

## **Economic stimulation of the development of agriculture in Ukraine due to integrated use of natural resources and waste**

**Oleksandr Shubalyi\*, Petro Kosinskyi and Vasily Golyan**

*Lutsk National Technical University, Department of Economics, Lutsk, Volyn region, 43018 Ukraine*

*\*Corresponding author: shubalyi@ukr.net*

### **Abstract**

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Ensuring of the integrated use of natural resources and waste based on the development of industries for their in-depth industrial recycling can solve a number of economic, environmental and social problems that have appeared in Ukraine. It is extremely important to create a system of economic stimulation of the development of industries that will work on integrated in-depth industrial recycling of available local natural resources and waste. It is defined the stimulation directions of complexity in the forestry sphere. It is designed the scheme of organization and defined the directions of economic stimulation of integrated use of land resources and waste as a precondition of development of agriculture, recycling industry and renewable energy. It is defined the possibilities and directions of economic stimulation of bioethanol production at the enterprises of the alcohol industry. It is considered the directions and economic stimuluses of complex use of Amber that will be an additional impulse for development of related branches of agriculture and recycling industry. The reactivation process of economic stimulation of agriculture and forestry, recycling industry and renewable energy development through integrated use of natural resources and waste will contribute to: increasing the level of socio-economic development of the state overall; receiving of extra income by economic entities; raising the level of financial self-sufficiency of territorial communities. It is concluded that the formation of an effective system of economic stimulation of agriculture and forestry, recycling industry and renewable energy development through the integrated use of natural resources and waste should become one of the priorities of national natural resource and industrial policy.

*Keywords:* economic stimulation; natural resources; waste; recycling industry; bioethanol

### **Introduction**

In the conditions of the transition of developed countries to a model of resource-saving and environmentally-friendly economic management, the economic mechanism of nature use in Ukraine is aimed at performing mainly fiscal function and doesn't fully use the levers of economic stimulation of the integrated use of all components of natural resource potential. Only integrated approach will allow using all internal reserves in order to increase the environmental and economic efficiency of nature use and create conditions for the stable development of agriculture and forestry, recycling

industry and renewable energy. The main task is to provide an optimal combination of market levers, methods and tools into a single mechanism of economic stimulation, which will create organizational and economic bases for ensuring the integrated use of natural resources and waste.

In foreign sources, the process of economic stimulation of the integrated use of natural resources and waste is considered as an integral part of environmental economics and management, using the terms "environmental economics" and "environmental management". During last years, a number of fundamental works (monographs) of foreign scientists have been paid special attention to this direction (Callan &

Thomas, 2013; O’Riordan, 2016; Mitchell, 2014), which received a significant number of quotes according to Google Scholar. Fundamental researches on this issue are also carried out by other foreign scientists: Barnes et al. (2017), Fang et al. (2014), Mangra et al. (2014), Bergstrom & Randall (2016) and Ambec et al. (2013).

The natural-resource sphere deserves special attention in the process of economic stimulation, since almost all types of natural resources are concentrated in Ukraine. The natural resource sphere is an important factor in the socio-economic development of the national economy at the present stage of market relation’s development in Ukraine. In the present conditions, the availability of certain natural resources (forest, water, land, mineral, recreation) can become a powerful competitive advantage for the development of the economy of the district, region and country.

According to Stoian (1998), in Ukraine the ways of stimulation in the natural resource sphere are realized mainly through payments for nature use, as well as fines in the procedure of administrative responsibility (administrative and economic mechanism), local environmental taxes and charges for excessive pollution of atmospheric air by mobile sources. Insufficient incentive effect of payments for nature use is caused by weak and incorrect accounting of the defective factors of influence, perception and condition.

Such incorrect account of the damaging factors of influence, embranchment and condition is due, in our opinion, to the insufficient level of industrial manufacturing development in our state that explains the use of outdated equipment and technologies which require significant resources and cause environment pollution.

