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RESEARCH ON DEVELOPMENT OF PRODUCTION INDICATORS OF AGRICULTURE OF ALMATY REGION WITH THE METHOD OF THE ASTROLOGICAL COMPUTER SIMULATION

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Key words: astrological simulation, model Horoscopes, situational model.

Abstract. Work is devoted to the development of a mechanism for effective forecasting of agricultural production at the level of the Almaty region using astrological elements modeling. The proposed technology can be used forecasting managers of industrial and agricultural enterprises in choosing the most effective planning and forecasting solutions.

Planning and forecasting of agricultural production is impossible without reliable forecasting dynamics of agricultural production as the main technical and economic indicators of its effectiveness.

Single, universal prediction method does not exist due to the huge variety of predictable situations and a great variety of forecasting methods (over 150).

The diversity of problems encountered in providing vital activity completely agricultural enterprises and the subject of forecasting, leads to a large variety of forecasts, developed on the basis of certain forecasting methods. Since modern economics has a large variety of forecasting methods, each manager and planner must master the skills of applied forecasting and policy makers responsible for strategic decisions should also be able to make the right choice of prediction method.

Practice planning and forecasting purposes are often full of unrealistic and inadequate methods. Rejection of inefficient administrative-command system was perceived by many politicians, managers and professionals as an opportunity to abandon the forecasting and planning at all. However, this approach is disastrous results of its usual grim. Underestimation of planning and forecasting - a major cause of ruin and bankruptcy of companies in developed countries. Refusal of planning and forecasting leads to ruin and bankruptcy of enterprises.

In the majority of daily situations decisions are made proceeding from current situations on the basis of experience and intuition of the head. But in order to make the qualitative decision it is necessary to expect correctly (to predict) a consequence of the decisions. Therefore the role and the importance of forecasts on the basis of which decisions are made increases. To predict isn't difficult, however, it is difficult to make it correctly and to prove the forecast. For this reason quantitative models of data play more and more noticeable role in creation of forecasts.

Thus, development of modeling methods of economic and production situations and acceptance on their basis of decisions on planning and forecasting of business activity is a necessary condition of ensuring efficiency of business.

The agricultural enterprises cannot directly influence on natural factors but have to consider features of their impact on production. The purpose of agroeconomic systems is the maximum adaptation of production to stochastic weather climatic conditions. For realization of this purpose it is required to solve a problem of an assessment and measurement of degree of a variability of a studied statistical agricultural indicator in various years in certain soil climatic conditions.

A number of researchers connect a variability of efficiency of agricultural production with solar activity. Degree of solar activity is connected with a row all-terrestrial hydrometeorological, productivity

of crops, dairy efficiency of cows, mass reproduction of harmful organisms and so forth. However, researches of dependence of indicators of agricultural production from solar activity (Wolf's number), including our researches, yield ambiguous results [5].

From time immemorial (7 thousand years) people use a horoscope. Representatives of former civilizations without having meteorological stations, unmistakably predicted weather conditions and future crop. In comparison with solar activity (Wolf's number), astrological approach has some differences: duration of a cycle does not change and is equal to 12 years; action delay on live objects is not observed; the horoscope is considered on a lunar calendar and so on.

Essential dependence of agricultural production on natural and climatic conditions became long ago a fact of common knowledge and doesn't demand any arguments and proofs. For example, incidentally developing weather conditions of each agricultural year and climatic characteristics against soil potential predetermine fluctuations of productivity of crops in economy, the area, the country. The crop is a difficult product of interaction of natural and economic factors. Productivity characterizes efficiency of a certain culture in specific conditions of its cultivation. That also is object of research of the real work as a result of interaction of economic and agrotechnical or operated factors and factors meteorological, caused its casual variability.

Thus, climatic conditions are reflected in a long-term variation of crops productivity, and this variation is objectively inherent in any culture and in any region. Therefore, with good reason it is possible to use in forecasting of any indicator of agriculture a systematic component natural climatic - which a factor, i.e., for example, variability of crops productivity by years of a horoscope (the Mouse, the Cow, the Leopard, the Hare, the Dragon, the Snake, the Horse, the Sheep, the Monkey, Chicken, the Dog, the Boar), i.e. with cycle duration in 12 years in a certain region under the influence of climatic conditions.

