

## FORMS, FACTORS AND EFFICIENCY OF ECO-MANAGEMENT IN BULGARIAN FARMS

This paper presents the results of the first large-scale study on forms, factors, and efficiency of eco-management in Bulgarian agricultural farms of different juridical type, size, specialization, and location. First, a brief characterization of surveyed “eco-active” farms is made, analyzing the various forms and scope of eco-management in agricultural farms. Next, different factors of eco-management in farms are specified along with the costs, effects, efficiency and perspectives of eco-management in agricultural farms. Finally, conclusions from the study are summarized.

JEL: O13; O17; Q12; Q18; Q24; Q26; Q28

The environmental management in agricultural farms is one of the key issues at the current stage of development of Bulgarian agriculture<sup>1</sup> (Bachev, 2008, 2013). Nevertheless, there are no empirical studies on forms, factors and efficiency of the eco-management in farms of different types and locations in Bulgaria.<sup>2</sup> In order to identify and assess these factors we have made a survey<sup>3</sup> with 306 agricultural producers (4,52% of all registered agricultural producers in Bulgaria) carried out in the spring of 2014 during the training courses in different regions of the country under Measure 214 “Agri-environmental payments” of the National Program for Agrarian and Rural Development (NPARD). The training of the agricultural producers is free of charge, and it is mandatory for all beneficiaries from the Measure 214. Therefore, the interested farmers had strong incentives and low costs (time for traveling and training, etc.) for participating in the specialized training. This survey gives a good insight in the “eco-active” agricultural producers, interested in the environmental measures of the NPARD, in the protection of natural environment and in the characteristic features of environmentally-friendly management of farms .

### Characteristics of surveyed farms

The majority of the participants in the survey are Physical Persons, small and middle sized farms for the industry, specialized in field and permanent crops, and located predominately in plain and plain-mountainous regions<sup>4</sup> (see theTable ).

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<sup>1</sup> Bachev, H. (2014). Eco-management in Bulgarian agricultural farms. - Economic Thought Magazine, N 1, p. 56-79.

<sup>2</sup> Yovchevska, P. (2012) Ec-code of new CAP and of the new agricultural producer. - Economic Research, N 3, p. 25-34 (in Bulgarian); Mitova, D. and D.Toteva. (2013). Analysis and estimate of the impact of CAP on EU and on the national agrarian policy on organic farming. Grain and oil crops under CAP conditions. IAI, p. 39-49 (in Bulgarian)

<sup>3</sup> The author is grateful to all participants for the provided information and to the National Agricultural Advisory Service for the assistance.

<sup>4</sup> Classification of farms in different juridical type, specialization, and geographical and program (e.g. less-favored mountainous regions, less-favored region different from mountainous, lands in protected zones and territories) locations is made according to the official typology for agricultural farms in the country. Each of the surveyed farmers

The majority of surveyed farmers are from the North-Central region and the North-Eastern region of the country, while more than a fifth of the participants did not indicate the region (municipalities) where their farm is located.