Dudiuk (2011) believes that the formation of an economic mechanism for stimulation of the use of natural resources depends on political, economic and social situation in the state. Thus, the mechanism of economic stimulation of the use of natural resources needs constant improvement.

The development of recycling industries should focus on maintaining the balance between the raw material base and industrial capacities, as well as between the amounts of final product production and the possibilities for its realization. Inconsistency of amount of raw materials and the size of production capacity leads to a violation of the work rhythm, excessive extension or reduction of the length of the production period, underutilization of production capacities, irrational transportation of raw materials and products (Daniali, 2012).

Based on the results of our own previous researches (Golyan et al., 2012; Shubalyi & Kosinskyi, 2017a, Shubalyi & Kosinskyi, 2017b), we believe that the creation and development of processing enterprises around raw material zones has its advantages:

- export of already made products to the external and internal markets, that is, finished goods or components at a significantly higher price (value added);

- cost reduction on transportation of raw materials; optimization of logistic activity, as it is possible in many recycling industries to use different raw materials for the production of consumption products;

- improvement of the economic condition of the region due to financial revenues to the local and state budget (taxes from the activities of industrial recycling enterprises, investments into their development);

- fulfilling of population needs in available products, both in physical and financial plans (food, clothing, pharmaceuticals, furniture, household items, fuel materials, building materials, etc.);

- implication of local people to work at recycling enterprises, will reduce unemployment in the region and increase its social status;

- will assist in developing of innovation activities, scientific and technological progress in the recycling industry;

- will promote non-waste production and improvement of the general ecological status of the region, etc.

Therefore, in order to increase the level of development of agriculture and forestry, recycling industry and renewable energy in our country, there is a need into deepening of scientific researches in the field of economic stimulation of integrated use of natural resources and waste.

The problem of providing integrated use of natural resources and waste should be solved, taking into account current market realities, having formed the appropriate mechanism of economic stimulation, based on taking into account all current problems of nature of users. This will allow justifying the directions of market-oriented levers and tools that will help to restore the work of industries that collapsed during the transition, but today, subject to proper state support, can provide the integrated use of natural resources and waste, in order to get additional income into perspective.

## **Materials and Methods**

Today, there is an important and not so easy task for an economists, which is based on the formation of an effective system of economic stimulation of the development of recycling industries on the basis of local natural resource complexes, which would have contributed to a significant financial flow to the state budget, that implies the growth of the level of economic development of a separate region and the state as a whole, as well as would ensure a sharp reduction of emissions of poisonous pollutants into the natural environment.

While forming system of economic incentives, it is necessary to take into account the peculiarities of the territory where it will function. Proceeding from the current world trends and orientations of the leading world countries, this system should be aimed to limit the scale of nature use in the appropriate regions, to set limits on attracting new natural resources to economic turnover. Thus, the system of economic stimulation of nature use should be aimed at the rational use of natural resources and make ecological pure environment.

The system of state and non-state stimulation of the integrated use of natural resources and wastes should involve the use of various economic instruments (Figure 1).

The peculiarity of the stimulation of the recycling sector itself is to motivate business entities to in-depth recycling of natural resources in order to increase revenues to the state budget as a result of realization of industrial recycling products with increased added value. The mechanism of economic stimulation of processing industries should be directed on the complex use of all available natural resources.

That is, the natural resource complex is a complex system; which separate element practically can't function fully without the help of others.

It is advisable to use the experience of foreign countries to solve domestic problems of economic stimulation (Table 1).

So, overseas stimulation of in-depth recycling of natural resources and resource conservation is carried out, mainly through the establishment and implementation of national development programs, the relevant regulatory and legal acts, own financing of environmental measures and in-depth recycling of natural resources etc.

Economic stimulation in the natural resource sector performs a regulatory function. Affecting to the material interests of entities of the nature management, it motivates to observance with economic requirement established by law.