However, extrapolative approach is anyway reflected in the majority of methods of modern forecasting. However, not everything is settled by this method. There is an alternative approach when the forecasts including a combination of options of development of chosen indicators and the phenomena are created. Thus, each of options of development is cornerstone of the special scenario of the future.

In the estimated concept we will note that for forecasting of indicators of development of branches of agriculture of one extrapolation isn't enough, just as development of modern business without astrological modeling.

Further we will stop on technology of forecasting taking into account astrological modeling.

Based on the above concepts and methodologies described in the interim report [5], we carried forward estimates by type of manufactured products such as crops and livestock in Almaty region. In the course of study and research of the dynamic series features respected accounting principle's horoscope (*Mouse, Cow, Leopard, Hare, Dragon, Snake, Horse, Sheep, Monkey, Chicken, Dog, Boar)*, or, alternatively, variations in the levels of time series, i.e., their deviations from the trend, expressing the trend of levels - the process of flowing data horoscope and therefore all changes of climatic factors accumulated in these years.

The purpose of the study of economic time series is getting its typical characteristics that would choose to predict the most appropriate method, i.e., preforecasting analysis.

To this end, the study begins with an examination of statistical data of crop and livestock sectors of Almaty region (see Ref. [5]), and the task was: to carry out a long-term forecast for the example of grain yield due to climatic conditions, reflecting the long-term variations in crop yields. In turn, climate, manifested by year chart, is simulated by climatic factors through the years horoscope (*Mouse, Cow, Leopard, Hare, Dragon, Snake, Horse, Sheep, Monkey, Chicken, Dog, Boar*).

For economic analysis in order to make the forecast yield of grain crops in Almaty region it is necessary to establish the existence of trends in a time series grain yields (Table 1).

Note that because of the awkwardness of forthcoming calculations, we have developed a working program in the environment of MS Excel, which is widely used in built-in statistics and language VBA. Detail of the program is shown in Fig. 1. The calculations were carried out in a MS Excel spreadsheet automatically in cells N41 and N42.

Further studied and evaluated the dynamics of the oscillation of the trend, i.e. deviations from the trend of the dynamic series. Fluctuations always occur in time, there can be no hesitation out of time, at a given moment. In our case, the oscillations are expressed in year's horoscope.

Table 1 – Dynamics of grain yields in Almaty region

Years	Sequence number, the sample P_t	Yield of grain crops, centers per 1 hectare	$Y_{p(t)}=f(t)$	Rank horoscope (the actual level of productivity) P_y	d	d^2
Sheep -1991	1	10,20	11,72	4	-3	9
Monkey-1992	2	14,60	14,94	8	-6	36
Chicken -1993	3	14,60	15,72	9	-6	36
Dog -1994	4	8,70	10,05	2	2	4
Boar - 1995	5	7,80	9,19	1	4	16
Mouse -1996	6	9,50	10,89	3	3	9
Cow -1997	7	11,10	12,54	5	2	4
Bars -1998	8	14,20	13,35	6	2	4
Hare -1999	9	15,00	16,48	10	-1	1
Dragon -2000	10	14,50	14,15	7	3	9
Snake -2001	11	16,60	17,24	11	0	0
Horse -2002	12	22,60	20,87	16	-4	16
Sheep -2003	13	24,10	24,23	21	-8	64
Monkey -2004	14	21,40	20,16	15	-1	1
Chicken -2005	15	20,80	18,72	13	2	4
Dog -2006	16	21,20	19,45	14	2	4
Boar -2007	17	23,20	22,25	18	-1	1
Mouse -2008	18	17,00	17,99	12	6	36
Cow -2009	19	25,70	24,87	22	-3	9
Bars -2010	20	22,70	21,56	17	3	9
Hare -2011	21	24,00	23,58	20	1	1
Dragon -2012	22	23,40	22,92	19	3	9
Average		17,40	17,40			
Standard deviation		5,72	4,85			
Dispersion		32,70	23,54			
At least		7,80	9,19			
Maximum		25,70	24,87			
Swings in		17,90	15,68			
Amount		382,90	382,86			

We verify the hypothesis of the existence of trends in the dynamic range of grain yields in Almaty region.

