

OPPORTUNITIES AND CHALLENGES FOR RURAL AREA TRANSITION TO GREEN GROWTH

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Abstract

In developing countries, such as Serbia, the transition to green economy models represents one of the key prerequisites for realizing sustainable rural development. Present study deals with the rural areas ecosystems and challenges connected to transitional process from brown to green economy. The aim of the paper is to point out problems for underdeveloped and developing countries correlated to the major challenges for rural areas. Also, study presents one of possible approaches for assessing the agricultural systems sustainability - the Sustainability Assessment of Food and Agriculture Systems (SAFA) indicators. Special focus is on describing holistic framework for assessing sustainability along the value chain of both the food and agriculture industries. As the innovation are suggested tool for green growth, the innovation projects in the fields of agriculture, food technology and food industry which are successfully implemented in Serbia where analyzed. Result showed that the largest number of green projects in the total number of projects, partly funded by The Innovation Fund of the Republic of Serbia, in the fields of agriculture, food technologies and food industry is approved within Collaborative Grant Scheme Program and Technology Transfer Program.

Key words: *agricultural systems, indicators, rural development, green growth, sustainability.*

Introduction

Green economy is defined as an economy that improves human well-being and reduces inequality, while not exposing future generations to significant

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environmental risk or ecological scarcity (UNEP Green Economy Initiative). This definition can be simplified into the form - green economy implies the reduction of the carbon footprint, while promoting resource efficiency and social inclusion. In addition to the term green economy, the term green growth is used by the World Bank (WB), Organization for Economic Co-operation and Development (OECD) and Global Green Growth Institute (GGGI), (Fedri-go-Fazio and Brink, 2012). Green growth involves fostering economic growth and development, while ensuring that natural assets provide the resources and services on which well-being is based (OECD Green Growth Report, 2011). These two terms are often equated, but the definition of green growth can be seen as an extension that refers to improving the resilience of ecosystems to changes (climatic and economic), as well as reducing the loss of biodiversity and ecosystem services. In addition, green growth in the context of economic benefits includes efficient sustainable business, the development of new skills and professions, the development of new products (processes and markets), and as particularly important, the revitalization and prosperity of communities in rural areas (European Network for Rural Development, 2017).

In addition to green growth, it is also important to mention extension of green growth syntagm inclusion green growth, which is interesting for developing countries. Inclusionary green growth is a synergy of green growth and inclusive growth (raising the standard of living). In this way, it is ensured that green growth is necessary, efficient and affordable (WB, 2012). This novel term is focused on the ecosystem and its resource conservation, which in conjunction with economic growth and social determinants, ensures that the principles of sustainability govern through all three spheres - economy, society and the environment.

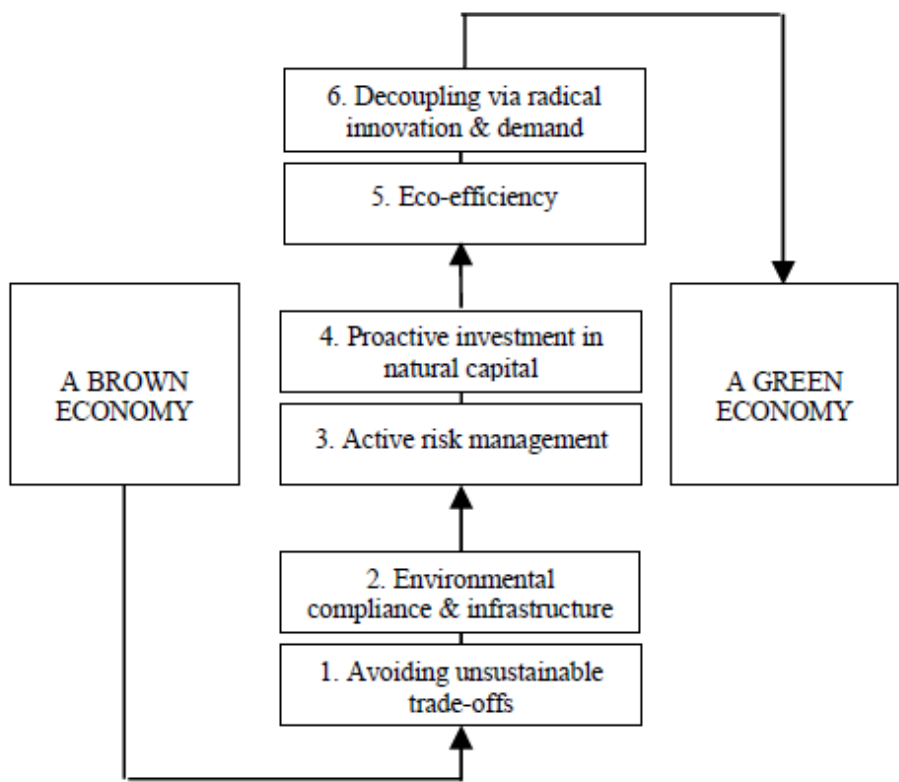
All defined phenomena are based on planetary boundaries (i.e. processes – nitrogen and phosphorus cycles, climate change, biodiversity changes, new chemicals, land use, water consumption, ocean acidification, depletion of the ozone layer) proposed by Rockström et al. (2009) where anthropogenic development is based on the state of the planet - natural systems limits and potential. This concept correlates to the rural areas ecosystems and challenges connected to transitional process from brown to green economy.

