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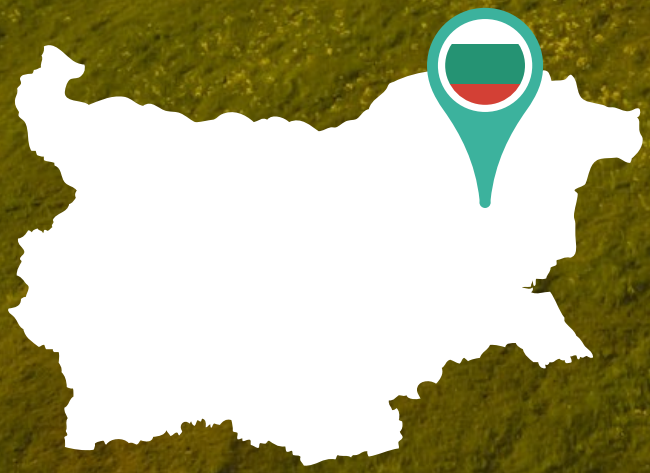
Rural Science-Society-Policy Interfaces

MAP Position Paper

CHANGE IN PRODUCTION AND DIVERSIFICATION OF THE RURAL ECONOMY



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Topic and headline messages

The world and humanity are on the verge of a new technological and information revolution that will determine the development of people and territories in the forthcoming decades. The rural areas were lagging behind in the previous industrial and capitalist period to urban centres, which led to their demographic decline and economic adversaries. The introduction and accelerated development of information and digital technologies, biotechnologies, green energy sources, artificial intelligence, bio-economy can attract people and business entrepreneurship back to rural areas. Demand for a better quality of life that will not be at the expense of people's professional and personal realisation can make rural areas again desirable places to live. Without populated and robust communities, rural development will remain a vain notion, where the territorial development will be redundant.

The diversification of rural economies should imply and assure qualitative changes in the economy, social, health and educational infrastructure of rural areas, leading to a better lifestyle, not just to diversity. Public policy and governance in this area is extremely important and indispensable in order to make this change and transformation because it should facilitates to capitalise resources for this change and to build a balanced, equal and sustainable environment.

Problem being addressed and key questions

The key questions addressed for each dimension are:

1) What is to be done to create the conditions for rural economies to catch up and adopt the New Economic Cycles of technological and digital progress?

2) What can be the role of public governance and public support to drive up the compatible and appropriate adaptation of rural economies to the new opportunities and economic transformations capitalising on the endogenous strengths and potential?

3) How can the diversification of the economy create the demand for different employment for people of higher educational levels, with more qualifications and specific skills, because even currently as the diversification in rural areas expands and local people find jobs away from agriculture the incomes and quality of the work is not attractive for young and skilful people?

4) The diversification of the rural economy is very crucial and important, along with the diversification of the future agricultural development, where agriculture should remain the key sector embracing both the role of food supplier and delivering public goods in terms of agroecology and bioeconomy;

5) How can the research and scientific community contribute to transforming and integrating the rural economies with the New Economic Cycle?

1. Diversification of the rural economy: Entrepreneurship, employment & new business models

1.1. Key scientific evidence

Unemployment is one of the major problems that influence the migration of populations from rural areas. After 2002 the unemployment rate in the rural regions has been higher than the unemployment rates both in the intermediate and urban regions (Figure 2) and in 2015 it is over 12%. In the beginning of the new millennium, agriculture is the biggest sector in the rural regions. The GVA produced in it is higher than the Gross Value Added (GVA) produced in any other sector, and it is 21.6% of the total GVA produced in the region, followed by industry (except construction). For the next 15 years the importance of agriculture in the GVA of all regions decreases(GVA from agriculture is about 4% since 2007 on national level). This situation is related to more rapid development in the other sectors of the economy than to a decline in GVA produced in agriculture. In 2014, 15% of the GVA in the rural regions is from agriculture, but 34.47% of the employed people are still working in the agriculture sector. In the intermediate regions 7.7% of the GVA and 34% of the employees are from agriculture. In the urban region, less than 1% of the GVA and less than 2% of the employment is from agriculture. This data show that agriculture still has a major role for the development of rural regions. Having in mind that agriculture could also hire a less-skilled and less-qualified labour force, and that most of those employed are non-paid family members and the importance of agriculture is even higher.

The results of the applied correlation analysis for the first model are presented in Table 1. This model investigates the strength of the correlation between the unemployment rates in the rural areas and number of factors. These factors include the total population, the educational level, the ratio between extensive and intensive sectors (which serves as a proxy for the structural change in Bulgarian agriculture), the average remuneration in the economy and agriculture, and the GDP growth that represents the total income growth in the economy. The main interest is which of the analysed factors, if any, has a strong correlation with the unemployment rate in the rural areas and what is the importance of these factors for the development of the variable in the 15-year period.