Table

Characteristics of surveyed farms

| Indicators                                      | Physical Persons | Sole Traders | Cooperatives | Companies, Corporations, etc. | Number*, % in total |
|---|------------------|--------------|--------------|-------------------------------|---------------------|
| Share in total number                           | 84.64            | 7.19         | 2.61         | 5.55                          | 306*                |
| Field crops                                     | 17.37            | 50.00        | 75.00        | 52.94                         | 23.53               |
| Vegetables and mushrooms                        | 11.20            | 0            | 0            | 0                             | 9.48                |
| Permanent crops                                 | 34.75            | 31.82        | 0            | 5.88                          | 32.03               |
| Grazing livestock                               | 1.93             | 9.09         | 0            | 5.88                          | 2.61                |
| Pigs, poultry and rabbits                       | 0.77             | 4.55         | 0            | 0                             | 0.98                |
| Mix crops                                       | 10.81            | 0            | 0            | 17.65                         | 7.52                |
| Mix livestock                                   | 14.29            | 0            | 0            | 5.88                          | 9.48                |
| Mix crop-livestock                              | 1.54             | 4.55         | 25.00        | 5.88                          | 13.40               |
| Beekeeping                                      |                  | 0            | 0            | 0                             | 1.31                |
| Mainly subsistence                              | 15.06            | 4.55         | 0            | 0                             | 13.07               |
| Small for industry                              | 49.03            | 31.82        | 0            | 11.76                         | 44.44               |
| Middle size                                     | 30.89            | 50.00        | 75.00        | 58.82                         | 35.29               |
| Big size for industry                           | 1.93             | 13.64        | 25.00        | 17.65                         | 4.25                |
| Mainly plain                                    | 59.85            | 50.00        | 87.00        | 70.59                         | 60.78               |
| Plain-mountainous                               | 25.48            | 27.27        | 12.50        | 23.53                         | 25.16               |
| Mainly mountainous                              | 8.88             | 9.09         | 0            | 0                             | 8.17                |
| With lands in protected areas and territories   | 5.41             | 0            | 0            | 11.76                         | 5.23                |
| Less-favored mountainous regions                | 6.95             | 9.09         | 0            | 0                             | 6.54                |
| Less-favored regions different from mountainous | 3.47             | 4.55         | 0            | 5.88                          | 3.59                |
| North-west region                               | 7.33             | 4.54         | 0            | 11.76                         | 7.52                |
| North-central region                            | 18.15            | 31.82        | 75.00        | 23.53                         | 20.91               |
| North-east region                               | 15.44            | 9.09         | 0.25         | 29.41                         | 16.01               |
| South-west region                               | 9.27             | 4.54         | 0            | 0                             | 8.17                |
| South-central region                            | 13.90            | 0            | 0            | 5.88                          | 12.42               |
| South-east region                               | 11.97            | 27.27        | 0            | 11.76                         | 12.74               |
| Unspecified region                              | 23.94            | 22.73        | 0            | 5.88                          | 22.22               |

Source. Survey with agricultural producers, May 2014.

Most of the surveyed Physical Persons are self-determined as “small” (49%) and “middle sized” (30,9%) for the sector, a portion is predominately for self-subsistence (15,1%), and a tiny segment is with “big size for the industry” (1,9%). Most of the Physical Persons are specialized in permanent crops (34,7%), field

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self-determined himself as predominately for subsistence, rather small, middle size or large for the industry, and located mainly in plain, plain-mountainous or mountainous region., since they know the best their comparative characteristics in relations with other farms in the region and (sub)sector.

crops (17,4%), mix crop-livestock production (14,3%), vegetables and mushrooms (11,2%), mix livestock production (10,8%), and mix crop production (7,7%), while a small portion is in grazing livestock (1,9%), beekeeping (1,5%), and pigs, poultry and rabbits (0,8%).

The Physical Persons are predominately located in plain (59,8%) and plain-mountainous (25,5%) regions, and a small share is in mountainous regions (8,9%), with lands in protected zones and territories (5,4%), in less-favored mountainous regions (6,9%) and in less-favored regions different from mountainous (3,5%). A relatively greater portion of the surveyed Physical Persons are with unspecified region (23,9%), or situated in the North-Central (18,1%), North-Eastern (15,4%), and South-Central (13,9%) regions of the country, while participants from the North-Western, South-Western and South-Eastern regions are fewer – accordingly 7,3%, 9,3% and 12%.

