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NEW BUSINESS MODELS IN AGROECOLOGY. STUDY CASE - INNOVATION HUB BIO DANUBIUS AS PRIVATE (VOLUNTARY) STANDARDS BASED ON INDICATORS

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Abstract

Agroecology is a new area of knowledge and emerging body of experience linking in a transdisciplinary manner, experiments, research, and action-oriented innovations targeting enhanced food systems' resilience, environmental and socio-economic sustainability at the farm, organizational and institutional levels. Authors view is that applying ecological principles and social values to agricultural production and consumption has to have a market recognition. This paper investigates in which conditions agroecology can also offer new business models that are more inclusive, diverse, and profitable for farmers and other food system actors especially those small farmers actioning in a regional context and willing to cooperate to co-create new business models. These business models involve the adoption of innovations such as integrated management, organic fertilizers, participatory guarantee systems,

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and collective marketing in a regional value chain perspective. The paper investigates as well some pathways to agroecology developed in IH Bio Danubius, a regional cluster already engaged in organic agricultural practices and willing to further embrace new agroecological principles. One important pathway, in wich our research is conducted are conditions under which private (voluntary) standards based on indicators can meet market requirement through a viable business model.

Key words: *agroecology, organic agriculture, business model*

JEL Classification: Q13, Q16, M21

Introduction

Agroecology, is a dynamic and transdisciplinary concept encompassing a scientific areas such as sustainable agricultural practices, environment management, consumer behaviour or social aspect. There are many principles, up to thirteen as per figure below:

Figure nr. 1. **Thirteen principles of Agroecology**
Source: HLPE 2019

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Our research beeing concentrated on the regional cluster perspective, we investigate the prospect of a cluster value chain mangement in this area in order to achieve a market recognition through private voluntary standards. The agroecological value chain, in our market-oriented analyses, should be ecologically, socially and economically sustainable, incorporating agroecological principles, if at farm, business and institutional levels the cohesive forces of transformation are able to [Gliessman, 2016]:

- ✓ include and promote the participation of all relevant stakeholders in the co-creation of a common VC vision.
- ✓ strengthen stakeholder engagement and addressing power differences.
- ✓ supporte diversified, nutrition-sensitive and resilient production systems, including mixed livestock and agroforestry, which preserve and enhance biodiversity, as well as the natural resource base [HLPE, 2016].
- ✓ promote diversified and healthy diets as a pathway to support transitions towards more sustainable, diversified and resilient food systems.
- ✓ adopt agroecological innovations (both technological and institutional) that foster co-creation and co-learning through the integration of science and local knowledge.
- ✓ create strategic partnerships with food VC innovation platforms, incubators and aggregation mechanisms in which private and public sector actors invest in and reward sustainable food producers and the production of public goods [Jonasz & Varga, 2022].
- ✓ support the development of local and regional markets, processing hubs and transportation infrastructures to increase employment and business opportunities, and to promote circular economies.

Since our research focusses on a cluster business we assume that such an ecosystem may create and deliver value to its members and stakeholders, such as customers, suppliers, investors, and authorites. To be succesful a cluster business model should describe how a cluster generates revenue and covers its costs, as well as how it measures and improves its performance and impact. On the other hand, a value chain approach is a way of analyzing and optimizing all activities to deliver a product or service, from the initial design to the final customer taking into consideration all costs and revenues, associated with each activity. Therfore, a value chain approach should identify all activities that add value to the product or service from a customer prospective. A value chain analyses has also to look into

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the linkages and interactions among the activities and actors involved in the value creation process, such as suppliers, producers, distributors, and buyers.

Both cluster business model and value chain model are useful frameworks for understanding and improving the performance and competitiveness of a cluster but also a company within a cluster. However, the cluster model and the value chain model are not identic. A cluster business model is more focussed on the strategic and financial aspects of a cluster, while a value chain model is more focused on the operational and organizational aspects of a company or a cluster. A cluster business model can help a cluster to define and communicate its value proposition, while a value chain model can help a company or a cluster to deliver and enhance its value proposition [Gartenstein, 2019].