Yearly horoscope defines the order of rank (number) grain yields in the ranked list of P_{yi}, which does not always correspond to the sequence number (rank) P_{ti} year (see. Table. 1).

During the period of 1991-2012 years. in Almaty region equation tendencies trend for grain yields is:

$$y_{p_t} = -0{,}0053 \cdot t^2 + 0{,}8685 \cdot t + 8{,}3292$$

and its coefficient of determination was: $R^2 = 0{,}72$.

To account for the oscillation of the annual yield of grain crops, i.e., astrological phenomena due to years horoscope in the equation-NII, the correct serial number of the difference in rank levels under study, a number of direct and ranks years in a row, without changing its dynamics and years horoscope. In this way we estimate the oscillation of and model the features of its year horoscope. The result is a situational model that adequately describes the annual variability of yield data horoscope, that is:

$$y_{p_t} = 8{,}3292 + 0{,}8685 \cdot (t_i - d_i) - 0{,}0053 \cdot (t_i - d_t)^2$$

Fragments of the results of the calculation of this model are shown in Figure 1, where the data from 1992 to 2011 hidden.

Regardless of the type and method of construction of economic and mathematical model, the possibility of its use for the analysis and forecasting of economic phenomena can be resolved only after the establishment of adequacy, i.e. fit of the model under study process or object. Therefore, the main aim of the study is to verify the adequacy of the oscillation of the study of economic and mathematical functions and objectives of the statistical study of the oscillation of grain yields is the following:

- measurement of the force fluctuations;
- study of vibration mode, the oscillation of the decomposition of the complex to the heterogeneous components;
- study the oscillation of the changes over time;
- study of the variation in the spatial oscillation of a set of objects;
- study of the factors for the oscillation and its statistical and mathematical modeling-something.

Thus, as a result of the above analysis, we are to build models of the main trends in data chart, and identified indicators, the degree and type of oscillation of grain yields in Almaty region, which are summarized in Table 2.

Table 2 – Results of the analysis of the oscillation of grain yields in Almaty region

The average yield from 1 hectare hundredweigh t	Indicators for the oscillation				The degree of oscillation of	Stability factor	The actual number of "turning points"	$K_m \pm 2 \cdot 6$	Type of oscillation of
	Absolute			Factor for the oscillation,%					
	Actual	Theoretical	Residues						
17,4	17,9	15,68	3,6	7,0	weak	0,93	6-8	$7 \pm 3{,}78$	random

As calculated above figure does not reflect the evolution of the stability levels and characterizes the stability of levels with minimal vibrations, to estimate the stability of the dynamics of grain yields calculate Spearman rank correlation coefficient.

Coefficient ranks years and levels of the dynamic series can take values ranging from -1 to 1 if the level of each higher than the previous year, the ranks of the levels of a number of years and the same, i.e. continuous growth. When Cr = 0 is unstable growth. The closer to 1 Cr, the more stable the reduction or increase in the studied parameter.

Calculate the correlation coefficient Spearman's rank for grain yields in the Almaty region as follows:

$$K_p = 1 - \frac{6 \cdot 282}{22^3 - 22} = 1 - 0{,}16 = 0{,}84$$, in cell R37 (Figure).

The calculated stability of the dynamics of grain yields in the Almaty region indicates a steady growth of the studied parameter. Therefore, the model for the prediction should provide fixed growth rate projected figure. In case of failure to do so must be entered into the model adjustment, recognizing the current rate of growth by building on the power equal to the value of the coefficient of the growth rate, that is: $y_{(n-i)} = f(y_i)^{\overline{T}}$.

Conclusion on the adequacy of the trend model is, if all of the above check the properties of the residual sequence give positive result. Hence, we have constructed a situational (Horoscopes) trend model is adequate. The coefficient of determination characterizes the effect of the dispersion factor for the total variance, the greater the number, the more dependent on the level of productivity of agricultural activities and other controllable factors, and vice versa. For the theoretical number of interpolated by Horoscopes model, it is calculated by the formula:

$$R^2 = 1 - \frac{G^2_{ост}}{G^2_{общ}}$$, *here* $R^2 = 1 - 0{,}05 = 0{,}95$ *or* 95%, in cell K34 (Figure).

