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Assessment of Climate Policy and Sustainability in Hungary

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***Abstract*—**The last Assessment Report of the Intergovernmental Panel on Climate Change, stating that the greatest risk in climate change affects sustainability is now widely known and accepted. However, it has not provoked substantial reaction and attention in Hungary, while international and national efforts have also not achieved expected results so far. Still, there are numerous examples on different levels (national, regional, local, household) making considerable progress in limiting their own emissions and making steps toward mitigation of and adaptation to climate change. The local level is exceptionally important in sustainability adaptation, as local communities are often able to adapt more flexibly to changes in the natural environment.The aim of this paper is to attempt a review of the national climate policy and the local climate change strategies in Hungary considering sustainable development.

***Keywords*—**adaptation, climate policy, mitigation, local sustainability.

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I. Introduction

NOWADAYS there is an increased interest in climate change and sustainable development[1] [2].Both terms can be characterized by their actuality, holistic approach, appearance on more levels (global, regional, local), moreover both terms taking the coherences among the natural, social and economic environment into consideration. Therefore, the adaptation to climate change cannot be solved on its own, but in relation to the adequate climate policy and sustainability issues. Like sustainability, climate change is also more and more often in the focus of attention and discussions. The most diverse views, facts and ideas are published related to these two terms, which require the harmonization of viewpoints, co-operation and common thinking [3]. Despite the fact that the causes connected with climate change are still debated, as well as the phenomenon of global climate change, the examinations have shown that, in accordance with the principle of precaution, action is needed on behalf of local citizens towards prevention and mitigation of damages or towards the adaptation to climate change emphasizing related synergic effects [4].

Considering the different levels and dimensions of sustainability, according to our examinations it can be expected that the local level is where may be it is easier to foster the practical implementation of climate friendly and sustainable strategies, programs and solutions.[5]

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Adaptation on the local level requires knowing how it is possible to connect the different adaptation solutions with the diverse programmes. It is needed to know and follow with attention the Hungarian and European Union programmes and decisions in relation to climate policy, sustainable and spatial development. In order to investigate actual conditions, a survey was carried out about sustainability and local adaptation to climate change in several settlements at Lake Tisza in Hungary.

II. Climate policy and sustainability in Hungary

Currently, climate policy is not the most significant issue on the national political agenda in Hungary. However, numerous different mitigation and adaptation programmes and strategies have been initiated in recent years, even as the Fourth National Communication of Hungary to the UNFCCC stated that "very often climate change mitigation is not the primary objective for a policy or measure, but rather a secondary benefit, which is, nevertheless, expected and assessed" [6].

Mitigation refers to actions that are able to reduce anthropogenic causes of climate change e.g. reducing emissions of greenhouse gases, such as CO_2, through energy efficiency and using sustainable solutions in transport and energy management.

Adaptation to climate change takes place through adjustments in human and natural systems to reduce vulnerability in response to observed or expected changes in climate and associated extreme weather events [7].It involves changes in perceptions of climate risk and in social and environmental processes, practices and functions to reduce potential damages or to take advantage of new opportunities. Adaptation is a cross-sectoral, multi-scale and trans-boundary issue, which requires comprehensive and integrated modeling methodologies [8].

Mitigation and adaptation are closely related and should be considered together rather than separately. Fostering local sustainability can also play an important role both in adaptation and mitigation strategies according to the precautionary principle causing several positive externalities and synergic effects [9][10].

Since 2006, more direct activity can be detected in the field of Hungarian climate policy. According to the international commitments of Hungary, firstly the ratification of the Kyoto Protocol of the UNFCCC in 2002 can be mentioned. In this document, Hungary committed to reduce its greenhouse gas emissions by 6%. This pledge is compared to the average of years between 1985 and 1987 between 2008 and 2012[6].In the 1985-1987 base period the level of CO_2emissions was higher than in 1990, thus this earlier base period caused a lower emission reduction commitment than if 1990 emissions were used. According to the last UNFCCC report in 2008[11] the greenhouse gas emissions of Hungary were stagnating,

followed by a slight increase, mainly due to the transport sector. Hungary committed itself to maximizing greenhouse gas growthat 10% by 2020 compared to 2005 levels in the non-EU ETS (Emission Trade System) sectors[12].