Theoretical background

Voluntary standards in agri-business are norms or rules that are developed by private actors like farmers, processors, suppliers or trader, such as agri-business associations, non-governmental organizations, or multi-stakeholder initiatives, and that are not enforced by the state. Voluntary standards in agriculture may cover wide range of areas like product schemes, management standards, food security or a combination of these or more other topics.

Voluntary standards are becoming increasingly important in the agri-business and food systems, as they can help address some of the sustainability challenges that the global food system faces, such as climate change, biodiversity loss, water scarcity, food insecurity, poverty, and malnutrition [UNCTAD, 2020].

As voluntary standards can all provide opportunities for small-scale producers to access new markets, improve their productivity and income, and enhance their body of experience has been developed by UN organizations like FAO and UNCTAD. However, voluntary standards also pose some challenges and risks for the agri-business and food systems, such as:

- ✓ Confusions triggered by over proliferation and fragmentation of voluntary standards, which may be market inconsistent;
- ✓ The potential exclusion or marginalization of small-scale producers, especially in developing countries, who may lack the capacity, resources, or information to comply with the requirements of voluntary standards;
- ✓ Trade distorsion or brand captivity;
- ✓ Uncertainty of economic outcomes in the implementation phase.

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Voluntary standards may need pre-evaluation, and governance to ensure that they contribute to the sustainable development of the agri-business and food systems, and that they benefit all the stakeholders involved.

Several models have been experimented and are linked to regional value chains for different food products and we have different options where research has been done. Identifying through value chain analyzes opportunities and challenges can be a very useful tool in the research carried out as follows [Charry, Narjes, Gonzalez, Chege & Tran, 2022]:

- ✓ The initiative is also conducting rapid agroecological value chain analyses (RAVCAs) to identify the opportunities and challenges of integrating agroecology into the existing and potential business models in the region.
- ✓ In other situation it has been revealed the potential of diversification of the value chain with new products like native potatoes or sorghum.
- ✓ The initiative is also looking at the potential of diversifying the quinoa value chain with other crops and products that are compatible with agroecology, such as amaranth, cañihua, and native potatoes.
- ✓ The initiative is also promoting the diversification of the sorghum value chain with other crops and livestock that can enhance the agroecosystem services and resilience. Last but not least, certifications schemes and linkages between stakeholders has been a good pathway towards a valid busines model.
- ✓ The initiative is also facilitating the linkages between date producers and consumers, as well as the access to finance and certification schemes.

New business models in agriculture

As anywhere, in agri-businees, business models address profitability as well as sales revenue, describing the ways that a company invests capital in order to generate income, by creating and selling inventory, or creating a business location that attracts paying customers. To clarify how new models can be created we analyzed the resource nexus, a concept that analyses the interconnections between different natural resources, such as food, land, water, energy, and materials, and how they affect each other and the environment in the context of European Green Deal and its set of policies and actions that aim to make Europe the first climate-neutral continent by 2050, while also ensuring a fair and prosperous society. In this context, taking into consideration the case of an organic cluster (Bio Danubius) we investigate potential synergies and trade-offs associated

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with increasing organic farming illustrated for the 'Food-Land-Ecosystem services' nexus (EEA analyses).

