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CLIMATE ADAPTATION READINESS OF BULGARIAN RURAL AREAS

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Abstract
Adaptation to climate change has been raised on the political agenda since the Paris Agreement (2015). The European Climate Law (2021) recognizes that adaptation as a key component of the long-term response to climate change and requires from member states to enhance their adaptive capacity, strengthen resilience and reduce vulnerability as well as maximize the co-benefits with other policies and legislation at both national and regional levels. Local governments thus became an increasing important actor to prepare and act on climate adaptation. The objective of this paper is to assess the climate adaptation readiness of Bulgarian rural municipalities. The study is based on Ford and King's conceptual model (2015) for assessing adaptation readiness at various governance levels based on factors without which adaptation is unlikely to occur. Four factors are assessed in the study: political leadership on adaptation, institutional organisation for adaptation, availability of usable science to inform decision-making, and funding for adaptation planning, implementation and evaluation. Criteria and scores for assessing the factors are developed to address the Bulgarian context. The analytical method applied is content analysis of municipal policy documents. The Municipal integrated development plans (PIRO) for the 2021 – 2027 programming period are required to address their climate mitigation and adaptation needs in a specific section of the plans. By June 2024, 218 rural municipalities have published their PIROs online and 14 were either not available online or not officially adopted.
The results show an average adaptation readiness score across the 218 rural municipalities at 3.22, indicating a 'fair' level of readiness. No rural municipalities reached a 'very good' or 'excellent' level of readiness; 34% scored 'poor' level of readiness, 43% – 'far' and 23% – 'good'. The 'good' scores are the highest achieved in this assessment and result from several combinations – a priority is given to adaptation and/or a combination of adaptation measures and/or responsible unit(s) defined and/or budget is estimated. The 'poor' scores are achieved in PIRO which tick the bare minimum for the PIRO to be approved – only general discussion of climate issues. A comparison of the results for 'intermediate' and 'predominantly rural' areas indicate no significant differences between these two categories in the EU rural areas typology. Still, the mapped individual adaptation readiness scores indicate certain geographical clustering of 'good' and 'poor' scores which requires further assessment.
Key words: climate change governance, adaptation readiness, rural areas
JEL code: Q54, Q58, Q18

Background

Adaptation to climate change has been raised on the political agenda since the Paris Agreement (2015). Moreover, recent policy reports (IPCC, 2022; EU Climate Ad-

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aptation Strategy, 2021) indicate that adaptation is the only available and appropriate response to the changing climate even if all new CO2 emissions are halted. Despite the equal importance assigned to both mitigation and adaptation by the UN Framework Convention on Climate Change (1992), for over two decades the global efforts have been focused on mitigation with significantly less attention on adaptation, including in academic research (Verschuuren, 2022).

The European Climate Law (2021) recognizes that adaptation is a key component of the long-term response to climate change and that the adverse effects of climate change can potentially exceed the adaptive capacities of the EU member states (Article 5). It required from member states to enhance their adaptive capacity, strengthen resilience and reduce vulnerability as well as maximize the co-benefits with other policies and legislation at both national and regional levels. Local governments thus became increasing important actor to prepare and act on climate adaptation.

Meanwhile, academic research on climate adaptation has also gained prominence. A recent search for publications on 'climate adaptation at local level' provided 3 690 000 results for 0.07 seconds in Google Scholar (19.08.2024). Multiple assessment frameworks have been proposed and tested such as. national adaptation capacity frameworks (Berrang-Ford et al., 2019; Dixit et al., 2012; Ford & King, 2015), local adaptation capacity frameworks (Aguiar et al., 2018; Braunschweiger & Ingold, 2023; Jones et al., 2010), the interaction between them (Barr & Lemieux, 2021; Biswas and Rahman, 2023; Darjee et al., 2021; Ford et al., 2017; Huitema et al., 2016; Olazabal et al., 2019; Rogers et al., 2023), as well as assessments of local adaptation plans' credibility and effectiveness (Olazabal et al., 2019; Singh et al., 2021).

The objective of this paper is to assess the climate adaptation readiness of Bulgarian rural municipalities. On the one hand, rural areas are particularly vulnerable to climate change according to the IPCC (2022) assessment that the largest adaptation gaps exist among lower income population groups, especially among small-scale agriculture producers and rural inhabitants. On the other hand, Bulgarian municipalities had not addressed their climate adaptation needs up until 2020 (the period of the first EU Strategy on Adaptation to Climate Change, 2013) and more recently the more targeted actions were taken by eight urban municipalities (National Trust EcoFund). Therefore, this assessment will be the first to focus on rural municipalities' progress on climate change adaptation in Bulgaria.

Methodological Approach

This study is based on Ford and King's conceptual model (2015) for assessing adaptation readiness at various governance levels on the basis of six factors without which adaptation is unlikely to occur: (1) Political leadership on adaptation, (2) Institutional organization for adaptation, (3) Adaptation decision making and stakeholder engagement, (4) Availability of usable science to inform decision-making, (5) Funding for adaptation planning, implementation and evaluation, and (6) Public

support for adaptation. They suggest a set of criteria which can be used to assess the factors depending on the different contexts.

