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Shifting to green economy: hype or hope for entrepreneurs into medicinal and aromatic plants?

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Abstract

This research aimed at finding out if rural development concerning medicinal and aromatic plants (MAP), in Portugal, was sufficiently consolidated to be considered an alternative lifestyle. Secondary data collected from a panel of 12 high-level experts enabled to picture the sector. Operations were the core knowledge area that helped to find out the implementation of the existing social platform into a technological solution to support a virtual collaborative effort among the stakeholders, as the main requirement to consolidate the sector. The required role of State was also defined as holistic, integrative, supportive, despite not-regulative, to implement a broad MAP policy.

Keywords: Virtual supply chain; sustainability in green economy; medicinal and aromatic plants (MAP).

Introduction

A new generation of highly educated young people is returning to the rural world attracted by government grants to help to establish themselves as organic farmers producing medicinal and aromatic plants (MAP), in Portugal. The purpose of this study is to find out if this trend should be seriously considered as an alternative rural lifestyle within the current state of the sector both in Portugal and in the world. Therefore, the following research question arises: Shifting to green economy: hype or hope for entrepreneurs into medicinal and aromatic plants?

The paper is structured into four sections: introduction, literature review, case study and conclusions. In the literature review the concepts of MAP and organic farming are introduced and the market conditions in Portugal and worldwide are briefly investigated. The case study about the state of the MAP in Portugal is based on secondary data from five panels of a representative forum for the sector. The requirements for a virtual supply chain model, a technological platform, a clear distinction between the roles of a farmer and an entrepreneur and also, for adequate funding schemas are found out as mandatory to develop the sector, as well as the responsibility of the State in defining the adequate MAP policies to consolidate the sector and so, assuring hope for the stakeholders. Finally, it is argued for a relevant

contribution of the Operations knowledge area to the definition of a National Policy for MAP.

Literature review

Definition and use of medicinal and aromatic plants (MAP)

Many plant species are primarily used for their medicinal or aromatic properties in pharmacy or perfumery products, and because of that, they are defined as medicinal and aromatic plants (MAP) in the EU (Verpoorte et al., 1999; Gomez-Galera et al., 2007).

For thousands of years, the natural plant products have been utilized for human healthcare in the form of drugs, antioxidants, flavors, fragrances, dyes, insecticides and pheromones. However, the use of synthetic drugs has led to a reduction in the consumption of plant-derived compounds, throughout the last century. Nevertheless, in recent years the consumption of MAP has increased, firstly because the synthetic drugs have side effects that are not found in plant-derived medicines, and secondly because there is a growing demand of the markets for high quality natural products, such those offered by MAP (ECPGR, 2010).

Definition and importance of organic farming

The industrial revolution was a turning point for agriculture, as factory-made implements designed to saving labour were widely diffused and artificial fertilizers were introduced (Grigg, 1984). Gradual increases in crop yield were due to the step-by-step replacement of human and animal labour with tractors and a wide range of machines, and also, to the chemical control of pests and diseases. However, the increasing use of synthetic chemicals in agriculture has had disadvantages, such as eutrophication and hypoxia (McIsaac et al., 2001), teratogenic effects on animals, health problems in humans and reduced populations of beneficial insects (Soule et al., 1990). Moreover, conventional agriculture also lacks sustainability because it heavily depends on petroleum for powering farm machinery, and for transporting products to markets that can be very far away from the farm (Pimentel and Pimentel, 1996).

Organic farming has arisen as an alternative to agriculture depending on chemicals. It is a method that has delivered improved productivity combined with consideration for quality of soil, environmental welfare, and human health. The key principles were self-sufficiency and economic viability, despite maintaining soil fertility through crop rotation and careful management and use of animal manures (Stockdale et al., 2001).

The area of organic land, the number of organic farmers and the organic market continued to grow. In Europe, 11.2 million hectares, constituting 2.3 percent of the agricultural area, were under organic management in 2012, an increase of 6% if compared with 2011. There were more than 320 000 producers. The value of the European organic market in 2012 was 22.8 billion euros and the overall growth rate was approximately six percent (FiBL-AMI-IFOAM, 2013). The European Department/Council of Agriculture estimates that the value of retail sales of MAP produced in organic farming in 2013 was approximately \$6 billion (GPP, 2013). The number of organic farmers in EU has been increasing by about 12% per year (Carrera and González, 2011), most of them, small-scale producers.