Technology of prognostication of the productivity of grain-crops of the Almaty region with the elements of astrologic design

E27 fx =-0,0053*(B27-($I$14+$I$26)/2-(I3+I15)/2)^2+0,8685*(B27-($I$14+$I$26)/2-(I3+I15)/2)+8,3292

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2	Years		Yield of grain cropsa, centers per 1 hectare	Calculation of situational trend	Point forecast	The upper boundary of the forecast	The lower boundary of the forecast	Py	$d_t=P_t-P_v$	d_t^2	$e_t=Y_t-Y_{pt}$	e_t^2	$\lvert(e_t)\rvert$	$e_t{*}e_{t-1}$	e_t-e_{t-1}	$(e_t-e_{t-1})^2$	$(\lvert e_t\rvert/y_t)$	Criterion of peaks (turning points)	
3	Snake -1989								0										
5	Sheep -1991	1	10,20	11,72				4	-3	9	-1,52	2,31	1,52	0,51	1,18	1,39	0,148862745		
6	Monkey-1992	2	14,60	14,94				8	-6	36	-0,34	0,11	0,34	0,38	-0,78	0,61	0,023150685	-0,34	
7	Chicken -1993	3	14,60	15,72				9	-6	36	-1,12	1,25	1,12	1,50	-0,23	0,05	0,076465753	ЛЕ	
24	Bars -2010	20	22,70	21,56				17	3	9	1,14	1,30	1,14	0,48	-0,72	0,51	0,050132159	1,14	
25	Hare -2011	21	24,00	23,58				20	1	1	0,42	0,18	0,42	0,20	0,06	0,00	0,017533333	0,42	
26	Dragon -2012	22	23,40	22,92	22,92			19	3	9	0,48	0,23	0,48				0,020623932		
27	Snake -2013	23			23,58	27,93	19,23	253	0	282	0,04	31,07	23,60	11,20	2,00	37,20	1,620929647	14	
28	Horse -2014	24			25,50	30,28	20,72	Enter the amount of parameter of trend			3		General number of trning points					14	
29	Sheep -2015	25			28,20	33,60	22,81	RMSR of bits and pieces $S_{(t)}$			1,28		Expected value of number of turning points					13,33	
30	Monkey -2016	26			27,62	33,06	22,18	Coefficient of variability $V_{y(t)}$			0,07		Dispersion					3,59	
31	Chicken -2017	27			27,33	32,96	21,69	Coefficient of random variability d			0,05		Calculation number of turning points					10	<14
32	Dog -2018	28			25,50	31,20	19,81	Factor dispersion			31,22		Verification of the expectation of residues					0,014	<2,003
33	Boar -2019	29			26,43	33,52	19,33	Mean linear deviation			1,073		Checking for normality through a criterion R/S					2,81	1,95-6,55
34								Coefficient of determination R^2			0,95		d - criterion Durbin - Watson					1,58	1,15-1,64
35								Index of correlation h			0,977		The average growth rate in the past					1,032	103,25%
36								Error of approximation			7,37%		The average growth rate in the future					1,029	102,95%
37													Spearman rank correlation coefficient					0,841	>0,3597
38	Average		17,40	17,40							0,004		The autocorrelation coefficient of the 1-st order					8,548	
39	Standard deviation		5,72	4,85							1,22								
40	Dispersion		32,70	23,54							1,48								
41	Minimum		7,80	9,19							-1,52	T_{min}=	1,6794792	<2,823					
42	Maximum		25,70	24,87							2,08	T_{max}=	1,4505677	<2,823					
43	Oscillation amplitude		17,90	15,68							3,59								
44	Sum of		382,90	382,86							0,04								

Thus, in the period of 1991-2012, oscillation of the annual yield of grain crops in Almaty region 95% depends on the controllable factors. Note that the modified model we have a good description of the dynamics of the oscillation of grain yields, as witness to the values of the coefficient of determination, which increased from 0,72 (obtained in the initial trend) to 0,95.