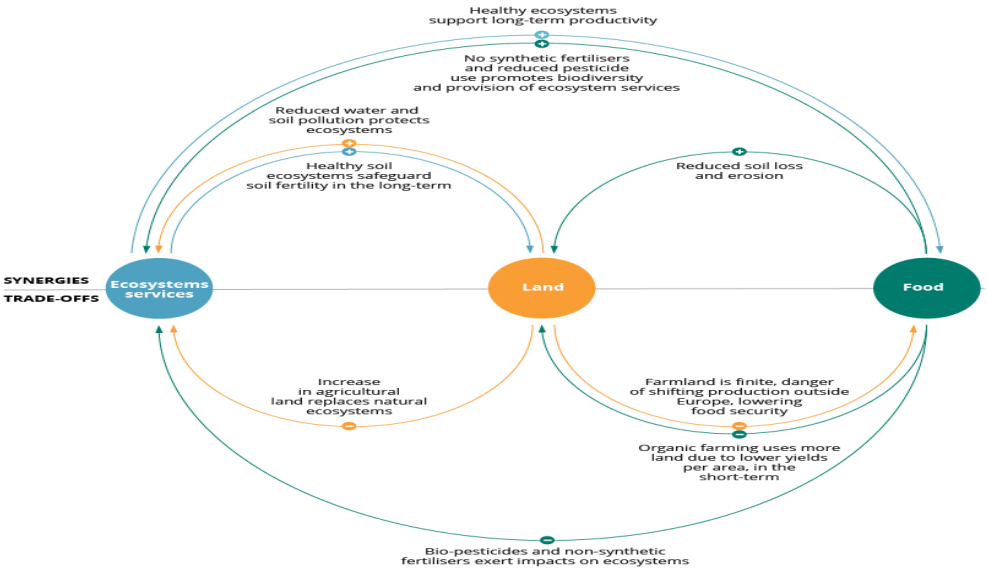

Figure nr. 2. **Sinergies and trade-offs associated with organic farming**
Source: EEA

As per figure above most of the positive trade-offs are associated to organic agriculture advocategin in favour of actions proposed by the European Green Deal is to increase the share of organic farming in the EU, which is currently around 8% of the agricultural land. Indeed organic farming is a type of agriculture that relies on natural processes and inputs, and avoids the use of synthetic chemicals, genetically modified organisms, and intensive animal production. Organic farming can have several benefits for the environment, such as reducing greenhouse gas emissions, enhancing soil quality, biodiversity, and water resources, and providing ecosystem services [FAO, 2023].

However, organic farming also faces some challenges and trade-offs, such as lower yields, higher costs, and potential conflicts with other land uses. For example, increasing organic farming could require more land to produce the same amount of food, which could compete with other needs such as forest conservation,

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urban development, or bioenergy production. Moreover, organic farming could have different impacts on different regions, depending on the local conditions, markets, and policies [FAO, 2020].

Therefore, it is important to assess the potential synergies and trade-offs associated with increasing organic farming, taking into account the complex interactions between food, land, and ecosystem services. This is what the European Environment Agency (EEA) did in one of its case studies, using a resource nexus approach. The EEA analysed four scenarios of increasing organic farming in the EU, ranging from 25% to 100% of the agricultural land, and compared them with a baseline scenario of 8%. The EEA used a set of indicators to measure the impacts of each scenario on food production, land use, greenhouse gas emissions, soil, nitrogen surplus, water use, biodiversity, and ecosystem services [EEA, 2022].

The results of the EEA analysis showed that increasing organic farming could have positive effects on some indicators, such as soil organic carbon, nitrogen surplus, water use, and biodiversity, but negative effects on others, such as food production, land use, and greenhouse gas emissions. The magnitude and direction of these effects varied depending on the level of organic farming and the assumptions made about the demand and supply of food, the trade of agricultural products, and the management of organic waste. The EEA also identified some knowledge gaps and uncertainties that need to be addressed to improve the robustness and relevance of the analysis.

The EEA case study illustrates the usefulness of the resource nexus approach for identifying the opportunities and challenges of increasing organic farming in the EU, and for informing policy decisions that support the European Green Deal. The resource nexus approach can also be applied to other topics and sectors, such as advanced biofuels, electric vehicles, circular economy, etc., to provide a holistic and systemic understanding of the sustainability issues and solutions.

Based on this assesments, we made the following scenario for food business models in agriculture.

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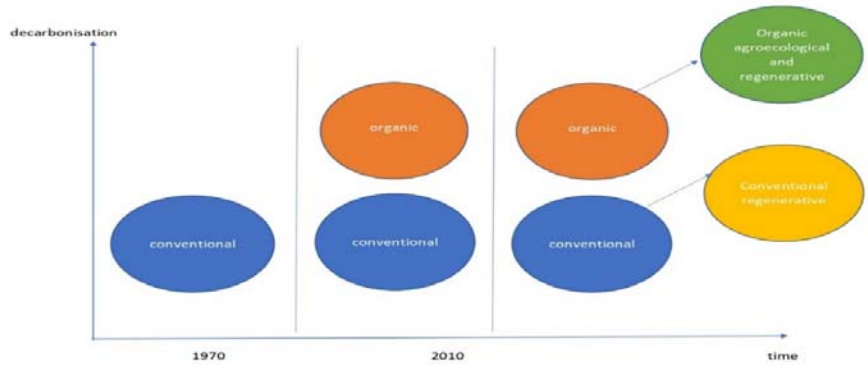