Table 1 shows the relevant climate policy related documents.

TABLE I
CLIMATE POLICY-RELATED DOCUMENTS IN HUNGARY

Year	Examined document
2003-2009	VAHAVA national climate research project
2007-	National Strategy for Sustainable Development
2008-2025	National Climate Change Strategy
2010	Framework Law for Climate Protection

In 2003, the Hungarian Ministry for Environment and Water Management and the Hungarian Academy of Sciences have launched a three-year joint research project titled "Global climate change, Hungarian impacts and responses". The VAHAVA project created the conceptual basics of the Hungarian National Strategy for dealing with climate change.(The name "VAHAVA" is an abbreviation of the first letters of the Hungarian words Change – Impact – Responses, namely VÁltozás – HAtás – VÁlaszadás.) Moreover, through the VAHAVA research project a widespread network of experts has been organized in order to support further development and implementation of climate strategies and action plans on different levels in Hungary[13].

The VAHAVA Report summarizes the main results between 2003-2006 in the field of climate change scenarios in the Carpathian basin, nature conservation and the climatic factor, water management, agriculture, soil management, forestry, energy, architecture, traffic and transportation, health and health protection, tourism, catastrophe defense, insurance implications, climate-conscious thinking, risk analysis and economic rehabilitation and reconstruction[13].

Prognoses show that climate change will have a serious effect on Hungary. Considerable warming, drying (decreased mean annual precipitation) and an increased frequency, intensity, duration and damage of extreme weather conditions can be expected[13].Weather conditions of recent years and months have proven that this is a real threat.

In 2008, the National Climate Change Strategy was adopted for the years 2008-2025 focusing on Hungarian climate policy. This strategy has to be reviewed by the Hungarian Government two years following adoption and every five years later on. Furthermore, the strategy is supported by a two-year National Climate Change Program focusing on the most significant impacts and possible responses.

The adoption of the Framework Law for Climate Protection has been launched in Hungary. In February 2010, the draft version of the Framework Law for Climate Protection was submitted to the Hungarian Parliament. This framework law was supported by roughly 500, mainly environmental, social and rural NGOs. Finally, the Framework Law for Climate Protection was not approved by the Parliament mostly due to the lack of supporting solutions enhancing the possibility of sector-specific integration.

The National Strategy for Sustainable Development[14] was adopted in 2007. It consists of eleven priority areas including climate change-related issues and focusing on both mitigation and adaptation efforts. Furthermore, the National Council for Sustainable Development was established in 2007. The Parliament shall request the different predefined organizations, associations and bodies to send delegates into the Council. The members of the National Council for Sustainable Development are listed in Table II.

TABLE II
NATIONAL COUNCIL FOR SUSTAINABLE DEVELOPMENT

Number of delegates	Institution
1 per MP group	MP groups of the parties in Parliament
3	Hungarian Academy of Sciences
2	Chambers of commerce
2	Churches
2	Trade unions
2	Municipal associations
2	NGOs representing social classes and age groups
2	NGOs form the cultural and educational sectors
2	NGOs operating in the social or health-care spheres
2	Organizations representing national and ethnic minorities
2	Environmental and nature conversation NGOs
1	The Federation of Technical and Scientific Societies
1	The Hungarian Rector's Conference

Source: [15]

Hungarian people have the negative experience of the increased frequency of weather anomalies, with damages becoming increasingly evident, even quantifiable, using different damage calculation methods. From the viewpoint of both sustainability and climate change, a holistic approach is needed to be able to examine the interactions and to find the possiblesolutions[16] [17].According to the IPCC Reports, climate change can be one of the greatest threats to sustainable development. Furthermore, the third IPCC Report emphasized in relation to sustainability that it can be an advantage in the mitigation of climate change[18] [19].

