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Foresight Requirements in Governance for Applicability of Emerging Technologies; With Emphasis on Achieving Sustainable Agriculture in Iran

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Abstract

Purpose: Foresight deals with giving shape to the desirable world of tomorrow for a society: therefore, the main purpose of the research is to identify the requirements of foresight in governance for the applicability of emerging technologies with an emphasis on achieving sustainable agriculture in Iran

Method: This research was conducted as part of quantitative research and survey method. Its statistical population was 641 agricultural technology experts, 314 of whom were studied by stratified random sampling method with appropriate attribution.The data collection tool was a questionnaire whose form validity was confirmed using experts' opinions and its reliability was confirmed by calculating the Cronbach's alpha coefficient (0.931)

Findings: Findings: The use of technologies plays an important role in the optimal use of basic production resources, and changing the perspective of agricultural users is the first priority of the foresight requirements in governance for the applicability of emerging technologies to achieve sustainable agriculture. The results of exploratory factor analysis showed; 5 factors of realizing sustainable agriculture, increasing efficiency and productivity in agricultural production, technologicalizing production in agricultural sub-sectors, developing the culture of technology and innovation in society, and developing the infrastructure required for emerging technologies, totaling 75.57% of the desired variance.

Conclusion: Foresight in governance is effective for the applicability of emerging technologies in Iran's agriculture: therefore, in order to develop technological agricultural units in agricultural sub-sectors and achieve sustainable agriculture, it is necessary with national determination and will based on a plan. A comprehensive and forward-looking operation, appropriate supports and incentives should be considered by the statesmen.

Keywords: Governance, Foresight, Emerging Technology, Technology Development, Sustainable Agriculture

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Introduction

The development of technologies, while contributing to economic growth and increasing the production of agricultural products, has adverse effects on the environment and is accompanied by the destruction of basic resources and has created concerns in meeting the needs of the future generation and the sustainability of agricultural production, especially in developing countries. (Iskandari Nesab et al., 1400). Several factors play a role in the development of technologies, one of the most important of which is technology governance with a foresight approach. According to Namdarian (2016), technology foresight is a relatively new and innovative tool that is expanding worldwide to help technology policymaking and can provide the necessary data for policymaking in the field of technology. Secondly, to identify the weak but important signs that will lead to the evaluation and readjustment of the desired policies.In this regard, technology governance is also a way that involves stakeholders in decision-making groups and allows them to participate along with all levels of government officials and other members related to the issue (Luciano, 2021). According to David (2021), it is conventional to some extent through governance to support the scientific, entrepreneurship and policy communities that seek to manage the risks and benefits of technology, and foresight of basic technology to identify threats and opportunities. Technology is in today's ever-changing environment.Prioritizing the requirements of foresight helps different variables to be considered as the main factors in the implementation of the foresight process and their importance is determined; Therefore, the basic issue of the research is that the governance of emerging technologies has what needs and future-looking components for the realization of sustainable agriculture? In this regard, the general purpose of the research; It consists of recognizing and explaining the requirements and needs of foresight in governance for the applicability of emerging technologies with an emphasis on achieving sustainable agriculture by stimulating attention to the environmental needs of the target community and the needs to pay attention to the contribution of generations. The future can keep them dynamic and active (figure 1).

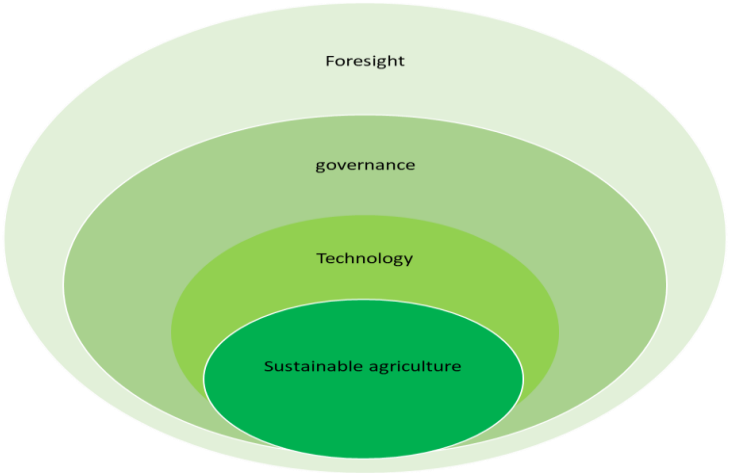

Figure-1: The conceptual relationship between futurism and governance, technology and sustainable agriculture

Methodology

From our point of view, the research is one of the quantitative researches, based on how to collect the required data, it is a survey, and from the point of view of the goal, it is one of the applied researches that was carried out in the descriptive-survey method in 1402. The statistical population includes 641 experts in the field of studies, policy making, planning, supply, production and supply of modern agricultural technologies and equipment as well as users of emerging technologies in Iran based on Krejcie and Morgan table. (1970), 314 of them were studied as a sample. The data were collected using a structured research questionnaire, the validity of which was confirmed by using the opinion poll of experts in the field of research and the reliability of the measurement tool by calculating the internal consistency of the questions using Cronbach's alpha coefficient (0.931). becameTo analyze the data, in descriptive statistics, percentage, average, minimum, maximum, standard deviation and coefficient of variation statistics were used, and in inferential statistics, exploratory factor analysis technique was used in order to identify the influential requirements in governance foresight. For the applicability of emerging agricultural technologies in achieving sustainable agriculture, 30 variables were used and included in the analysis. The amount of variance in the data that can be explained by the factors was measured by the KMO test and its value was 0.769. Also, Bartlett's test was significant and shows that the data are confirmed for factor analysis (Table 1).

