



February 2011

page

1

## Evaluation "Risk analyses of agroparks"

**Period:** March 1, 2009- December 31, 2010

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### 1. Introduction

The concept of agroparks is one of the solutions to enhance a sustainable development of the agricultural sector. An agropark is 'a cluster of agro-functions and related economic activities on or around a location' (Smeets, 2010: 39). The last years have shown increasing interest in the development of agroparks, but also a stagnation of many agropark projects. One important obstacle for the actual development of agroparks has been the high uncertainty about the feasibility and profitability of an agropark.

An agropark consists of complex interaction of individual firms. Each firm has its own objectives, responsibilities, uncertainties and considerations. The agropark itself is also accompanied by a multitude of uncertainties concerning technological, market and institutional developments in the future. These uncertainties present risks to the agropark as integral design and to the stakeholders of the agropark as individual actor. Lack of insights in the risks and opportunities are an obstacle in decision-making of stakeholders, which makes firms reluctant to invest or participate in agroparks. This research focuses on the analysis of uncertainties and the possibilities to transform them into manageable risks. With that, one of the obstacles to realize agroparks may be tackled.

### 2. The project

#### 2.1 Aim

The aim of this project is to systematically identify and analyze risks of agroparks. This will result in a generic framework that can be used to quantify financial and economic risks of agroparks, and a risk model that can be applied to agroparks being developed or to be developed.

## 2.2 Approach

The research used a combination of desk studies and field studies to obtain objective information. One of the first steps to develop the generic framework was to analyze the agropark concept. An agropark can have different institutional settings. Key issues and risks are identified in these settings. New Institutional Economics theory is used to determine how institutional factors influence success or failure of agroparks. This is combined with practical examples of five agropark projects, among which Greenport Shanghai and New Mixed Farm.

For development of the risk model, a Monte-Carlo simulation in combination with fault tree analysis is used to quantify risks. With the Monte-Carlo method, the opportunities and downside risks per category can be quantified with probability distributions which indicate the magnitude and chances of various outcomes. The results can then be used for further decision analysis, such as evaluating a particular investment project or a particular financial or organizational structure.

The data for the risk model are retrieved from statistical databases of CBS, EuroStat, Farm Accountancy Data Network, and from scientific and empirical publications on key agricultural sectors.

## 3. Results and findings

### Factors jeopardizing agropark development

Experience from five agroparks showed that the development of agroparks can be jeopardized by:

- 1) Social or legal resistance to the development of the agropark;
- 2) The economic or environmental impact elsewhere;
- 3) Technological problems in implementing the concept;
- 4) The level in which stakeholders share the value propositions of the agropark and agree to cooperate under these propositions;
- 5) The level in which participating enterprises are prepared to stick to cooperation agreements even when they become unfavorable due to changes in market conditions.

### Institutional setting key in success

The analytical framework that is developed in this project, showed the impact of institutional arrangements on the success or failure of agropark formation. Combined with practical experiences of agropark projects it is shown how theoretical advantages of the agropark concept may fail to

February 2011

materialize due to high institution cost of organizing, establishing, and maintaining the collaboration among different stakeholders as required by the agropark concept. The key to successful formation of an agropark was the choice of proper institutional arrangements which create high incentives to cooperate and acquire low institution cost. The characteristics of the institutional settings are input for the risk model.

### Risk model

The generic risk model operationalizes the theoretical consideration of the factors influencing agropark development. The model assesses the formation and business risks of agroparks as a whole. The model consists of qualitative and quantitative elements in different phases of the agropark development.

A step by step approach is developed to assess the risks of a particular agropark or agribusiness cluster, see figure 1:

