

Economical Effectiveness of Using Biofuel of Agricultural Organizations (On the Material of East Kazakhstan Region)

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Abstract: Determination economic effectiveness' of using biofuel agricultural organizations is one of the important research tasks. Increasing effectiveness of agriculture is reached with the increase of income agricultural organizations which is possible on basis of adopting innovative ecologically orientated technologies in agricultural production which based on use of biofuel energy resources. Valuation of economic effectiveness using biofuel agricultural organizations reasonable to use integral index of economic effectiveness which helps to identify effective and optimal using of available resources.

Key words: Biofuel • Resources potential • Integral index • Economic effectiveness • Industrial and innovative development

INTRODUCTION

Improving efficiency of functioning agricultural organizations is achieved through innovative processes, expressed in the production of environmentally friendly products, which is possible through the use of environmental-oriented technology based on the use of bio-fuel energy sources. Planning and problem solving of economic efficiency are possible only on the basis of their own knowledge resource potential of agricultural production.

The resource potential can be described as a multifaceted system of resources being interrelated and interdependent in conditions of development of innovative processes [1].

The resource balance allows defining not only the structure of the resources included in the resource-fuel capacity, but also the effect of the use of biofuels [2]

All of this characterizes the particular relevance and practical significance of the research problem - the effectiveness of the use of biofuels of agricultural organizations of the East Kazakhstan region.

The object of the study is agricultural organizations using biofuel in the agricultural production of the East Kazakhstan region. The subjects of the study are the

relations arising in the process of formation and use of biofuel resource potential and its impact on the economic efficiency of the agricultural organizations.

Methods: In solving the problems in a comprehensive way applied the methods of systematic, comparative, logical, factor, the method of expert evaluations and statistical methods.

The Main Part: With the development of innovative processes of agricultural the increase of production efficiency is achieved mainly due to new technologies, including the use of biofuel resources. In its essence biofuels has features, since its production is closely associated with the process of growing and processing of agricultural products.

Biofuels - an environmentally friendly fuel that is derived from renewable raw materials, i.e. agricultural waste products. Biofuels do not lead to environmental pollution. Its use can significantly reduce air emissions from simultaneous utilization of agricultural waste, which makes getting the economic and environmental benefits.

The biofuel resource potential is a set of tools, supplies, opportunities, the use of which allows receiving not only economic but also environmental benefits.

This type of resource potential is part of the production capacity. Nature of its use in agricultural production allows to allocate for the main purpose of biofuels, safety aspects, environmental benefits, the impact on the results of production. Biofuels: biodiesel, biogas and fuel briquettes.

Biological diesel - biofuels is based on vegetable or animal fat (oils). It is used in motor vehicles in its pure form and in the form of various blends with diesel fuel. The use of the biological diesel engine has certain advantages. Biological diesel, as shown by the experiments, when immersed in water will not harm plants and animals. In addition, it undergoes almost complete biodegradation: in the soil or water microorganisms are processed within 28 days 99 % of the biological diesel engine, which allows minimizing the pollution of rivers and lakes [3].

Biodiesel allows put into circulation unused agricultural land, to create new jobs in agriculture, engineering and construction [4]. Biodiesel can be produced from renewable oilseed crops. Crops such as renewable resources for production of alternative fuel may continue to operate until such time as possible to grow them.

East Kazakhstan region has good potential to increase oilseed crops for biodiesel production due to the involvement in the agricultural use of unused land.

In addition, it is known that the enterprises of agriculture remains a large amount of waste vegetable (sunflower husks, do not waste feed silos, straw, etc.) from which you can get high quality wood pellets. In the East Kazakhstan region is more than enough biomass that can be used to fabricate these briquettes. These resources are not monopolized by large companies and their value is not affected by the global markets.

Often the data are biological fuel resources can be even negative cost, as they somehow need to be disposed of.

Husks remaining in large quantities in the production of sunflower oil and buckwheat hulls in the production of cereals can be processed into briquettes (so-called agro briquettes) which can be used in furnaces and boilers for civil and industrial use.

Received fuel briquettes - a highly efficient fuel, approaching on heat transfer to coal with low ash content.

Fuel pellets (pellets) are cylindrically shaped pellets obtained by compression, pre -dried and shredded waste vegetable materials.