Table 1 - Bartlett and KMO test results

0/769	**Sampling adequacy size**	
5	Approximate chi-square	Bartlett's test
253	degree of freedom	
0/000	meaningful	

Results

According to the obtained data, the average age of the studied sample is 43 years, 71.3% of them are male and 28.7% are female. is Examining the coefficient of change of factors influencing foresight in the governance of the applicability of emerging technologies to achieve sustainable agriculture also showed that the change in the vision of agricultural users, the development of export-oriented agriculture, the improvement of the quality of agricultural products, the increase in the quantitative performance of agriculture and development Health-oriented agriculture has the most importance and priority. The results of the factor analysis showed that five factors in total explain 75.57% of the variance of foresight requirements in governing the applicability of emerging technologies to achieve sustainable agriculture (Table 2).

Table 2 - Factors related to the needs of foresight in the governance of emerging technologies for the realization of sustainable agriculture

row	Name of the factor (forecasting requirements in....)	special value	Percentage of explained variance	Cumulative percentage of explained variance
1	Sustainable and optimal use of natural resources	2/593	16/83	16/83
2	Increasing efficiency and productivity in future agriculture	2/309	15/63	32/46
3	Technologicalization of production in agricultural sub-sectors	3/083	15/09	47/55
4	Development of technology culture and innovation	2/785	14/34	61/89
5	Strategic management of technology development	2/831	13/68	75/57

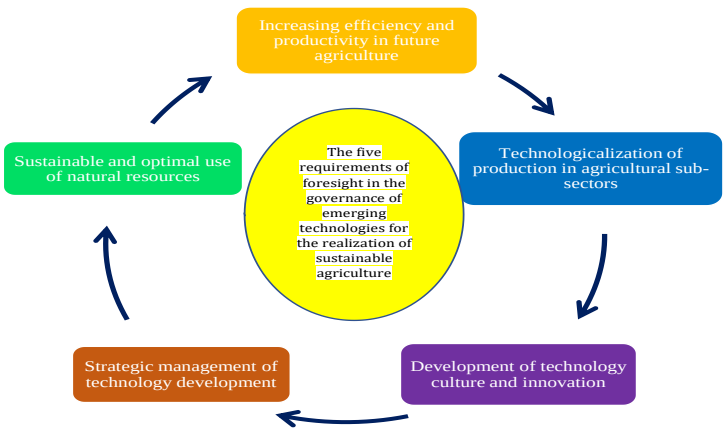

Figure 2- The five needs of foresight in the governance of emerging technologies for the realization of sustainable agriculture (source: research findings)

Conclusions

The results of this research, which was carried out with the aim of explaining the requirements of foresight in the governance of emerging technologies in achieving sustainable agriculture, showed that emerging technologies protect natural resources, pay attention to their contribution to future generations, and contribute to water sustainability. soil and improving food security help to realize sustainable agriculture. Also, five factors requiring sustainable and optimal use of natural resources, increasing efficiency and productivity in agricultural units, technologicalizing production in agricultural sub-sectors, developing technology and innovation culture and strategic management of technology development - 15.75% of the variance, The needs of foresight in governance explain the applicability of emerging technologies to achieve sustainable agriculture in Iran. These results, earlier in the research of Santiteerakul et al., 2020; 2021 Othmane Friha et, al., and Wreglesworth, 2023 2021 Jerotich; 2020 et al, Mustashkina; Boehlje and Langemeier, 2020 and 2022 Farooq et al.,, Matthew, 2022;
Khoshkhoi et al., 2023. 2020 et al., Morara and Etamadi, 2021 have been confirmed.Based on the obtained results, it can be said that there are suitable conditions for foresight in the governance of emerging technologies in the context of the development of technological agriculture in Iran. The development of emerging technologies in the field of technological agricultural activities, in addition to helping to protect basic agricultural resources, lays the groundwork for the entry of educated youth into the agricultural production sector; Therefore, it is suggested.
-The development of technological agricultural units, with the benefit of emerging technologies, should be considered and supported.

-The field of innovation, development, localization and application of emerging technologies in agriculture should be provided.

-Informing the target community about the capabilities and capacities of emerging technologies should be considered.

-Attention to the contribution of the future generation in the environment and natural resources should be institutionalized in the general culture of the society.- By replacing foresight with foresight, the realization of sustainable agriculture and a favorable future should be accelerated by using emerging technologies.

-To support prospective applied research to make emerging technologies applicable in agricultural sub-sectors

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