory to operate. Technology could be added as a fourth factor that is materialised in capital goods (equipment/hardware, information technology, etc.) and embedded in humans (technical and organisational skills, etc.). The activities in the conversion chain result in various outputs such as final products, jobs, salaries, profits, but also emissions, waste, transport movements, etc. See Figure 1.

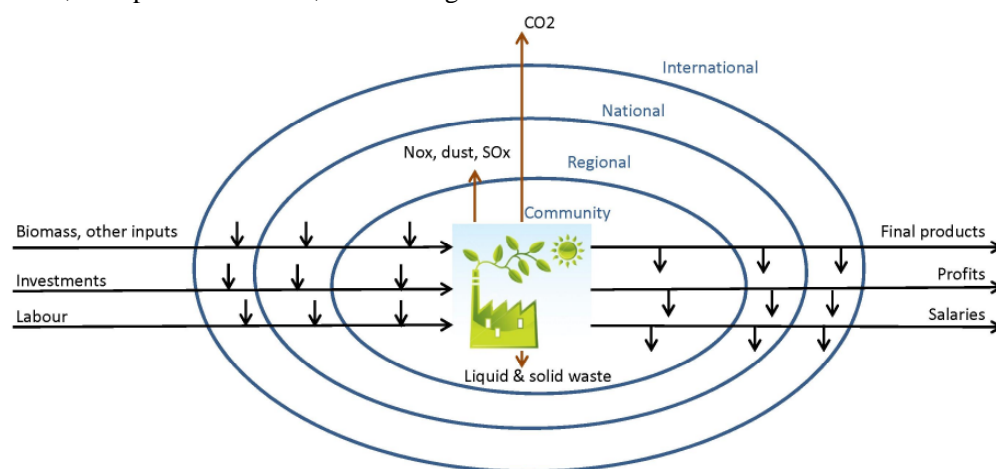


Figure 1 main inputs and outputs of biomass conversion facility

The biomass conversion chain (its inputs, outputs and activities) will have various impacts such as socio-economic, fiscal, environmental, and traffic impacts. The impacts can take place at various levels:

- Production unit level
- Community level
- Regional level
- National level
- International level.

Moreover, several types of impacts can be distinguished:

Direct impacts

Direct impacts are the direct consequences of a proposed project's location, construction or operation on the socio-economic environment. The direct socio-economic impacts of a large-scale development are often manifested as changes in socio-economic structures (e.g. increased employment opportunities, increased income levels, new or expanded social services, etc.).

Indirect impacts

Indirect impacts are the secondary consequences of direct impacts (e.g. altered consumption patterns, increased business opportunities and/or an increased need for particular services). The types of indirect impacts that the proposed development may cause, depend largely on an individual and/or community's priorities, and their ability to manage change.

Cumulative impacts

Cumulative impacts are repeated impacts on a valued component. The accumulation of insignificant impacts happening over time can cause one significant impact. An example of a cumulative impact is the effect on housing availability and the cost of living in a community that is experiencing an extended period of in-migration of people employed by several consecutive developments in one region.

1.2 Types of impact assessments

Various methods have been developed to assess and quantify the impacts of planned interventions (policies, programs, plans, projects), such as:

- Socio-economic impact assessment (SEIA)
- Environmental impact assessment (EIA)
- Strategic environmental assessment (SEA)
- Social impact assessment (SIA)
- Development impact assessment / sustainable development
- Fiscal impact analysis
- Traffic impact analysis

Within the GlobalBiopact project, the socio-economic impacts of biofuel/bioproduct conversion chains are the main topic of interest. Therefore, the *socio-economic impact assessment (SEIA)* is expected to be the most relevant assessment method. Nevertheless, it is worthwhile to be acquainted with the other impact assessment types. In the next section the SEIA is described and related to the other impact assessment methods.