Calculate the index of correlation known formula:

$$\eta = \sqrt{1 - \frac{G^2_{ост}}{G^2_{общ}}} \quad or \quad \eta = \sqrt{0{,}95} \approx 0{,}97, \text{ in cell K35 (Figure 1).}$$

This indicator shows the dependence of the yield on the level of agricultural technology, organization and management. The relationship between yield and controlling factors in Almaty region is strong. The correlation coefficient is significant, since, according to the Fisher test at P = 0,95 and n = 22 significant correlation coefficients are greater than 0,5. Now let us construct point and interval forecast grain crop yield in the Almaty region for 7 years.

As mentioned above, that can justifiably be used in predicting crop yields systematical component of natural factor in the agricultural production, in years horoscope, describing the dynamics of the vibration-admissibility, under which it should be understood statistically measurable long-term variability of yield crops, particularly cereals. Therefore, along the length of the projection period, copy, i.e. we model the dynamics of the oscillation of the installed data horoscope grain yields.

Account the order of the year continues along the length of preemption, and the forecast starting from 2013, the year of "Snake", which is implemented astrological modeling, i.e. energy potential of the current events of 2013. Yield is expected to increase by the amount of the average value of its long-term variability. What is the current value of the order, the projected deducted averaged over cycles horoscope: deviation (volatility) of the previous (neighboring) year of the "Dragon" (which is denoted by $\overline{k}$), and the deviation (volatility) of "Snakes". Further calculation proceeds to the next year horoscope and continues throughout the length of preemption. In this case, over the forecast period $\overline{k} = const$.

After this clarification of situational model to predict grain yields data horoscope in Almaty region is converted to a form:

$$y_{(n+i)} = 8{,}3292 + 0{,}8685 \cdot (n + i - \overline{k} - \overline{d}_i) - 0{,}0053 \cdot (n + i - \overline{k} - \overline{d}_i)^2, \qquad i = 1,2,\ldots L,$$

where $\overline{k}$ – the average value of the oscillation of the previous (adjacent to the beginning of the forecast), on the cycles of the horoscope ($\overline{k} = const$); $\overline{d}_i$ – the average value of the oscillation of the i-th projected year; L – length of the forecast (during pre-emption).

The results point forecast made in the medium MS Excel, shown in Figure 1. Interval forecast is calculated based on the annual oscillation of the yields of the formula:

$$U_i = y_{(n+i)} \pm S_{n+i} \cdot K_i,$$

where

$$K_i = t_\alpha \cdot \sqrt{1 + \frac{1}{n} + \frac{(n+L)^2}{\sum_{i=1}^{n+L} t_i^2} + \frac{\sum_{i=1}^{n+L} t_i^4 - 2(n+L)^2 \cdot \sum_{i=1}^{n+L} t_i^2 + n(n+L)^4}{n \cdot \sum_{i=1}^{n+L} t_i^4 - (\sum_{i=1}^{n+L} t_i^2)^2}}, \quad i = L, L-1, \cdots, 1,$$

here t_α - tabular value of the t-test at a significance level α =0,05 (with degrees of freedom f = 22-3=19, t_α = 2,093); t_i - serial number of the i-th point forecast.

S_{n+i} - standard deviation of the i - the projection year, which taking into account the oscillation of recommended yield calculated by the formula:

$$S_{n+i} = y_{n+i} \cdot V_{y(t)}$$

For example, knowing the value of the coefficient for the oscillation of (0.07), as defined above, we calculate the standard deviation for 2013 according to this formula: $S_{(2013)} = 17,99 \cdot 0,07 = 1,26$ centers per 1 hectare.

We construct an interval forecast of annual average grain yields in Almaty region in 2013-2019. For this we first calculate the average yield for the year, standing in the middle of the term preemption, as an annual average point forecast is a point forecast of the level calculated the trend for the year, standing in the middle of the base term forecasting. The equation of the trend in Almaty region has the form:

$$U_i = y_{(n+i)} \pm V_{y(i)} \cdot y_{n+i} \cdot K_i$$

Prediction error probability 0,95 (t Student test when the number of degrees of freedom n - 3 (22-3=19) and the 0,05 level of significance equal to 2,093) for the predicted data are shown in Table 3 All other calculations are summarized in the same table.