Sustainable development and green growth

The transition from the brown economy to the green economy requires a series of adaptations, which are a challenge for all countries and societies, depending on their state or development in different areas (natural resource quality and availability, education, technology, economy, social determinants, EU membership, communication with neighboring countries etc.), (European Network for Rural Development, 2017). In underdeveloped countries there are problems related to the lack of food, water, energy sources, but also adequate sanitation, health, transport and education systems, and poverty is an accompanying social determinant. In developing countries, industrial production is often not sustainable, that is, resources are used irrationally, with increased waste production, there are problems with waste management, with a strong negative impact on the environment and health. Developed countries, that is, societies that have high adaptation to sustainable development, challenges are related to further ways of reducing the carbon footprint, the efficiency of production processes and the use of renewable resources, the transition to green occupations, etc.

The listed problems for underdeveloped and developing countries correlated to the major challenges for rural areas. Additionally, the six main foundations of the transition from brown to green economy for rural areas are defined as (Figure 1): 1 - avoiding unsustainable trade, 2 - environmental compliance and infrastructure, 3 - active risk management, 4 - proactive investment in working capital, 5 - eco-efficiency, 6- separation through radical innovations and demanding changes. These foundations relate to the way of doing business (1 and 2), active management of the environment (3 and 4) and achieving environmental sustainability (5 and 6), (Fedrigo-Fazio and Brink, 2012). Challenges for achieving rural green growth are often related to developing countries and concern the analysis the impact of various factors such as regional characteristics (such resources, industry, education, market of agriculture and its products distortion, unequal environmental legislative implementation).

Figure 1. Six building blocks in the transition to the green economy in rural areas



Source: European Network for Rural Development, p. 6.

One of the factors recognized as a driver of economic development in modern society are innovations. The link between innovations and growth can be explained through the link between technological progress and productivity growth on both the social and production levels (Jia et al., 2023). In addition, the implementation of biotechnology, the use of waste as a resource and promotion and implementation the principles of circular business model will enable reduction the need for new resources consumption. The essential step for innovation implementation in practice are realization projects based on technology transfer, product upgrade (improvement or production *up scale*) and clean / green technology development and connection of academic sector with industry.

Framework for assessing sustainable food and agriculture industry

Back in 1992, at the United Nations Conference on Environment and Development held in Rio de Janeiro, two important documents were adopted: Agenda 21 and the Declaration on Environment and Development. These documents later were used as the basis to the promotion and implementation of sustainability concept. In the context that we consider in this work/paper, it is important to note that the aforementioned Agenda 21 devotes an entire chapter to sustainable agriculture and rural development. Sustainability is a topic that is at the center of all current debates in the social, political, economic and environmental fields. It is a concept that is not easy to analyze, perceive and follow, so it requires an integral and multidisciplinary framework. Creating the methodologies and tools to assess sustainability has become an increasing area (Binder, Feola & Steinberger, 2010).