1.2.1 Socio-economic impact assessment

The socio-economic impacts assessment (SEIA) can be defined as follows:

- *Socio-economic impact assessment (SEIA)* is the systematic analysis (used during EIA) to identify and evaluate the potential socio-economic and cultural impacts of a proposed development on the lives and circumstances of people, their families and their communities (Mackenzie 2007).
- *Socio-economic impact assessment (SEIA)* examines how a proposed development will change the lives of current and future residents of a community (Edwards 2011)

The goals of SEIA may vary from simply reducing the negative effects of these actions on people to maximizing their positive benefits and to contribute to sustainable development.

The concepts used in SEIA are derived from a number of social disciplines, including economics, sociology, geography, anthropology and political science. The key issue and challenge in SEIA is understanding the nature of social or economic impacts. An impact is a change in conditions caused by a development, such as a road or a mine. Generally, socio-economic impacts are changes in the human condition. They are changes in the economic and social conditions of local communities, vulnerable groups (such as women, children or poor), businesses and employees, districts, provinces or even the nation. Generally, health and cultural impacts (e.g., language loss) are also the subject of SEIA, but are not always covered in depth, as they may need special study. Social and economic impacts may each require specific study and analysis using various techniques.

Various other assessment methods have been developed in order to determine the impacts of projects, policies, programs and plans. Below a selection of these assessment methods are defined and related to SEIA.

1.2.2 Environmental impact assessment and strategic environmental assessment

Environmental impact assessment and strategic environmental assessment are generally defined as follows:

- *Environmental Impact Assessment (EIA)* is a systematic process to identify, predict and evaluate the environmental effects of proposed actions and projects. This process is applied prior to major decisions and commitments being made. A broad definition of environment is adopted. Whenever necessary, social, cultural and health effects are considered as an integral part of EIA (UNEP 2002).
- *Strategic Environmental Assessment (SEA)* refers to a formal process of systematic analysis of the environmental effects of development policies, plans, programmes and other proposed strategic actions. This process extends the aims and principles of EIA upstream in the decision-making process, beyond the project level and when major alternatives are still open (UNEP 2002).

Socio-economic impact assessments (SEIA) are often seen as additional to environmental impact assessments (EIA). (Mackenzie 2007) states: “*In the past EIA focused on direct and indirect biophysical impacts of proposed developments (i.e. impacts of development activities on water, air, land, flora and fauna). In recent years the impacts of industrial development on society, culture and different forms economic activity have gained equal importance in EIA.*” Especially when the social impacts are high, for instance when a big dam is planned, it is obvious that carrying out a SEIA in addition to an EIA is essential. EIA procedures and frameworks have been used as a base to develop SEIA.

1.2.3 Social impact assessment

Social impact assessment can be defined as follows:

- *Social impact assessment (SIA)* includes the process of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to

bring about a more sustainable and equitable biophysical and human environment (IAIA 2003).

- *Social Impact Assessment (SIA)* identifies the consequences to people of any proposed action that changes the way they live, work, relate to one another, organise themselves and function as individuals and members of society, with particular attention to the mitigation of adverse or unintended aspects. This definition includes social-psychological changes, for example to people's values, attitudes and perceptions of themselves and their community and environment (based on (UNEP 2002), topic 13).

The main types of social impact that occur as a result of these project-related changes can be grouped into five overlapping categories (UNEP 2002) (topic 13):

- lifestyle impacts – on the way people behave and relate to family, friends and cohorts on a day-to-day basis;
- cultural impacts – on shared customs, obligations, values, language, religious belief and other elements which make a social or ethnic group distinct;
- community impacts – on infrastructure, services, voluntary organisations, activity networks and cohesion;
- amenity/quality of life impacts – on sense of place, aesthetics and heritage, perception of belonging, security and liveability, and aspirations for the future;
- Health impacts – on mental, physical and social well-being, although these aspects are also the subject of health impact assessment.

The definitions of Social Impact Assessment (SIA) are very comparable to those of *Socio-economic* impact analysis (SEIA). These assessment types are sometimes mixed. However, it is clear that in a proper SEIA both social and economic impacts are studied.

