

Comparative Assessment of Adaptation Preparedness of Company and State Policy to Climate Changes in Agriculture and Tourism

Maya Kerezieva*

Summary:

The current research is focused on the extremely urgent issue of adaptation to climate change in two of the most vulnerable sectors of Bulgarian economy, namely agriculture and tourism. The author presents a system of indicators which is the ground for evaluation of the adaptation preparedness at business and state level for each of the studied economic sectors and which helps identify the adaptation policy weaknesses and formulate recommendations for improvement. Based on the methodology used, the results of the study show that adaptation preparedness is alarmingly low in both sectors. Despite the fact that the majority of company representatives declare that they are already facing the negative consequences of climate change for their businesses and that they demonstrate high motivation for implementation of adaptation practices, the presence of various barriers prevents them from moving from the planning to the implementation phase of the selected adaptation strategy. On the other hand, state institutions are currently focused on an initial phase of research and planning of adaptation measures and currently are unable

to support Bulgarian businesses in their efforts to adapt to climate change. Bulgaria lags behind most of the European companies such as Austria, Belgium, Germany, Malta, the Netherlands, Spain, Switzerland and UK, which are quite advanced in terms of their climate change adaptation policies. This delay puts the competitiveness of the agriculture and tourist sectors under the risk of climate change threats.

Key words: adaptation, climate change, index, agriculture, tourism

JEL Classification: Q54

1. Introduction

The United Nations' Framework Convention on Climate Change (UNFCCC) from 1992 recommends that member states should «formulate, implement, spread and regularly update national and, if necessary regional policy and measures for adequate adaptation to climate change» (United Nations, 1992). In the EU Strategy for Adaptation to Climate Change (European Commission, 2013), Member States are advised to take adaptation measures at all levels - local, regional, national and prepare national adaptation strategies. In the current programming period from 2014 to 2020 the

* PhD student, Economics of Natural Resources Department, UNWE; e-mail: mayakerezieva@gmail.com

Articles

European Commission has allocated over 20% of their budget to action on climate change, including adaptation measures. All this testifies to the importance that the international community attaches to adaptation to climate change as a tool to mitigate the effects of climate change and possibly to benefit from opportunities to ensure sustainability of national economies.

At present, however, there is no explicit policy on climate change adaptation in Bulgaria, a national adaptation strategy has not been prepared yet and the measures taken are single. It would be useful to research whether the business is already vulnerable to the impacts of climate change, if there is any motivation for adaptation and in which directions businesses need support from the State. Since climate change vulnerability in socio-economic systems varies according to the type of economic activity, it is appropriate that the analysis is done at sectoral level and the data should be summarized per economic sector. The sectors of agriculture and tourism are especially vulnerable to the impacts of climate change and this is the reason why the author seeks to explore the level of adaptation preparedness to climate change by companies and government institutions.

The specific objectives of the study are as follows:

- to develop a system of indicators to assess the adaptation preparedness of a socio-economic system. The indicators should be applicable to any sector of the economy and should allow evaluation at different levels: business and government.
- to assess the extent of adaptation preparedness at the state level by examining the process of preparation of public adaptation policy and its implementation for two sectors of the Bulgarian economy: tourism and agriculture.

Comparative Assessment of Adaptation Preparedness of Company and State Policy to Climate Changes in Agriculture and Tourism

- to assess the extent of adaptation preparedness at company level by examining the attitudes to adapting to climate change and identifying adaptation measures in corporate strategies for autonomous adaptation in the tourism sector and the agricultural sector.
- to compare the adaptation preparedness in agriculture and in tourism at both company and institutional level.

2. Methodology for assessment of adaptation preparedness to climate change

In this study, the method for assessing policies is based on "Evaluation of indicators", also called "Benchmarking"(Nonchev, 2009). This method makes it possible to cover the whole process of adaptation starting from its initial to final stages. The assessment of adaptation preparedness is based on a system of indicators whose values are monitored to assess the degree of achievement of objectives and concrete results achieved in the implementation of policies and programs (Nonchev, 2009). The author of this study developed two separate indexes: the first one estimating adaptation preparedness at company level and the second one estimating adaptation preparedness at institutional level.