Thus, environmental and economic stimulation includes:

- taxation (including environmental);
- financial and credit mechanism of environmental activity (preferential lending, subsidization, subventions, etc.);

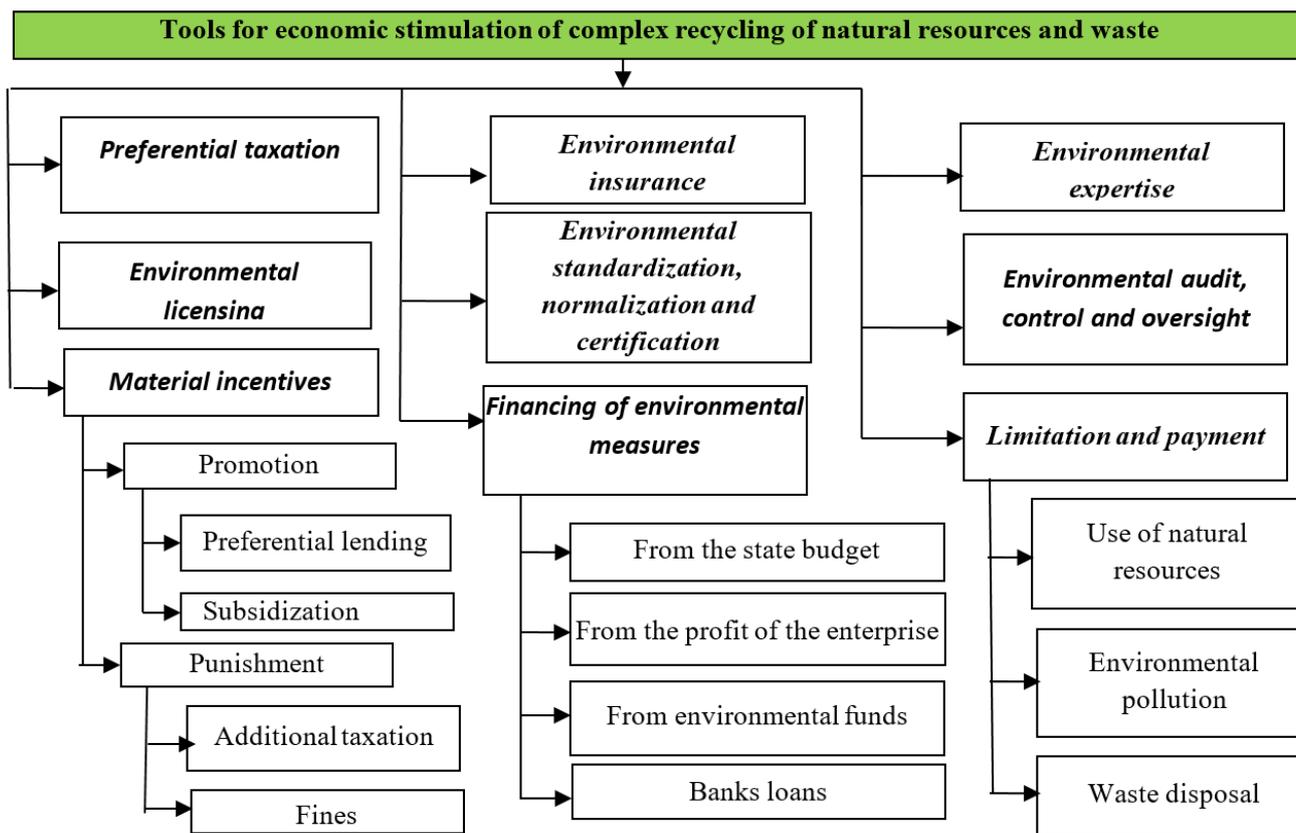


Fig. 1. Instruments of economic stimulation of integrated use of natural resources and waste

Source: authors

**Table 1. Foreign experience in using economic instruments to stimulate the integrated recycling of natural resources and waste within leading economic complexes**