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III. Local Governance in Relation to Climate Change

The climate of Hungary is being affected by impacts arriving from three directions: Continental effects arrive from the East, Atlantic effects from the West and Mediterranean effects from the South. Owing to these meteorological events, years and seasons are highly variable. It is not too rare that there is drought, floods, inland inundation and frost damages in the same year, sometimes even at the same location. The Hungarian settlement structure makes the situation more complicated due to the high percentage of small municipalities among the more than 3 000 settlements in a country with around 10 million population.Furthermore, in Europe it is unique that the numerous small local governments have sucha wide range of obligatory tasks and responsibilities as in Hungary.

This fact plays apivotal role in the effectiveness of climate and sustainable actions on the local, municipality level. It is necessary to deal with the municipality structure and regulations to be able to foster the practical implementation of adaptation and mitigation strategies.

Municipal governance in Hungary is based on a two-tier system. The first tier comprises of the settlement level and the second is the county level. Settlements and municipalities also belong to the local level,but are responsible for different tasks. In addition to the two-tier system, a third special category exists on the local level that is the city with county rights. This type of local governance means that the city council, in addition to its settlement tasks, also has to deal with county tasks within its boundaries. The focus of the present paper is only the settlement level.

The 1990. LXV. Act on Local Governments (Parliament of the Republic of Hungary) [20] defines the main tasks of settlements. These tasks can be dividedinto two different types, one of them is mandatory and the other is voluntary.The tasks of settlement municipalities include local structural planning, sewage collection and disposal;local development planning, protection of the built and natural environment; housing policy, local public transport, street cleaning, provision of fire brigades, housing policy, collection and drainage of rainwater; provision of public order, contribution to local energy supply service;advocating local scientific, cultural and sport activities; assisting healthy lifestyles, provision of public space; ensuring the rights of national and ethnic minorities; provision of pre-school, elementary school, health, basic social and youth services; and contribution to creation of local jobs.

The Act on Local Governments lists the mandatory tasks that every municipality is obliged to carry out. Mandatory tasks include the maintenance of public roads and the public cemetery; provision of healthy drinking water, pre-school education, elementary school education, basic health and social services; and ensuring the rights of national and ethnical minorities. Furthermore, the local municipality has the right to carry out additional, voluntary tasks. These kind of voluntary tasks are in relation to the needs of local inhabitants taking into consideration the financial resources. This also means barriers for local sustainable and climate strategies and actions. While it is not an obligatory task for the Hungarian local governments to engage activities related to climate change or sustainability, they are allowed to do so.

The results of our investigation showed that the most significant factor in fostering local climate action is the lack of permanent and reliable financial background of local municipalities. The financial state and opportunities of the settlement strongly influences the ability to cover mandatory expanses and to start voluntary tasks.However, the importance of the role of local authorities to tackle climate change both the VAHAVA Report and the National Climate Change Strategy emphasize[21].Based onthe assessment of municipalities the main barriersof local level climate strategies and actions are:

- Economic and financial crisis;
- Financial pressure on local governments;
- Conflictsbetween local investment options;
- Political conflicts within the municipality;
- Socio-economic conditions (e.g. low environmentaland climate consciousness, increasing consumption);
- Time period of political elections vs. long termclimate and sustainable strategies;
- Insufficient information – both quality and quantity – according to climate change;
- Lack of expertise in the field of mitigation and adaptation techniques in case of local politicians and officers.

Five modes of local governance are presentaccording to the mitigation and adaptation strategies of municipalities [22][23]. These five types of governing climate change are usually utilized in parallel on local level:

- Self-governing;
- Provisions;
- Regulations;
- Enabling;
- Partnerships.

Self-governing is the ability of municipalities to operate their own system in a climate-friendly way. Self-governing local authorities can focus on the reduction of their greenhouse gas emissions and the preparation for the possible effects of climate change in their organizations.

Provisionsare related to the ability of local governments to provideclimate-friendly solutions to their inhabitantsin their jurisdiction. Provisions can be found at settlement municipalities in the form of particular services and resources, such as local climate-friendly transport modes, energy consultancy or direct financial support.

Regulation is the third type of climate change actions on the local level. It is mainly focusing on the implementation of national laws and different kinds of regulations in relation to climate change. Sometimes it means the adoption of a stronger regulation on local level compared to national law.

The ability of local municipalities in motivating different stakeholder groups in order to foster the practical implementation of climate action is called enabling. The motivation usually means providing useful information.