Although agriculture continues to be an important lever for growth and development, the fact is that it faces constraints such as the devastation of natural resources, climate change, genetically modified organisms, soil degradation, loss of biodiversity, intensive use of agrochemicals, resulting increase in rural poverty etc. New directions are emerging that strive for sustainable development of agricultural production, paying much more attention to ecological standards.

Sustainable agriculture preserves diversity, improves soil resources, protects waterways, provides healthy food, reduces producers' dependence on external sources and provides a reliable source of income for producers. There are many of context-generic frameworks that have been made for those purposes of agricultural systems.

The one of possible approach for assessing the sustainability of agricultural systems developed by FAO (Food and Agriculture Organization of the United Nations) - the SAFA (Sustainability Assessment of Food and Agriculture Systems) indicators. It is a relatively young methodology (framework) since it was presented in the fall of 2013. The specificity of SAFA is that „*covers a wider range of industries (cropping, livestock husbandry, forestry, fisheries and aquaculture) and a wider range of sustainability dimensions and aspects – especially in relation to the governance dimension – and it targets a diversity of stakeholders (e.g. supply chain stakeholders, policy makers and non-governmental organizations)*“ (Gasso et al., 2014; Gasso, 2014).

SAFA is a holistic framework for assessing sustainability along the value chain of both the food and agriculture industries. Its characteristic is that it is applicable on a global level. It has been prepared so that companies, whether large or small, that are involved in production, processing, distribution or sale, understand the components of sustainability and the means and methods for its improvements. The target group of the SAFA project is small, medium, large companies, organizations and all other interested parties involved in agriculture, livestock, forestry and fishing.

Table 1. Overview of SAFA default indicators per themes and sub-themes

| Sustainability dimension (4) | Themes (21) | Sub-themes (58) | Number of defaults indicators (116) |
|---|---------------------|------------------------------------|-------------------------------------|
| GOOD GOVERNANCE (5 Themes, 14 Sub-themes, 19 default indicators) | Corporate Ethics | Mission Statement | 2 |
| | | Due Diligence | 1 |
| | Accountability | Holistic Audits | 1 |
| | | Responsibility | 1 |
| | | Transparency | 1 |
| | Participation | Stakeholder Dialogue | 4 |
| | | Grievance Procedures | 1 |
| | | Conflict Resolution | 1 |
| | Rule of Law | Legitimacy | 1 |
| | | Remedy, Restoration and Prevention | 1 |
| | | Civic Responsibility | 1 |
| | | Resource Appropriation | 2 |
| | Holistic Management | Sustainability Management Plan | 1 |
| | | Full-Cost Accounting | 1 |

| Sustainability dimension (4) | Themes (21) | Sub-themes (58) | Number of defaults indicators (116) |
|---|---------------------------------|------------------------------|-------------------------------------|
| ENVIRONMENTAL INTEGRITY (6 Themes, 14 Sub-themes, 52 default indicators) | Atmosphere | Green House Gases | 3 |
| | | Air Quality | 3 |
| | Water | Water Withdrawal | 3 |
| | | Water Quality | 4 |
| | Land | Soil Quality | 5 |
| | | Land Degradation | 3 |
| | Biodiversity | Ecosystem Diversity | 5 |
| | | Species Diversity | 4 |
| | | Genetic Diversity | 5 |
| | Materials and Energy | Material Use | 4 |
| | | Energy Use | 4 |
| | | Waste Reduction and Disposal | 4 |
| | Animal Welfare | Animal Health | 2 |
| | | Freedom from Stress | 3 |
| ECONOMIC RESILIENCE (4 Themes, 14 Sub-themes, 26 default indicators) | Investment | Internal Investment | 1 |
| | | Community Investment | 1 |
| | | Long Ranging Investment | 2 |
| | | Profitability | 3 |
| | Vulnerability | Stability of Production | 2 |
| | | Stability of Supply | 3 |
| | | Stability of Market | 1 |
| | | Liquidity | 2 |
| | | Risk Management | 1 |
| | Product Quality and Information | Food Safety | 3 |
| | | Food Quality | 1 |
| | | Product Information | 3 |
| | Local Economy | Value Creation | 2 |
| | | Local Procurement | 1 |