Agro-industrial complex	Forestry complex	Fuel and energy complex
<i>Poland</i>		
Acceptance of the law that defines the legal basis for the protection of arable lands, regulates the methods of handling pesticides; development of policy guidelines to integrate environmental issues into agricultural development projects	Created a program of nature protection; allowed private ownership of forests ; introduced the national forestry program; tax privileges for forests not older than 40 years; forests state support	Created National Agency for the Efficient Use of Energy; started the program of thermal energy restructuring; support of the national fund of the environment
<i>France</i>		
Formed standards for organic products; system of tax crediting; compensation for certification of organic cost	Creation of a security body; filling the forest fund at the expense of the tax taking from forest products and sawmills	Financial stimulation of the use of alternative renewable energy sources
<i>Germany</i>		
Implementation of the country-funded agricultural programs	Large investments in the reproduction and conservation of forests; creation of ecological zones; improvement of the biological active base of forests; high cost of wood	Realization of scientific researches connected with generating (transformation) of heat; development of biodiesel production
<i>USA</i>		
Put into operation the research program of the transition to organic production; improvement of organic standards and certification, improvement of the system of reimbursement of producers' expenses for certification, as well as encouraging farmers to preserve the environment; large domestic investments	Own investments into development of wood recycling; own investments in the reproduction and protection of natural resources; purchase of cheap wood abroad	The promotion of the use of environmental energy sources is accompanied by subsidies, tax privileges, etc.

Source: based on sources: Syaska, 2013; Salikhova, 2011; Oliynyk, 2014

- price policy (use of incentive prices and bonuses for environmentally friendly products, price regulation for primary resources and final products);
- state support to enterprises that implement environmental equipment and control instruments, as well as firms that performs works and provides economic services;
- creation of the system of ecological certification, in particular accreditation of apparatus of environmental certification;
- formation of the market of environmental works and services;
- carrying out a policy of trade in the rights of pollution (use of the mechanism of purchase and sale of state licenses for the right of environmental pollution);
- introduction of accelerated amortization of basic funds for environmental protection purposes;
- licensing on the use of natural resources (license fee).

The development of natural resources sphere will depend on the peculiarities of the forms, methods and tools of its economic stimulation.

