Volume 4 – Exhibit II

Methodology for the Analysis of Production Chains (Quantitative Method)

CONTENT

Production Chain Analysis Methodology (Quantitative Method)

The concept of "production chain" entails the value added in the process of transforming raw materials and local products into semi-manufactured or manufactured products, giving special attention to the linkage of goods and services involved.

Based on the selection of the most important chains in the regional environment of the project group, the production chain analysis methodology is intended to describe the production chain structure, linking raw material production, processing and manufacturing with consumer centers or ports for end products. This methodology will underscore connection links, i.e. logistics and transportation, which are closely related to each other and depend heavily on economic infrastructure.

Objectives of the Production Chain Analysis Methodology

- Evaluate the competitiveness of production chains relevant to the territory of project groups;
- Assess the potential for increasing the Hubs' added value;
- Facilitate the identification of the most important linkages in the production structure on the basis of project groups;
- Test the benefits of production integration in relevant or potentially relevant products after projects are implemented;
- Identify the products representing the GDP best and the GDP within the project area;
- Identify the chains and components linking the entire production structure in the area of the project group;
- Find the linking element between physical infrastructure (transport, telecommunications and energy) and added value;
- Be deeply knowledgeable of the reality of the territory concerned in order to evaluate how relevant a project (works and infrastructure) is for local development.
- Identify production chains and how they are integrated in the territory of the project group;
- Prove how infrastructure can contribute to adding value;
- Identify associated chains that can provide financial support to investments in the project group.

Special Variables to Be Observed

- Potential for reducing transport costs;
- Potential for input cost savings;
- Potential for increased profitability of chains;
- Potential for attracting production-related investments;
- Potential for reducing processing/industrialization costs;
- Potential for attracting new projects with a view to providing better infrastructure services of all types;
- Identification of complementary projects.

The chain analysis methodology is suitable to meet the following purposes:

Measure objectively the impact caused by the group's project on the group's major value chains in the region concerned with the projects and offer an approach to private costs;

Identify the profitability of each link of the chain as well as of the entire chain before and after infrastructure investments are made;

Assess the impact of infrastructure and logistics on the value added of the chains and on cost savings after infrastructure investments are made;

Evaluate the improvements made in terms of competitiveness of the chain after infrastructure investments are made;

Provide a (quantitative) measure of competitiveness gains (financial efficiency) in the chain, with and without infrastructure works;

Make it possible to identify efficient chains with infrastructure and logistic deficiencies;

Major Tools

The main tools of this approach are the accounting matrixes built for each selected chain, based on private costs and the value added by the different links that make up the chain structure, as detailed further below.

Methodology Requirements

In order to implement this chain analysis methodology, the following pre-requisites must be met by the products from selected chains:

- They must be homogeneous products, listed in the Commodities Exchange or other transparent sources of market price information;
- They must be export or import raw materials and products (traded via foreign trade), with value added as a result of an industrialization process within the chain.
- They must make intensive use of infrastructure, and should be manufactured in considerable volume.

Primary data to be collected at interviews held with qualified players (chain participants) are:

Production costs, benefit costs, including establishments, scales and the most representative technologies in each chain;

Domestic prices (producer and wholesale), border prices (FOB) for raw materials, products and byproducts selected from the chain;

Port fees (expenses, taxes);

Taxes having a bearing upon each link;

Transportation at all chain stages (average kilometers traveled, number of hours traveled);

Assumptions to be Proved with this Methodology

Based on chain descriptions, information gathered on chains and in-situ visits to chain locations, the following assumptions can be derived and tested with this methodology, namely:

Infrastructure policies have a significant impact on costs and profitability of production chains;

Infrastructure requires the implementation of projects that should complement project groups;

The lower the profitability margin, the more infrastructure investment projects are needed;

Infrastructure enables road, port and other structures to become integrated to the economic structure.

The main assumption states that the project group implementation will improve the profitability of the chain vis-à-vis its past situation and that it is possible to evaluate such impacts from the data collected in situ through qualified informants who have a role to play in the different links of relevant production chains — not only carriers— and who may also make reference to other important impacts of the investments to be made in the project group.

Guidelines for Methodology Application

This section describes how the methodology works: a) the main stages to be followed; b) the information to be collected; c) the organization of such information and d) the time required for its implementation. The studies available in IIRSA and other participating institutions' databases, particularly the Groups and Hubs' Profiles, must be taken as a starting point.

The main stages to be followed are described below:

Stage 1: Identify the marketing channels and routes to be used

At this stage, consultants must apply the criteria previously defined by the group in order to select three chains within each project group. The absence of such criteria —e.g. the non-representativity of the production activity in the territory defined by the project group, the need to use logistic infrastructure for this activity and the unavailability of reliable microeconomic data— is one of the risks of an incorrect methodology application.

In addition to selecting the chain, multimodal transport and logistic maps must also be defined. Furthermore, it is necessary to decide on the road transport systems, works of art, projects within project groups, among others. Maps indicating the exit channel from export, processing and industrialization locations to export ports must be included as well.

Stage 2: Map out the exit routes from marketing, processing and industrialization locations to wholesale markets (domestic markets) and (export) ports.

This stage consists in combining the chain identification stage with the spatial and geographic approach facilitated by maps.

First, the price-making centers for each product (CFP-PN) must be identified at the wholesale level. In these centers there must be a national versus imported product competition market (CFP-PI), in which the national product must be competitive vis-à-vis the imported one. In the case of export products, the ports of shipment must be identified. Maps will indicate price-making centers as well as the route to be followed by the product from its production area in order to get information on region and freight-related costs, which are important factors when production chains are studied. Maps must also indicate the physical and financial flows of the chains.

