

STUDY ON THE PERSPECTIVE OF USING BIO-ECONOMY IN AGRICULTURAL AND RURAL DEVELOPMENT

Tunduc Adrian*

*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048,
Oradea, Romania, e-mail: atunduc@uoradea.ro; adrian.tunduc@icloud.com

Abstract

The bio-economy brings a tremendous opportunity in facing food security, the deficit in natural resources, the need for fossil resources by emphasizing on a sustainable use of the renewable natural resources, on competitiveness and on economical, social and environmental issues.

Key words: bio-economy, resources, bio-diversity, climate change, food security, economic opportunities, rural development

INTRODUCTION

This paper is aimed to emphasize on the importance of bio-economy especially for agricultural and forestry.

In 2050 the world population will reach approximately 10 billion people.

In 2015 the CO₂ level reached the highest level at 400 parts per million since 1960 when the measurements started. At the beginning of the industrial age the CO₂ level was 280 parts per million. In almost 200 years we managed to almost double it. The agreements signed this year in Paris, after Rio de Janeiro in 1992 and Kyoto or the one that signed also in 2016 in Kigali-Rwanda will not bring an over-night change in pollution. It is estimated that the effects of these agreements we will not see in our lifetime.

MATERIAL AND METHOD

Bio-economy is the science that studies the economy of nature or the science that studies the society economy and its effects on the environment. Regardless how we call it, earth needs bio-economy, humans need it too in order to secure their future. Trying to define bio-economy, I might say that is science that uses biological resources from earth and sea, on one hand and wastes as raw-materials for food, animal food and for industrial and energetic processing on the other hand, all on a sustainable approach. For example, bio-wastes are highly potential as an alternative to chemical fertilizers or for conversion into bio-energy and thus could contribute to achieve the objective of EU that 2% of energy to come from renewable

sources. The EU bio-economy has reached 2 trillion euro and more than 22 million people are involved (9% of the labour force). Bio-economy includes fields such as agriculture, forestry, fishing, aquaculture but also bio-based industries. To see how effective bio-economy could be it is estimated that 1 euro invested in research and innovation in bio-economy will generate 10 euro added-value in bio-economy related sectors until 2025.

Bio-economy is different from linear economy and uses biological resources from soil, sea and air, and wastes, as raw material for producing food and goods for humans, animals and industrial production in a circular way. Also bio-economy uses ecological processes for agricultural and industry as an alternative for chemical fertilizers or components. This new economy (bio-economy) has an inter-sectorial feature, interconnecting areas as food-security, limited natural resources, dependency from fossil resources, climate changes in order to ensure a sustainable economic development.

In order to successfully implement the bio-economy a 4 pillars based process is needed. Those pillars are: investments in research and innovation of bio-eco-technologies based on local, national and European funds; the conversion of wastes into economical products in order to be re-introduced into consumption process (the cost of collecting food wastes in EU is between 55-90 euro/ person/ton/year and produces 170 mil. Tons of CO₂); implementing and coordinating local, national, European and global bio-economy policies.

As we stated before, by 2050 the Earth will have to feed almost 10 billion people, which will represent an exceptional feat and also a challenge for agricultural and rural areas around the globe.

Droughts

The demand for potable water and irrigations are increasing every year. Unfortunately global warming and changes in weather patterns show us that we can not rely on rain as much as our food demand requires.

There are many studies and experiments on drought effects on plants (if we can not rely on water we need to “teach” plants to grow normally with a scarcity of water. Surprisingly it seems that plants ways out to assure and protect next generation (fruits) by directing the water to the fruits.

The scarcity of water has another dangerous effects on plants; without water plants are slowing down photosynthesis, meaning a reduction of the take up of CO₂ and growth.

Emerging plants deases

The scarcity of water may raise the level of pathogens spreading-virus, bacterium, fungi. Its true that they were a problem for agriculture eversince but the raising level today is concerning.

Eventhough plants have their resistance mechanisms that could stop new pathogens, they dont have the information that they are under the attack and put their defence system on.