## Results and Discussion

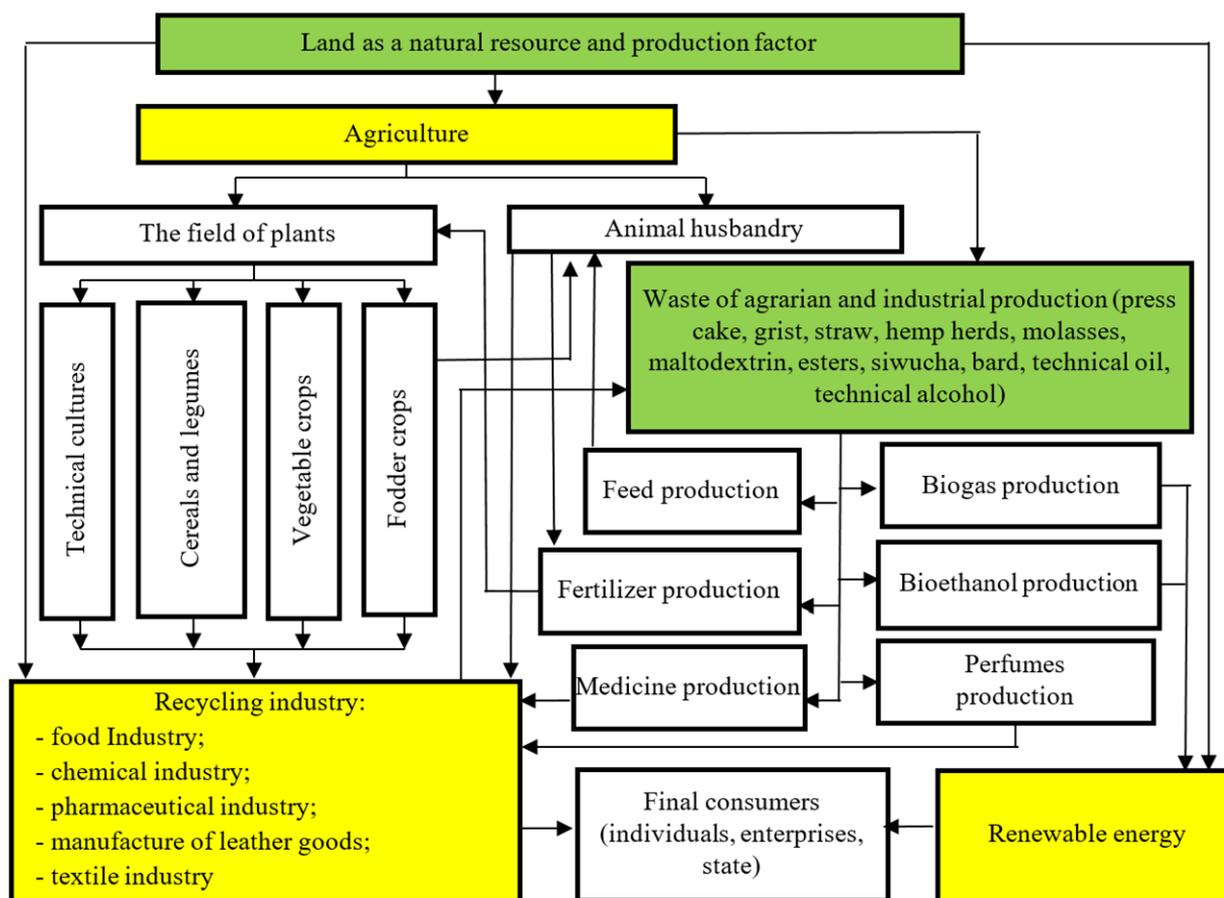
In Ukraine, at the present stage, it is the most useful to develop depth processing of natural resources in the field of

forestry and agriculture. After all, the potential of these areas of the economy is very large, but not fully used, which is manifested in the inappropriate use of natural resources. In addition, there is a constant demand on natural resources that are related to these spheres of the economy, and therefore they are the main source of financial income to the country and local regional budgets.

Agriculture is a very promising area for the development of in-depth processing of natural resources. Agriculture is the main supplier of food raw materials for recycling enterprises. We believe that the most favorable area for the deep development of natural resources in agriculture is plant growing.

Today in Ukraine the development of deep-processed crop production is relevant. These productions will contribute to rational and non-wasteful use of these crops; provide population with environmentally friendly products and increase financial incomes to the budgets of territorial communities. Taking into account the above; it is expedient to create integrated production from the crop production recycling.

The scheme of integrated use organization of land resources and waste as a precondition for the agriculture development, recycling industry and renewable energy is shown on Figure 2.



**Fig. 2. The scheme of integrated use organization of land resources and waste as a precondition for the agriculture development, recycling industry and renewable energy**

Source: authors

It is advisable to include the recycling of cereals and industrial crops in the priority directions of activity, because the main product of their processing will be oil, which will provide needs of the food industry and can be used in various areas of recycling. Also, as the results of the primary industrial processing, wastes and technical products will be formed (press cake, grist, straw, hemp stems, molasses, maltodextrin, esters, siwucha, bard, technical oil, technical alcohol), which will further promote the development of feed, fertilizers, medicines and perfumes productions.

In addition, stimulation of increment of biogas and bioethanol production will contribute to the development of renewable energy. The most suitable for the production of biofuels are agricultural crops, which contain as much oil as possible. Such crops are sunflower, colza, ricinus, soya, corn, sugar beet, mustard, flax and others.

From all listed crops are obtained the following types of fuels: bioethanol and biodiesel. In addition, the production of biofuels from such crops is practically non-waste and involves a closed cycle of production.