1.2.4 Development impact assessment / sustainable development

The classic definition of sustainable development is "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*"¹. The United Nations 2005 World Summit Outcome Document refers to the "interdependent and mutually reinforcing pillars" of sustainable development as economic development, social development, and environmental protection. See Figure 2. By combining environmental impact assessment and socio-economic impact assessments the sustainable development impact can be assessed.

¹ United Nations. 1987. "Report of the World Commission on Environment and Development." General Assembly Resolution 42/187, 11 December 1987. Brundtland Report

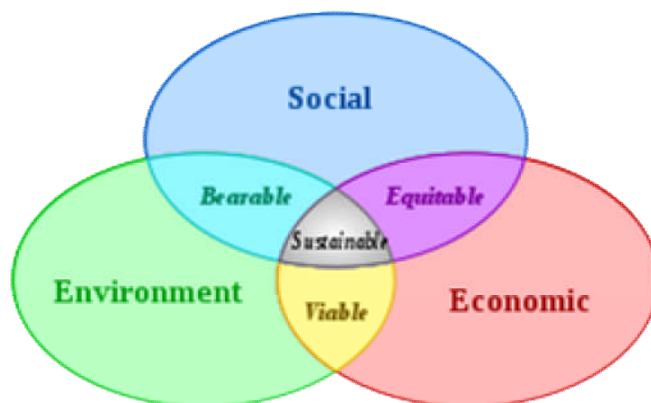


Figure 2 Scheme of sustainable development: at the confluence of three constituent parts. Source: (Adams 2006)

(Sustainable) Development impact assessment is defined as follows:

- *Development impact assessment* involves a process to comprehensively evaluate the consequences of development on a community. The assessment process should be an integral part of the planning process as it provides extensive documentation of the anticipated economic, fiscal, environmental, social and transportation-related impacts of a particular development on a community (Edwards 2011).
- *Sustainable development assessment (SDA)* is an overarching methodology (with many components), which is used in evaluating investment projects (as well as programs and policies), to ensure balanced analysis of both development and sustainability concerns. The ‘economic’ component of SDA is based on conventional economic and financial analysis (including cost benefit analysis). The other two key components are environmental and social assessment (EA and SA). However, many other more specialized types of assessments may be included within an integrated SDA.

1.2.5 Other impact assessments analyses

Some other impact assessment analyses were found:

- *Fiscal impact analysis* estimates the impact of a development or a land use change on the costs and revenues of governmental units serving the development. (The analysis enables local governments to estimate the difference between the costs of providing services to a new development and the revenues—taxes and user fees, for example—that will be generated by the development.) (Edwards 2011)
- A *Traffic impact analysis* is a study which assesses the effects that a particular development’s traffic will have on the transportation network in the community. Traffic impact studies should accompany developments which have the potential to impact the transportation network (Edwards 2011).

Fiscal impact analysis could be part of an economic impact assessment. A traffic impact analysis could typically be included in an environmental impact assessment.

2 SOCIO-ECONOMIC IMPACT ANALYSIS

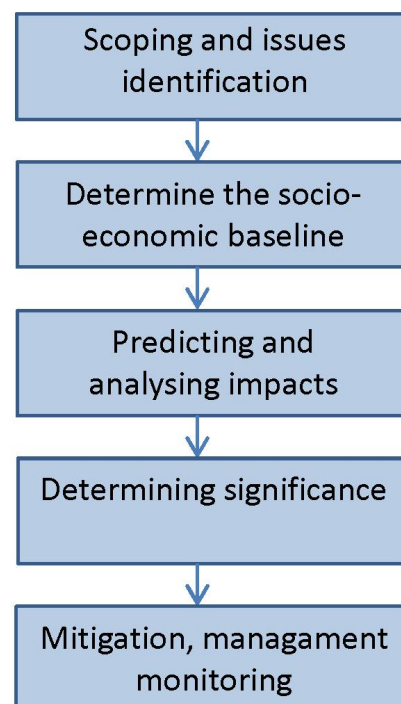
2.1 Introduction

In the last decade, broad guidelines for the practice of socio-economic impact assessment (SEIA) have been developed at the practitioner level. For example, principles for SEIA have been developed by the International Association for Impact Assessment (IAIA) (IAIA 2003); Mackenzie has published *socio-economic impact assessment guidelines* (MVEIRB 2007); and UNEP has published an *Environmental Impact Assessment Training Resource Manual*, that includes a chapter on social impact assessment (UNEP 2002). Based on this documentation it is possible to determine an approach for assessing the socio-economic impacts for the case studies in the Global Biopact project.

