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CONTRIBUTION OF AN AGRICULTURE PROJECT IN THE BEIRA INTERIOR REGION TO REGIONAL DEVELOPMENT: HOW CAN THE TRIPLE HÉLIX METHODOLOGY EXPLAIN THIS?

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Abstract: Regional development can take place gradually or rapidly but it should always aim at increasing its population welfare. This population welfare results from wealth per capita in that same region. Both Sociology and Economics study and systematize actions that contribute to create wealth and, therefore, regional development. These sciences analyze actions and results, and systematize methodologies which may be replicated in case they are successful. The project +peach - Innovation and development in peach production in the Beira Interior region, funded by PRODER, aiming to contribute to both the overall recovery of the peach production sector and all stakeholders involved. This is achieved carrying out different activities during the production process as well as the increase in peach final price. This project applies the Triple Helix model (both in structure and organization) to the peach production sector in which both fruit growers and growers support organizations are the stakeholders. The most relevant aspects to be pointed out are the establishment of a knowledge network, inter-replacement tasks for stakeholders, and even future actions planning in a bottom-up perspective. It should be noted that this may create a dynamic space, increase innovation synergies, networking and cooperation among the different stakeholders.

Keywords: Knowledge network, regional development, rural, peach, *Prunus*.

INTRODUCTION

Regional development is of paramount importance to every region. Therefore, to be able to contribute to the development of a region one should be aware of what is necessary to achieve success. In addition to these aims, different actions should be carried out involving different regional stakeholders.

The Triple Helix model is an analytical model used to pinpoint the importance of

interaction among University - Industry - Government in innovation process (Etzkowitz and Leydesdorf, 2000). It also shows the advantages of this triadic relationship. Etzkowitz and Ranga (2013) show the importance of the Triple Helix model in regional development and its evolution to a system consisting of spheres of action and interaction spaces that co-evolve over the time.

The concept of Triple Helix system shows progress in relation to the innovation system that individualizes Components, Relationships and Functions (Carlsson et al., 2002; Bergek et al., 2008). The three Triple Helix system spheres (i.e. University, Industry and Government) correspond to components of the innovation system. However, this model presents new concepts for functions of each system component which are called spaces. These key elements in interaction among the different spheres are knowledge, innovation and a “consensus space”.

METHODOLOGY

The methodology of this work can be divided into the following sections: 1) brief presentation of the project; 2) identification of actions and partners in the project; 3) the Triple Helix spheres and 4) the Triple Helix spaces.

CASE STUDY: THE +PEACH PROJECT AS AN ENHANCER OF SYNERGIES AND DYNAMICS OF PEACH PRODUCTION ACTIVITY IN THE BEIRA INTERIOR REGION

THE TRIPLE HELIX MODEL AND PEACH PRODUCTION IN THE BEIRA INTERIOR REGION

The Beira Interior region has many hours of sunshine and in summer temperatures are high and the rainfall is low. In fact, it may even be the case that there is no rainfall in July

and August (Brito, 2005; Simões, 2008). On the other hand, the soil is mostly sandy with high permeability (Simões et al., 2008). These conditions are favorable for peach production. Moreover, there has been a fruit production tradition in this region since the 60s, when fruit production was increased as a result of state actions at either national or regional level (Development Plans). This enabled the development of technical knowledge in the region, both in terms of fruit growers, as well as growers support organizations and providers related to fruit production systems. Simultaneously, there are marketing channels, which are very important factors to be taken into account, to estimate and to encourage. Strengthening favorable conditions of soil, climate and human skills, the Beira Interior region is the main peach production region in Portugal, with 1640 ha (INE, 2015), and it has high quality fruits.

Regional development should always contribute to increase population welfare, and this welfare is directly related to the increase of per capita income. Therefore, regional development plans should draw up strategies to increase capital gains and income fixation within the region. Peach production in the Beira Interior region has a high growth potential but joint work synergy of all regional stakeholders is needed. Thus, the project + peach - Innovation and development in peach production in the Beira Interior region meets the needs of the region. This project develops the Triple Helix model, involving the Academy, Production and Government.

The Academy Sphere includes the Escola Superior Agrária of Castelo Branco (ESACB - The School of Agriculture of the Polytechnic Institute of Castelo Branco), the Universidade of Beira Interior (the University of Beira Interior) and the Instituto Superior de Agronomia (ISA - The School of Agriculture of the Technical University of Lisbon). The

Production Sphere includes both peach growers and their organizations, namely the Associação Quinta de Lameçais, Associação de Agricultores de Produção integrada de Montanha (AAPIM - Mountain Integrated Production Farmers Association) and Associação de Proteção e Produção Integrada do Zêzere (APPIZÊZERE - Association for Protection and Integrated Production of Zêzere). The Government Sphere includes the Gabinete de Planeamento de Projetos (GPP - Planning and Projects Office) (Figure 1). This project involves also three research and technical support institutes, that were included in the Academy Sphere, namely Instituto Nacional de Investigação Agrária e Veterinária (INIAV - National Agronomic and Veterinary Research Institute), Centro de Apoio Tecnológico Agro-alimentar (CATAA - Technology and Agrifood Support Center), and Centro Operativo e Tecnológico Hortofrutícola Nacional (COTHN - National Center for Horticultural Production). The last center that congregates all the sector. Fifty people participate in this project.