While the per-hectare gross income from organic farming is less than that from conventional farming, the total benefit is higher. In fact, a 21-year study of biodynamic, bioorganic, and conventional farming systems in Central Europe found out that in the organic systems, crop yields were 20% lower, but fertilizer input was lower by 53% and pesticide input by 97% (Mäder et al., 2002). In this paper, MAP is considered as organic

farming, focusing on the utilization of resources from the farm itself, excluding the use of synthetic fertilizers, pesticides, herbicides and growth regulators (Morujo, 2012).

Figure 1 produces a comparative analysis of the biggest organic markets.

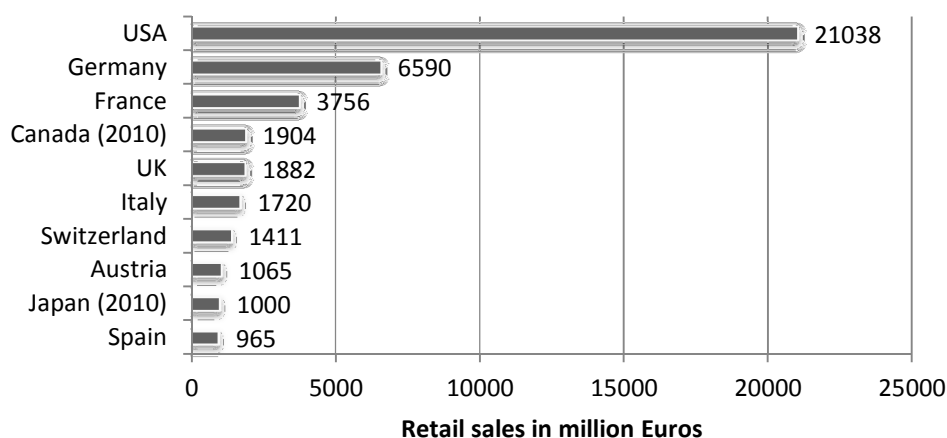


Figure 1 – The largest organic markets (Source: FiBL – AMI-IFOAM, 2013)

MAP importance in the world and in Portugal

Statistical information about MAP trading is neither abundant nor updated. According to some studies, the worldwide market for MAP worth about 60 000 million euros, and has a steady growth, which can vary between 3% and 12% per year (Gruenwald, 2010), depending on the market segment (Figure 2).

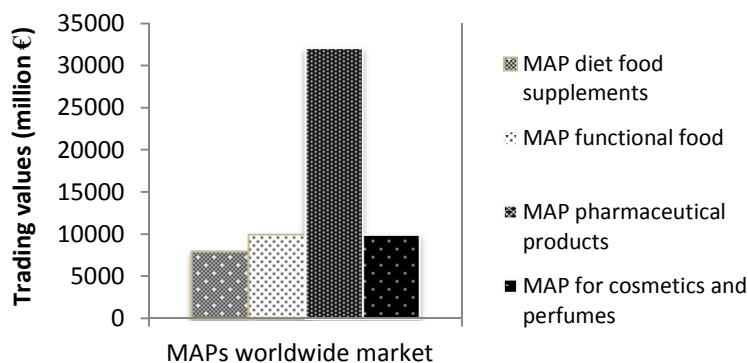


Figure 2 – Figures for various segments of MAP (Source: Gruenwald, 2010)

The exceptional conditions of Portugal, as regards soil and climate, could be a success story in the production of MAP since many of the big markets are dependent on imports. Thus, in economic terms, its production can provide good growth rates.

Portuguese flora comprises numerous MAP species, which show an exceptional potential for the development of sustainable explorations. Production in Portugal presents other advantages, such as: low labour costs and so, low harvest and processing costs; favourable edaphic and climatic conditions; and herbicide and chemical free production. However, despite all this potential, the development of the MAP sector is changing mainly due to the demand increase and to the interest of young farmers with high level of education. In fact, the “Programa de Desenvolvimento Rural do Continente 2007-2014”, ProDer, funded 240,61 hectares of projects from 257 young farmers (2008-2013, 1st Quarter) (ProDer, 2014). Moreover, recent data shows that the

MAP sector has risen significantly in Portugal. In fact, the explorations doubled over the past four years (GPP, 2013) and cultivated areas soared from 80 to 1324 ha.