One should also take into account the opinion of Markarchuk (2014) that cultures that have high sugar, starch, or cellulose content are used for the production of bioethanol, and biodiesel is obtained through the physico-chemical transformation of plants containing high levels of oil, used oil in the food industry or animal fat.

In addition, oil crops (press cake) have high protein content and, therefore, are quite nutritious, and can be used in the production of mineral fertilizers and feeds for farm animals. That is, the creation of recycling complexes of industrial crops will provide non-waste production.

However, biofuel production has its advantages and disadvantages (Table 2).

**Table 2. Advantages and disadvantages of increasing biofuel production in Ukraine**

Advantages	Disadvantages
1. An alternative to traditional fuels (natural gas and oil)	1. According to small amount of production, the low competitiveness of biofuels with traditional fuels, caused by the high cost of its production
2. Favorable conditions for the cultivation of oil crops	2. Seasonal production of biofuels
3. Demand on colza oil at the world and domestic markets, as well as products for its processing (bioethanol and biodiesel)	3. Violation of trade and economic relations with buyers (consumers) of oil crops, which were formed over the years
4. Increasing of added value due to in-depth recycling of oil crops	4. Possibility of soil exhaustion in the process of cultivating technical crops due to non-compliance of relevant crop rotation
5. Potential to increase the value of oil crops	5. The increase of oil crops production may lead to decrease of other agricultural crops production, which, in turn, can lead to a food crisis in the country
6. Ecological effect (from non-waste production, consumption of biologically pure fuel)	6. Lack of effective position from the state side
7. Providing of energy security of the country and regions	
8. Creation of new workplaces for the local population	

Source: authors

Significant prospects in our state may have the adjustment of bioethanol production at enterprises of alcohol industry based on recycling cereals and industrial crops (Figure 3).

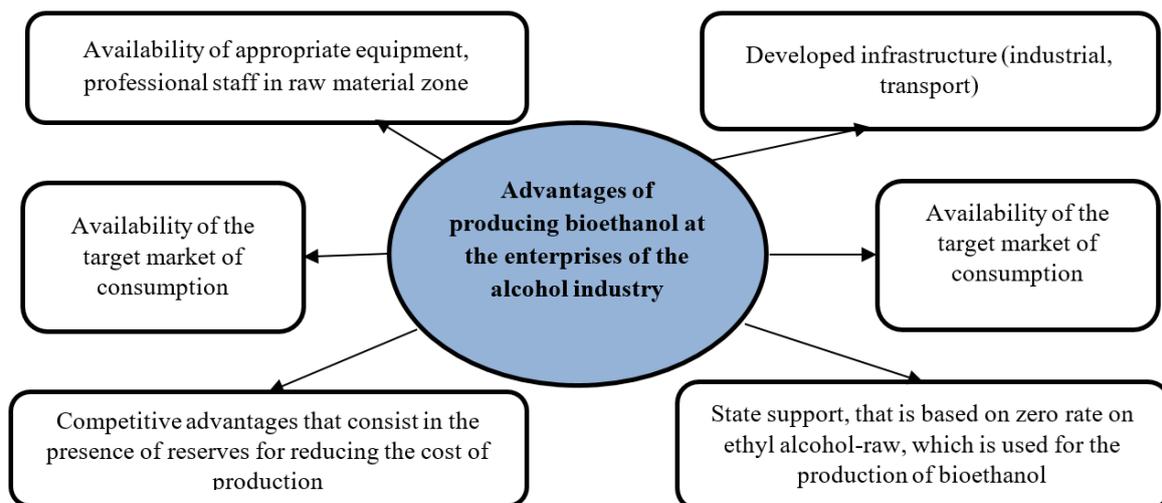
An important technical crop is flax, as it provides three important types of produce: fiber, seeds and hemp stems, which are used as raw materials for the processing industry. Important role has flax seeds, from which are produced oils for wide use in electrical engineering, soapmaking, paper, leather, rubber, pharmaceutical, paint and varnish industries.