The socio-economic situation in the rural regions of Bulgaria is worse than the situation in the intermediate and urban regions, although balanced rural development is one of the main goals of the agricultural policy implemented in the country. Agriculture has been recognised as one of the most important sectors that could bring about economic development in less developed regions characterised by slow economic growth and high unemployment. Agriculture still has an important role for the employment and GVA in rural regions; however its growth is slower than for other sectors. The higher unemployment rate in rural regions is not specifically related to the restructuring of Bulgarian agriculture. Having in mind the political efforts put into the development in less-developed rural areas there is an "unemployment paradox"– the economic activities suffer from lack of labour and at the same time there is a surplus of people actively seeking work, as evident from the high unemployment rates. This paradox has serious socio-economic effects and it should be further researched and addressed in the future CAP.

One of the profound studies of the employment and the new sources of labour activities in rural areas is implemented in the project RuralJobs. The main factors when studying workforce availability are related to demographic development - low birth rates, adverse natural population changes and migration flows. High migration is evidence that labour demand at the national level or regional ones is high and this high demand can attract and squeeze the labour force from disadvantaged regions where labour conditions in terms of remuneration, quality of jobs, etc., are unfavourable. The economic development of the region is the most important factor in the labour market and labour demand. From the point of view of GDP, GVA, as well as household income in the different types of regions, it is clear that despite possible trends, the relative situation of rural areas compared to urban centres has not improved.

Regarding the level of employment, the economic status and the potential for the economic development of the regions are essential. In regions with relatively well-developed economies, job opportunities are higher than in those economically underdeveloped. The economy is more developed in cities than in rural areas. In spite of the large differences in GDP between the different types of regions and

the clear understanding of this and the declared measures for inclusive and balanced growth between the different types, the developed predominantly urban type areas continue to outpace the other two types of regions in terms of development and GDP growth. A small increase is observed in Predominantly Rural regions, which helps to increase the gap between urban and rural areas. Knowing the characteristics of value in the region helps to have a common understanding of labour market processes. This shows the formation of a new effective base of recruitment strategies. In terms of employment by sector, the share of people employed in the services sector in predominantly urban areas and intermediate regions is significantly higher than in predominantly rural regions. This difference suggests that the access of people from the villages to various services is very limited compared to the opportunities of the residents in Predominantly Urban and intermediate areas, which is a significant disadvantage of life in predominantly rural areas.

1.2. Summary of position of the Multi-Actor Platform

The diversification of rural economies is closely connected to investment and human potential in these areas. Rural municipalities have a hidden potential in terms of endogenous benefits that has not yet been sufficiently explored. According to the majority of MAP members, these advantages are:

- The tourist potential of the country, which is not used for the development of tourism in rural areas, and most of the tourists visit the established tourist places for vacation.
- Achieving and maintaining the sustainability of rural areas requires synergistic use of tourist resources, construction of accompanying common infrastructure, conducting a proper and targeted advertising and marketing policy, protecting the interests of all countries by strengthening public-private partnerships.
- The internal potential of rural areas is significant in terms of space and real estate prices, both in terms of business development and attracting people to live.
- There is a necessity to increase entrepreneurial initiatives, which can be done through joint efforts between administrations and local businesses.
- The digitalisation of many activities also provides information on rural areas, many of which can be carried out remotely, which does not provide jobs but ensures people live close to work.
- The cultural and historical features of rural areas, together with the favourable environment in terms of a calmer rhythm of life, ambience, clean air and nature, and more space and opportunities for better local food, can attract young people to settle in rural areas, as incentives for economic diversification.
- The beginning of a new stage in the development of rural areas in terms of their revival and revitalisation must take place, at least at the very beginning, with external assistance, which may come from public funds to invest in human and social infrastructure and prioritising real needs of rural communities.
- It is advisable to develop programmes to encourage private investment in rural areas, which will create job opportunities, increase the incomes of people in rural areas and create skilled jobs.
- Increasing the decentralisation of rural areas, with special emphasis on the management of villages, where the mayors of these settlements receive greater financial and economic freedom and are more closely involved in decision-making at the municipal level.
- The main goal of rural development is to improve the demographic structure and attract new people and stop the emigration of young people from these areas, as the availability of human resources will lead to demand for services in order to increase diversification.

2. Smart rurality, smart communities and digitalisation

2.1. Key scientific evidence

Agriculture is an important sector in Bulgaria, in spite of a decreasing share in the national GDP, which in the recent year is about 3%. The importance of the agriculture sector pertains to the relatively significant number of people engaged in the industry, which accounts for 7-8% of the total employment, and the crucial contribution the sector makes at the present time to rural development. Bulgaria has accepted the Strategy for digitalisation of agriculture and rural areas, which delineates and entails the future evolvement of information technology and society, which are seen as a tool for sustainability and vibrancy. In the Rural Development Programme of the Republic of Bulgaria 2014-2020, it is stated that access to a standard broadband internet network should cover almost all households in rural areas (99%), but in less-populated rural areas only 60% of households have access to a fixed broadband network, compared to 90% on average for the country. Only 10% of households in rural areas have access to next generation networks. The broadband outreach in rural areas has expanded significantly in recent years, but remains low - only 37% of households in predominantly rural areas have the regular contracts for internet access. The use of the internet by businesses and households for e-commerce, internet banking, information and training are still some distance from what is potentially achievable. As of the end of June 2015, Bulgaria has a new generation broadband infrastructure (>30Mbps) of 72% of households, but only 2.7% of the network is available and delivered in rural areas, below the EU average of 2.8%.