Figure nr. 3. **Scenario for food business models**
Source: authors intepretation

In this figure we consider that organic model in the next 20 year will co-exist with conventional one, but both will adopt new more practices based on agroecological principles.

Private standards of the Bio Danubius innovation hub based on indicators

Bio Danubius is a well-individualized cluster since its focus is organic product in wetlands along the Danube River. It was founded in February 2015, as a cluster of the Danube Delta region for those who believe in organic agriculture, bioeconomy and sustainability. It became a significant cluster of the Danube River wetlands region. By joining the cluster, member became aware and active to sustainable development on the principles of the agroecology. The Bio Danubius cluster aims to make the voice of organic producers heard through lobbying campaigns as well.

Since its formation, the leader of this cluster has been farmers cooperatives and associations backed as main facilitator by Spiru Haret University and its entrepreneurial center USH Pro Business, which had important results in the promotion of organic products. It also has a close relationship with local and central authorities. He is also among the members of Inter-Bio, the professional association of organic farmers nation-wide.

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The Bio Danubius cluster was created at the initiative of the local associations and business environments from Tulcea county, but it has been extended gradually to other wetlands along Danube in Ialomita, Constanta, Calarasi and Dolj, thus becoming an emblematic cluster for the wetlands (Danube Delta and other humid areas along Danube). These wetlands are a refuge for birds, fish, insects, reptiles, plants of diverse types and is located in a region with rich cultural diversity. The Danube wetlands are threatened by harm-generating activities related to activities in conventional agriculture, industry, households, etc. The main problems were identified both in the field of sustainable environmental development and social development. The Danube is the main waterway, river and sea and the most important source of water in the county. The abundance of fluvial, deltaic, and coastal lakes is as many natural water resources, with fish importance, as a means of communication and as bases for leisure or water supply of the population. The Danube Delta and the wetlands are among the largest in the world - as a habitat for waterflow, the largest area of compact reeds on Earth and a true museum of biodiversity.

The largest surface of arable land certified ecologically is in Tulcea County. The Danube Delta is ideal for organic farming, along with fish farming and tourism, representing non-polluting economic activities. Currently, in Tulcea County, about one hundred thousand tons of ecologically certified cereals and oil plants are produced annually, which are destined for export. The cluster was formed to address some regional threats like depopulation, poor infrastructure: lack of running water, sewerage, roads, irrigation systems, lack of young people willing / able to develop agriculture or aquaculture in a sustainable way, lack of job offers the possibility to start agricultural activities, too slow conversion of producers in organic agriculture and aquaculture, lack of support for smallholders, lack of financial support (training, etc.) to facilitate access to agriculture and development.

Bio Danubius cluster profile

The Bio Danubius cluster has emerged as unique platform for collaboration towards competitiveness in the Danube rivers region of Romania. The cluster aims to harmonize and represent the interests of enterprises, research, administration and catalyst entities economic and job creation, sustainable development, internationalization of members, professional development of managers and employees, administration of a common database, participation in national and European networks, increasing the innovation potential of enterprises in the sectors

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like: organic farming and processing, eco-tourism, transportation logistics, environmental protection and conservation renewable energies, R&D and digitalization.

From the beginning Bio Danubius developed innovative, processed products and services and their marketing internationalization, marketing, networking promotion. In this way, based on promotion, in became a quality brand for organic producers based on an advanced certification system in organic. The cluster supported participation and / or initiation of projects for SMEs, research, administration, cluster, with funding from public and / or European funds and collaboration with other clusters in the country and abroad in order to achieve strategic partnerships, cross-border and transnational collaboration (EU Strategy for the Danube Region and other international programs) as well as participation in national and European networks where not neglected.