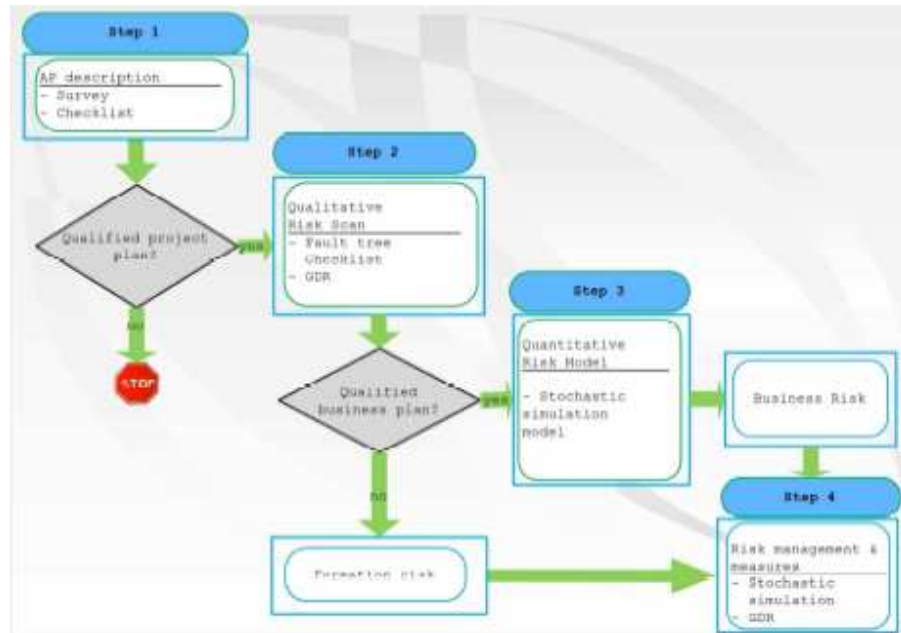


Figure 1: steps in risk analysis of agroparks

*Step 1: Checking the clarity of the project plan*

A survey and checklist are developed to assess whether the project plan is defined. If yes, one can go to step 2.

*Step 2: Qualitative risk scan*

If the project plan is well defined, a quick risk scan can be performed to specify the risk factors and their possible impacts. A fault tree model and Group Decision Room (GDR) is used to assess the risk of agropark formation.

In order to do a quantitative risk analyses, a detailed business plan is required. When the business plan is only broadly defined, quantitative assessment can only be made on the formation risk based on expected profiles of the firms involved. This means that for agropark projects that are in a conceptual planning phase, only qualitative risk analysis can be performed. If a detailed business plan is available, one can go to step 3.

*Step 3: Quantitative risk model*

A stochastic simulation model is carried out to assess the return on investment and key variables for success or failure.

*Step 4: Risk Management*

Based on the outcomes of the quantitative risk model (step 3) or the qualitative risk scan, a list of risk reduction measures and risk management strategies can be identified.

It should be noted that using the model is not a one-time access and the situation in developing an agropark may evolve continuously. As such, risk analysis should accompany the design and plan process. Inputs for the risk model should be updated when new information is available.

### **Insights in challenges facing agropark development**

Besides the Risk Model that has been developed, the project made a number of findings regarding the challenges facing agropark projects:

- Most project plans focus on the technical details and design, and not on clearly specified budgets, operational goal and time frame. They often lack giving any insights in the management of risks and uncertainties.
- Implementation often suffers from a chicken and egg dilemma: on the one hand, stakeholders are unlikely to commit to the project without a well-defined institutional design. On the other hand, this institutional design cannot be defined without committed stakeholders. As a result, formation risks are likely to be the major risk of an agropark project.

- Most project plans for agroparks describe the ideal agropark. The various master plans required conditions that can differ from practice, and therefore were unlikely to materialize. A more practical approach should start from identifying the divergence between theoretical conditions and practice.

#### **4. Meaning for TransForum**

##### **Contribution to metropolitan agriculture**

Agroparks are an example of high tech metropolitan agriculture. The insights and tools that are developed in this project are helpful in transforming uncertainties into manageable risks. This is needed to make well-informed investment decisions and to shift agropark development from the planning to the investing stage, therewith contributing to realizing metropolitan agriculture.

##### **Contribution to connected value development**

Agroparks connect people, planet and profit values. The different institutional settings of agroparks determine the success of the agropark and therewith the actual value capturing. Insights into the possible opportunities and risks can serve as a basis for designing sustainable institutional arrangements among the stakeholders.

The risk model is also useful or even recommended in the investing and implementation stage. Changing conditions in the agropark development process requires updated risk assessment throughout the different stages. The theories and methods in this project provide a philosophical and methodological basis to tackle challenges in the implementation and operational phase.

##### **Contribution to the agro innovation system**

Realizing a system innovation in a changing institutional environment, where it is difficult to fully understand how the system works, is a real challenge. It can take many years before the process of planning and implementing is realized. Agropark development is a dynamic process in which the situation may change. Existing uncertainties may be resolved and new uncertainties may arise. Risk analysis should therefore be regularly updated to take into account new information.