The development of digital agriculture began in the last decade with the advent of new technologies such as ground sensors, satellite imagery, GPS receivers in agricultural machinery, etc. However, the lack of digital knowledge and competencies at administrative, managerial and executive level is one of the main obstacles to the introduction of digital technologies in agriculture and rural areas. That is why it is necessary to provide accessible information on the opportunities that digitalisation and innovative technologies provide as well as what they will contribute to the development of the sector, its competitiveness and profitability, and opportunities for training and advisory services.The accelerated digitalisation of Bulgarian agriculture and rural areas, including the public administration in rural areas is thought of as an engine for optimising production processes, increasing income and the yields of farmers, achieving a sustainable bio-industry, maintaining food safety in conditions of increased industrialisation and emerging technologies, drastic increase in competitiveness and increased demand for Bulgarian products in the single European and world markets. On the other hand, digitalisation in rural areas is envisaged as a tool for improving viability of rural areas, creating preconditions for income increase and quality of life, attracting and retaining young people and enticing investments in cutting-edge technologies. Monitoring the conditions for the development of production in real time, tracking "from farm to fork", balancing consumption and other new technologies, easing the administrative burden, precise prediction of stages in the development of the harvest - all this is made possible with the application of the latest computer, robotic and artificial intelligence technology.

At present, the funds available for investments in digital solutions and precision farming technologies are extremely private, and depend on the economic opportunities of the individual farm or entrepreneur. For this reason, there is a lack of comprehensive information at national level on investments so far and the level of digitalisation reached, and for the available technologies for precision agriculture. At present in Bulgaria, there are companies that are dealing with the creation of software products and applications aimed at the agriculture sector. Most of them are targeted at specific customers, and create applications according to the customers' specifications. The activities on these products are related mostly to uploading them to a client server, as they perform basic actions, related to the administration and organisation of the customers' databases. Other solutions are related to more mass services in terms of software decisions for separate units and directions in the state administration. The digitalisation in agriculture is strongly connected with the digitalisation in rural areas, because it drives the creation of infrastructure to facilitate agricultural digitalisation. These are good practices in digitalisation in organic beekeeping, innovations in the feeding of chickens, testing of new technologies in the production of quail eggs, creation of high-yielding breeding herds for the production of hybrid mule ducks, and other projects are among those approved under the innovation measure. Among the 26 projects worth BGN 15.6 million there are also ones for biological management of soil and hydroponic production with beneficial microorganisms, for the development of ecosystems through the introduction of methods for monitoring and biological control, etc.

2.2. Summary of position of the Multi-Actor Platform

Agriculture produces about 4% of Bulgaria's GDP, employing 18% of the country's population. The big difference is due to the relatively low labour productivity in the large number of small farms, which nevertheless preserve the character of Bulgarian agriculture. These farms are also characterised by a relatively high age composition of employees. Therefore, support for new digital technologies should be focused primarily on the real future of farms, without leaving aside small, often self-sufficient households.

The future efforts of the institutions should focus on:

- Expanding the scope of broadband internet - rural households have full access to normal contacts with internet suppliers. Particular attention should be paid to farms and households in underdeveloped rural areas.
- Real access to e-commerce, banking, information and training, etc., on an expanding scale, which will turn these important processes of economic relations into constant care and necessary data for farmers.
- Expanding digital knowledge and skills in the administrative, managerial and executive staff with a clear understanding that they contribute to the development of the sector, its competitiveness and profitability, as well as advisory services.
- Introduction of digital solutions and precise technologies and good practices not only in organic beekeeping, precise feeding of laying hens, etc., but also in a wider range of agricultural activities.

3. Bioeconomy and sustainable management of resources

3.1. Key scientific evidence

At the national level, the current state of bioeconomics is measured by indicators of Gross Value Added (GVA), the number of employees, volume of production, utilisation and consumption of biomass, and impact on the environment. The agricultural sector, which produces biomass production and the food industry are fully involved in the bioeconomy. The other sectors are either only partially or segmented in the field of bioeconomy. In 2015, Bulgaria's bioeconomy produced €3.7 billion GVA and ranked 20th among the EU-28. It is found that the agricultural sector provides about 50% of GVA out of all the bioeconomy industries and of the employment output, which emphasises the crucial role for the future of this sector. Agriculture continues to dominate in the bioeconomy, as despite the lack of exact figures, the agricultural sector accounts for about 44% of GVA and those employed entirely in this sector. According to data from Agrostatics (MAFWE, 2017), the production of basic biomass amounts to 15.1 million tons, with the largest share of the grain sector - 63%. In turn, the amount of waste products amounts to 20.3 million tons in equivalent of raw biomass.