Among main objective of the cluster development of its own private, voluntary standard it became very important going hand in hand with other objectives like stimulating innovation, research, and competitiveness of cluster members, promoting organic agriculture and food, development of eco-bio products, services and technological processes, protecting the environment and biodiversity.

Engagement towards agro-ecological standards - flagship project of the cluster

Using the center's infrastructure, the cluster conducted research among its members related to business models. At the same time cluster has started joint research in the value chain sector, for the ecological plants in the Danube Delta and their use for health. Other research areas considered in the cluster are:

- ✓ Future value chains in the bioeconomy
- ✓ Traceability of organic products and food safety
- ✓ Development of real value chains
- ✓ Creation of interprofessional organizations for organic products
- ✓ Development of cluster distribution chains
- ✓ Links between bio value chains and other industries (tourism, IT&C, logistics)

Bio Danubius is concerned with creating and promoting the standard of organic farming and protecting the Biosphere of the Danube Delta and the surrounding area by addressing the following issues related to environmental sustainability reported by the cluster:

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- ✓ *Eutrophication*: due to the excess of organic elements (mostly N + P compounds) in water and soil;
- ✓ *Emissions* to soil, water and air, many types of manure in addition to pesticides, chemicals etc.;
- ✓ *Contamination*: heavy metals, pesticides, other harmful substances, also waste of various types;
- ✓ *Erosion*: largely caused by human activities, such as upstream dams, widening and deepening of Delta canals for navigation, lack of land cover and inadequate crop rotation;
- ✓ *Waste*: different types and causes, insufficient waste management;
- ✓ *Water management*: insufficient management;
- ✓ *Loss of biodiversity*: extinction of local species, emergence, and multiplication; Invasive species (especially fish);
- ✓ *Global warming*.

Initial pathways for implementation of a private standard

During 2019-2022 a core group of farmers, consultants and researchers in the cluster started to work on options for a standard. Their main activities can be summarized as follows:

- ✓ Awareness building among certified organic farmers and processors in wetlands areas, about the necessity to measure the impact of their activities (crop management, energy consumption, waste management, etc.) on water, soil, and air, in order to detect weaknesses and to prevent or at least reduce the negative impact to acceptable limits.
- ✓ Awareness that performances should be defined in metrics resulting from a set of indicators.
- ✓ Awareness that authorized farmers and processors should report measures to promote the biodiversity and fertility of the soil, to protect local fauna and flora, in particular relevant local species and they should strive to develop new innovative cultivation methods, such as: agroforestry, simultaneous agricultural crops (intercrops), mixed crops, permaculture, testing of new varieties adapted to organic farming and others.
- ✓ Awareness building among other type of stakeholders such as farmers in conventional, fisheries and tourism and aquaculture branches, to develop synergies in optimizing good practice and to take appropriate measures to encourage rural development.

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- ✓ Use of advanced technology and digitalization.
- ✓ Financial instruments identification.

For all of these, several exploratory awareness campaigns were organized such as workshops with local partners and international partners, financing the project through national programs, possible funding institutions. The idea of the standard was discussed with relevant stakeholders in Romania, Germany, and Switzerland. In several meetings, we received feedback from all stakeholders consulted and were able to integrate comments into the first draft standard. The standard was developed, formulating risks and requirements for wetlands. Possible indicators were further analysed, such as:

- ✓ Systems for measuring N and P emissions in soil and water;
- ✓ Irrigation management: good practices, opportunities and difficulties;
- ✓ Waste collection: good practices and difficulties;
- ✓ Carbon retention;
- ✓ Promoting biodiversity, measuring energy consumption, reducing emission;
- ✓ Seeds management;
- ✓ Social indicators.

At the local level, the cluster was involved in the debates and conferences on poverty and social exclusion in the Danube region, sustainable development of the region through organic agriculture and the opportunity to link it with development tourism consistently covered by the press. Preoccupations of the cluster to develop a competitive identity was launched in Biofach Nurnberg which captured the attention at national level and internationally.