Table 3 – Results of predicting the yield of grain crops in Almaty region, centers per 1 hectare

Years	Meaning of point forecast	$\pm V_{y(i)} \cdot y_{n+i} \cdot K_i$	The value of the interval forecast	
			The upper limit	The lower boundary
2013	17,99	$\pm$ 0,07 · 17,99 · 2,51	21,31	14,67
2014	21,56	$\pm$ 0,07 · 21,56 · 2,55	25,60	17,52
2015	24,87	$\pm$ 0,07 · 24,87 · 2,60	29,62	20,12
2016	20,87	$\pm$ 0,07 · 20,87 · 2,68	24,98	16,76
2017	19,45	$\pm$ 0,07 · 19,45 · 2,81	23,46	15,43
2018	20,16	$\pm$ 0,07 · 20,16 · 3,04	24,67	15,66
2019	22,92	$\pm$ 0,07 · 22,92 · 3,65	29,06	16,77

Graph of the results of point and interval forecasting grain yields in Almaty region is shown in Figure 2 As can be seen from this graph as in point and interval forecasting annual dynamics of the oscillation of the yield data are stored horoscope with a marked tendency to increase the overall growth rate.

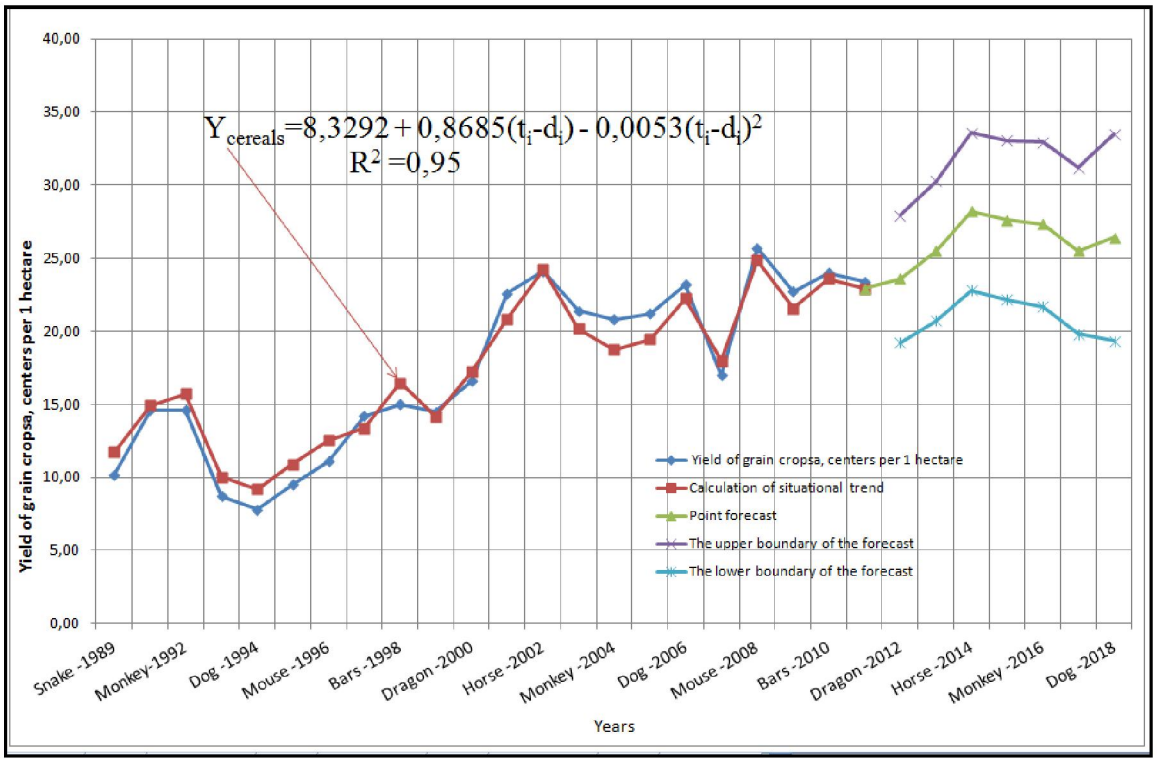

Figure 2 – Graph the results of the forecast yield of grain crops

Thus, with a probability of 0,95 is expected average annual yield of grain crops in Almaty region for the 2013-2019 period within the limits listed in Table 3 and the graph in Figure 2.