The vegetable residuals or biomass have two sources - the production of crops and by-products from their processing and the residues after harvesting. The main goals of the agriculture dedicated to providing food security for the population, have naturally focused on primary production. But lately, there is more interest in the related secondary sector - the use of waste products. Using the latter is more expensive, but opens up opportunities for more efficient use of resources and maintaining the balance to the environment. Increased demand for biofuels is closely linked to the nutrition of the population. Currently, about 2% of fuel is provided through biomass, but if this continues, a sharp rise in agricultural prices can be expected. The linking of raw agricultural materials to energy unambiguously will increase prices, which has been reported at the beginning of the 2000s, but the secondary use of biomass and agricultural wastes will not trigger this effect though the pricing of these products is still an issue. However, in the coming years it can be expected that the demand for this type of renewable energy will continue and will cause rising demand for agricultural residuals and wastes, which treated and processed in an innovative way will make them competitive to conventional energy sources. It is thought that at the transition period and at very beginning it may occur increase in the prices of agricultural goods, and therefore difficulties in feeding the population.

As of 2018, the Ministry of Education and Science approved National Scientific Programme "Healthy Foods for Resilient Bioeconomy and Quality of Life". The purpose of this programme is to conduct basic and applied research to create advanced models and technologies for the production of healthy foods for strong regional bioeconomy and to improve the quality of life and wellbeing of Bulgarian society. Expected and already known results of ongoing basic and applied research are achieved, as well as the transfer and dissemination of scientific knowledge relevant to users. The main directions are associated with the exploration, development and/or putting into practice innovative models of healthy and safe food systems within industry/bioeconomy through the promotion of targeted research. This program should contribute to the development and outreach of biotechnology and to stimulate for creating clean and functional raw materials for cyclical economy and healthy life. The implementation of the programme should help to achieve progress in the following areas: production, processing and marketing of safe and quality food; development of strong regional bioeconomy; bio products such as functional foods; production risk control and increased yields in agriculture; high-quality food for increasing human and animal welfare; green / bio-based economy. Through the programme is built up a cluster, including the major research institutes and universities in Bulgaria, working and having capacity in the scope of the programme, which is a prerequisite for achieving greater leverage and multifunctional effects.

3.2. Summary of position of the Multi-Actor Platform

Investments in biomass utilisation require an assessment of how much the starting material costs, the purchase price for the energy produced and the fixed costs associated with the reliability of the installation. First, investors in waste raw materials and steam and energy production face high and often volatile raw material prices. Despite the advanced technologies of modern installations for the provision of raw materials and their transportation, the installation comprises a number of costs, which will make the venture unprofitable. As a rule, the price of the raw material is not expensive, but transporting it to the installation is often unprofitable.

The second problem is the relatively common problems of energy and electricity financing. Electricity is bought at different prices depending on what is produced and what is the political view on the issue. Some inconsistency in this regard can lead to irrational investment decisions. The third problem concerns the reliability of the installation itself for the production of electricity, energy or heat. Often the costs of operational maintenance are quite expensive.

Of course, the advantages of bioenergy production are clear, as follows:

- Organic fuels are the main obstacle to the more sustainable development of contemporary societies. From this point of view, biomass and the energy extracted from it are a possible solution.
- Biomass is significantly more evenly distributed around the globe and, therefore, makes it possible to reduce dependence on oil imports.
- Biomass production and the use of agricultural waste for biomass will stimulate rural development in the field of farming, forestry and related industries.
- Biomass technologies are more in line with the quality of the environment compared to conventional energy technologies.
- Biotechnology alternatives would help reduce emissions of air pollutants associated with fossil fuels.

Almost all countries have adopted rules and laws granting tax rebates on the sale of ethanol for gasoline and biodiesel for diesel engines. We can assume that if developed countries give up their subsidies and accept market opening, all producers, both poor and rich, can benefit. Biofuel markets for developing countries can contribute to rural development. Moreover, the rising biofuel prices and the associated rise in agricultural prices may give developing countries some opportunities. Agricultural development can be a driver of growth and help to overcome malnutrition and poverty, but this development will also require a lot of new knowledge of farmers, new changes in infrastructure - creation and financing, scientific and educational, judicial and others. All this can have immediate negative effects on the nutrition of the

population. The problem is most important for developing countries, because most of their population spends half of their income on food. In addition, the strong growth in organic crops does not completely solve the problem of threats to the environment - it does not necessarily lead to an automatic reduction of greenhouse gases in the atmosphere. Almost all note that changes in land use have the greatest impact on emissions; that is, changes related to deforestation for the needs of developing agriculture are an obstacle to land quality and biodiversity, and greenhouse gas emissions.