Once the price-making centers are identified, the route followed by the product from its basic production areas to its price-making (wholesale or export) markets can be mapped out.

Between these two extreme points, the route will mark the following locations:

a. Production Centers: the regions of origin of the product;

b. Production Concentration Areas or Centers: where the basic production is gathered;

c. Industrialization Centers: where the products are processed/industrialized;

d. Storage Centers: where products are stored;

e. Main Price-Marking Centers, at the wholesale level (CFP-PN);

f. National versus Imported Product Competition Market (CFP-PI);

g. Ports of Shipment of exported goods;

Second, the main production costs have to be identified, for which purpose accounting matrixes will be constructed (income and expenses):

Primary production of major raw materials;

First transportation from the production area to the first industrial processing facility;

First-stage industrial processing;

Second-stage industrial processing;

Second transportation to ports;

Other relevant chain links;

Port fees

Stage 3: Choose an establishment representing the chain in order to analyze the technology and cost structure of the chain

At this stage and in accordance with the chain features, it is necessary to measure the costs incurred in and the income derived from each link. To this end, a representative establishment must be selected, representing the costs of a typical producer/manufacturer of the chain. The selection of such establishment will depend on the technology most frequently used by producers in the region of origin, which largely determines how profitable the chain is.

The second step consists in building the cost/income structure, for which purpose private expenses and income forms will be designed and completed with current prices. This structure will follow the path defined by the product and costs will be assigned, depending on the link concerned, to the appropriate item: production, transport, processing, storage or distribution.

FOB decomposition will be one of the forms to be designed, since it shows the costs incurred in each transportation stage until the product is exported —i.e. from the producer's establishment to the storage location, from there to the processing center; then to the place where the industrialization process takes place and from there to the export ports.

Stage 4: Apply accounting matrixes to measure the private profitability of the chain

a. Work on basic private costs and income forms, at current prices;

b. Use an establishment representative of the production area and all its links;

c. Get information on the production costs of (primary, industrial, transport, processing) representative establishments;

d. Collect information on current freights and, particularly, on operators who will use the roads that will be substantially improved: freight users can inform about time savings;

e. Design cost forms for each link in the whole chain, highlighting the items related with the project;

f. Use FOB value decomposition, parity price, etc. from market sources.

Stage 5: Matrix calculations

a. Once the accounting matrixes for this task are ready, their results will be of a quantitative nature. We will measure relative profitability on the basis of FOB values;

b. All the forms will make up an articulated model;

c. An accounting balance of costs and income will be made for each one of the links involved;

d. The balance of any one link will take into account the profitability of its previous links;

e. The profitability of any one link and of the entire chain will be calculated at market prices, carefully linking the profitability of one link with that of the following link.

The current price matrix method estimates the private profitability of a chain both before and after infrastructure works are completed (i.e. with two different cost structures).

The matrix breaks down the costs of each chain link into domestic factor costs (labor, land and capital) and tradable inputs (intermediate inputs).

The task of entering data in the analysis matrix should include the total income of each link, at observable prices, as well as its expenses, at mean historical prices (modal prices or moving average).

Such expenses can be divided into fixed and depreciation costs, used labor costs, intermediate input expenses, capital yield, financial costs and all other income.

Advantages of the Chain Analysis Approach

It is a simple primary data collection method: applied to representative (production, industry, transport) establishments;

It requires few data, most of them of an accounting nature, unlike other methodologies;

It derives from price-making market parameters;

It identifies real-world routes and marketing channels (within the territory of project groups);

It works on long-term or mean historical prices;

Disadvantages of the Chain Analysis Approach

It is hardly adaptable to more complex chains having highly diversified end products;

It evaluates the impact of project groups on one chain at a time;

It does not take into account significant complementary aspects, such as the role of each player, institutional factors, and chain governance, all of them instrumental in assessing the dynamics of the chain and its potential for reacting promptly to changes; nor does it evaluate opportunities resulting from the implementation of project groups;

It evaluates private costs and profits, rather than economic costs; in other words, in the calculation of quantitative indicators it takes public policies, regulations and current changes for granted.

Methodology Application

The application of the Methodology begins by identifying and locating the following elements in the area of influence of the relevant project group:

Brief report on the basic studies on IIRSA's Hubs and Project Groups;

Existing studies and surveys on the region;

Price-making centers in international markets;

Domestic price-making centers, ports or wholesale markets;

Production concentration areas or centers;

Industrialization and processing centers;

Road and logistics systems;

(Wholesale) consumption centers and exporting ports where products are sold;