2.2 Steps of the SEIA process

The following main steps are followed in the SEIA process (Mackenzie 2007) :

1. *Scoping and issues identification*: The proposed project must be well-defined. Social and economic issues must be identified as well as the geographic and temporal study boundaries.
2. *Determining the social and economic baseline*: There must be a good understanding of the impacted community or communities and the general socio-economic conditions in the project area.
3. *Predicting and analysing impacts*: The assessment must be able to project what the social and economic impacts may be, including the effect of potential interactions between factors and over the lifetime of the development.
4. *Determining significance*: There must be an assessment of the importance of the social and economic impacts of the project.
5. *Mitigation, management and monitoring*: Once impacts and their significance are understood, decisions must be made about whether the project should proceed. If so, measures must be identified to avoid or lessen negative impacts and maximize positive impacts (mitigation). Management of the mitigation needs to occur and on-going monitoring of the projects effects must be carried out to ensure thresholds are not crossed.



These steps are further worked out in the next sections. More information can also be found in (Mackenzie 2007).

2.3 Scoping and issues determination - appropriate level of SEIA

Before starting an SEIA it is important to determine its scope consisting of:

- The scope of development
- The scope of issues
- The scope of assessment

Scope of development

The scope of development includes a description of the project to be studied in the SEIA, including the needed human resources, skills, goods and services and changes to the physical infrastructure.

Scope of issues

Potentially relevant impacts need to be identified. An initial selection can be made with help of existing long lists of possible impacts. Initially or later in the process, also community members need to be involved to ensure that relevant impacts are included.

The Global Biopact Task 2.1 report (van Dam, Faaij et al. 2010) provides a list of socio-economic impacts relevant for biomass production, classified under the following themes:

- Working conditions and rights
- Economic aspects
- Competition and availability of natural resources
- Social aspects and welfare
- Health impacts
- Food security
- Smallholder aspects
- Policy and governance aspects
- Land tenure and rights
- Participatory aspects

Each theme consists of a number of potential impacts. The theme *working conditions and rights* includes for instance:

- Freedom of association and collective bargaining
- Forced labour
- Elimination of child labour and protection of children and young persons
- Equality of opportunity and treatment
- Minimum wages
- Working time
- Health and safety
- Social security
- Unemployment benefit
- Social security for migrant workers
- Maternity protection
- Migrant workers

Most of these themes and their underlying impacts potential impacts could be relevant for biomass *conversion* projects too.

If needed, other lists of potential impacts can be used to support the process of impact identification. An initial list of issues - mainly relevant on community level - is provided below (Mackenzie 2007):

- Housing (access, appropriateness, affordability)
- Family/household stability
- In-migration and out-migration
- Maintenance of cultural values such as language
- Access to land for traditional uses
- Traditional economy-harvesting success
- Income and levels of disposable income
- Cost of living and inflation
- Employment levels
- Community expectations
- Business opportunities
- Gender equity
- Inter-generational equity
- Access to education/training and their perceived value
- Human health concerns including access to services
- Pressure on infrastructure (roads, buildings)
- Public safety concerns
- Level and accessibility of social services provided
- Lifestyle choices
- Boom and bust economic cycles
- Archaeological/heritage resources

Another extended list of potential impacts from (UNEP 2002) is provided in Annex A.

During the SEIA process some issues initially included might be found less relevant, and some new issues might be added to the selection.