4. Farm diversification and food chains

4.1. Key scientific evidence

In the rural municipalities the determinants of the diversification of the economy are connected with "Manufacturing" industries, the "Food" sector, along with services such as Trade, "Repair of cars and motorcycles", "Transport", storage, tourism and entertainment, leisure time services, etc., which continue to increase their economic share. A significant part of the enterprises are micro in scale. To improve the competitiveness of enterprises it is necessary to introduce new technologies and digitalisation of business processes, as well as to improve labour productivity. The investments in fixed assets increase for micro enterprises, but their production capacity is lower than that of small and medium-sized enterprises. It is noted that regardless the service sector in rural areas expands consistently, those businesses in rural areas have lower turnover and economic activities compared to counterpart none-rural contenders. To accelerate the development of the rural economy, it is necessary to invest in innovative products, which would lead to better positions of micro-enterprises and small-medium size firms on the local and international market. In this regard, the introduction of digital technologies and innovative business processes are solutions to improve the profitability of economic outcomes.

The diversification of economic activities in rural areas creates an alternative to traditional employment in agriculture. Some of the factors that are a barrier to the potential of Bulgarian villages characterised by favourable natural, historical and cultural heritages are the migration of the population to urban centres along with emigration abroad from rural municipalities. There is strong linkage between prescribed diversification of rural areas and the expansion of tourism, and attraction of tourists to rural areas is a very relevant opportunity. The aging population definitely discourages entrepreneurs in investing resources in these areas and they prefer to invest their capital in predominantly urban areas or in popular tourist sites where there is predetermined demand and supply of tourist products. Depopulation together with the education and qualification level of people of working age hinder investment and entrepreneurship in rural areas. Problems arising from the poor infrastructure in the areas, which is much more exacerbated in the villages than in urban areas, the lack of sewerage, and telecommunication connections also contribute to the weaker diversification. The food industry in Bulgaria, which includes both the production of food and beverages and tobacco products, accounts for about 2.3% of Gross Value Added in 2019. Over the years, there has been a reduction in the share of the food industry in the economy, in comparison with the initial years after 2010 when this percentage reached 3.2%. The contraction in the production of tobacco products is the most significant, but the reported decline is also due to a decrease in value added in the food-producing sectors. It should be noted that the total production in the industry increased during the period 2011-2019 by about 18%, while the value added increased by about 10%. This means that production costs in the industry are growing at a faster pace, which shrinks the competitiveness of the industry. At European level, the share of the food industry in the total economy of the EU-27 is about 2% and this percentage is relatively constant over the years, and in this respect the Bulgarian food industry is approaching the European average.

The post-COVID-19 economic crisis is characterised by the pressure on farmers and processors, who on the one hand face rising prices of raw materials and inputs, and on the other hand face selling prices that are retained or suppressed due to competition. It turns out that in such situations efficiency and economy of scales is very important, which are not noticed as strong sides by the majority of Bulgarian businesses. The market competition climbs and businesses in rural areas, which very often are critical to their economic margins and reserves, are at stake. Although foods are less price elastic than other goods, they respond more strongly to price changes than to income movements, and in this period those businesses that can

offer products at a lower price and deliver the best quality per value, which reflects the utility value of the product have advantages. The integration along the chain, both with the raw production and with the realisation outlets, provide a favourable position, which is a safeguard in this crisis and during difficult times. In addition to the economic factors emerging in the post-COVID-19 period, the environmental challenges and priorities initiated by the world community unravel the certainties and impose the need for transformation. Agricultural producers and food manufacturers encounter the need to reinforce their adaptability to a changing environment and to integrate better to new emerging value chains, which will be critical for sustainability and future viability.

4.2. Summary of position of the Multi-Actor Platform

The partners from MAP-Bulgaria note that agriculture is an economic sector, which in many cases is viewed through the prism of economic results, efficiency and effectiveness of its activities. However, agriculture must also be seen as a public good, the aim of which is not to achieve economic growth, but to ensure food security and provide the necessary high-quality and safe food for humanity. Therefore, it should not be seen as a purely market business industry led by profit and financial performance. Public support in this sector must continue, and the direction is to look for the common public good, extended not only in terms of food, but also in terms of environmental dimensions. In everything, the result must be sought for both producers and consumers in order to balance these relationships.

The biggest competitor for the future of agriculture will be technologies. Land resources have no alternative in food creation and it was one of the indispensable factors of production, but the next era will make molecular technology the biggest competitor in human nutrition. On the other hand, innovation will enable agriculture to become more attractive to the people who deal with it, make it more efficient, more productive and more environmentally friendly. At the very beginning of this transition, competition and proven economic laws of efficiency, economies of scale, returns and profitability will make small and medium-sized producers worried about their existence until these innovations become economically accessible to them, but we believe that everyone will find a place in the market. At the same time, the economy is consumption and it must be maintained, and the danger of support for consumption is the situation of "unproductive" consumption, which does not create motivation for production. In turn, consumption depends on prices, and they are influenced by costs. The essence of the economy is consumption, which is driven by the income through which this happens, but the key variable for the distribution of consumption between goods and people is through prices.