The project + peach - Innovation and development in peach production in the Beira Interior region, aims to contribute to the overall recovery of the sector through several activities at the production techniques level, and also through peach enhancement. The project includes both the development and evaluation of new production techniques. It also aims to contribute to the profitability of peach production, and environmental preservation.

Activities are distributed all over the production process and they include tests of innovative technology for soil maintenance, flowers thinning, fruits thinning, deficit irrigation, rational fertilization, and the characterization of fruit quality throughout the production period, as well as an economic characterization of this sector (Table 1).

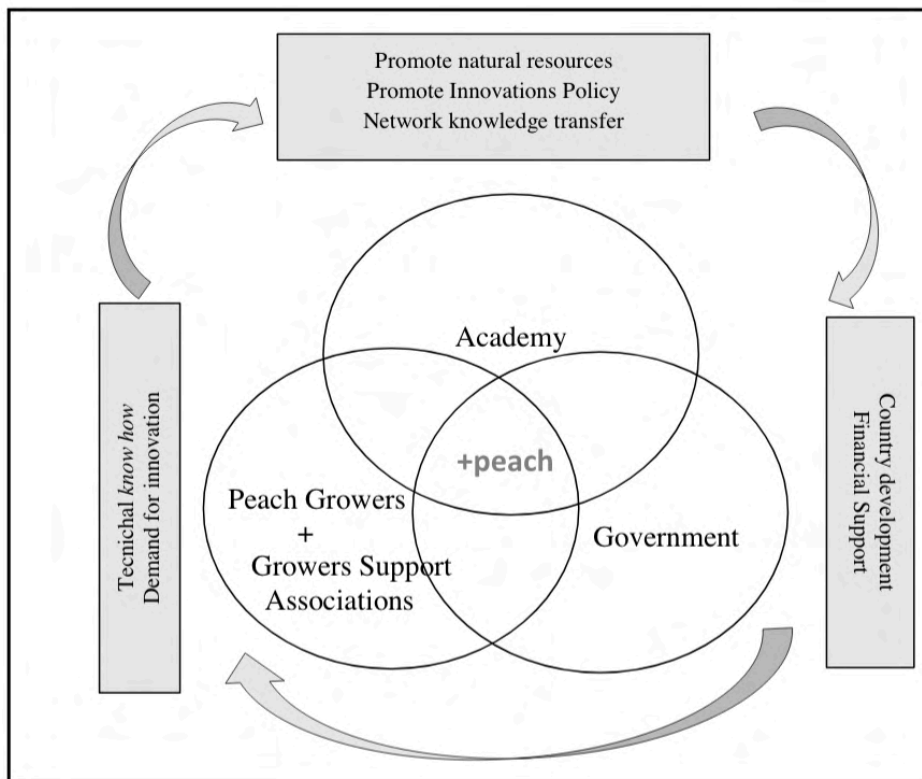


Figure 1 - The +peach project according to Triple Helix diagram.

Activities	Goals	Partners
Soil maintenance	To assess the effect of the use of ground cover blanket Ecoblanket in fruit production in the first two years after orchard installation	AAPIM, APPIZÉZERE, ESACB, COTHN, ISA
Flower thinning	To assess the impact of Saflower equipment at flower thinning	AAPIM, APPIZÉZERE, ESACB, COTHN,
Fruit thinning	To design and build a prototype for a portable device that will allow the mechanization of fruit thinning operation	AAPIM, APPIZÉZERE, ESACB, COTHN, UBI
Deficit irrigation	To optimize irrigation water management	AAPIM, APPIZÉZERE, ESACB, COTHN,
Fertilization	To contribute to the determination of reference values to be used in assessing plant nutritional status	AAPIM, APPIZÉZERE, ESACB, COTHN, INIAV
Characterization of fruit quality throughout the production period	To assess fruit quality parameters to support an outreach plan as well as to contribute to fruit quality maintenance	AAPIM, APPIZÉZERE, ESACB, COTHN, CATAA
Economic characterization of the sector	To assess crop yield and contribute to provide information needed for planning projects	AAPIM, APPIZÉZERE, ESACB, COTHN.

Table 1 - Objectives and partners involved in the different activities of the project + peach.

Academy	Fruit Production	Government
ESACB	Sociedade Agrícola Quinta de Lamaçais (growers organization)	
UBI	AAPIM	
ISA	APPIZÊZERE 8 Peach Growers	GPP
CAATA		
INIAV	COTHN	

Table 2 – Players involved in +peach project.

Table 2 shows the different stakeholders in the Triple Helix related to the project divided into Academy sphere, Fruit Production sphere and Government sphere.

This study analyzed the advantages related to the Triple Helix model applied to an agriculture project. It also aimed to contribute to identify constraints that may reduce the potential of a triadic relationship among the different spheres.