For this study, their model is adapted to the local, municipal level of Bulgarian rural areas and is focused on the assessment on four factors – (1), (2), (4) and (5). Factors (3) and (6) are not included in this assessment as the information available for them at this stage is less reliable.

The criteria developed for assessing the four factors that are relevant for the Bulgarian rural areas are presented in Table 1, the scores for their rating are presented in Table 2 and Table 3. The resulting adaptation readiness scores per municipality are mapped according to the rating, presented in Table 3. The last step in the analysis is comparing the adaptation readiness scores for the Bulgarian rural areas classified as 'Intermediate (between rural and urban)' and 'Predominantly rural' in the EU rural areas typology.

The analytical method is content analysis of municipal policy documents. The analysed documents are the Municipal integrated development plans (PIRO) for the 2021 – 2027 programming period. The municipalities defined as rural areas in Bulgaria are 232 (out of 265): 218 municipalities had published their PIROs online and 14 municipalities either lacked PIRO or had not made them available.

Table 1. Factors relevant to adaptation readiness and selected criteria for the study

Factor	Assessment options	Criteria for the study
(1) Political leadership on adaptation	Statements from leaders on the importance of adaptation, development of legal mandates, including in departments and governmental plans.	Adaptation is recognised as a priority or strategic objective in PIRO
(2) Institutional organization for adaptation	Existence of political and administrative structures that foster or limit adaptation.	Institutional responsibilities for adaptation are clearly allocated in PIRO
(3) Adaptation decision making, stakeholder engagement	Proactive inclusion of stakeholders and communities in decision-making about planning, implementation and monitoring.	Not analysed now
(4) Availability of usable science to inform decision-making	Quality, timely and reliable science available to inform decision-making and implementation of actions.	Adaptation measures included in PIRO reflect the spectrum of local needs
(5) Funding for adaptation planning, implementation and evaluation	Specific funding and resources dedicated to adaptation efforts, including capital, maintenance and human resources for both research and actions.	Funding is allocated to adaptation measures in PIRO
(6) Public support for adaptation	Public opinion and perception of risks as an influence on decision making and implementation	Not analysed now

Source: Developed on the basis of Ford and King (2015), and Ford et al. (2017)

Table 2. Criteria and assessment scores for the study

Criteria	Short name	Assessment scores
Adaptation is recognised as a priority or strategic objective in PIRO	Adaptation priority	[2] Clear, top priority [1] Listed in overall environmental priority [0] No priority given
Institutional responsibilities for adaptation are clearly allocated in PIRO	Adaptation institution	[3] Dedicated adaptation unit [2] Existing unit takes on coordination of adaptation [1] Responsibilities distributed among units [0] No responsibility allocated
Adaptation measures included in PIRO reflect the spectrum of local needs	Adaptation measures	[3] [2] + Soft measures [2] [1] + Technical measures [1] General measures only [0] No measures planned
Funding is allocated to adaptation measures in PIRO	Adaptation funding	[2] Estimated and earmarked [1] Not earmarked/included in other [0] No funding considered

Source: Own elaboration

Table 3. Rating of adaptation readiness score in the study

Rating of adaptation readiness	Scores	Colour code
Excellent	9 or 10	
Very good	7 or 8	
Good	5 or 6	
Fair	3 or 4	
Poor	1 or 2	

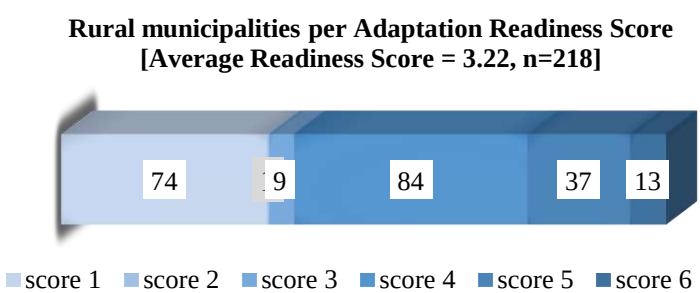
Source: Own elaboration

Results and Discussion

The Municipal integrated development plans (PIRO) for the 2021 – 2027 programming period need to address both the national regional development policy priorities and the EU Cohesion policy goals. The Methodological guidance for the development of PIRO (MRD, 2020) ensure that all relevant policy priorities and goals are adequately assessed and planned for. Climate mitigation and adaptation needs and measures take a prominent role in the Methodological guidance document with a separate section focused on them. It also indicates that PIROs should consider the National Climate Adaptation Strategy and Action Plan as well as the river basin management plans and the flood risk management plans. Thus, the national level