The vertical expansion and diversification of agricultural production on raw material farms should be encouraged. Farms should be encouraged to invest in agriculture and strive to maximise profits and returns, not just optimise gross revenues to production costs. Introducing an approach to support investment in equipment and machinery, taking into account economic need, return and public benefits, can help to better target and enhance the effects of public interventions. Direct payments need to be more strongly connected to demand for value-added results and competitiveness. Income support for farmers through direct payments must go hand-in-hand with increasing competitiveness and added value, with a focus on productivity, modernisation and innovation. Innovation and continuous modernisation of production is essential for competitiveness. Innovative solutions are inherently relatively expensive and require significant financial resources, which requires a clear definition of the segment of farms and industries where this can be more widely promoted. Improving the environment for more innovative solutions and projects can be achieved by promoting public-private partnerships and joint collective action. Better and full use of the potential of Bulgarian agricultural science can contribute to lowering the cost of innovative solutions and technological investments, as well as to increasing their adaptability and their applicability in local conditions. This requires directing more efforts for collective and branch organisation of innovation activity in agriculture in order to increase the efficiency and expediency of such investments.

5. Agroecology

5.1. Key scientific evidence

Although Bulgaria has a high share of protected lands in Natura 2000 network sites, along with a moderate rate of organic production, and relatively low levels of mineral fertiliser and chemical plant protection products use, it turns out that the share of utilised agricultural area (UAA) included in agri-environmental measures and in the territories hosting agricultural habitats are among the lowest in the EU-28. Levels of organic production are increasing at some of the highest rates in recent years in the EU, but remain about half the EU average. For the period from 2010 to 2016, information on the application of pesticides and fertilisers is relatively scant, however since then the trend is of expanding chemical usage, which testifies to production intensification but this is still lower than the EU average. The main method directly related to soil protection is "zero tillage". This indicator has a positive trend, if we compare the 6-year period. According to the "Ministry of agriculture food and forestry", the declared areas with "zero tillage" and conservation soil management method are: 1650 ha in 2010, while in 2016 there is a significant increase in the areas cultivated in this way, amounting to 4 845 ha and by 2022 we may judge that over 15% of the arable land is tilled likewise. We could also look for a positive trend at the level of "manure" and more precisely for the needs of the research we take as an indicator the farms with manure storage facilities; as the farms that owned such facilities in 2010 were 2% of all households, while in 2016 they were 5%. Following the concept of environmental protection and increasing the share of UAA with manure application, it is clear that progress is being made here as well. While share was 3% in 2010, in 2016 it was 5.3% and is increasing visibly today.

In connection with an expert's judgement made by the Institute of Agricultural Economics on topics related to the European Green Deal concerning the use of mineral fertilisers and plant protection products, it was found that Bulgaria uses low levels of mineral fertilisers in crop production. A small nitrogen footprint is still observed. There is a tendency to increase the use of nitrogen fertilisers per unit area, which may create a risk of water pollution with nitrates in the future. Although at the moment Bulgaria does not exceed the norm of fertilisation with nitrogen fertilisers, the data on the nitrogen balance show that there is an ecological risk of water pollution with nitrates. The assessment shows that a medium negative effect on the total production of crop production is expected, which is directly related to the fact that modern agriculture depends on the use of mineral fertilisers as a means of compensating for nutrient depletion from the land in the form of production. Productivity and area yields are also expected to decline as a result of reduced agricultural production. The quality of the production will also be affected in a negative direction, as with reduced fertilisation rates we can expect an increase in the share of production that does not meet the expectations in terms of weight and volume.

The expectations are in the direction of reduced plant production as a consequence of the reduced amount of plant protection products used, which in turn will lead to a decrease in productivity and area yields. The reduction of pesticides is expected to have a weak and negative effect on the quality of production in terms of the appearance of agricultural products and their durability. We can expect an increase in the share of production with external defects, as well as that affected by various plant diseases and pests. On the other hand, food products will become closer to those produced naturally due to the reduced amount of chemicals used in their production. We can expect that the agricultural products produced will be healthier. Therefore, the effect on the quality of production will be in two directions: on the one hand, deterioration of the appearance and durability, and on the other, supplying the population with healthier food. Achieving the higher environmental goals of the European Green Deal will depend on the pace and ability of science to provide technological solutions that must compensate and support farmers so as to reduce the consequences and effects of high demands.

5.2. Summary of position of the Multi-Actor Platform

The 21st century marks the beginning of a new economic era, the 'Fourth Technological Revolution', based on information. The industrial age has brought humanity into sharp conflict with nature and the climate, and the pursuit of evermore material goods threatens the sustainability of the planet. These challenges will need to be addressed in a smarter way, and agriculture will need to be transformed. World agriculture contributes an average of about 10% of greenhouse gas emissions and Europe wants to reduce pollution that comes from agriculture, and this can only be achieved through more science and innovation, which will reduce the high cost of making the necessary efforts in this direction.

