The basis for obtaining high yields is keeping to the requirements of basic laws and patterns of agriculture and crop production. The whole biological science is constructed on this, scientifically-based technological processes of certain crops cultivation, the theoretical basis of the agriculture intensification is identified, including modern methods of high yields programming.

The model of the harvest formation is determined for optimization of operational agrotechnical solutions based on detailed account of the crops and variety needs in the main living factors according to phases of development. Knowledge of the numerous details, processes taking place in the soil, the surface air and in the plant is necessary in constructing of it. In each of mentioned kinds of models the same processes must be reflected with varying degree of detail. The model of crop formation (the first two types of models are mainly used when the harvest is planed) may get interested in the process of operational crop yield management.

The development and introduction of the new methods of planning and operational management of the crop yield, which are known as «program crops», is one of the prospective areas of agriculture intensification.

At the same time, the recommendations specialized institutes, which are busy with harvest programming, practically come to the instructions concerning the amount of fertilizers and scheme of irrigation, which are necessary for the obtainment of the programmed yield, while keeping to the so-called «optimal technology of cultivation processes of agricultural crops». In other words, only the individual targets, are given. The implementation of theme can ensure the expected yield, i.e. without taking account possible deviations from optimal conditions while in use of growing crops. It is obviously, definite decisions should be taken to compensate deviations, not only before sowing and during the whole vegetative period and harvesting.

Reliable projections of the impacts on the crop yield, organizational-technological and biological factors, which will give the opportunity to take appropriate management decisions, are necessary for a qualitative problem-solving of crop yields programming. To obtain accurate yield forecasts is possible by means of systemic imitating mathematical models which make possible to reproduce the production processes. The conducted researches have confirmed the possibility of using the systemic imitating mathematical models for forecasting yields.

ZAYATS Y.O.*

Petro Vasylenko Kharkiv National Technical University of Agriculture

THE WORLD EXPERIENCE OF BIOFUEL PRODUCTION

Stable and effective economic development of any state depends on its provision of fuel and energy resources. Ukraine imports up to 75 % natural gas and 85 % crude oil and oil products, which threatens the energy and national security of Ukraine.

A significant increase in energy consumption for the last time, encourages the search for alternative sources of energy. Alternative sources include renewable sources, which include the energy of sunlight, wind, seas, rivers, biomass, heat of the Earth, and secondary energy resources, there are constant or occur intermittently in the environment.

Bioenergy – an independent branch of a great power, it occupies a prominent place in world production of heat, electricity and new types of biofuels. The leading countries of the world pay much attention to renewable energy sources (RES), derived from plant material, including biodiesel. Bioenergy is one of the most promising components of renewable energy of Ukraine.

---

* *Scientific advisor – Kolpachenko N.M., assistant professor*

The world experience proves that the use of biological energy is effective and solves a number of problems. Biofuels produce over 40 countries, leaders are USA, Brazil and European Union countries, primarily Germany, France and Italy. For example, U.S. production of biodiesel was 135 million gallons in June 2016. Biodiesel production during June 2016 was 2 million gallons higher than production in May 2016. Increased interest in biofuel production is observed not only among developed countries. The countries of South-East Asia that are particularly dependent on oil imports, are also interested in organizing the production of alternative fuels. For Asian countries the production of biodiesel was a strategically important sector.

The final 2016 standard for cellulosic biofuel – the fuel with the lowest carbon emissions – is nearly 200 million gallons, or 7 times more, than the market produced in 2014. The final 2016 standard for advanced biofuel is nearly 1 billion gallons, or 35 percent, higher than the actual 2014 volumes; the total renewable standard requires growth from 2014 to 2016 of more than 1.8 billion gallons of biofuel, which is 11 percent higher than 2014 actual volumes. Biodiesel production standards grow steadily over the next several years, increasing every year to reach 2 billion gallons by 2017 [6].

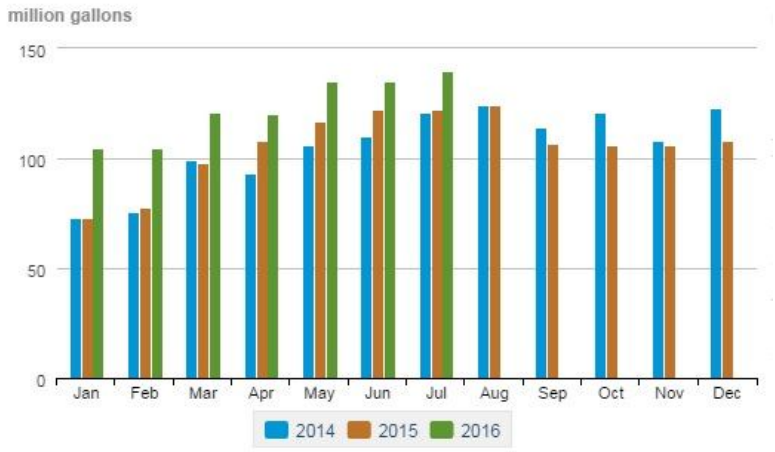

Figure 1. The global amount of monthly production from 2014 – 2016 years [4]

U.S. Energy Information Administration, Form EIA-22M Monthly Biodiesel Production Survey

To stimulate the production and use of biofuels, these countries used policy levers: tax breaks, tax credits. In 2015 the volumes of financial support made in the interest of biofuel production by Canada, the European Union and the United States to $ 25 billion [2].