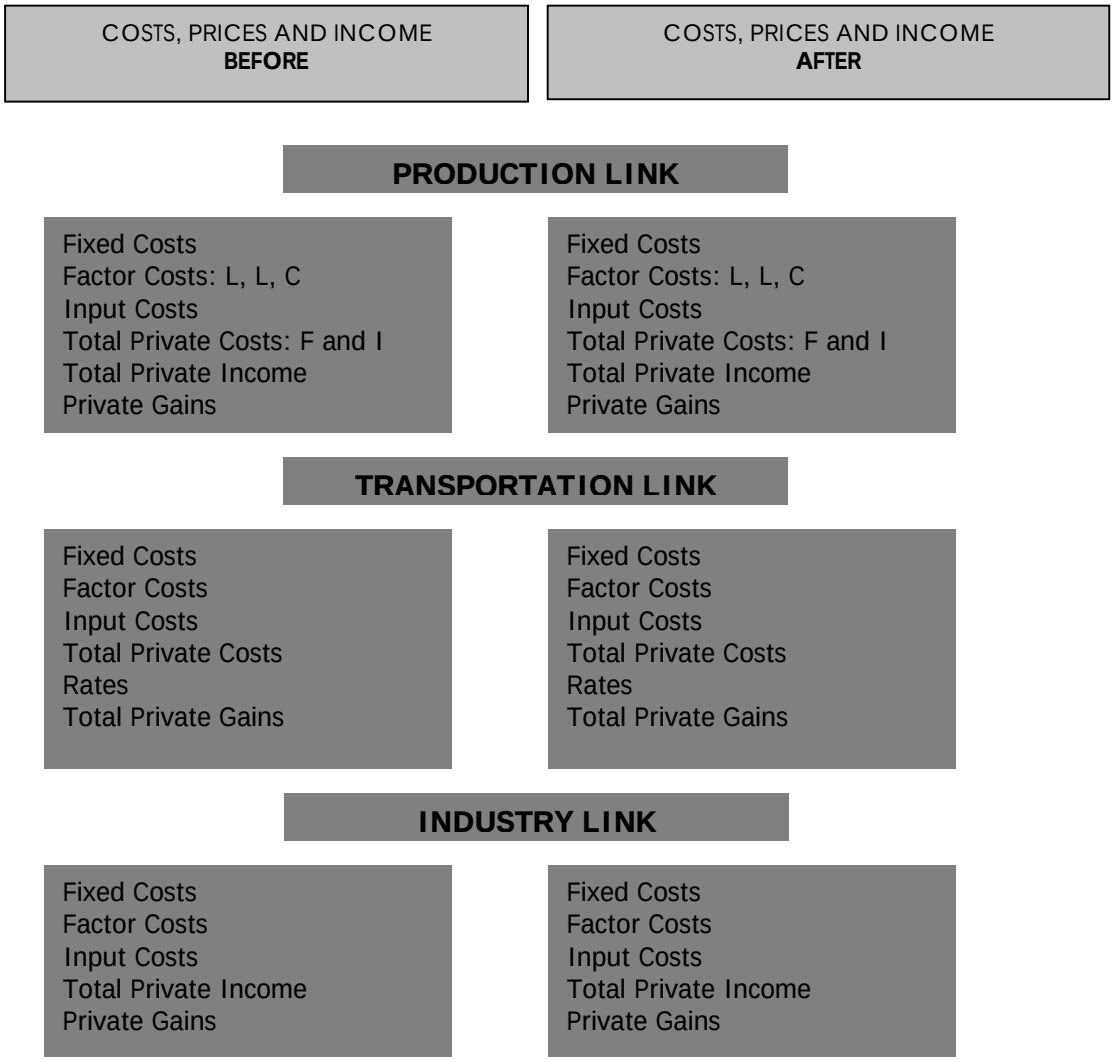
Export routes and quantification of flows.

Structure of Accounting Matrixes and Chain Assembly

To design accounting matrixes it is necessary to identify and single out key inputs affected by cost reductions resulting from the execution of projects within the group.

The data collected are used to build the pre- and post-investment accounting matrix, which is structured as illustrated in Figure 1.

Figure 1: Chain Accounting Matrix - Before and After Infrastructure Works



Results

Investments in project groups are expected to substantially reduce private transportation, input and port costs as well as to increase competitiveness and added value of chains.

The identification of complementary investments and any other opportunity to attract more investment is intended to add greater value to chains and increase local clusters' maturity.

The results obtained may give way to recommendations on what changes should be introduced in the public policies in force.

The application of the methodology will result in the following:

It may give way to recommendations on the project and on other infrastructure works that may enhance the impact and maximize the efficiency of the project groups already included;

Conclusions may be drawn that may be indicative of the potential impact of the project group beyond its territory, in a place larger than the Integration and Development Hub

Guidelines for Methodology Application: Production Chain Analysis

Section 1 – Bibliographic review: brief report on IIRSA studies on development hubs and project groups

A **–** Reviewing and outlining existing studies on projects, groups and development hubs.

A brief report on the main conclusions derived from existing studies on the territory of the project group (Itemized report):

_____
_____
_____

(Attach a text with the review of existing studies).

Source for data collection:

_____
_____
_____

Multilateral agencies, financial institutions, research entities, etc.:

_____
_____
_____

Section 2 – Defining the area of influence of selected project groups

A – Defining the area of influence of the project group'

The task consists in defining the area of influence of the selected project group, after having identified all the municipalities that form part of the direct area of influence of the selected project group. IIRSA's studies should be used as reference (state whether IIRSA's definition, if any, will be used, with the necessary adjustments to adapt it to existing administrative divisions, such as states and provinces, municipalities, etc.).

_____
_____
_____

Indicate any methodological problems or difficulties encountered in the attempt to define the area of influence or state the criteria used to define such area of influence when there is no definition available in IIRSA. For example, a radius (expressed in km.) including surrounding areas (150 km from main trunk roads), if such a definition is more suitable for the project group under analysis.

Relation between states, provinces, municipalities within the area of influence:

Project Group	Country	State-Province	Municipality

B - Maps of the area of influence:

_____
_____
_____

(IIRSA maps should be used. Indicate the map scale as well as any other information source, including websites)

C – Provide a physical description of the area of influence of the project group

A brief description of the main physical characteristics of the area of influence of the project group:

_____
_____
_____

Section 3 – Guidelines for Project Group Analysis

The Project Group Analysis is a diagnosis of the regional economy of the direct area of influence of each project group that must complement and increase the information available from IIRSA studies, with a view to evaluating the impact of proposed investments.

The first part of the project group analysis consists in the socio-economic characterization of the area of influence of the project group and the details of the studies already conducted by IIRSA in the indicative territorial planning process, focusing on the following subjects:

A – The socio-demographic characterization of the area of influence of the project group

This description should follow the steps listed below:

i) Demographic aspects (population, growth rate, urban and rural distribution).