Main exporters and importers of MAP

Figure 3 depicts the MAP main exporter and importer countries according to the United Nations Commodity Trade Statistics Database for the years 2009-2012 (UN Comtrade, 2013).

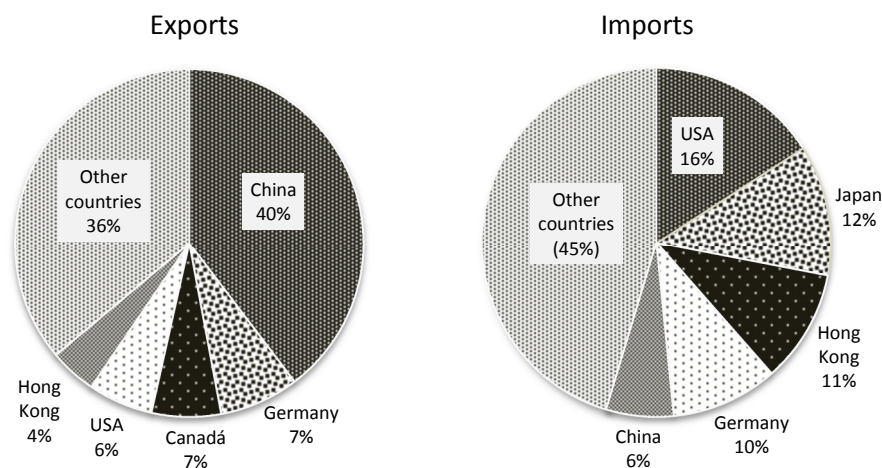


Figure 3 – MAP exports and imports for the years 2009/2012 (Source: UN Comtrade, 2013)

Case Study

Methodology

This research is based on secondary data, generated by the participants in the four panels of the “National Forum –PAM Producers”, venue: Oeiras, Portugal, 12th April 2013, which made a characterization of the MAP sector. The event was supported by the portuguese Ministry of Environment, Spatial Planning and Energy. The panels concerned the following topics: 1) Results of the EPAM project; 2) MAP production; 3) Markets; 4) Producers organization. The twelve participants were the Secretary of State, representatives of rural development associations and from the producers.

Characterization of the MAP sector

Next sections present the synthesis of this meeting concerning MAP sector in Portugal.

Market and competitive environment

The competitive environment was described as very unstable and as requiring a close relationship and monitoring. On the other hand, the market was defined by requiring a big sales effort, in a tough competitive environment, needing investor knowledge, which could be a problem for the new entrants. Visits to International Exhibitions, e.g. Biofach, were strongly advised. This could also help to track new market trends for gourmet products and, for plants on demand, e.g. stevia, as a non-caloric sweetener.

Pharmaceutical industry and health sector, perfumes and cosmetics, food, aromatherapy, phytotherapy, detergents and other chemical products were confirmed as the main applications and so, markets, of MAP. Europe, i.e. France and Germany were

pointed out as a major destination, for bulk products sold in big bags. However, Japan and USA are addressed markets for essential oils and gourmet cans.

Prices were described as very volatile, while quantities kept varying, despite the same, as always, high requirements for quality. This places a threat to the traditional key success factors that assume high prices for high quality. In addition, the lack of tradition on recognizable brands appears to worsen things, as concerns essential oils and gourmet products. Other threats were shared, e.g. the requirement for tighter standards for health use, more demanding skills and specific equipments, in the short term.

New product development and R&D

The Secretary of State suggested to formalize R&D by a protocol led by the *Instituto Nacional de Investigação Agrária e Veterinária* (INIAV), the state laboratory responsible for research in agriculture and veterinary. ADCMoura and Animar should act as mediators among the farmers and INIAV. Both associations are non-profitable and target the sustainable development of rural regions.

Few initiatives of joint projects with universities were mentioned. The development of a new infusion and of new consumer habits involving the *Universidade do Porto* and other ProDer project concerning new own brands and product certification were quoted. Thus, no significant number of innovative projects is going on, despite the delegates recognition of the importance of R&D for new products and processes. Moreover, there were complaints about lack of institutional support. The Secretary of State still stressed the growing number of young and highly educated farmers entering the sector, as an opportunity to create more dynamic and innovative projects.