importance of climate adaptation needs and measures was communicated to the municipal level. The next step was for the municipal authorities to make their own assessments of climate adaptation and mitigation needs and address them in their PIROs.
The cumulative results based on the criteria and assessment scores (Table 2) for the 218 rural municipalities are summarised on Figure 1. The average adaptation readiness score across the 218 rural municipalities is 3.22, indicating a 'fair' level of readiness.
No rural municipalities reached a 'very good' or 'excellent' level of readiness.
The lowest possible scores of '1' and '2', indicating 'poor' level of adaptation readiness, is recorded for 75 (74+1) rural municipalities (34%). This reflects a minimal level of commitment in these PIROs – they cover the somewhat obligatory requirement for a separate section on climate change mitigation and adaptation as per the Methodological guidance and nothing more.
The highest achieved scores of '5' and '6', indicating 'good' level of adaptation readiness, is recorded for 37 and 13 rural municipalities (23%). These scores are achieved in several combinations – a priority is given to adaptation and/or a combination of adaptation measures and/or responsible unit(s) defined and/or budget is estimated. Adaptation priority, when existing, is usually within a wider environmental or sustainable development priority. In terms of allocated responsibilities, the most usual case is where adaptation responsibilities are distributed among several municipal units. The adaptation measures is the only criteria which achieved its maximal score meaning that all type of measures were planned for – general, technical and soft (training, awareness) measures. Budgets were mostly estimated per project than per adaptation needs.
The 'fair' level of adaptation readiness with scores of '3' and '4' is recorded for 93 rural municipalities (43%). The most common combination in this group is general and possibly technical measures and several responsible municipal units and project based budget.

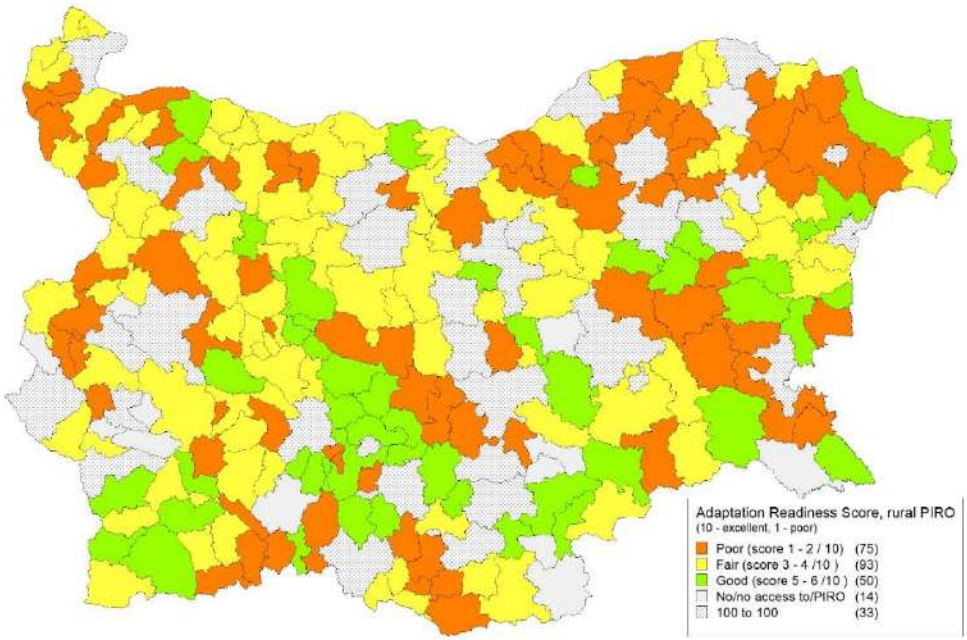
Figure 1. Adaptation readiness scores of the 218 rural municipalities



Source: Own calculation

The individual results of the adaptation readiness scores are mapped and presented on Figure 2. The spatial patterns visualised indicate certain clustering of 'good' level of adaptation readiness in the rural municipalities in southern Bulgaria and three larger groups of rural municipalities with 'poor' level of adaptation readiness in eastern Bulgaria. Whether this spatial pattern is statistically significant and what are the factors behind it remains to be assessed.

Figure 2. Mapped adaptation readiness scores of the rural municipalities



Source: Own calculation

The last step of the analysis was to test for any differences in the results between rural municipalities falling within 'intermediate' rural areas and 'predominantly rural' areas according to the EU typology of rural areas (Table 4). The t-Test results indicate no significant differences in the overall adaptation readiness score and in the adaptation measures score, even if the actual scores in 'intermediate' rural municipalities are slightly higher

Table 4. T-test of adaptation readiness in 'intermediate' and 'predominantly rural' areas

Indicator	EU_typology	N	Mean	Std. Deviation	Std. Error Mean	t-Test (Sig. (2-tailed)
Readiness	Predominantly rural	135	3.200	1.5920	.1370	.832
	Intermediate	83	3.253	1.8989	.2084	
Measures	Predominantly rural	135	1.66	.535	.046	.657
	Intermediate	83	1.70	.694	.076	

Source: Own calculation

Conclusion

Rural areas have a significant role for the adaptation to climate change and the policy signals in terms of requests but also available funding for this are increasing. The level of adaptation readiness, however, remains a challenge with an overall score of 'fair' readiness, resulting from a significant one third of rural municipalities having 'poor' and 43% having 'fair' levels of climate adaptation readiness. The results indicate certain geographical clustering of 'good' and 'poor' scores which requires further assessment. The initial test comparing the results for 'intermediate' and 'predominantly rural' areas indicate no significant differences between these categories of the EU rural areas typology.

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