| Sustainability dimension (4) | Themes (21) | Sub-themes (58) | Number of defaults indicators (116) |
|--|-------------------------|--|-------------------------------------|
| SOCIAL WELL-BEING (6 Themes, 16 Sub-themes, 19 default indicators) | Decent Livelihood | Quality of Life | 2 |
| | | Capacity Development | 1 |
| | | Fair Access to Means of Production | 1 |
| | Fair Trading Practices | Responsible Buyers | 1 |
| | | Rights of Suppliers | 1 |
| | Labor Rights | Employment Relations | 1 |
| | | Forced Labor | 1 |
| | | Child Labor | 1 |
| | | Freedom of Association and Right to Bargaining | 1 |
| | Equity | Non-Discrimination | 1 |
| | | Gender Equality | 1 |
| | | Support to Vulnerable People | 1 |
| | Human Safety and Health | Workplace Safety and Health Provisions | 3 |
| | | Public Health | 1 |
| | Cultural Diversity | Indigenous Knowledge | 1 |
| | | Food Sovereignty | 1 |

Source: adopted according to SAFA Sustainability Assessment of Food and Agriculture systems indicators, p. 3-7.

As it is presented above in Table 1. SAFA framework is structured according to several hierarchical or aggregation levels (i.e. dimensions, themes, subthemes and indicators). The most general level comprises four sustainability dimensions. At the intermediate level, each dimension comprises a few themes (21) and subthemes (58) that are the elements associated with specific sustainability goals and objectives. At the most specific level, each subtheme comprises indicators (116) that are measurable and verifiable factors based on a five-scale performance rating (i.e. best performance, intermediate performances with room for improvement, and unacceptable performance), (FAO, 2013).

SAFA is focused on supply chains and treats a lot of elements such as an analysis of the inputs, outputs and environmental impacts. It can be useful for: 1. Food and agriculture enterprises (for self-evaluation of operations and identifying hot-spots for performance improvement), 2. Non-governmental organizations

(NGOs) and wider communities (monitoring outcomes of impacts of projects, sharing of, and global learning on best practices) and 3. Governments, investors and policy makers (informing the establishment of Sustainable Development Goals, implementation of regional planning, local procurement, investment or the development of legislation etc.), (Scialabba, 2013, p. 5).

Transition to green models of rural development in Serbia

In developing countries such as Serbia, the application of green economy and its concepts of circular economy and bioeconomy represents one of the key prerequisites for realizing sustainable rural development. Their simultaneous application can enable efficient transformation of local economy (new job openings on farms, diversification of activities by enabling new job in secondary and tertiary sectors and improving life quality in rural areas) owing to numerous economic, social and ecological effects. Sustainable development of rural areas means promoting green development based on using rural resources more efficiently, preserving and improving the rural environment, sustainable management of land and the protection of biodiversity (Josipović, 2018).

The transition to green models of rural development in Serbia is hindered by numerous problems such as: the usage of outdated technological machinery, insufficient training of agricultural producers in implementation of necessary quality standards, low efficiency of agro-food sector, unfavorable age structure of rural population, structural problems in job market performances, insufficient human capital due to unfavorable educational structure of rural population, low prevalence of entrepreneurial activities and underdevelopment of entrepreneurial spirit among rural population, low quality in terms of public services provision, the underdevelopment of rural infrastructure etc.