SPHERES

a) Academy

The traditional role of the Academy is lecturing and research. Yet, in recent years the Academy has assumed a third role – involvement in the socio-economic development of the regions where they are located (Etzkowitz and Ranga, 2015). Based on an integrated vision of regional potentialities, ESACB assumes this third role in the present project. UBI was invited to participate due to its potential to develop technology which may be used to solve regional problems. ISA provides laboratory technology and technical and research knowledge. Research organizations such as INIAV and CATAA are included in the Academy Sphere and provide laboratory facilities and laboratory techniques.

b) Fruit Production

The aim of the Production sphere is to create income through the production process. This income results from i) farmers' work which depends on soil, climate and social conditions. This work can be assessed by farmers' production capacity, and ii) economic factors, especially production cost factors and market price of the final product.

In a simplistic way, the rise of capital gains for growers can be obtained by increasing gains at the production process, which results from either increasing yields or decreasing production costs or both. Moreover, capital gains can be achieved through direct increase of the final market price. Unfortunately, growers do not influence the final market price because it is increasingly imposed by large distribution chains. Therefore, production demands successful innovation in the production process, enabling growers to increase their income. Growers are always looking for innovation. However, those who create innovation cannot always the same institutions or companies. In other words, standardization hinders innovation. That is why dynamic organizations are required to meet these needs. The Triple Helix model can lead a collaborative action among those who, on the one hand, have the role of creating and/

or disseminating innovation and, on the other hand, those who need it.

The fact that +peach project growers provided their orchards for new cultivation techniques experiments, highlights their need and demand for innovation. This contributes actively to accelerate the process of knowledge transfer.

c) Government

Any government will attempt to boost regional development in its country. In order to achieve this goal it will establish the legal control of its country economics. Traditionally, the role of any government is to establish the legal control (Leydesdorff and Meyer, 2006), which aims to ensure an efficient resource use (Etzkowitz and Ranga, 2000).

Standards/rules should be established bearing in mind the goals of the methodology that will be adopted. In the present case study, PRODER funding, measure 4.1 innovation, has as a requirement that the project should be led by either farmers companies or farmers organizations. This will lead to a greater interaction and a planning according to the Triple Helix model. In other words, the fact that this rules has to be complied has had the consequence that Triple Helix methodology had to be adopted.

SPACES

a) Spaces and relationships

There are overlap zones in any interconnected spheres model. Group dynamics as well as innovation dynamics takes place in these overlapping areas. They will contribute to contribute to generate, manage and monetize knowledge networks. These overlaps zones are the main entrance for innovation attitude within organizations (spheres). Those who understand the connections of these space zones will be able to take full advantage of the individual actor

performance as well as gain insights into and work for a global result rather than be focused on a self-centered and immediate result.

The players in these spaces zones will generate bottom-up strategies showing a greater capacity of resources profitability. This will result in a more cooperative attitude, where stakeholders may take each other roles whenever needed. These two aspects, individual substitution and group collaboration are highlighted as focal points of space zone relationship in the Triple Helix model.

If the dynamics of Triple Helix model are clearly understood, cooperation and replacement aspects can be enhanced especially in the case of a small project in a small region.

In the +peach project, we can emphasize that growers encouraged and carried out experiments at their own risk which traditionally were assigned to the Academy sphere. Simultaneously, the Academy takes the role assigned by the productive sector as they adopt an active attitude identifying innovation needs in a collaborative relationship with the productive sphere, transferring these innovation needs to their research goals.

b) Knowledge network

A very positive result of the +peach project is the recognition of local technical skills for peach production including growers, farmers association and the Academy, at a regional level as well as at national level. This recognition results in a leverage of innovation attitude and it may attract more investment. At the same time, stakeholders become aware of their role, build and share knowledge networking, which definitely contributes to the enhancement of existing human resources. This attitude towards innovation contributes to the development and increase of qualified human resources

(improving brain gain) over the depletion of these resources (brain drain).

CONSTRAINTS

A consensus space is identified in the Triple Helix system, which may be a physical or virtual space, such as a space of discussion and planning where information flow will be either bottom-up or top-down leading to leadership emergence in a collaborative process, rather than an authoritative one (Etzkowitz and Ranga, 2015). We have identified some constraints associated with the generation and use of this consensus space. One of these constraints is devaluation of the time allotted to reflection and creativity. This attitude cannot be seen in the short term. On the other hand, standards and rules are always changing which results in an enormous amount of paperwork and, therefore, a waste of time and resources. If standards and rules are always changing, it is necessary quite a lot of time to adapt to these changing standards and rules, which would be used to plan, to interact, to discuss and to analyze the results obtained. In order to overcome these constraints, not only innovation policies are needed, but also policies of innovation at a political level. The latter should promote and value the time allotted to this consensus space which will foster partnerships, develop human resources skills and an innovative attitude. This will lead to a collaborative and replacement attitude.

CONCLUSION

The methodology used in the project + peach - Innovation and development in peach production in the Beira Interior region uses the Triple Helix model involving the Academy, the Production sector and the Government, triggering the promotion of partnerships. This results in active networking and innovation in the fruit production sector as well as a

broader participation of the different players in building development strategies. These strategies have included the development of nine new project applications for peach and cherry production which are included in the umbrella term *Prunus*.

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