Municipality /Province	Population (2005)	Mean growth rate (1995-2005)	Urbanization rate (% of population in cities with more than 20,000 inhab.) – 2005
Subtotal			
Total			

ii) Urban network structure: main urban centers, metropolitan and urban agglomeration: population data and hierarchy of urban system (when available).

Municipality/ Agglomerations/ Metropolitan areas	Population (2005)	Share in total population of area of influence (2005)	Ranking (hierarchy) 2005
Subtotal			
Total			

iii) Brief indicators of the living standard – average HDI (in the area of influence, and per province and/or municipality, if available)

Municipality /Province	HDI (2005)
Subtotal	
Total	

iv) Profile of the economically active population (EAP) per economic sector (in the area of influence and per province and/or municipality, if available). Table with absolute figures:

Municipality /Province	EAP (2005)	EAP agriculture (2005)	EAP Processing or transformation industry (2005)	EAP (...) (2005)	EAP (...) (2005)	Total EAP (2005)
Subtotal						
Total						

Note: Indicate any methodological problems or difficulties encountered when trying to disaggregate data per province and/or municipality; indicate alternative methods to infer indicators, if any. Use the most recent

information available and state year and source. Use information from household research works (census or other sampling research types).

B – Description of the Production Structure in the Region

This description should follow the steps listed below:

1. Provide a broad view of the most relevant economic activities in the region. In this initial stage, IIRSA documents can be used as a starting point, but it is absolutely necessary to carry out a bibliographic review of other existing studies and their elements.
2. The next stage consists in registering the main chains responsible for the economic activity in the territory of the project group. In addition, a summary must be made of all the chain-related information in the form of descriptive charts, including values and some references to how such chains will be affected by the projects. The main source of information at this stage is the existing literature; if this were not available, it shall be collected *in situ*.
3. Then, selected chains should be recorded on a preliminary basis in order to evaluate the impact upon them and to account for the selection, the strategic aspects of chains for regional development, the effect of increased profits and employment, etc.
4. Some final data on the region and the selected chains have to be entered:
    1. Main productive activities
    2. GDP (or added value) of selected chains
    3. GDP (or added value) of complementary chains
    4. Regional and international trade flows: basic foreign trade statistics
    5. Growth pattern of production sectors in the region (area of influence of the project group): the tendency towards the clustering or not of economic activities; intra-regional specializations; main production agglomerations: relationship between clusters and/or local production organizations (indicating the region and sectors of activities).

In this section, all data and any relevant information, not only the above-listed, should be entered. Indicate any methodological and/or difficulties encountered when trying to disaggregate data per province and/or municipality; indicate alternative methods to infer indicators, if any.

C – Removal of Physical Barriers that Hinder Production Integration and the Implementation of IIRSA's Project Portfolio, within the Project Group

The bibliographic review of existing studies should focus on the following specific issues:

1. What physical infrastructure barriers –transport, energy and telecommunications– should be eliminated, in addition to those for which projects were designed in the first place?

2. What are the "other" physical barriers that reduce project efficiency?

Transport

Energy

Telecommunications

3. Which are the projects within IIRSA's Portfolio and what are their goals and/or rationale:

Transport Projects	Goal\Rationale

Energy Project	Goal\Rationale

Telecommunications	Goal\Rationale

D – <u>Potential for Production Integration and for the Development of a Regional Economy:</u>

The second part of the Analysis of Project Groups consists in the preliminary identification of production complementarities, economic resources and the potential for economic growth in the Project Groups resulting from physical integration. This study should establish, as an initial qualitative approach, the potential impact that IIRSA's scheduled investments might have on production integration, with a view to:

1. Identifying the most dynamic activities, the production sectors and economic resources capable of becoming integrated as a result of infrastructure investments;

2. Assessing the integration capabilities of the production base available in the project groups' territory in order to boost the development of local and regional production chains (both forward and backward) and the use of natural resources from the region;

3. Establishing whether there is any prospect for strengthening the economic structure and for evaluating general strategies to encourage existing and future chains and trade flows.

The methods and procedures used for the Analysis of Project Groups will involve:

1. the collection of secondary information on the areas of direct influence of the selected project group to be analyzed;

2. interviews with analysts and researchers with expertise in the dynamics of regional economy (see Section 7 – guidelines for interviews).

The final product will be a report addressing the following items:

1. the impact of creating a wider market and the investment prospects resulting therefrom;

2. potential for diversifying exports as a result of investments in project groups;

3. potential for complementary private investments resulting from larger economies of scale and greater specialization;

4. potential for higher value-added content;

5. potential for strengthening (backward and forward) production chains at the regional level;

6. Potential for diversifying production networks or for creating new sectors.

7. Inventory of scheduled investment projects: both public and private; indicate current status (bids have been called for, projects are in the bidding process, projects are being implemented)

Section 4 – Guidelines for Chain Methodology Implementation[1]

The chain methodology was selected because it is a quantitative method capable of evaluating the impact of project groups and the competitive efficiency of the most important chains identified in the territory.

The quantitative method proposed follows the path of the production chain approach detailed below, as to the fieldwork conditions for its implementation. As many chains in the real world are potentially important for the goals pursued by the study, it is advisable to take into account the observations introduced in the Methodological Report.

The guide below describes how to implement the chain analysis approach as a quantitative method. Moreover, it assumes that the production chains to be evaluated were previously selected in accordance with their strategic importance in the territory of the project group, and their potential for production integration and for strengthening the economic activity in the region.