Consequently, in the structure of agricultural land, it is necessary to increase the proportion of flax crops, as well as to restore the capacity for its industrial processing. To do

this, you need to use the whole arsenal of methods and instruments of state economic stimulation.

The state should carry out economic stimulation of the development of in-depth processing of technical crops in the following areas:

- stimulation of agricultural producers – compensation of losses incurred due to the cultivation of technical crops (such as flax); provide incentive payments, loans; tax privileges; to create optimal economically justified prices for agricultural technical raw materials;
- stimulation of processing enterprises – granting of tax privileges; simplification of the taxation system; provision of

**Fig. 3. Prospects of the bioethanol production at the enterprises of alcohol industry**

Source: based on Luchechko, 2018

interest-free long-term government loans; exemption from payment of customs duties for imported equipment, coverage of part of its property, etc.;

- stimulation of investors – to create favorable investment climate for domestic and foreign investors; to ensure transparency of the activities of enterprises for the processing of technical crops.

It is also necessary to promote the idea of a healthy lifestyle and consumption of environmentally friendly domestic production among the local population.

Thus, the following economic instruments can be used for the economic stimulation of the development of deep-processed agricultural technical crops:

- state subsidies for agricultural producers – will allow farmers to cover the costs of growing unprofitable or low profitable technical crops (such as sugar beet and flax), which are the main raw material for strategically important industrial enterprises (first of all, light and food industries) that will cause farmers to their cultivation;

- the installation of low prices on raw material – the minimum price must be economically justified, cover the cost of production, and be profitable for its producer;

- government orders – the state's need (for example, to provide the army) in high-quality consumer goods (clothing, food, fuel, etc.) necessitates the creation of appropriate industrial enterprises, which in turn creates demand for raw materials that can be obtained from technical crops;

- facilitating the creation of new or restoration of once powerful industrial processing plants (for example, flax fac-

tories) at the expense of state long-term interest-free loans and full or partial exemption from taxes;

- exemption from payment of import duties for enterprises that have purchased foreign equipment for the processing of industrial crops;

- to promote exporting of finished products, and not raw materials – to maximize taxes on the export of technical crops in raw form and, conversely, to maximally reduce taxes on the export of finished products abroad;

- strengthening control by the territorial communities;

- assistance of territorial communities to investors in allocation of land for organization of processing enterprises;

- direct tax incomes to local budgets;

- to stimulate the transition of local textile and clothing enterprises to linen – can increase the import customs on foreign raw materials, limit the amount of its imports, etc.

Also, today, the actual task is to ensure the legal extraction of amber in the zones of its occurrence. In our country there are all favorable conditions that promote the creation and development of enterprises for the extraction and processing of this natural mineral, namely: huge amounts of amber; the demand for “solar” stone and products from it, both in the domestic and foreign markets; workforce; jewelry factories and individual processing plants for this stones; readiness of the population to legal business in the sphere of extraction and processing of amber, etc.

Industrial amber processing is relevant, as it will increase the value added chain and ensure its use in various types of economic activity (Figure 4).