In Bulgaria, the environmental problems in agriculture are fortunately not so great, as it is characterised by a small nitrogen footprint in the soil, as well as low deposition of chemicals in agricultural products, and greenhouse gas emissions are lower than the EU average per unit area. At the same time, the EU's goals, measures and actions in the field of environmental protection will have a much stronger impact on the EU's developed and agriculturally-leading countries and to a lesser extent on the home industry. For the results to be sustainable and lasting, environmental challenges must be addressed and solved through the economy. This means that the environmental goals set must guide us steadily from now on, creating everything necessary so that we can reduce carbon emissions, reduce the use of mineral fertilisers and preparations, antibiotics and alleviate the pressure on soils and stop the shrinking of biodiversity. This involves creating alternatives and smart technologies, and making them widely available and implementing them. We need to set deadlines to achieve this in the first place, to create concrete funds, and then to set time limits for our main goals.

Except in purely conceptual terms agroecology can be seen as an opportunity (which is not to be neglected) to provide public goods. Agricultural practices compatible with sustainable agriculture, which have inclusive explication pertaining not only to purely agronomic and production sense but also in social, political, cultural, historical and environmental significance, would be a precondition for adequate capitalisation of rural areas. At this stage of the development in Bulgaria, it is of high importance to turn to rural areas with commitments and engagements for the future. The ideas and the goals to mitigate and to prevent climate change lead to a focus on the circular economy and renewable energy sources, and set up the basis for new economic cycles and driving factors, which give an opportunity to rural economies and societies to align this agenda. The natural resources of Bulgaria, such as climate, historical heritage, natural biodiversity and ambience are important and provide advantages to rural areas. It is crucial that we use all this to optimise the added value in order to foster the wellbeing and welfare of rural communities, to the benefit of the natural and agroecological potential of rural areas.

According to the MAP members, the agroecological opportunities for rural areas can be designed to:

- Increase public support for agri-environmental agriculture to become a provider of public goods for less intensive production, with a reduced and neutral carbon footprint in the coming decades.
- Support for the development of precision and digital agriculture, which will enable the increase of agri-environmental aspects and will support the agricultural sector developing predominantly in rural areas.
- Attracting young people and creating conditions for improving the demographic situation in rural areas on the basis of ecology and easier access to clean and quality food.
- Development of services based on a sustainable, environmentally-friendly economy in rural areas suitable for building green energy, ecological tourism, organic farming, maintenance of valuable ecological places, etc.

Recommendations and Conclusions

Rural areas lag behind in development compared to non-rural areas, therefore public support and special policy is indispensable. Maintaining the balance between the two and reducing the development distance currently existing between rural and urban places necessitates a consistent and systematic public intervention. Special attention should be paid to villages in rural areas, where the problems are most acute. They should play a more important role in the structure of local self-government and the bottom-up approach. This is important in the implementation of all public policy decisions. Leadership and institutions are the most important tools for achieving the desired situation and changing negative trends. Leadership brings the right and credible ideas and vision, and driven by a strong will it can build territorial development institutions that give a promising future to rural areas. The coming digital age and the development of information technology is also on the side of future sparsely-populated, environmentally-friendly rural areas. These are the strengths of rural areas as providers of better living conditions that will work for their development in the future, which must be used to ensure continuity between rural areas today and those of the future.

Rural diversification has been happening and expanding in recent years, and although agriculture is taking a stronger place in rural economies, its share is shrinking and being replaced by the growing presence of the services sector. The problem of rural economies is not so much in diversification, but in the general level of their economic development compared to other non-rural areas and in the type of economic activities. So far, rural areas have failed to attract innovative and advanced economic ventures and sectors, which is becoming a diversification of the future. Although the resource potential of rural areas is great for the development of the bioeconomy, the circular economy, the eco-economy, rural areas fail to reap these benefits, the main one being the problem of human resources and demography. The development of such an economy requires highly-qualified experts, well-educated and trained specialists and researchers, which is not among the strengths of rural areas. That is why placing demographic and human resources at the heart of the future of rural areas and viewing public support as a tool for generating future change are extremely important.

Public funds should be significantly oriented towards people and communities and towards their real priorities. The creation of services and the promotion of activities that do not meet the immediate needs will not lead to rational achievements and effects. Investing in expensive technology and digitalisation of rural areas without this being preceded by a real analysis of the state, needs and potential of rural areas will lead to a negligible result for the efficiency and effectiveness of these investments. In the new age of information technology, rural areas are becoming more attractive for changing demographics and will facilitate the return of more young and educated people, which will be a priority for modern diversification and modernisation of rural areas. Efforts must be focused on exploiting the potential and strengths of rural areas, which is embedded in their natural, cultural and historical resources and the living conditions they provide. This is undoubtedly connected with the possibilities of diversifying the economy and building a much more technological and innovative agriculture, which, in addition to producing food, can also create public goods.