Nevertheless, it was mentioned that there is evidence of investment by foreign investors implementing greenhouses advanced technologies to foster productivity and to take advantage of the edafoclimatic conditions of Portugal. Finally, it was argued for the need to develop entrepreneurship both in the MAP sector and in its agents. ADCMoura provides an example of an initiative in this domain, to excluded people¹.

Collecting and treating data about the sector

“Entrepreneurship in MAP” (EPAM) was mentioned as a successful initiative within the *Méditerranée Innovation Senteurs Saveurs* (MEDISS) project. It aims at divulging MAP, by building up a data repository about georeferenced producers and by implementing several activities to animate the sector, e.g. conferences, panels, etc. Moreover, it was also argued that the EPAM site, which is visited by 4000 people per month, could act as a broker by distributing MAP products in medium/ long term.

Finally, the Ministry of Agriculture and Sea divulged the intention to release a study, in October 2013, to fully characterize the MAP investment in Portugal, by surveying the producers. The audience welcomed the initiative, despite it should be stressed the different nature of this information, when compared with the outcome of these panels, which included an important dimension of shared living experience. Thus, a detailed and reliable compilation of producer characterization, such as local, amount invested, average production, plants, public funding, producer age was expected (GPP, 2013).

Production

The concern with a fragmented production with many and small producers of which income provides just a weak economic sustainability was also mentioned. Some

¹ http://www.adcmoura.pt/Docs/EmpreenderAMedida_ADCMoura.pdf

delegates did even argue for a need to link sales and agriculture. On the other hand, one of the most important worries regarded production costs. It was argued that costs are high because of: (i) manual operations; (ii) transportation cost for bulk products; (iii) underutilization of buildings and equipment; (iv) control difficulty; (v) no consistency in outputs; (vi) crop yield variation, specially in essential oils; (vii) imprecise capacity definition; (viii) small production volumes; (ix) not fully addressed need to adapt plant, machinery and techniques to the type of soil.

The supply chain (?) appeal

The “*fileira*” (supply chain?) emerged as a strong requirement to be developed and operationalised. There were many views on this issue, as follows: (i) it should be developed from the farmers (upstream focus); (ii) it should link consumers to producers (downstream focus); thus, waste should decrease and better stock control should arise; (iii) it should promote the intensification of partnerships and collaborative processes, as well as, people’s relationships, education and training, getting funding, R&D effort, i.e. full networking fostering; (iv) it should develop the institutional perspective of sector organization in national/regional associations, no matter the juridical personality.

On the other hand, the great diversity among partners due to many small farmer structures was also recognized, as well as the need for an open environment favouring knowledge sharing between producers and, voluntary work. Some stakeholders believed that there was no critical mass, despite hoping this would improve in short term. Finally, there was a call for putting together an operational group for “Horizon 2020”.

A discussion of this very specific “selfie” of the MAP business is going to follow.

Results discussion

It is believed that Operations might have a unique contribution to this situation. By Operations it is understood a holistic approach to the business greatest purpose, without discriminating the main typical business functions, i.e. R&D, marketing, production and finance. Therefore, four missing links of the Business Policy are addressed, as follows:

First missing link

One missing link is the “*fileira*” concept that all delegates were able to identify, despite the different views on it. “*Fileira*” is indeed a curiosity because it feels like something that one expects to materialize in a tangible and stable relationship, solving most of the misunderstandings of the MAP business and appearing to be subject to administrative regulation by the State.

The proposed conceptual Operations Model works, exactly, the other way around. In the MAP business, it is becoming hard and expensive for one company handling all market issues to adapt in the competitive context. Therefore, it would be advisable to pay more attention to the areas of inter-organizational co-operation, and to invest in more flexible logistics processes and supply chain (SC) networks, supported by information technologies (IT). The development of IT pushed all the organizations involved to collaborate and integrate temporary to achieve momentary goals, based on shared core competencies, despite geographic locations. It is being proposed a Virtual Supply Chain model which is a virtual enterprise with a series of value chains in which a variety of participants can contribute, either to strategic or operational activities. Moreover, Virtual Enterprises (VE) are defined as a number of geographically dispersed independent vendors, customers, even competitors, and other partners, composing dynamic networks of companies engaged in many different relationships through

Internet, ICT, and mobile technologies. The purpose is to share technology, skills, risk and cost to create temporary co-operations supported by inter-organizational networking, virtual organization and flexible collaborative partnerships to realize the value of a short business opportunity that the partners cannot capture on their own. A VE might share complementary resources or even own inventory, plants, factories or warehouses itself (Davidow and Malone, 1992; Katzy and Schuh, 1997; Choy and Lee, 2001; Müller, 1996; Wang and Chan, 2010; Chituc et al., 2009; Scott and Mula, 2009).