Buckwheat, sunflower, wheat, rice husks and hulls remaining in the processing of other agricultural crops, perfectly pelletized. They are mainly used in boilers and furnaces. Waste treatment plant into fuel briquettes can solve the problem of heating in rural areas. According to the calorific value of solid fuels is close to brown coal and environmental parameters has the advantage over coal, fuel oil, etc.

There are also a number of indirect benefits to enterprises: reducing the cost of waste collection and disposal in landfills, loss of payment for environmental pollution and the release of additional land use for waste storage. We define the advantages and prospects of biogas plants in agriculture.

Suitable for the production of biogas various waste: manure, litter, cereal grains, brewer's grain, beet pulp, sewage sediments, fish waste and mud houses (blood, fat, intestine), grass, household waste, dairy (salty and sweet whey), waste from potato processing (cleaning, skin, rotten tubers).

It can be said that biogas allows receiving alternative energy from virtually nothing for its production are used waste that had simply thrown away.

Processed manure, grains and other debris can be used as fertilizer in agriculture. This will reduce the use of chemical fertilizers; reduce the load on the ground water.

The biogas used as a fuel for the production of: electricity, heat and steam, or as an automotive fuel [5].

Biofuel - a hazardous substance and does not bring side effects [6]. Results of the study identified the main indicators of certain types of biofuels with their advantages (Table 1).

All these economic and environmental aspects of the release and use of biodiesel, biogas and fuel briquettes from plant waste will significantly increase the profitability of agricultural enterprises of the East Kazakhstan region, to create a stable base for diesel fuel internal combustion engines, except this will decrease the environmental burden on the environment [7].

Thus, the use of biofuels in the agricultural enterprises of the East Kazakhstan region showed a major advantage in the processing of raw materials into biofuels increases the added value of products, increased economic indicators (such as GDP), increasing the tax base, new jobs are created.

The Republic of Kazakhstan has all the economic conditions of production and use of biofuels, free areas for the cultivation of grains and oilseeds, technical and

Table 1: Key indicators and benefits of certain types of biofuels

Indicators	Biogas	Biodiesel	Fuel briquettes
1	2	3	4
Source	Manure, litter, cereal grains, brewer's grain, beet pulp, fish oil sludge and mud houses (blood, fat, intestine), potato processing waste.	Plant oils and animal fat	Agricultural residues (sunflower husks, buckwheat hulls, millet)
Yield of substance	1 ton of manure 50 - 60m ³ of biogas	Can be used in pure form or as a mixture in any ratio with diesel fuel oil. The most common is a blend of 20% biodiesel and 80% petroleum diesel	1 ton of coal = 100 packs of briquettes. 1 m = 100 packs = 1.3 m ³ 1 pack = 10 kg
Application sphere	1. Alternative fuel in the household, on average and in small business, residential and industrial heating facilities. 2. Full of energy carrier	Completely combusted alternative (synthetic) fuels. It applies: 1. As a lubricity additive (1... 2%) of a diesel fuel with a very low sulfur content. 2. A mixture of 20% of the biological diesel with 80% diesel fuel (B20) is commonly used as substitute for diesel fuel	Alternative fuel: 1. Heating of premises, baths, saunas. 2. Preparation of kebabs and barbecue. 3. Cooking in restaurants and cafes. 4. Fuel for the fireplace.
Environmental benefits	1. Reducing the emission of methane (a greenhouse gas) 2. Reduction of combustion of coal, wood, or fuel for power generation. 3. Umenshenie discharge to the environment polluted water 4. Purification of polluted waters from organic substances and microorganisms 5. Saving the forests from being cut down 6. Clearing the air in the house and the village of coal combustion products 7. Reducing air pollution nitrogenous compounds, deodorization of air	1. Biological harmlessness. 2. 99% collapse in the ecologically clean. 3. Vegetable origin. 4. Less CO2 emissions.	1. Cost-effective, high-performance environmentally friendly fuel does not contain sulfur. 2. The virtual absence of smoke, soot, carbon monoxide and harmful emissions during burning 3. It does not contain dust and spores that cause allergies
Safety	Hazardous substance	Hazardous substance	Resistance to high temperature ie not explosive as opposed to gas, diesel fuel 2. Do not contain the latent time

Table 2: Projected production of biofuels in 2013-2015 in the EastKazakhstan region

