

## A little about real options and their application in agriculture

When it comes to a real option, it means the right, but not the obligation, to make any management decision in a limited time, relating to a specific investment project or enterprise under conditions of uncertainty.

In the modern world, there are a huge number of such options, for example, in education, the following choice can serve as an option - whether to take entrance exams to a certain university or not. In this case, time is limited by the timing of the exams, while there is some uncertainty in one's knowledge and what questions will be asked in the exams themselves. In the process of preparation, we compensate for uncertainty with new knowledge, that is, we teach, teach and teach again, prepare for exams and already before them we understand the degree of our readiness and make the final decision - to enter the chosen university or not.

Difficult choices often have to be made not only in our personal lives, but also regarding the work of agricultural enterprises. Let's look at some examples of real options in this industry.

### Real options in agriculture:

Option type	Possible real options
Classification by action:	
Sequential investments, option on the stage of project implementation (sequential investments, follow-up investment opportunities)	Organization of a complex for processing agricultural products at an agricultural enterprise. If successful, the next stage may be the production of various packaging, different packaging of the products. Then entering new markets, first in the producing country, and then to the international market.
Growth options	Selection work on seeds and breeding highly productive animals.
Option to abandon, option to exit a business, project	Leasing. Short-term financial investments and investments in long-term securities. Possibility of selling agricultural land, agricultural machinery, livestock farms and obtaining liquidation value. As well as the sale of technology for processing products or breeding developments.
Waiting and learning (option to wait and learn), option to delay the start of the project	The ability to postpone (mothball) investments until new clarifying information about the project is received. Purchase of short-term and long-term securities.
Variation in volumes and variety of products (option to expand or contract, option to scope up or scope down):	Depending on the forecast economic or weather situation, maneuvers are carried out in crop areas, equipment, capital investments, and the use of labor resources.
a) option to develop or replicate experience	Expanding the size of sown areas (if there is a surplus) for highly profitable crops. Expansion of the livestock industry in the presence of production premises (development option) or construction of additional premises (replication of experience).
b) option to reduce business	Reducing the size of acreage for unprofitable products and their

	conservation, use for livestock farming or lease. Reduction of the livestock industry.
Option combinations:	
Switching options	Changes in the specialization of the economy, sales markets, raw materials and equipment. Transition to another technology, for example, processing of own-produced products, transition to environmentally friendly products.
Compound or complex options Due to the fact that demand for an industry product may change, it is sometimes advisable to create a complex option, i.e. option for development and exit. Moreover, unlike a rainbow option, where there are several sources of uncertainty, a complex option has only one source	In the presence of surplus (i.e., not involved in crop rotation) agricultural land, combined with favorable market conditions, it is possible to expand the size of acreage for highly profitable crops. And in unfavorable conditions - a reduction in the size of sown areas for unprofitable products and their conservation, use for livestock farming or lease, up to the sale of agricultural land. A similar option may exist in livestock farming, i.e. if there are production premises, depending on market conditions, it is possible to expand the industry or build additional premises, as well as reduce the industry or sell livestock complexes and obtain liquidation value.

Based on this table, we can say that in such an important sector of the national economy as agriculture there is a wide variety of options, which, if used correctly, can bring additional income to agricultural enterprises or reduce their losses. In addition, due to the significant difference between the types of real options, their classification certainly facilitates the task of selecting a methodology for their evaluation.