The scope of assessment

Depending on the type of the listed potential impacts, the spatial boundaries of the SEIA can be defined. It is likely that many social impacts take place on company and community level; some impacts such as the contribution to the GDP can be assessed on a national level. Furthermore, it should be defined which stages of the project are included in the SEIA. The following stages can be distinguished: planning, construction, operation, decommissioning, and post closure stage.

Level of detail of the SEIA

SEIA can be carried out at different levels of detail. It is reasonable to link this level to the size of the project and the expected level of concern related impacts. (MVEIRB 2007) distinguishes basic, moderate and comprehensive SEIAs and developed a test to determine which level is appropriate.

Basic SEIA

In a basic SEIA the following information should be included:

-
1. A record and description of efforts to consult potentially affected communities and other parties.
 2. A development description, including the following socio-economic data:
 - Total estimated capital costs of the proposed development, including annual operating costs
 - Approximate number of workers including the developer's employees and contractors, and number of person days/years of work for the proposed development, including subcontracting
 - Identified archaeological resources within the footprint of the proposed development
 - A list of any extra regional infrastructure required for the proposed development to proceed
 3. Any identified potential impacts on the socio-economic environment, and suggestions for mitigating these impacts

Moderate SEIA

In moderate SEIA a distinction is made between the construction, operating, maintenance and decommissioning phase of the proposed project. Additional information requirements are described in (MVEIRB 2007) (chapter 3, table 7).

Comprehensive SEIA

Complex large-scale and long-term developments such as large mines, oil and gas operations, pipelines, large new highways, hydroelectric dams, etc. demand for a comprehensive SEIA. The SEIA needs to be carried out well in advance of the proposed development. See (MVEIRB 2007) (chapter 3, page 28-29)

2.4 Determination of baseline

The developer should describe the current socio-economic and cultural environment and the context of the proposed project. It can be difficult to determine whether an impact is caused by the proposed project. The socio-economic environment will continue to evolve whether the project occurs or not. The occurrence of two simultaneous projects/developments can make it hard to attribute the impacts between the projects. Even the issue whether an impact is adverse or beneficial, depends on an individuals' personal choice. For example, increased disposable income can create stronger families, brighter futures for children and greater health; or it can fuel anti-social behaviour (MVEIRB 2007).

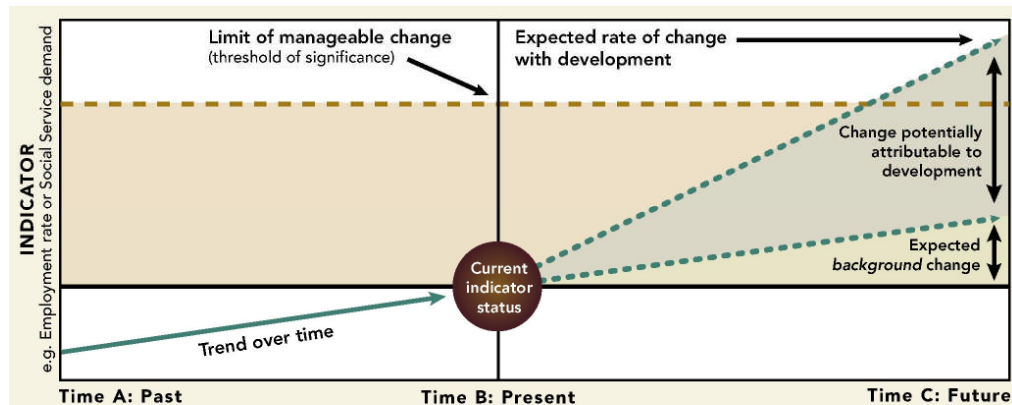


Figure 3 Impact prediction. Source (MVEIRB 2007)

The choice of methods and tools for characterising and predicting social and cultural impacts is essential.

2.5 Methods for predicting and determining economic impacts

Economic issues are given substantial emphasis in SEIA. Possible economic impact assessment tools include fiscal analysis, cost benefit analysis and input/output analysis.