For the members of MAP-Bulgaria, agriculture should continue to be among the most important and significant sectors for rural areas. However, it must be technologically upgraded and become more innovative, relying not so much on low-skilled labour, but also able to attract much more educated and highly-knowledgeable professionals. Precision agriculture, digital technologies, and the bioeconomy can become engines of rural development in the coming decades. In this way, diversification will occur in the quality of the labour force employed in agriculture, which will make it more attractive and desirable for young people and those with higher education. This will help to improve the demographic balance in these areas, the main key for sustainability and a better future.

Annex 1: Key scientific evidence or activities cited by the Multi-Actor Platform

Responsibility: Facilitator and Monitor

The scientific and research findings and conclusions from different projects are incorporated in the Paper. The National Plan for Recovery and Sustainability, Advancing Sustainable Circular Bioeconomy in Central and Eastern European Countries – BIOEAST and many others are reviewed and reflected in the Paper.

- Within the rural areas, there are specificities and disparities, which demands to delineate more precisely rurality.
- Although all EU Member States have their bioeconomy strategies, the definitions of it are different and distinctive, which testifies for still unclear and divergent conceptualisation however, stressing the need for coordination and directionality.
- Innovation Deals of EU should help innovators who face regulatory obstacles to report and all stakeholders – public authorities, legislators, and private agents to look for solutions but it is still not well-known at the practical level.
- An estimated 20% of the total food produced is lost, which generates wastes and pollution and along with foregone value added, which istargeted tofood waste reduction and circular economy promotion.
- The Farm to Fork Strategy adopted a goal for reducing the usage of mineral fertilisers, pesticides, and antibiotics in order to addressclimate change, and considered agriculture as a crucial industry in future global policy that impacts rural areas and development.

Annex 2: Key scientific evidence or activities provided by the Multi-Actor Platform

Responsibility: Facilitator and Monitor

Through the work of the Multi-Actor Platform, a significant number of official documents and researches are reviewed and referred, while the Institute of Agricultural Economics is engaged to provide and ensure the facts and figures on the topic in order to formulate and conclude the MAP positions.

- Diversification should be viewed not only as an economic diversity of sectors and services, which is noted even nowadays in rural areas, but as a qualitative change of the provided jobs and demanded employment.
- Innovations and technological breakthroughs are the reliable and real path to improve rural economies and diversify their viability, but in order to achieve this livelihoods and living attractiveness of rural areas have to be realised.
- The demand for a better quality of life by human beings in the next decades will determine the outlook for rural areas, which have a lot of advantages in terms of ambience, food and nature, and which, along with digital technologies and advanced services and appropriate public support, will facilitate the rural rebound.
- Agriculture should continue to play an important role for rural areas. However, it must be technologically upgraded and become more innovative, relying not predominantly on a low-skilled and cheap labour force, but also providing opportunities for highly-educated people.

- The new information and technological era can be accomplished only through powerful scientific work and development, and public governance and public support for research and science is crucial to create the capital and to set up conditions, through public-private partnership, for these innovations and discoveries to be practically implemented.

Appendix

Table 1. Compilation of noteworthy projects / initiatives / tools / methods implemented

Name	Time of implementation	Contact & Internet address
Strategy for digitalisation of agriculture and rural areas in Republic of Bulgaria	2019	https://www.mzh.government.bg/bg/politiki-i-programi/politiki-i-strategii/strategiya-za-cifrovizaciya-na-zemedelieto-i-selskite-rajoni-na-/
Strategy for strengthening the role of agriculture in bioeconomy	2020	https://www.agriacad.bg/bg/presscenter/news/article/odobrena-strategiq-za-ukrepvane-rolqta-na-agrarniq-sektror-v-bioikonomikata-razrabotena-ot-ekip-na-selskostopanska-akademiq
Healthy Foods for Resilient Bioeconomy and Quality of Life	2018 - 2022	http://www.nnp-food.au-plovdiv.bg/
New sources of employment to promote the wealth-generating capacities of rural communities	2008 - 2010	http://www.nnp-food.au-plovdiv.bg/
Challenges to Bulgarian agriculture and rural areas for implementation of the New CAP	2019 - 2020	https://www.iae-bg.com/projects/%d0%bc%d0%be%d0%b4%d0%b5%d0%bb-%d0%b7%d0%b0-%d0%b8%d0%b7%d1%81%d0%bb%d0%b5%d0%b4%d0%b2%d0%b0%d0%bd%d0%b5-%d0%b5%d1%84%d0%b5%d0%ba%d1%82%d0%b8%d1%82%d0%b5-%d0%b8-%d1%80%d0%b5%d0%b7%d1%83%d0%bb/
Socio-economic analysis of rural development	2019 - 2020	https://www.mzh.government.bg/media/filer_public/2020/01/21/proekt_na_sotsialno-ikonomicheski_analiz_na_razvitieto_na_selskite_raioni_01_2020.pdf
Thematic Working Group "Innovations"	2019 - 2022	https://ruralnet.bg/%d1%82%d1%80%d0%b3-2/

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