Indicators for assessing adaptation preparedness at company level are based on a study of Fankhauser and his team according to which the factors for effective autonomous adaptation include the presence of proper motivation, awareness, resources and competencies by private agents (Fankhauser, Samuel, Joel B. Smith, and Richard SJ Tol. 1999). Each of the above mentioned indicators are studied in particular through detailed performance indicators described in Table 1.

Articles

Table 1. Indicators of adaptation preparedness at company level

General indicator	Performance indicator
1. Motivation	1.1. Representatives of the company are aware of the existence of climate change in recent years. 1.2. Representatives of the company are aware that climate change is affecting the development of their business. 1.3. Representatives of the company have a clear idea of the direction and strength of climatic impact. 1.4. Representatives of the company believe that influences require adaptation measures.
2. Information awareness	2.1. Representatives of the company are familiar with the opinion of NIMH for registered so far climate change. 2.2. Company representatives have shown interest in seeking expert information about the impact of climate change on the economy and their industry. 2.3. Representatives of the company are informed about European Commission recommendations on measures for adaptation to climate change. 2.4. Representatives of the company are aware of the adaptation measures, undertaken by the same or similar businesses from across Bulgaria and abroad.
3. Competencies	3.1. The choice of adaptation strategy of the company is based on a professionally developed analysis and evaluation. 3.2. The management team and the employees of the company possess know-how on the implementation of organizational and production adaptation. 3.3. Employees are trained to work in new climatic conditions (introduction of new technology, using new materials or machines). 3.4. A positive result from the implementation of the adaptation policy of the company occurs or is expected in the medium term (next five years).
4. Access to financial, technological and human resources	4.1. The company has its own funds and / or has used EU funding to secure investment in adaptation measures. 4.2. The company uses insurance to cover unexpected costs due to extreme and catastrophic weather events. 4.3. The company has sufficient human resources to ensure organizational adaptation... 4.4. The company experiences no difficulties in the procurement of the desired new technologies or materials to adapt to altered climatic conditions.

The presence of each performance indicator is assessed by one point. The overall assessment of adaptation to climate change preparedness of a company is calculated by Formula 1. The adaptation preparedness for each studied sector is equal to the mean value of the preparedness evaluation of all surveyed companies in the sector. This method is repeated twice for each sector, namely once for agriculture and a second time for tourism. Then the final index for adaptation preparedness is presented by sector, based on which conclusions and recommendations are formulated.

$$\text{Ind A} = (\text{dm} + \text{di} + \text{dk} + \text{dr}) / 16 \quad (1)$$

where:

Ind A - Index of adaptation preparedness of companies

dm - assessment of indicator "Motivation"

di - assessment of indicator "Information awareness"

dk - assessment of indicator "Competencies for adaptation"

dr - assessment of indicator "Access to financial, technological and human resources"