2.5.1 Fiscal analysis

Fiscal impact analysis estimates the impact of a project or development on the costs and revenues of governmental units serving the project or development. It focuses on the inter-relationship between project viability and government costs and revenues. Government obtains revenues from a project through a variety of taxes, fees, and royalties. Government may also impose conditions on the developer that will raise the costs of government institutions managing and monitoring the environmental and socio-economic standards of a project. If the net cost of all of these elements is too high, the project will not proceed. A balance is required. Fiscal analysis also concerns intergovernmental relationships with respect to project revenues and costs (Mackenzie 2007).

2.5.2 Cost-benefit analysis

Cost-benefit analysis is a technique used to compare the various costs associated with an (investment) project with the benefits that it proposes to return. Most feasibility studies use cost-benefit analysis to determine the feasibility of a project. Typical indicators used are Net Present Value (NPV), Internal Rate of Return (IRR), Simple Payback Period and figures showing yearly cash flows. In order to make this calculation, traditionally, the main inputs and outputs of the project need to be identified, including direct labour costs, use of intermediary products, quantities of waste etc. as far as they have a direct financial impact on the proposed project. In addition, it is possible to quantify the costs and benefits of environmental impacts, cost effectiveness of mitigation and, where possible, environmental and social costs of intangibles (for example, value of country food or costs of pollution) in monetary units (e.g. dollars, euros). In some cases, the environmental and social cost/benefit estimates provided in the SEIA are then used to perform an overall

economic analysis of the project. An overall economic analysis evaluates the total economic value of a project (e.g. will the project provide society, overall, with overall positive benefits or not?).

An example data format for cost-benefit analysis for biomass production is provided in Annex B.

2.5.3 Input/output analysis

Input-output (I/O) analysis studies the interrelationships within and between economic sectors of a country and can be used to determine the impacts of an economic activity on the whole economy. The I/O method is based on a country's I/O table, which is available from national statistical bureaus and which generally concerns the country's economy for a time period of one year. There are two options by which a new industry can be introduced to the economy. The first method is based on creating a new final demand vector, while the second method is based on including the new industry in the technology matrix. Despite the first method's popularity, the second method has the advantage that it accounts for the impacts of the introduction of a new sector in a more complete manner. That is to say, the second way not only accounts for the inputs being bought by the new sector from the existing sectors, but can also account for its outputs being consumed by the existing sectors (Wicke 2006). The construction of an input-output table requires a large amount of data on inter-industry flows and other variables. Governments are often the only organizations with adequate resources for designing these models, and collecting and analysing the required data. Other agencies wishing to use input/output models must often rely on existing models developed by government (Mackenzie 2007). For more information and examples of input/output analysis applied to a biomass conversion chain see (Wicke 2006), (van den Broek, van den Burg et al. 2000), (Wicke, Faaij et al. 2006).

2.6 Methods for predicting and determining social impacts

Many consultative techniques are used in SEIA to identify issues, predict impacts and plan for mitigation. These include surveys, public meetings, workshops, focus groups, networks, and checklists. See Table 1 for an overview of commonly used tools.

Table 1 Tools for determination of social impacts (Mackenzie 2007)