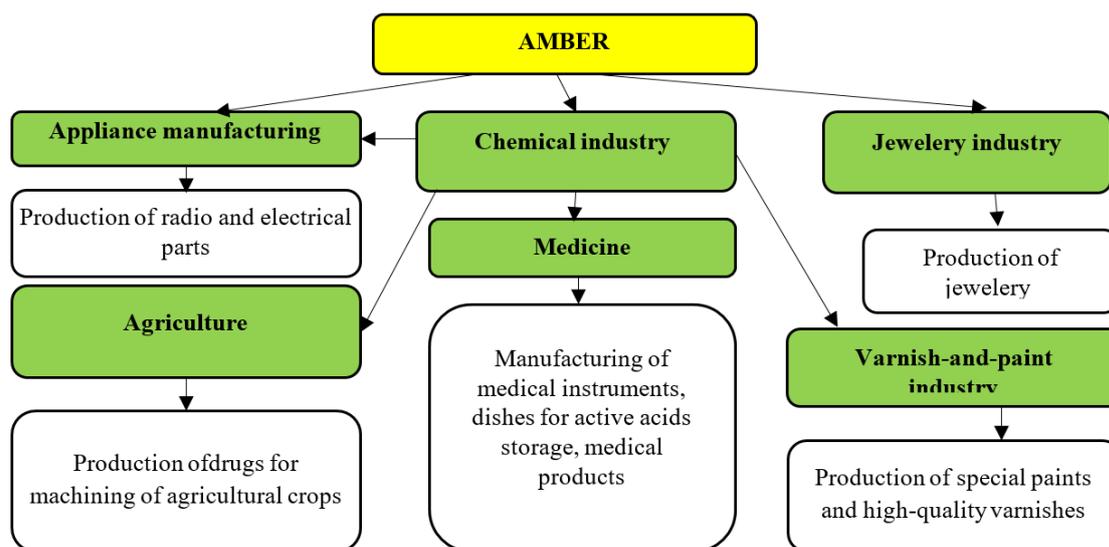


Fig. 4. Directions of integrated use of amber to stimulate the development of agriculture and recycling industry

Source: authors

Extraction, processing and marketing of amber can bring significant additional incomes to the state and local budgets, provide profitable work of economic entities that will be engaged in the development of this type of economic activity, as well as increase the incomes of the population of the respective country territories. This type of economic activity is a prospect for attracting external and internal investments, as there is a stable demand for this natural resource and products for its processing at the world market.

In order to stimulate the development of industrial amber processing, the state should apply the following instruments of economic stimulation:

- providing financial assistance in the form of interest-free long-term loans (for the purchase of searching, mining, processing equipment); tax privileges;
- create favorable conditions for attracting foreign and domestic investments in the development of industrial amber processing in Ukraine, as well as assist entrepreneurs in finding investors;
- to ensure transparency of the registration process and receipt of the certificate of the amber production;
- to charge taxes of processing enterprises to the budgets of the respective territorial communities in order to increase their interest in the transparency of this type of activity;
- to prohibit exporting of amber in raw form abroad;
- to strengthen the public control of the purchasers from the territorial communities in order to legalize the labor force, the amount of amber production, timely and full payment of taxes, etc.

## Conclusions

Providing of the integrated use of natural resources and waste is based on the development of the branches of their in-depth industrial processing can solve a number of problems of economic, ecological and social nature that have arisen in Ukraine. Therefore, it is extremely important to create a system of economic stimulation of the development of industries that will engage in deep industrial recycling of existing local natural resources and waste.

From the side of the state and the territorial communities should be ensured the development of in-depth processing of existing local natural resources and waste through the use of institutional, investment, tax, financial and credit, innovation levers with the wide use of the entire arsenal of economic stimulus tools.

Thus, the process activation of economic stimulation of the development of agriculture and forestry, recycling industry and renewable energy through integrated use of natural resources and waste will promote:

- raising the level of social and economic development of the state as a whole, because such enterprises will send products with a high degree of value added to the external and internal markets, that is, finished goods, but not raw materials or semi-finished products;

- obtaining additional economic benefits by economic entities through the introduction and use of resource-saving technologies that will promote the rational use of available natural resources, their conservation and reproduction, as well as non-waste recycling;

- to increase the level of financial self-sufficiency of territorial communities, as it will enable the local population to be integrated into the complex processing of natural resources, to receive additional tax incomes to local budgets, and to develop the infrastructure of rural areas.

Therefore, the formation of an effective system of economic stimulation of agriculture and forestry, recycling industry and renewable energy development through integrated use of natural resources and waste should become one of the priorities of the national natural resource policy.

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