Table 2. Indicators of adaptation preparedness at the state level

State function	Performance indicator
1. Research	<ol style="list-style-type: none"> 1.1. Current and future dynamics of climate stimuli that influence the activities in the sector are studied. 1.2. Sensitivity and vulnerability of economic activities in the sector are evaluated. 1.3. The state authority has implemented a procedure for continuous monitoring of the dynamics of climate stimuli and the state of natural resources, which are important for the sector. 1.4. A list of existing adaptation activities in the sector has been drawn and the efficiency of these activities has been studied in order to choose which of them will be repeated in the future. 1.5. Climate change adaptation practices from foreign experience have been studied in order to choose which of them are applicable in the sector. 1.6. The institution has studied and evaluated uncertainty in the outlook of climate scenarios and has provided risk management in the sector.
2. Planning	<ol style="list-style-type: none"> 1.1. Strategic goals for adaptation in the sector have been set for different time horizons: <ul style="list-style-type: none"> - Short-term plan by 2020. - Mid-term plan by 2050. - long-term plan by 2080 – 2100. 1.2. Alternative adaptation measures for the economic sector have been studied and evaluated based on various criteria, such as cost, benefit and effort. 1.3. The adaptation strategy for the sector has been elaborated. 1.4. An assessment of the human and financial resources for adaptation in the sector has been done and sources of funding have been identified. 1.5. An evaluation of the environmental impact and socio-economic effects of the implementation of the selected sector adaptation measures has been done. 2.6. Adaptation measures for cross-border cooperation with neighboring countries have been chosen.
3. Coordination	<ol style="list-style-type: none"> 3.1. Long-term commitment to adaptation in the sector has been publicly declared. 3.2. There is coordination between the leading institution policy for adaptation to climate change and the ministries / departments / agencies responsible for sectoral policy implementation. 3.3. Scientific and research institutions have been involved in the process of decision making. 3.4. Representatives of companies from the sector have been involved in adaptation policy creation. 3.5. NGOs, interested in adaptation to climate change in the sector, have been involved in the process of decision making. 3.6. The necessity to adapt to climate changes in the sector has been officially stated by high authority government officials. Information campaigns have been conducted in order raise the awareness of the general public.
4. Implementation	<ol style="list-style-type: none"> 4.1. Adaptation strategy for the sector is harmoniously integrated into sectoral policies and plans. 4.2. The experts responsible for the implementation are thoroughly familiar with the objectives of the selected adaptation measures, the overall time frame and the resources allocated for adaptation in the sector. 4.3. A detailed implementation plan exists with a breakdown of the specific tasks, the deadline for their achievement and the responsible persons as well as criteria for assessing their effectiveness. 4.4. Previously planned deadlines are respected. 4.5. Allocated resources are not exceeded. 4.6. The undertaken responsibilities are respected.
5. Monitoring and evaluation	<ol style="list-style-type: none"> 1.6. Measurable and clear indicators to assess the effectiveness of adaptation measures have been identified. 1.7. A specific procedure for monitoring has been adopted. 1.8. Periodic reports with information on the progress of the achievement of goals are elaborated. 1.9. The effectiveness of adaptation measures is being constantly monitored and the ones that are not efficient enough are replaced on time. 1.10. Updates on resources planning are done on time. 1.11. Changes in the external environment are monitored.

Articles

The system of indicators for assessing the adaptation preparedness of state institutions is based on the experience of foreign countries, according to which the state must meet the following essential objectives to ensure a successful adaptation policy: undertake research, make realistic planning, ensure coordination among state authorities and business, NGO and scientific sectors, guarantee the timely implementation of policies, provide monitoring and evaluation. Table 2 contains indicators and criteria for evaluation of the implemented actions across sectors based on the recommendations for application of best practices in managing adaptation to climate change from the EU Adaptation strategy (European Commission, 2013).

The performance of each state function (research, planning, coordination, implementation, monitoring and evaluation) is being evaluated by six indicators, which represent concrete tasks that should be fulfilled. Each task can be evaluated as unfulfilled (0 points), partially fulfilled (1 point) or fully accomplished (2 points). Therefore, the sum points for each of the five functions ranges from 0 to 12 points and the total for the assessment of the adaptation preparedness of state institutions varies from 0 to 60. The final index for the adaptation preparedness of state institutions for each economic sector is calculated by the mean of the scores for the different functions according to formula 2

$$\text{Ind PI} = (\text{da} + \text{dp} + \text{dc} + \text{dr} + \text{dm}) / 60 \quad (2)$$

where:

Ind PI - Index of adaptation preparedness of state institutions

da - assessment of the performance of the research function

dp - assessment of the performance of the planning function

dc - assessment of the performance of the coordination function

dr - assessment of the performance of the implementation function

dm - assessment of the performance of the monitoring and evaluation function

When assessing both the adaptation preparedness of companies and state institutions, the interpretation of the final result is as follows:

- If the Index of Adaptation Preparedness = 1 => preparedness for adaptation in the sector is very good (100% of the indicators are available);
- If the Index of the Adaptation Preparedness is in the range from 0.75 to 0.99 => preparedness for the adaptation in the sector is good (at least 75% of the indicators are available);
- If the Index of the Adaptation Preparedness is in the range from 0.50 to 0.74 => the preparedness for adaptation in the sector is moderate (at least 50% of the indicators are available);
- If the Index of the Adaptation Preparedness is in the range from 0.25 to 0.49 => the preparedness for the adaptation in the sector is low (at least 25% of the indicators are available);
- If the Index of the Adaptation Preparedness is in the range from 0 to 0.24 => the preparedness for adaptation in the sector is absent (less than 25% of the indicators are available).

3. Comparative assessment of adaptation preparedness in agriculture and tourism

The sample of interviewed company representatives included 74 respondents for each studied economic sector and they were chosen by simple random selection. Respondents answered questionnaires, which included one question for each of the indicators for the adaptation preparedness at company level. According to the chosen methodology for interpreting the responses from the survey of companies in the agricultural sector on their corporate policies for the adaptation to climate change, the adaptation preparedness index equals 0.42 points, which means

that farms in Bulgaria have demonstrated less than 50 % of the signs for adaptation preparedness. Businesses in the tourism sector showed adaptation preparedness index equaling 0.47 points, which means that tourist companies in Bulgaria also demonstrated less than 50% of the signs for adaptation preparedness.

Each factor for the adaptation preparedness at company level was examined by 4 survey questions designed to ascertain whether the factor is available in the company. Based on the results for each indicator, we can now identify where progress is greatest and which are the weaknesses in both sectors surveyed. Figure 1 presents a general picture of the existence of the factors for adaptation preparedness in the two studied sectors.

and implementation of the adaptation policy. The study showed that despite the fact that there are some official publications on the existence of climate changes in Bulgaria and there are analyses containing advice on adaptation measures that are recommended in the surveyed sectors, representatives of companies are not familiar with these documents (Bulgarian Academy of Sciences, 2010). Their low awareness hampers the objective of making correct management decisions on the company's adaptation strategy. The lack of official information awareness could lead to weaker competencies to choose and implement efficient adaptation measures. According to the survey, a significant majority of respondents take management decisions based on intuition. They admit that there

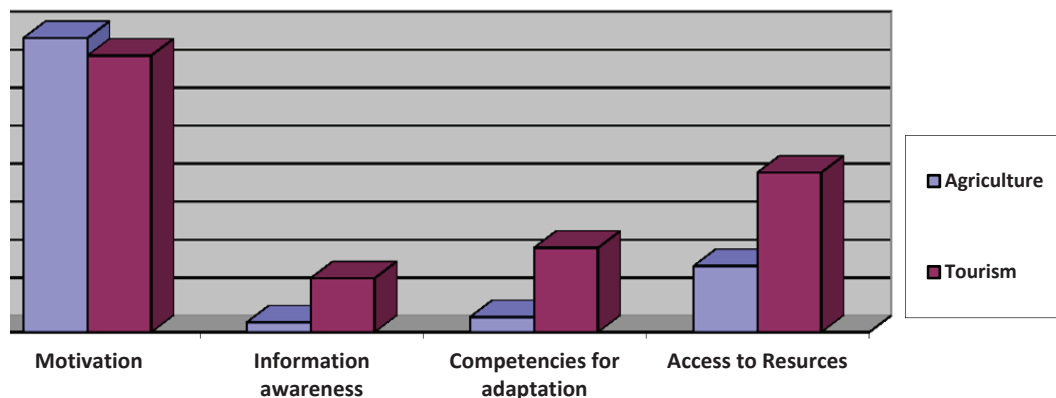


fig. 1. Comparative assessment of the adaptation preparedness at company level in the sectors of agriculture

Source: Author based survey

The motivation to undertake adaptation measures is particularly high in both sectors and we can notice a slight advantage in the agricultural sector. The second highest factor is "Access to resources", which is available to a bigger extent in the tourism sector. The "Competencies for adaptation" and "Information awareness" factors are poorly demonstrated in both sectors and this fact should be alarming for the institutions responsible for the formulation

is a general lack of know-how on climate change adaptation in the company and do not believe that the employees are ready to deal with changes in the organizational or production process due to climate change. Despite this negative picture, in most cases staff trainings on adaptation practices have not been conducted in the company yet.