The idea of organic operators (farmers and processors) to have a private standard, documented by a credible certification, started got momentum since the event in Murighiol in October 2022. It was clearly assessed at that meeting, that this process will have a positive influence on the active insertion of organic agriculture in efforts to maintain and develop wetlands areas, to improve the image of the organic sector in Romania, encourage exports and stimulating producers from other parts of the country (and even outside Romania). It was better perceived the positive role of organic farming in terms of issues such as climate change, global warming, deforestation, biodiversity loss, etc. It was more clear as well how previous efforts will contribute to the inclusion of organic farming in projects with relevant regional, national, and international stakeholders.

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Important enabler factor at national level recognized

To support emulation towards a private label in the innovation hub Bio Danubius Cluster, ASRO - The National Standardization Body, IBA Bucharest - National Research and Development Institute for Food Bioresources, Spiru Haret University and Inter-Bio Association (where the university is a founding member together with farmers associations Bioterra Association and Bio Danubius) during 2019, developed a parallel project at national level, to ensure a national standard of organic and agroecological producers and processors. Farmers and researcher both members of innovation hub and outside of it, got together and developed, during 2 years of research *the Romania original standard based on good international practice*. Due to their effort highly appreciated, in collaboration with ASRO, the first national standard for agroecology addressed to organic farmers was developed and launched in May 2022. The standard *SR 13595* is now in place offering a good anchor to the farmers in the wetlands to get inspiration for a quality scheme. During 2022 and 2023, extensive awareness campaigns among farmers and researchers, contributed to a faster understanding of the new agroecological practices. The outcome of this process is the initialization of a voluntary scheme for the organic cereal's products.

The innovation hub Bio Danubius members organized events, sight visits and held presentations to all potential interested entities. Some farmers inside and outside the hub initiated audit procedures to identify the most suitable programmes available for their activity. Enablers in the area of certification (SRAC, TUV, RENAR) clearly accepted by the farmers as an important pathway to the scheme. Most important lesson is to take responsibility to choose a scheme owner among the core team of innovation hub and to explore options. Another important gain (already asserted in the innovation hub history before being involved in the European project) is that we do not have to stick to the Danube Delta farmers, but also farmers with a common "terroir" in the wetland along the Danube. Through TRANSECT project, the innovation hub legacy grew and is better perceived as a strategic player.

Conclusions

The idea of organic operators (farmers and processors) to have a private standard, documented by a credible certification got momentum, but the process may last. It is important to ensure a proper governance of the standard through scheme ownership. It was clearly assessed that this process will have a positive

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influence on the active insertion of organic agriculture in efforts to maintain and develop wetlands areas, to improve the image of the organic sector in Romania, encourage exports and stimulating producers from other parts of the country (and even outside Romania). At the same time, in an "*organic plus*" perspective, the standard fits into organic-agroecology scenario predicted by us in section 3.

The national standard *SR 13595* is offering a good anchor to the farmers in the wetlands to get inspiration for an "*organic plus*" voluntary scheme. During 2023, extensive awareness campaigns among farmers and researchers, contributed to a faster understanding of the new agroecological practices took place to see the advantages of the concept "*organic plus*".

It became also more clear that enablers in the area of accreditation and certification (accreditation body RENAR) are of strategic importance in the governance of the scheme. Based on the existing learning history of the cluster one main obstacle for the private standard is the revenue model. In spite of the fact that agroecology and organic farming have a strong positive impact on sustainability nature-inclusive agriculture can only be scaled up if it goes hand in hand with a viable model for generating revenue. The limited possibilities for individual farmers to achieve a viable revenue model can be overpast through co-creation and increased cohesion forces and market approach. Options should be developed inside the farmers communities for sharing costs and benefits These are:

- ✓ Carbon credit schemes which may help in reducing investment costs;
- ✓ Voluntary membership fee from the farmers and other stakeholder at a differentiating rate based not only in compliance to the standards requirements, but also on their position in the cluster value chain;
- ✓ Combined cost-revenue model both in a value chain and cluster approach can bring more light into the problem of financing;
- ✓ Possible outside investments for the scheme, either from the autority level or from interested private companies (buyers, certification bodies, consumers organizations).

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