This conceptual model addresses most of the specificities and requirements of the MAP business, through interactive collaboration, as follows: 1) it provides flexibility to adapt to unstable environments, enabling Collaborative Planning, Forecasting and Replenishment (CPFR); 2) it brings together all the agents of the supply chain from the brokers or even final customers to the producers and entrepreneurs, including rural development associations, funding partners, logistics service providers, certifiers, entrepreneurs, governmental agencies, universities and other R&D institutions; 3) it enables sharing core competencies within this partnership, despite being geographically dispersed; 4) it enables sharing physical resources, through common management at distance, reducing investment; 5) it enables shared services, e.g. training, maintenance, consultancy, etc.

Second missing link

The second missing link concerns the need to establish the enlarged social platform of all the active agents (individual or organizations, private or public, business or non-profit, producers or customers) involved in the MAP business. This should be based on the civil society and built up on the top of the already established associations for rural development. There is no need to create more institutions. Moreover, divulgation, motivation and pure interest keep together all these agents being the latter, the basic definition of a stakeholder. Without multilateral interest there is no MAP cluster, despite there might be individual initiatives. Thus, this loose network of the MAP stakeholders, is glued together, only, by non-mandatory interest, by understanding the need and the value of trust and collaboration, in order to build up a voluntary partnership. This is our “*fileira*” at the end of the day.

Moreover, the SC agent – producer – needs to be better defined. Several types of producers are possible, coping within the virtual network, as follows: 1) small independent farmer; they do need to share resources and support to reach the market, producing on a small scale; 2) big independent farmer; they do have their own resources, producing on a larger scale; they do have dimension to go to the market on their own and to have their own R&D; 3) small dependent farmer; they just provide labour, usually they come from Employment Agencies and lack all other resources, which might include land; 4) big dependent farmer; investors provide funding and they might also provide technology, in a franchising like model; they do not share resources.

The entrepreneur role must also be addressed. In general, “Entrepreneurship is the process of identifying and starting a business venture, sourcing and organizing the required resources and taking both the risks and rewards associated with the venture.” Therefore, as regards the resources, the entrepreneurs may own them or not, as long as they get access to them, which might also happen by a collaborative partnership. The important point is that entrepreneurs must create something innovative at a calculated risk that adds value for the society. It might be concluded that it is not enough to be in the MAP business to automatically become an entrepreneur. This is a serious misconception that has been promoted, since farmers, businessman and entrepreneurs are different agents in their essence, despite their roles can mix once a while.

Third missing link

The third missing link is about the implementation of the social platform. A virtual platform needs to be created to put it to work. One might not forget that there is no virtual platform without the social one. This social momentum towards the MAP is the most important issue and it is very time consuming and risky to create. Their mentors, promoters, pioneers and leaders must be congratulated by their truly entrepreneurial initiative, by their perseverance to overcome so many obstacles during so many years. In summary, the social platform owns the virtual one, which is merely a tool to operationalize the “*fileira*”. Therefore, one should not think about establishing any type of regulation of the platform, neither private, nor public. Self-regulation, social interaction and free access are key ideas on this matter. Therefore, the platform should be open to every organization or individual willing to participate in the MAP “*fileira*”, despite some rules should be set for membership. The founders should also have some extra privileges. Finally, it is important to focus on specifying the functionalities of the technological platform based on the stakeholders requirements, despite design should be modular, favouring a phased implementation. State of the art software, hardware and gadgets should be used to enable advanced features.

Fourth missing link

The funding policies must be adequate to the type of requirement for money. As an example, four main types of requirement for money are addressed, as follows: investment in the technological infrastructure, new investment in MAP production or processing, new product development and business working capital.