Social analysis techniques	Description	Issues
Surveys / Questionnaires	<ul style="list-style-type: none"> • Continuous or one-time • Targeted at impacted individuals (e.g. those employed during project, workers spouses, etc.) 	<ul style="list-style-type: none"> • If a carefully designed survey keeps turning up a particular answer, causality is suggested • Poor design can yield inadequate • Responses
Focus Groups / Workshops	<ul style="list-style-type: none"> • Held in groups of 6 or less (the smaller the group, the more productive the session) of individuals well informed on a particular topic • Collaborate to move towards consensus on key issues. 	<ul style="list-style-type: none"> • A well-conducted focus group/workshop can yield a great deal of very useful information and insight. • Moderate disagreement would normally suggest that there should be no attribution until more evidence of causality has been obtained
Community Meetings	<ul style="list-style-type: none"> • Held in public to identify community based concerns • Provides opportunity for open dialogue 	<ul style="list-style-type: none"> • Effective when identifying broad issues regarding impacts (e.g. do you think what is happening is good or bad?) • Good indicator of public support / unhappiness • A poorly organized public hearing can be counterproductive, leading to polarization of views; to unfounded fears about the socio-economic impacts of the project; or to unfounded confidence in the project.
Networks / Technical Advisory Committees	<ul style="list-style-type: none"> • Experts on particular issues relevant to the assessment process who lend advice on an ongoing basis (community leaders/ policy analysts) 	<ul style="list-style-type: none"> • Difficult to establish. Development can take time and energy
Checklists	<ul style="list-style-type: none"> • Matrices are useful in ensuring relevant impacts are identified. Design requires giving consideration to key component impacts of a project. 	<ul style="list-style-type: none"> • Useful in making inter-community comparisons – identifying how various communities may see things differently.
Ethnographic / Ethnohistoric Studies	<ul style="list-style-type: none"> • Focused study of the impacts of development on indigenous communities on social organization • Carried out by trained community or academic researchers at the community level 	<ul style="list-style-type: none"> • Difficult to carry out in the timeframe of an SEIA. Alternative is the Rapid Ethnographic Assessment Procedures (REAP) of cultural mapping, in-depth interviewing, focus groups supplemented with limited survey research.

These techniques are effective for identifying present vulnerability and identifying development futures, and involve stakeholders in the identification of issues and concerns. Once issues and concerns are identified, the social analyst normally consults case studies of similar projects to compare impacts. If time permits, focused ethnographic research may be carried out. Otherwise rapid cultural appraisal techniques can be used.

In the Global BioPact project 'rapid appraisal' techniques can be applied. An example of the design of a rapid appraisal method is given below. The case study partners will determine their approach based on the particular situation of the case.

Rapid appraisal

Rapid appraisal firstly involves collecting data from existing written sources. Secondly, 'key informants' are recruited to help obtain the views of local people. Key informants are local people who have a good knowledge of the local area. Their opinions are sought and they are asked to identify further informants, and if willing can join the research team to assist in interviewing other local people. The final stage of the process is a validation workshop, which provides an opportunity to feedback on findings and identifies any remaining gaps.

2.7 Determining significance and mitigation

After analysis of impacts it is important to evaluate whether the (negative) impacts are acceptable. If negative impacts are below an acceptable threshold, proper mitigation measures must be taken or ultimately the project should be terminated. The acceptable threshold can be determined using traditional and local knowledge, community based knowledge, standards, guidelines, policy statements, and biomass sustainability certification systems. In many cases mitigation measures can be identified and discussed with impacted communities, governments and other stakeholders. From the positive view, measures can be taken to benefit optimally from the positive impacts of the project. Management of the mitigation needs to occur and on-going monitoring of the projects effects must be carried out to ensure thresholds are not crossed.

A. LIST OF SOCIAL IMPACTS

(UNEP 2002) provides a long list of possible social impacts on individual and household level and on community and institutional level.

Individual and household level

1. death, death of family member
2. arrest, imprisonment, detention, torture, intimidation or other abuse of human rights inflicted on individual
3. reduced availability of food and adequate nutrition
4. reduced control over fertility (availability of contraception, and empowerment)
5. reduced level of health and fertility (ability to conceive)
6. reduced mental health increased stress, anxiety, alienation, apathy, depression
7. uncertainty about impacts, development possibilities, and social change
8. actual personal safety, hazard exposure
9. experience of stigmatisation and deviance labelling
10. reduction in perceived quality of life
11. reduction in standard of living, level of affluence
12. worsening of economic situation, level of income property values
13. decreased autonomy, independence, security of livelihood
14. change in status or type of employment, or becoming unemployed
15. decrease in occupational opportunities potential diversity flexibility in employment
16. moral outrage, blasphemy, religious affront, violation of sacred sites
17. upset (objection/opposition to the project), NIMBY (not in my back yard)
18. dissatisfaction due to failure of a project to achieve heightened expectations
19. annoyance (dust, noise, strangers, more people)
20. disruption to daily living, way of life (having to do things differently)
21. reduction in environmental amenity value
22. perception of community, community cohesion, integration
23. community identification and connection to place (do I belong here?)
24. changed attitude towards local community, level of satisfaction with the neighbourhood
25. disruption to social networks
26. alteration in family structure and stability (divorce)
27. family violence
28. gender relations within the household
29. changed cultural values
30. changed perceptions about personal health and safety, risk, fear of crime
31. changed leisure opportunities
32. quality of housing
33. homeliness
34. density and crowding
35. aesthetic quality, outlook, visual impacts
36. workload, amount of work needed to be undertaken to survive/live reasonably