Introduction

This guide is made up of the following parts:

a. A brief description of the chain and key information;

b. Data collection sequence;

c. Basic structure of the links that form part of the chain;

d. Basic forms for chain data collection purposes;

e. Decomposition of FOB and CIF prices.

The purpose of this guide is to help data collection and fieldwork. In addition to its descriptive part, the guide includes forms that should help collect data, which —though a certain degree of flexibility is allowed— follow the entry data pattern of the order of the forms that calculate the sequenced profitability of the chain, before and after the project implementation.

A Brief Description of the Chain and Key Information

In this part of the data collection process, the checking list used for the network methodology can be used as a guide to know which data are to be collected in this case. Therefore, only the most salient aspects of the connection between links should be recorded, and given the fact that cost and profitability sequences are transferred from one link to the next, this should be repeated until the very end of the chain.

Depending on each evaluation, all the information available on existing studies and research works as well as any fieldwork information collected should be used. It is necessary to "split" the chain into different production areas up to the ports, prioritizing the segments where the chain impacts on (or fuels) the economic activity (of all the sectors) in all the influence areas within the chain.

It is necessary to get information on:

Input production and industrial processing outside the area of the chain (extraterritoriality of supporting and industrialization chains);

[1] This guide complements and receives information from the checking lists of networks and clusters.

The destination of processed products, to other regions that are not necessarily ports (extraterritoriality of "export" effects of chain products for regional integration);

Value creation or added value throughout the chain and around the key centers and poles within the chain; and

In short, data that will enable us to evaluate how much value is added in the area, though paying special attention to regional development (in the areas of the projects, chains and more distant regions).

NOTE: All data to be collected should make reference to the current situation (BEFORE) and to the period after the projects are implemented (AFTER). Even accounting matrixes should be built with the same reference pattern, i.e. before and after projects are implemented, especially forms related to freights and port costs.

Data Collection Sequence

Main stages in the sequence:

1. Identifying the marketing routes that will be used;
2. Mapping out the exit routes from the production, processing and industrialization locations to wholesale markets or ports;
3. Using an establishment representing the chain in order to analyze the technology and cost structure of the chain;
4. Applying a matrix method to obtain the private profitability of the chain (described below), and
5. Evaluating the general conditions of route infrastructure.

Stage 1: Identifying the marketing routes that will be used

Criteria for route selection:

1. The most heavily traveled by the market, which should coincide with those in which projects will be implemented;
2. Availability of informants who may provide information on freight costs and the current time spent (before) and the freight costs after the projects are implemented; and
3. Routes that characterize the economic activities of the chain.

Then, the routes will be indicated in the map, together with all the modal, multimodal, river, sea and inland transportation systems up to the ports.

Other maps may be used to indicate the exit channels from the production, processing and industrialization locations to the ports associated with trunk routes, where the area of influence of the projects can be fully deployed.

Stage 2: Mapping out the exit routes from the production, processing and industrialization locations up to wholesale markets and ports

At this stage, the mapping out of routes can be done by observing the main nodules or links:

1. Production areas – the region of origin of the product or raw material
2. Production concentration area – where the basic production is gathered
3. Industrialization and processing center – where the processing of the product takes place
4. Storage center – where the product is stored

5. Main price-making centers, at wholesale level, of the product (CFP-PN)
6. National versus imported product competition market (CFP-PI)
7. Ports of shipment for exported goods
8. Route made by the product to the port and/or wholesale market

Stage 3: Using an establishment representing the chain in order to analyze the technology and cost structure of the chain

Collect the following information from representative establishments[2]:

1. Cost and price structure of all links in the chain (production costs, transportation costs, industrial processing costs and successive freight costs).
2. Cost decomposition of each one of the links in domestic factors (labor, land and capital) and tradable inputs (intermediate inputs).

Stage 4 – Applying a matrix method to obtain the private profitability of the chain

1. Assemble the system production, transportation, processing, storing and distribution cost forms.
2. Introduce the following data in the Analysis Matrix:
    a. Total income of all links in the chain, at market value (including taxes imposed on each link).
    b. Expenses (or costs at market value):
        i. Fixed costs and depreciation,
        ii. Labor costs,
        iii. Expenses with intermediate inputs,
        iv. Capital yield, financial costs and other revenues.
3. Cost and expenses classified into:
    a. Tradable factors – all expenses with intermediate inputs in all links of the chain.
    b. Domestic factors (land, labor and capital), including labor and land revenues and charges.

Stage 5 – Evaluating the general conditions of route infrastructure

- The conditions of the electrical power supply to meet the current needs of the chain (before) and to meet an increase in needs as a result of chain expansion (after) and
- The conditions of the telecommunication service as provided today (before) and as will be provided in the future in response to the needs of an expanding chain (after).

In short, data to be collected comprise the following:

1. Primary data to be collected at interviews held with qualified players (chain participants):
    a. Production costs, benefit costs, including establishments, scales and the most representative technologies in each chain.
    b. Domestic prices (producer and wholesale), border prices (FOB) for raw materials, products and byproducts selected from the chain.

[2] The concept of a representative establishment can be used for a transport, processing or other industry. In fact, all links in the chain should have a representative establishment.

c. Port fees (expenses, taxes)

d. Taxes having a bearing upon each link

e. Transportation at all chain stages (average kilometers traveled, number of hours traveled).