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However, it can also take the form of subsidies or tax incentives.

Partnershipsmay be formed between non-state and state stakeholders in order to manage local climate actions.

IV. Local model addressing climate change and sustainability

It is acknowledged that sustainability has increasing significance and relevance, as it is clear that the anomalies in the natural environment and the reproduction of goods endanger human existence. Based on our examinations it can be assumed that among the dimensions and levels of sustainability, progress is easier in a small region or community and the practical implementation of sustainability is a vital challenge to those living there.

Furthermore, there is a lack of information on how local knowledge can encourage local mitigation and adaptation strategies. Moreover, the use of local-level assessments is pivotal to better grasp local reality [24].This is why we have chosen the settlement level, trying to outline how sustainability can be implemented and enforced in a region rich in natural values taking into consideration the possible effects of climate change.

International and national local climate actions usually focus on mitigation and adaptation. In addition, sometimes a third focus point is added, such as climate consciousness. The mitigation part usually refers to technical and infrastructural investments, renewable energy solutions, improving energy efficiency in order to cut greenhouse gas emissions. Mitigation is a widely revealed field of climate strategies. However, adaptation tools are not as fully explored. The adaptation toolkit portfolio depends on a variety of different factors as climatic and geographic differences, governance systems, housing realities and infrastructure[16] [25] [26].

In relation to local climate actions and sustainable strategies a survey was carried out among local municipalities in a special area of Hungary in 2007 and 2010. 7 main topics were covered by the 26-page questionnaire.The subject of the analysis was the Lake Tisza region in Hungary and the 73 settlements in the Regional Development Council of Lake Tisza. This region has been selected because it is rich in environmental values (protected, Ramsar sites, Natura 2000 areas), coupled with economic and social problems, making it suitable for the complex evaluation of the interdependences. One focal point of this examination was climate change on the local level especially dealing with the opinion of local stakeholders.This artificial lake (Kisköre aquifer, 1970) is the second largestin Hungary, having a very important role in flood protection, water storage, water quality protection, recreation and in the conservation of biodiversity. Another specialty of this 2 262 km^2 area is that one third of it belongs to two different National Parks.

The results are summarized in a local model. This model has a significant role in putting climate change in abroad societal context regarding all dimensions of sustainable development. Based on our results, the main steps of the development local climate and sustainable action are:

- The enforcement of sustainability;
- Mapping potential weather phenomena and local climate impacts;
- Outline the effects on the quality of life;
- Develop possible local responses;
- Formulate the main mitigation and adaptation tasks,
- Implement the strategy;
- Taking into consideration different action plans and programmes;
- Develop a monitoring system.

In addition to our model an adaptation toolkit was developed. The adaptation portfolio can be useful for local decision-making support especially in case of climate action. Four main modes of adaptation have beendefined:

- Passive adaptation;
- Indirect adaptation;
- Direct adaptation;
- Non-climate-friendly adaptation.

Table III shows some examples related to the different adaptation options that were mapped in our investigations.

TABLE III
ADAPTATION PORTFOLIO EXAMPLES

Passive	Indirect
Flood and inland inundation protection system, Climate-proof clothing, Storm-proof building, Heat alarm system etc.	Irrigation, Increasing water surfaces, Rainwater storage, Urban planning tools in order to decrease urban heat island effect, Shelterbelt development etc.
Direct	**Non-climate-friendly**
Building energetics systems in order to decrease energy consumption, Energy production with low or zero emission, Telecommuting etc.	Operation of ice skating rink (especially in warm zones), Artificial snow, Institution of siesta, Electric air-conditioning in buildings etc.

Source: own compilation

V. Conclusion

There is no doubt that thepredicted impacts of global climate change can affect socio-economic systems on different levels: from entire regions to individuals.In the interest of effective response to climate change,state and non-state actors also need a model and a toolkit portfolio, especially on the local level. On one hand, this model can help in the climate friendly decision-making process.On the other hand, the toolkit would allow for the local municipalities to be able to compare all possible mitigation and adaptation options and find the most appropriate solutions. The model and the toolkit portfolio can reinforce and clarify the decision-making system in order to move towards a more sustainable future.

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