In fact, venture capital might not be adequate for funding the technological platform that we believe to be risky and innovative, but not a business venture. Nevertheless, one should trust that after that infrastructural investment being done, then, for sure, entrepreneurs will start appearing with real ventures. However, it looks pretty fair to accept the technological platform as a relevant contribution to European integration and social cohesion and also to improve competitiveness in Europe. Therefore, it looks reasonable to expect the direct or indirect interest of the Horizon 2020, of the European Investment Bank (EIB) or of the future Portuguese Development Bank in the IT project.

As regards new regular investment in MAP farming or processing, the ProDer or similar schema might be adequate to put together public funds (from EU and Portugal) with private capital. Usually, public funding attracts private investment which might come from several sources, e.g. own capital, investors, commercial banking, consortiums. Horizon 2020 through Portuguese Agencies, e.g. Adi, may play the same role of attracting private capital for innovative initiatives, such as product development.

Finally, the future Portuguese Development Bank may play a core role in making money available for advancing payments and anticipating revenues at a fraction of the price of the commercial banking, in order to help SMEs with working capital needs. It should also be more sensitive to the regular investments in current businesses.

Conclusions

This paper reports a research concerning the potential opportunity offered to entrepreneurs in the domain of the medicinal and aromatic plants (MAP). The literature review argued for MAP being much more valued by the market as organic plants. Organic MAP is a growing market with high rates of growth between 3 and 12% per year. Therefore, an opportunity in the international market was documented, which also pushed ahead expectations in Portugal that has got excellent edafoclimatic conditions

for MAP. Moreover, a new generation of highly educated young farmers is returning to the rural world attracted by these opportunities, being supported by attractive government grants between 50 and 100.000€ to help to establish themselves. To sum up, the question to be investigated was, if this is a fad or, if it can provide a distinct interesting opportunity to pursue a different lifestyle closer to the green economy.

Data were collect from a few panels supported by the Secretary of State for Food and Agro-Food Research. Twelve people participated from Government (2), Rural Development Associations (5) and producers (5). Panel conclusions were treated, as follows: market; product development and R&D; organization of the sector data; production and supply chain. Four critical “missing links” were identified from the discussion of these data. First of all, “*fileira*” was conceptually modelled as a strong requirement for the development of a virtual supply chain, supported by a technological platform. Secondly, it was recognized the need for a broad social platform including all the MAP stakeholders before the technological development, which was classified as a true entrepreneurial event and, pioneers were praised for the initiative. Moreover, an important distinction between several categories of farmers was carried out, as well as a distinction between a farmer and an entrepreneur. At last, an exploratory approach both to the available funding schemas and to their adequateness to the needs was pursued.

As a result, two groups of factors some favouring, some against the success of developing a MAP cluster are now organized. In favour of MAP are, as follows: market opportunity and high rates of growth; established social platform of stakeholders; State grants, e.g. ProDer or similar programs; social interest, namely of young graduates; focus on the development of the rural areas; excellent edafoclimatic conditions; existence of knowledge and technology in Portugal; existence of technological infrastructures; existence of physical infrastructures in rural areas, e.g. roads, IT network, hospitals, universities, entertainment. Against MAP there are the following factors: difficult to reach the international market; no technological platform to support the social one; State grants might create the wrong incentive; urban appeal; need to adapt plants and production to natural conditions by specialized studies; need to bring together the countless specialists in the several knowledge areas by focusing on PAM; need of a clear research initiative in PAM, to focus research agents; need to promote a green lifestyle close to rural development; need to set funding schemas for SMEs based on a National Development Bank. It is believed that, in future research, these factors could be clearly addressed, if grouped under a Triple Bottom Line approach.

Moreover, the State role should generate a favourable environment to the economic agents, as follows: developing a MAP National Policy; mediating adequate funding schemas; promoting MAP research and sustainable lifestyles; providing evidence of MAP support for international agents; creating grants to expand the EPAM project into a technological platform. On the other hand, the State should not try to control or regulate anything or give the wrong signals. For instance, not having a holistic view of MAP, promoting isolated grants to individuals or associations or, promoting a wrong image of entrepreneurship look as very serious mistakes. It should be stressed that many ideas are already alright, but they need to be integrated into a sector policy.

To sum up, it is believed that adequate decision making together with right action might result into taking advantage of the opportunities in the MAP “*fileira*”, in order to pursue a shift to green economy, generating true hope and overcoming any transient unsustainable hypes. Finally, it is argued for a relevant contribution of the Operations knowledge area to the definition of a National Policy for MAP.

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