2. Then, the main links in the chain are to be identified. For this purpose, accounting matrixes are constructed (income and expenses):

   a. Primary production of major raw materials;

   b. First transportation from the production area to the first industrial processing facility;

   c. First-stage industrial processing;

   d. Second-stage industrial processing;

   e. Second transportation to ports;

   f. Other relevant links;

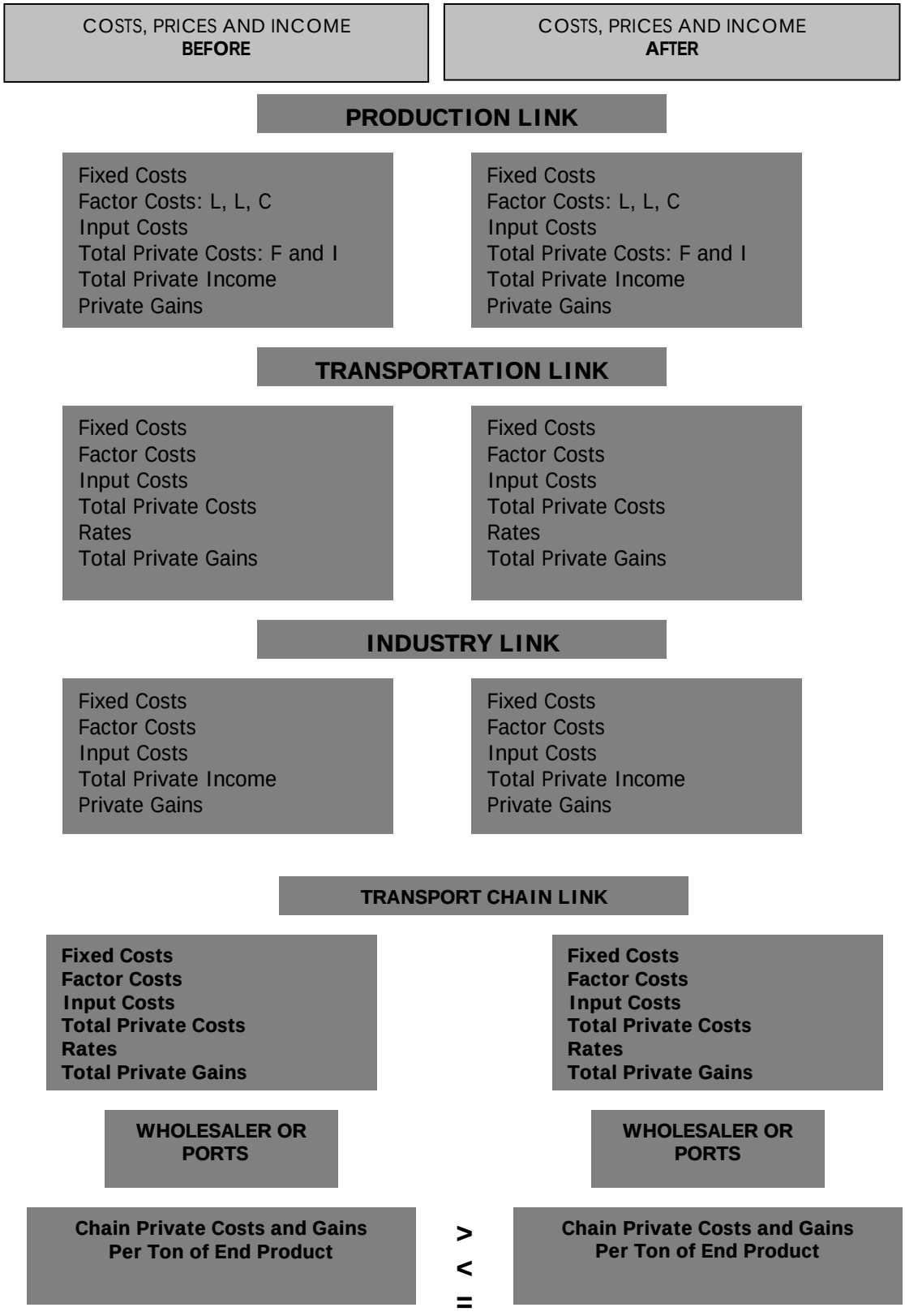
   g. Port fees (FAS – free along side and FOB – free on board.

Basic Structure of the Links in the Chain

Accounting Matrix Structure and Chain Assembly

To design accounting matrixes it is necessary to identify and single out key inputs affected by cost reductions resulting from the execution of projects within the group.

Data collected are used to build the pre- and post-investment accounting matrix, which is structured as follows:

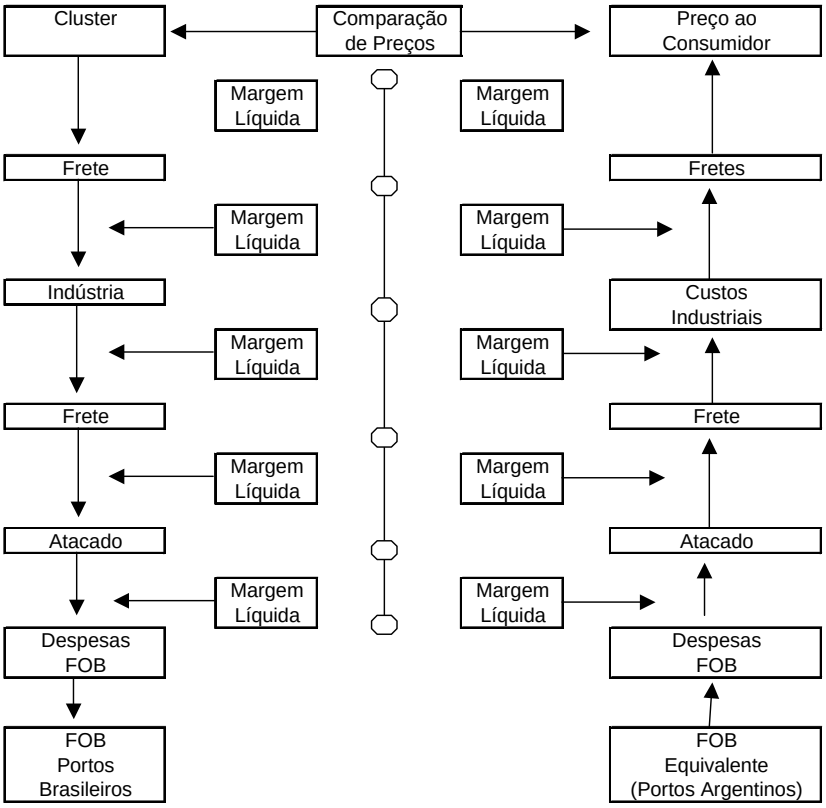

COSTS, PRICES AND INCOME
BEFORE
COSTS, PRICES AND INCOME
AFTER
PRODUCTION LINK
Fixed Costs
Factor Costs: L, L, C
Input Costs
Total Private Costs: F and I
Total Private Income
Private Gains
Fixed Costs
Factor Costs: L, L, C
Input Costs
Total Private Costs: F and I
Total Private Income
Private Gains
TRANSPORTATION LINK
Fixed Costs
Factor Costs
Input Costs
Total Private Costs
Rates
Total Private Gains
Fixed Costs
Factor Costs
Input Costs
Total Private Costs
Rates
Total Private Gains
INDUSTRY LINK
Fixed Costs
Factor Costs
Input Costs
Total Private Income
Private Gains
Fixed Costs
Factor Costs
Input Costs
Total Private Income
Private Gains
TRANSPORT CHAIN LINK
Fixed Costs
Factor Costs
Input Costs
Total Private Costs
Rates
Total Private Gains
Fixed Costs
Factor Costs
Input Costs
Total Private Costs
Rates
Total Private Gains
WHOLESALER OR PORTS
WHOLESALER OR PORTS
Chain Private Costs and Gains Per Ton of End Product
= < >
Chain Private Costs and Gains Per Ton of End Product

Physical-Financial Flow Chart

It is necessary to include a physical-economic-financial flow chart to represent the chain as well as a transportation and logistic map for the territory of the area of influence of the project group.

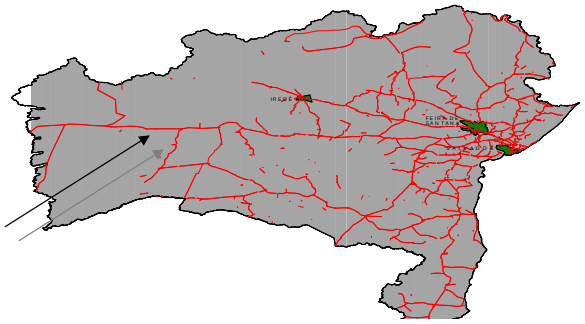
Each region has its own geographic characteristics. It is not difficult to get transportation and logistic maps of the regions to be studied. In this regard, we hereby enclose a few transportation network maps and physical-financial flow charts to exemplify our goal.

Physical-Economic-Financial Flow Chart



Transportation and Logistic Map

Road network



Main road

IRECO (Producer/Processor)
Feria de Santana (Industry)
Salvador (Industry, Port/Export)

Basic Forms to be Used for Data Collection on Chains

Introduction

This section of the methodology application guide presents the forms that will feed the impact evaluation model of the projects concerned. It includes suggestions on procedures and methods for their completion.

At the end of this section, the way to sequence or organize the forms is shown, following the links in the chain so as to build a technical structure or "model" of the entire chain. It also includes a method to measure the impacts of projects within the groups based on the results taken from the sequenced forms.

Finally, the procedures to aggregate data are defined.

Important: All forms have two versions, one BEFORE and the other AFTER the implementation of projects. Therefore, either separate forms or else one form with two columns (BEFORE and AFTER) should be completed.

Basic Forms for Chains

The main chain assembly or model forms follow the key instructions laid down in this section of the guide.

The forms included are:

1. Form on production costs from representative establishments producing raw materials for the chains;*
2. Form on the first transportation costs, from the raw material production area to the first industrial processing;
3. Form on industrial processing costs to produce finished products;
4. Form on the second transportation costs, from industrial plants to the wholesale market (domestic or regional consumer center) or ports of shipment (exports).

Procedures and Methods to Complete Basic Chain Forms

Procedures and methods to complete these forms follow the usual practice used for production, transportation and industrial processing costs. The information to complete these forms can be found in the market and among agents operating in the chain concerned.

For standardization purposes, we should take the average price of all inputs and products in the last four (or five) years.

Sequence of Forms

Forms will be organized and sequenced in accordance with the order proposed, from production locations to destinations of processed products. The data will be then introduced in an orderly structure, so that the "exit" of one form becomes the "entry" of the next. This set of forms may be regarded as a "model".

Special care should be given to units: the unit serving as a basis for the form as well as for the final part, for the wholesaler —in the case of production integration for national or regional markets— or for the ports, in the case of production integration for foreign markets. This unit will become associated to the units in the links according to the final destination market, by means of the proper technical conversions. For example,

* There might be more than one representative establishment for the production of raw material. In that case, we can resort to as many representative establishments as necessary. Later, with the production costs for each type of establishment in the total production of raw material, which will be duly weighed, the data from all types will be aggregated as the production costs for the first link in the chain.

the starting point is the quantity of raw material to be transported and processed in the industry in order to get one ton of processed or industrialized product in the wholesale center or FOB port.