To detect new pathogens plants uses “R protein” wich act as an antibiotic for livings.

Bio-genetic enegineering (part of bio-economy) has to find new “R protein” in order to help plants to detect new pathogens and activate their defense system.

Salty soils

Water used for irrigation contains minerals – sodium, calcium salts especially.

Unfortunately plants take the water, minerals remaining in the soil thus transforming it into salted soil.

For overcoming some of the treats occurred by the climate changes, bio-engineering has to come with solutions. One of them is to use fungi from plants species from extreme environment (rice inoculated with fungi from salty coastal areas *become salt tolerant*; tomatoes plants receiving fungi from plants from warm and geothermic soils could be resistant to temperatures of 50 C.

For being able to feed up to 10 billion people and livestock, crops need fertilisers.

Nitrogen, one of the three main macronutriens (nitrogen, phosphorus, potassium) plants need for growing is generally taken from atmosphere and converted into ammonia fertiliser; for artificial ammonia nitrogen needs to react with hydrogen at high temperature (500C) and high pressure (3000 atm); the proces is called HABER-BOSCH PROCESS.This process requires large factories, carbon emissions affecting thus global warming.

So a question arrise; CAN WE FEED 7.2 billion OR even 10 billion WITHOUT USING FERTILIZERS? THE ANSWER: YES !!! HOW? By MAKING PERENNIAL VERSIONS OF CROPS !!!!!

60% of the calories intake by humans and livestock come from wheat, maize and rice; they are annual plants. But with BIO-ENGINEERING and further more using BIO-ECOMONY pledges that we can innoculate these crops with perennial genes. Doing so crops will not

need additional fertilisers because their roots penetrates deeply into soil every year and tap nutrients and water.

It would be a much more environmental friendly way to grow food and it could be duable within 20 years (Only if Monsanto, Mosaic, Terra Industries, Yongye International- the biggest fertilizer companies will want to lose an estimated market value for 2017 of 193 billion dollars?).

RESULTS AND DISCUSSION

Bio-economy in Romania

Bio-economy is an important field for the employment of the active labour population, in particular in those economy branches that produce direct bio-resources – agriculture, forestry and fishing, and high-value added industries like food industry.

In Romania the level of bio-economy development is still low excepting highly productive industries such as medical bio-economy. The importance of implementing the bio-economy in other economic branches is starting to be seen by the romanian local and national authorities, who included it in the national strategy for energy, bio-energy chapter.

Bio-economy has a tremendous environment in Romania, from producing bio-ethanol from second generation (bio-ethanol from secondary agricultural production wastes, like wheat, sugar beet, whit a potential of 200.000 tones/year- 17.5% of the total bio-resources), to bio-agriculture and tourism.

The production of bio-ethanol could have a great positive impact on the rural economy and its development by creating more than 3200 jobs/year and a profit margin of 1 billion euro/year and reducing green gases by 1.6 milion tones/year.

In order to succesfully implementig BIO-ECONOMY in Romania there are some instruments for companies, local, regional or national authorities dissposal. Those are:

- **THE PUBLIC-PRIVATE PARTNERSHIP, THE BIO-INDUSTRY CONSORTIUM** who intends to suport sustainable development and competitiveness across Europe by reindustrialization and revitalization of rural areas (I agree with the concept only if its based on BIO-ECONOMY pledge and principles; if not is just another way to distroy enironment once more);

- THE EUROPEAN PARTNERSHIP FOR INOVATION (EPI), PRODUCTIVITY AND SUSTAINABILITY IN AGRICULTURE who intends to ensure a sustainable food security and a support for bio-industries that processes bio-sources or bio-wastes in the context of climate changes, without affecting agro-systems and bio-diversity.

CONCLUSIONS

Linear economy proved in decades that has fail on long-term and on sustainability, excepting 1% of the population who got reacher every year! The lefts of 99% of the population is now trying to survive poorer, in economic terms and living in an environment which is more polluted and un-suistanable on medium and long time. Therefore a new paradigm like bio-economy has to take place, which will make us all to be more responsible to the the nature and also to our health and future.

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