Community and institutional level

1. death of people in the community
2. violation of human rights, freedom of speech
3. adequacy of physical infrastructure (water supply, sewerage, services and utilities)
4. adequacy of community social infrastructure, health, welfare, education, libraries, etc.
5. adequacy of housing in the community
6. workload of institutions, local government, regulatory bodies
7. cultural integrity (continuation of local culture, tradition, rites)
8. rights over, and access to, resources
9. influences on heritage and other sites of archaeological, cultural or historical significance
10. loss of local language or dialect
11. debasement of culture
12. equity (economic, social, cultural)
13. changed equity /social justice issues in relation to minority or indigenous groups
14. gender relations in the community
15. economic prosperity
16. dependency/autonomy/diversity/viability of the community
17. unemployment level in the community
18. opportunity costs (loss of other options)
19. actual crime
20. actual violence
21. social tensions, conflict or serious divisions within the community
22. corruption, credibility and integrity of government
23. level of community participation in decision making
24. social values about heritage and biodiversity.

B. EXAMPLE DATA FORMAT FOR CBA (COST BENEFIT ANALYSIS)

Table 2 and Table 3 show the factors that should be taken into account when making a CBA.

Table 2: crop specific data

	Yield (m ³ or kg/ha)	Expenses per hectare (\$/ha)											Labour requirements (hours/ha) ¹												
		Field clearing	Field preparation	Planting material	Irrigation	transplanting	Tools for cultivation	fertiliser	Pesticides (quantity as well)	Tools for Harvesting, PHA	storage	packing	transport	Land clearing	Field preparation	Planting	Irrigation	Weed control	Pruning	Fertilising	Pest and disease control	Harvesting ²	PHA (post harvest)	Packing/transport ²	
Year 0																									
Year 1																									
Year 2																									
Year 3																									
Year 4																									
Year 5																									
Etc. until Year 24																									
Total																									

¹ Indicate the type of labour: unskilled, semi-skilled or high skilled

² Relates to yield

It is also important to indicate how often tasks like weeding are performed (per year or per lifetime of the crop). Other crop-specific factors that influence the profitability:

- Market price, (farm gate price, wholesale dealer price, consumer price)
- Transport distance and costs to processing unit, conversion costs

Table 3: Country specific data

	Unit
<i>Labour expenses</i>	
Average wage rate	\$/day
Unskilled labour	\$/hour
Semi-skilled labour	\$/hour
Skilled labour	\$/hour
Agricultural sector	\$/hour
Manufacturing sector	\$/hour
<i>Land costs</i>	
Land rent	\$/ha
Land rent commercial	\$/ha
Opportunity cost of land	\$/ha
<i>Utility costs</i>	
Diesel, Petrol, kerosene	\$/l
Taxes (excise duty, road toll)	% and \$
Electricity	\$/GJ
<i>Financial costs</i>	
Exchange rate	\$
Inflation	%
Discount rate	%

The costs listed in Table 2 and Table 3 can also contribute to an Input Output Analysis. For an I/O analysis additional data is required such as: total imports, direct-, indirect- and induced labour and so on, see e.g. (Wicke, Smeets et al. 2009).

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