On the world volume of the use of biofuels 90 % have rare species such as biodiesel and bioethanol. For the production of biodiesel are mostly used vegetable oils or animal fat. Bioethanol is produced by processing vegetable raw materials containing starch (wheat, corn, sugar cane, sugar beet, agricultural crop residues and the like). This is a small fraction of the total world needs, but it greatly affects world agriculture.

Currently, new biofuels account for about three percent of global area allocated to grains and oilseeds and contribute the equivalent of 1.5 million barrels per day (1.6%) to global liquid energy consumption. Most biofuel production comes from maize-based ethanol in the US and accounts for 49% of global biofuel production.

Sugar-based ethanol from Brazil accounts for 20% of the total, while edible oil-based biodiesel and ethanol in the European Union account for 15% (Brazil was the world's dominant biofuel producer until 2000). The remainder is produced by a number of smaller contributors, including Canada, China, and Thailand [5].

The development of the biofuel industry among many scientists is a mixed understanding. The use of agricultural crops for biofuel production could lead to food crisis. Increasing competition between food production and energy crops. To solve these problems can be by clearly defining the production quantities for industrial and energy purposes.

The effective functioning of the biofuel industry is possible if we have science-based organization of production. It is necessary to consider the available raw material base, production technology, potential market, the possibility of cooperation with foreign partners, implementation of incentive systems of production and consumption of biofuels.

World experience of development of competitiveness of States, regions and businesses demonstrates the effectiveness of using cluster technologies. A characteristic feature and advantage of clusters is that attention is focused not on individual companies and also on the relationship between enterprises and institutions, which are part of the cluster. Coordination of interests of participants of the cluster which have one process chain, is provided on the basis of personal relationships due to common goals and territorial proximity of the industrial, service enterprises, scientific institutions and authorities, and so forth [3].

Agro-industrial cluster of the region can combine a range of sectors. For example:

1. Directly cultivation of agricultural crops.
2. Processing of agricultural products into food.
3. The research organization.
4. Labour resources.
5. Investment resources.
6. Material and technical base.
7. Processing of agricultural products for biofuels.
8. The market for food products.
9. The market for biofuels.

The rational combination of these sectors into a single structure allows to clearly organize production processes, to minimize costs, that will enhance the efficiency of management.

Global production of biofuels to increase. In industrialized countries, net-importers of biofuel industry has significant public support. The introduction of scientific developments will shape the new technological order, which in some countries will lead to stabilization and reducing the consumption of hydrocarbon energy resources and decentralized power in some regions [1].

As an agricultural state, Ukraine has significant potential for biofuel production. But insufficient financial support for rural enterprises of Ukraine does not give the opportunity to introduce innovative production technology and management methods. For effective management of agro-industrial complex state support is necessary, a system of incentives to economic agents, the possibility of attracting Ukrainian and foreign partners or investors.

Literature.

1. KravchukO.O. Svitoviy dosvid formuvannya I tendentsiyi rozvitku rinku ridkogo biopaliva [Electronic resource]. – Accessmode: http://natureus.org.ua/repec/archive/1_2013/7.pdf.

2. Zayika S.O. Svitovi ta natsionalni tendentsiyi investitsiy nogorozvitku virobnitstva biopaliva / S.O. ZaYika // Visnik Harkivskogo natsionalnogo tehnichnogo universitetu silskogo gospodarstva. – Vip. 150: Ekonomichni nauki. – Harkiv : HNTUSG. – 2014. – S. 138-147.

3. MaznevG.E. Innovatsiyni tehnologichni klasteri: osoblivosti ta zasterezhennya / G.E. Maznev // Ekonomika APK. – 2013. – № 8. – S. 63-67.

4. U.S. Energy Information Administration, Form EIA-22M Monthly Biodiesel Production Survey

5. http://biofuels-news.com/display_news/10823/world_bank_biofuels_production_key_factor_behind_food_commodity_demand_over_past_decade/

6. http://www.biofuelsdigest.com/bdigest/2016/01/03/biofuels-mandates-around-the-world-2016/