Based on the methodology for assessing the adaptation preparedness of state institutions, the activity of the responsible

Articles

head authorities in both studied sectors was analyzed (Ministry of Environment and Water and Bulgarian Academy of Sciences) and also sectoral agencies involved in the integration and implementation of state policies related to climate change were interviewed (HC, 2014). Six indicators for the performance of each of the five state functions related to the implementation of adaptation policies at sectoral level were evaluated. After applying the formula, the results show that the adaptation preparedness of the state institutions from the tourism sector is as low as 0.18 points and the adaptation preparedness of the state institutions from the agricultural sector is 0.40 points. Figure 2 illustrates the comparative performance assessment for the adaptation preparedness of the state institutions by sector. Figure 2: Comparative analysis of the performance of the studied public functions for the adaptation to climate change in agriculture and tourism

sectors. As for the "Planning" function, both sectors are at an early stage. Sectoral adaptation strategies have not been prepared yet and they are expected in late 2017. This is particularly alarming given that these strategies are requested by the European Commission to allow the utilization of funds for climate change adaptation, coming from the operational programs for the period 2014-2020. As a result of this delay, Bulgaria has missed opportunities for absorption of EU funds for adaptation. The degree of involvement of the private sector, the research community, NGOs and the general public in the process of formulating adaptation policies, progress in agriculture are noticeably higher than in tourism. In the field of agriculture, the necessity for urgent climate change adaptation is clearly stated by representatives of the

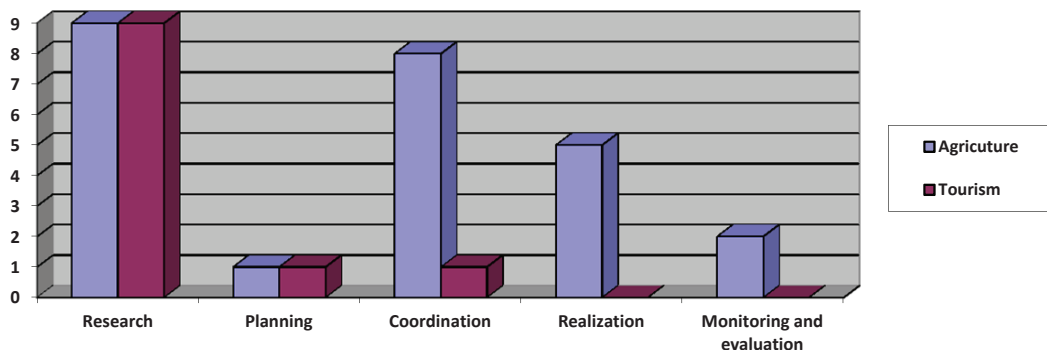


fig. 2. Comparative analysis of the performance of the studied public functions for the adaptation to climate change in agriculture and tourism Source: Author based survey

Source: Author based survey

The best performed public function at the moment is "Research." There are available independent studies on the effects of climate change and possible adaptation measures and analysis and assessments, prepared and distributed by the responsible institutions in both

responsible institutions, the pressmedia often covers impacts of climate change and adaptation in the sector is declared as a priority in several strategic documents. Coordination between the head responsible institutions and sector

departments in tourism is obviously lacking. Adaptation is not placed among the priorities in the Strategy for sustainable tourism (Ministry of economy and energy, 2014). Concerning the implementation of adaptation measures, in agriculture there are established traditions in dealing with drought, natural disasters and hail, and since we can treat these as efforts to adapt to climatic changes, implementation of adaptation measures in agriculture is greater than implementation in tourism. The performance of the "Monitoring and evaluation" function is in the initial phase in both sectors, which is understandable given that the implementation of adaptation policies is also not much more advanced in both sectors.