Conclusions:

- analysis of the dynamics yields of major crops has shown that since 1991, approximately 1998 was a period of decline in crop yields in Almaty region. Yield of grain crops in 1992 was 14,6 centers per 1 hectare, and in 1995 it was lower by more than two times and amounted to 7,8 centers per 1 hectare. The period from 1999 to the present time can be called evolutionary in nature changes in crop yields. Yields of the same crops, for example, in 2009 were equal to 25,7 centers per 1 hectare;

- the result of the development of agriculture of the region is the fact that currently the main factors forming the crop yields are agro-meteorological conditions. This fact qualitatively changed metho-dological and information support tasks of forecasting and planning crop yields;

- an approach to solving the problem of forecasting crop yields, based on the prediction of the dynamics of their oscillatory character associated with the astrological phenomena, accumulating in years horoscope.

REFERENCES

[1] Akhmetov K.A., Asaev R.A., Ungerbaeva A.E. Astrological forecasting-tion yield of wheat for the Republic of Kazakhstan. Scientific journal "Research results" KazNAU. n 4 (052). Almaty "Aytumar», 2013. N 4.

[2] Butakova M.M. Economic Forecasting: methods and techniques for practical calculations: a tutorial. M.: KNORUS, 2008. 168 p.

[3] Dubrova T.A. Statistical methods for forecasting: a textbook for high schools. M.: UNITY-DANA, 2003. 206 p.

[4] Minko A.A. Forecasting in business with the help of Excel. Just as ABC. M.: Penguin Books, 2007. 208 p.

[5] Research Report on "Production functions in the planning and forecasting of agricultural production of the Republic of Kazakhstan" (step 2013 Intermediate), № State registration of 0112RK001149. Almaty, 2013. 187 p.

АСТРОЛОГИЯЛЫҚ МОДЕЛЬДЕУ ЭЛЕМЕНТТЕРІН ПАЙДАЛАНЫП АЛМАТЫ ОБЛЫСЫ АУЫЛ ШАРУАШЫЛЫҒЫНЫҢ ӨНДІРІСТІК КӨРСЕТКІШТЕРІН БОЛЖАУ

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Тірек сөздер: астрологиялық модельдеу, гороскопиялық модель, жағдайлық модель.

Аннотация. Жұмыс астрологиялық модельдеу элементтерін пайдалану арқылы Алматы облысы деңгейінде ауыл шаруашылығы өндірісінің дамуын ұтымды болжау механизмін даярлауға арналған. Ұсынылып отырған болжау технологиясын тиімдірек жоспарлау және болжау шешімдерін таңдауда өндірістік және ауыл шаруашылығы кәсіпорындарының жетекшілері пайдалануы мүмкін.

ПРОГНОЗИРОВАНИЕ ПРОИЗВОДСТВЕННЫХ ПОКАЗАТЕЛЕЙ СЕЛЬСКОГО ХОЗЯЙСТВА АЛМАТИНСКОЙ ОБЛАСТИ С ИСПОЛЬЗОВАНИЕМ ЭЛЕМЕНТОВ АСТРОЛОГИЧЕСКОГО МОДЕЛИРОВАНИЯ

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Ключевые слова: астрологическое моделирование, гороскопическая модель, ситуативная модель.

Аннотация. Работа посвящена разработке механизма эффективного прогнозирования развития сельскохозяйственного производства на уровне Алматинской области с использованием элементов астрологического моделирования. Предложенная технология прогнозирования могут быть использованы руководителями промышленных и сельскохозяйственных предприятий при выборе наиболее эффективных плановых и прогнозных решений.

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