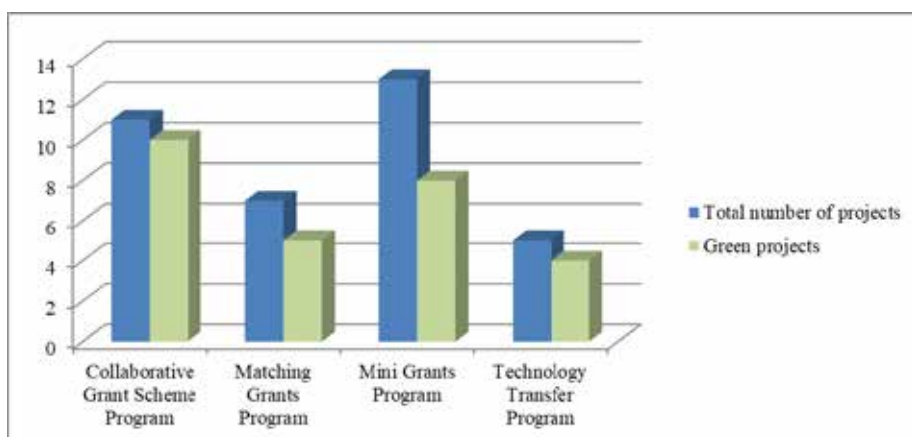
In order to improve the efficiency of agro-food sector and preserve natural resources and the environment, it is necessary to provide financial support for the realization of green investment projects. The key characteristics of efficient projects that support and encourage the transition to green economy are (European Network for Rural Development, 2017, p. 2): they are led by demand and occur as a response to social problems and economic conditions, innovative projects (they include new products, new services, new technologies, new business models and/or upgraded old ones etc.), create balance between economic, social and ecological goals, involve multiple actors from public and private sphere, heterogenous financing sources (private capital and public financing sources), publishing and promoting results etc.

The Innovation Fund of the Republic of Serbia (IF RS) supports the development of rural economy through different projects in the fields of agriculture, food technologies and food industry. The aim of these projects is to increase the competitiveness of agriculture, to improve the food quality and promote the development of small and medium-sized businesses and entrepreneurs. They are approved within four programs:

- *Collaborative Grant Scheme Program* – focused on strengthening the co-operation between science and economy through scientific research projects and development projects;
- *Matching Grants Program* – focused on strengthening the competitiveness of private enterprises by giving support to the development of innovative technologies, products and services;
- *Mini Grants Program* – focused on giving financial support to new enterprises which develop technological innovations, and
- *Technology Transfer Program* – focused on giving support to research projects with a view to efficiently commercializing the developed inventions.

Most projects in the fields of agriculture, food technologies and food industry that are approved withing the four mentioned programs promote the application of the principles of green economy and can be defined as green projects for the development of rural economy. Graph 2 shows the total number of projects and the number of green projects approved in the fields of agriculture, food technologies and food industry partly funded by IF RS.

Figure 2. Projects in the fields of agriculture, food technologies and food industry supported by IF RS



Source: adopted according to Innovation Fund of the Republic of Serbia

Within the four programs shown on Graph 2, 36 projects in the fields of agriculture, food technologies and food industry were approved in total. Their total value is €7,504,123, while Innovation Fund granted €5,234,641. Out of the total number of projects, 27 can be categorized as green projects. Their total value is €5,847,686, while Innovation Fund granted €4,089,620.

The largest number of green projects in the total number of projects in the fields of agriculture, food technologies and food industry is approved within Collaborative Grant Scheme Program and Technology Transfer Program (91% and 80% respectively). Within Matching Grants Program, they take up 71%, while within Mini Grants Program 62%.

Agriculture will continue to be important in the transition to green rural economy, but no longer from the perspective of providing jobs for rural population, but from the perspective of environmental and natural heritage protection (Josipović, 2019, p. 60). Rural areas in Serbia are characterized by good climate and rich natural resources suitable for different types of agricultural production. Based on previous they have a chance in the following fields: the development of organic plant and livestock production, the possibility of branding new products and services which are based on local identity and tradition, and which have recognizable characteristics and quality and the development of different types of rural tourism (Josipović, 2018, p. 178). Multifunctional agriculture, the diversification of rural economy, branding and promoting high-quality local products, local entrepreneurial initiatives and the preservation of rural ecological, social and cultural values represent the main components of future green growth of rural areas in Serbia.

Conclusion

Sustainability is a topic that is at the center of all current debates in the social, political, economic and environmental fields. New directions are emerging that strive for sustainable development of agricultural production, paying much more attention to ecological standards. The transition from the brown economy to the green economy requires a series of adaptations, especially in the field of food and agriculture industry that is one of the key sectors of the development of rural areas. SAFA is a holistic framework for assessing sustainable food and agriculture industry. In Serbia the application of green economy is one of the key prerequisites for realizing sustainable rural development. Green projects that are funded by the Innovation Fund of the Republic of Serbia are important for the achievement of the goals of sustainable rural development.

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