4. Conclusions

The conducted research on adaptation preparedness at company and state level in tourism and agriculture provided sufficient data to draw conclusions and to shape the final picture with regard to the topic of the article.

The analysis of state policies for adaptation to climate change gives a reason to conclude that the country is in the early phase of risk and vulnerability assessment at state level. Problem awareness of the existence of climate change on the territory of Bulgaria is clearly declared and also some official vulnerability assessments and impact analysis have been conducted. As a strategic document in this respect, we can point out the BAS report "Climate Change", published in 2010, and also the "Analysis and assessment of risk and vulnerability from climate change of sectors in the Bulgarian economy ", published by

the Ministry of Ecology and Water in 2014. Activities from the next stage of identification of alternative measures for adaptation have not yet taken place. In all three National action plans on climate change, the issue of adaptation to climate changes was ignored because a central place was given to the issue of limiting climate change. One positive thing that we could point out is the adoption of the Law on limiting climate change, in which the responsible institutions were named. However, the law still does not describe mechanisms to accelerate the process of adaptation and there are no deadlines for the elaboration of the national adaptation strategy. The delay in its preparation makes it impossible for the moment to use the allocated EU funds for adaptation to climate. As a whole, Bulgarian state lags greatly in the implementation of adaptation measures compared to other European countries such as Austria, Belgium, Denmark, Germany, Malta, the Netherlands, Spain, Switzerland, the UK, identified as leaders in the implementation of adaptation measures in the most recent study on adaptation policies in States, prepared by the European Environment Agency (EEA, 2014).

In contrast to the weak commitment of the state in matters relating to adaptation to climate change, the study showed a high degree of awareness of the problem and a strong motivation to take adaptation measures by companies in both studied sectors. According to the results of this study, almost 100% of respondents have realized and felt the effects of climate change for their businesses. Barriers in the reorganization of administrative and

Articles

production activities in order to adapt to the new climatic conditions, puts them in a difficult situation. Due to various reasons and despite the high motivation, their adaptation preparedness is low. The main problems identified are related to insufficient information awareness, lack of competences to manage the adaptation process and difficult access to financial resources to cover the transaction costs of change. Analysis of the link between the preparedness to adapt at state level and preparedness to adapt at company level, showed that the state does not take into account the difficulties companies face and doesn't take measures to support the private sector to more easily adapt to climate change. This lack of commitment on behalf of the state is contrary to one of the main recommendations contained in the European adaptation strategy, namely that the state should intervene and tackle the effects of climate change to which businesses fail to adapt autonomously. The main risk associated with the low adaptive capacity both at state and company level, is that the Bulgarian tourist business may lose some competitive position compared to other tourist countries and if Bulgarian farms fail to adapt to climate change also taking into account other financial difficulties that they experience, agriculture may be extremely negatively affected by climate change.

References:

- European Environment Agency, 2014, National Adaptation policy processes in European countries, Publication office of the European Union, National Adaptation policy processes in European countries, Publication office of the European Union
- Fankhauser, S., J.B., S.J.T Richard. 1999. Weathering Climate Change: Some Simple Rules To Guide Adaptation Decisions. *Ecological Economics*, 30 (1999)
- UNFCCC convention, 1992, Article 4, paragraph 1, Last accessed at http://unfccc.int/key_documents/
- Nonchev, A., 2009, Monitoring and Evaluation of Public Policies and Programs, Center for The Study of Democracy
- National Assembly of the Republic of Bulgaria, 2014 Law on limiting climate change, the forty-second National Assembly; Last accessed at: <http://parliament.bg/bills/42/354-01-49.pdf>
- EU strategy for adaptation to climate change, 2013, Last accessed at: <http://ec.europa.eu/>
- Bulgarian Academy of science–NIMH, 2010, Climate changes, Last accessed at <http://meteorology.meteo.bg/bro6ura.pdf>
- Ministry of The Economy and Energy, 2014, Strategy for Sustainable Development of Tourism in Bulgaria 2014 – 2030, Last accessed at: <http://www.strategy.bg/>