Final Data Aggregation

Final aggregation is done with data from the selected chains. For each group, the results of the model are aggregated once chains are selected and after it has been checked that at least the most important chains have been included in the tax evaluation. The final result will be given in value terms —for cost saving reasons—, in the case of transportation of both products and inputs.

This aggregation suggests a direct "first-generation" impact of the implemented projects. Necessary impacts on transportation cost savings —due to an increased production of raw material or a larger industrial scale— may be incorporated to the analysis on the basis of the interviews.

Final results should include any other information related to production values and turnover derived from the setting up of new industrial plants, as a result of improvements in transportation services and, basically, in energy supply conditions.

Expected Results from the Chain Analysis Methodology

Comparing costs BEFORE and AFTER projects are implemented is a way to prove chain performance with and without infrastructure investments, which result in transportation cost savings and, particularly, in port fee reductions.

Comparing data against FOB parity prices is a way to measure competitiveness, suggesting whether the chain has gained export competitiveness.

Comparing data against wholesale prices will indicate whether the chain has gained competitiveness in national markets.

About Forms and Columns BEFORE and AFTER Projects

An important aspect of the fieldwork data collection process is how to get reliable estimations of freight, loading and unloading expenses, port fees, etc. BEFORE and AFTER projects are implemented.

This survey, just as it was originally conceived of, may entail a certain degree of subjectivity. This is due to the fact that we cannot anticipate the conditions for supply and demand of specialized infrastructure services after project works are completed.

Therefore, it is useful to develop a method to get such information.

By way of a suggestion, we can provide a set of "ideas" on how to guarantee that the answers given serve the purposes pursued:

a. Select informants carefully, verifying from the very beginning that they are qualified for the task;

b. Ask, immediately after the beginning of the interview, whether the informant can provide any answer to the question on how costs are BEFORE and how costs would be AFTER projects are implemented;

c. Ask the informant to account for any quantitative data provided;

d. Complementary indications, such as: number of hours spent in the route, unnecessary stops, traffic bottlenecks, delays at border passes, expensive and unnecessary overstays, waiting periods while queuing to unload, waiting periods at ports. All this, when duly eradicated, will substantially reduce freight and port expenses. All sources for improvement should be analyzed.

e. The double checking system to confront information with more than one informant will help gain more accuracy.

Decomposition of FOB and CIF Values

These forms calculate the price parity at the level of the first link in the chain —generally in the raw material production area— based on current prices at ports of shipment. They are also known as “parity prices” or “border prices”. Market agents have estimated them for years in order to learn the parity value of products on the basis of prices listed in transparent markets for homogeneous products.

Generally, it is necessary to make corrections for exchange rate commissions or quality depreciations, rewards or penalties at ports, etc. But the market is very well acquainted with these procedures.

FOB Value Composition (From production areas to the port)

Breakdown	Project implementation	
	Before	After
Origin of the Product or Raw Material		
Producer’s Price		
Taxes (*)		
Transport (Freight to the storage location)		
Storage and Cleaning		
Financial Costs		
Administrative Expenses		
Sales Commission		
Technical Deficiencies		
Exchange Rate Commission		
Freight from the Production Area to the Port (*)		
Port Expenses (*)		
Port FOB Value		
Incentives, Stay, Dispatch		
FOB Value of the Product at Port of Shipment		
Equivalent FOB Value of Product from CIF Value at Port of Destination		
Improved Competitiveness		
Tax Reduction		

(*) Note: This cost structure helps to measure and analyze the impact of projects in terms of port fees reduction and of freight cost reduction. Furthermore, it helps to measure the reduction of penalties due to port inefficiency.

FOB Value Decomposition (From the port to the production area)

Breakdown	Project implementation	
	Before	After
FOB Value of Product – Port of Shipment		
Incentives, Stay, Dispatch		
Port Fees		
Freight from production location to the port		
Exchange Rate Commission		
Technical Deficiencies		
Sale Commission		
Administrative Expenses		
Financial Costs		
Storage and Cleaning		
Transport (Freight to the storage location)		
Taxes		
Producer's Price		
Origin of the Product (or Raw Material)		
Product Value in Production Area		
Increased Profitability at Origin		
Expected Production (Response from production)		

(*)Note: This cost structure helps to measure and analyze the impact of projects in terms of port fees reduction and of freight cost reduction. Furthermore, it helps to measure the reduction of penalties due to port inefficiency.

Instructions to Complete FOB Value Composition and Decomposition

The following suggestions should be taken into account:

1 – Where to get the information from? Market agents, brokers, commodities operators, companies specialized in market analysis, trading companies, etc. calculate parities directly at ports, i.e. at the "entrance" of industries and production areas (locations where products are gathered and stored).
2 – Parity estimations are the same as those used in FOB value composition and decomposition. Yet, it is necessary to adjust them to the new structure. Parities are strictly identical to FOB value decompositions.
3 – Structures proposed for FOB value composition (from the production areas to the ports) and for FOB value decomposition (from the ports to the production areas) have approximately the same structure, since one mirrors the other, but in the opposite direction. However, their components are roughly the same. Special care should be taken with the formula used.
4 – In passing from the "before" to the "after" columns, changes will be recorded only in the data columns directly associated with the improvements introduced by the project, such as cheaper freights, elimination of negative issues, overstays, dispatch rewards, positive incentives[3] in the port of shipment, etc., including improvements in border passes. In short, the "after" column will show the same data as the "before" column, provided the items are not directly affected by projects —for instance, taxes, commissions, procedure rates, technical deficiencies, financial costs, etc.
5 – If the port improvements resulting from the implementation of projects reduce port fees, the "after" column will have to show such new fees (lower due to enhanced port efficiency).

[3] It is worth mentioning that incentives can be either positive (rewards) or negative (penalties).