Indicators	Average for 2008-2010	2013-2015	2013-2015 in % to average for 2008-2010 year.
1	2	3	4
Meat			
Industrial processing in carcass weight,%	7,2	8,1	112,5
Output from 1 ton of meat processing waste from the meat industry	0,71	0,8	112,7
Estimatedvolumeofbiogas	0,56	0,63	112,5
Sunflower			
Industrial processing in terms of raw materials including vegetable oil (yield oil)	151,4	154,9	102,3
Estimated volume production of biological diesel	71,1	72,8	102,4
The estimated amount of fuel briquettes	34,8	35,6	102,3
	7,6	7,8	102,6
Crops			
Industrial processing in terms of raw materials includinggrainstillage	310,8	326,3	105,0
Estimatedvolumeofbiogas	61,1	64,6	105,7
Productionofcereals, total	30,6	32,3	105,6
	691,7	755,0	109,0
The estimated amount of fuel briquettes	44,2	48,3	109,3

Table 3: Results of the analysis of the profitability of individual biofuels in 2013-2015 year

Biofuels	Price of 1 ton, thousand rubles		The cost of 1 ton thousand rubles		Profitability, %	
	Average 2008-2010	2013-2015	Average 2008-2010	2013-2015	Average 2008-2010	2013-2015
1	2	3	4	5	6	7
Biogas	970	1065	770	685	26,0	55,5
Fuel briquettes	17560	18750	11655	11065	50,7	69,5
Biodiesel	415	445	315	285	31,7	56,1

human resources for the production of agricultural products, as they are the main resources for the production of biofuels and growing domestic demand for cheaper and more ecological types of energy.

The process of the increasing use of biofuels in agricultural production should not decrease the level of food security of the Republic of Kazakhstan, so as the raw material to be used: crop production technical nature, including wheat 3rd and 4th grade [8]. This will produce about 800 tons of biofuels with a low cost, which will be 1.5-2 times cheaper than in Europe produced biofuels.

The evaluation of the production of raw materials for the production of biofuels for the 2005-2010 years revealed raw potential for efficient production and use of bio-fuel resources in the sectors of agriculture in East Kazakhstan region.

On the basis of the present study forecasting of agricultural production in the East Kazakhstan region for 2013-2015 was calculated the projected production of biofuels from agricultural raw materials in 2013-2015. (Table 2).

As a result of the calculations confirmed the efficiency of production and use of biofuels in agricultural production (Table 3).

For a comprehensive assessment of the economic efficiency of agricultural enterprises that use biofuels in their agricultural production, proposed a set of indicators that reflect different aspects of the production processes in the areas of agriculture.

This assessment is carried out in stages, taking into account the regional program of industrial-innovative development of the East Kazakhstan region (EKR) [9, 10].

On the basis of general indicators calculated integral indicator of economic performance of agricultural enterprises.

$$I_{INT} = \sqrt[3]{E_{UBRP} \times E_{FVRP} \times E_{LR}}, \quad (1)$$

where:

I_{INT} - An integral component of economic efficiency of agricultural enterprises;

E_{UBRP} - An indicator of the effectiveness of the use of biofuels resource potential;

E_{FVRP} - An indicator of the effectiveness of financial resources;

E_{LR} - An indicator of the efficiency of the utilization of labor resources.

Integral indicator of the economic efficiency of agricultural enterprises that use biofuels reflects organization's ability to operate successfully in the market.

The higher the value of the integral index, the better it will be performed by the organization of its function - providing consumers with quality products and efficient use of available resources will be.

This indicator should be analyzed in a dynamic way in the course of which are determined by the pace of change and the results can be seen to increase or decrease the efficiency of the entire production and business activities of the organization.

CONCLUSIONS

Based on the research results are as follows:

- The biofuel resource potential is defined as a set of interrelated organic fuel and biological resources, agricultural production, the use of which allows you to not only economic but also environmental benefits.

This type of resource potential is part of the production capacity; the nature of the use is in the process of agricultural production makes it possible to identify the main types of biofuels intended purpose, safety aspects and environmental benefits.

- Based on the study of theoretical positions, a system of indicators and developed a method of evaluating the economic efficiency of agricultural enterprises that use biofuels.

The development of an integrated indicator of economic performance of agricultural enterprises that use biofuels, reflect an organization's ability to operate successfully in the market.

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