A half of the Sole Traders are middle sized, 31,8% are small sized, 13,6% are large, and 4,5% are self-determined as predominantly subsistent holdings. A half of this type of firms are specialized in field crops, 31,8% in permanent crops, 9,1% in grazing livestock, 4,5% in crop-livestock production, and the same share in pigs, poultry and rabbits. Half of the Sole Traders are located mainly in plain regions, 27,3% are in plain-mountainous regions, and a smaller portion is in mountainous regions (9,1%), in less-favored mountainous regions (9,1%), and in less-favored regions different from mountainous (4,5%). The greatest share of this type of farms are in the North-Central (31,8%) and South-Eastern (27,3%) regions, a good part is with unspecified region (22,7%), and the rest are located in the North-Eastern (9,1%), North-Western (4,5%) and South-Western (4,5%) regions of the country.

In the group of the "Companies, corporations, etc." there are mostly Corporations (82,3%) and the rest are equally distributed different types of (Limited Liability, etc.) Companies - by 5,6%. The biggest part of the Companies, Corporations, etc. self-determined themselves with middle for the industry sizes (58,8%), 17,6% are large farms, while 11,8% are with small size. Most of this type of farms are specialized in field crops (52,9%), while another significant portion is in mix crop production (17,6%), and a smaller share in (each 5,9%) permanent crops, grazing livestock, mix crop-livestock production, and mix livestock production.

The Companies, Corporations, etc. are situated explicitly in plain (70,6%) and plain-mountainous (23,5%) regions, a part of them are with lands in protected zones and territories (11,8%), and in less-favored regions different from the mountainous (5,9%). The biggest part of this type of firms are located in the North-Eastern (29,4%), North-Central (23,5%), and North-Western (17,65) regions, in the South-Eastern and South-Central regions there are by 11,7% of them, while with unspecified regions are 5,9%.

The surveyed Cooperatives are with middle (75%) and big (25%) sizes for the industry. Three-quarters of them are specialized in field crops, and the rest in mix crop-livestock production. The cooperative farms are located inclusively in

plain (87,5%) and plain-mountainous (12,5%) regions, and a three quartets of them are in the North-Central region, while the rest in the North-Eastern region of the country.

The *structure* of surveyed farms by juridical status, geographical locations, size, etc. approximately corresponds to the real structure of all the farms in the country. Nevertheless, among the farms with high eco-activity there are relatively more farms specialized in the permanent crops in comparison with other aspects of the production specialization.

*The owners and/or managers* of 70,6% of surveyed farms are males, as most of them are younger than 55 (71,2%). Moreover, the majority of the participants are young farmers less than 40 year old (43,8%), which indicate the considerable interest of this group of producers in increasing the environmental efficiency of farms.

The survey has found out that almost 7% of the farmers are “not aware” of the environmental problems in the region where their farms are located. According to a good part of the farmers, their holding is located in a region “without environmental problems” (37,9%), while the biggest portion indicate that they are in a region “with usual environmental problems” (39,9%).

However, the number of farms in regions with environmental problems of different type is not minor. More than 21% of the surveyed farms are in regions with “frequent droughts”, above 7% are located in regions “with exhausted soils”, and almost 5% are in regions “with frequent slush, hails and frosts”. What is more, almost 4% of the farmers indicate that their farms are located in regions “with extreme environmental problems” and equal number select regions “with eroded soils”, while more than 2% of them are in regions “with polluted ground waters”. On the other hand, the number of farms in regions “with polluted soils”, “with destructed biodiversity” and “with polluted surface waters” is small (below 1%), which is an indicator for the insignificant problems of this sort in the Bulgarian agriculture.

The largest part of the surveyed farms (65%) are with relatively little “agricultural experience” pointing out that they are involved in farming for a period up to 5 years, including 21,9% of them “less than 2 years”. The rest of the farmers have long-term farming experience, but needing additional information about the agri-environmental measures of the NPARD and/or formal certification for completed training in that area.

The majority of surveyed farmers indicate that they have taken care of the natural environment for the past 2 to 5 years (37,2%). Over 27% of them have a long-term experience (6 and more years) in the environmental protection. Nevertheless, for a considerable portion of farms (29,4%) the period associated with the protection of natural environment is short (“up to 2 years”). There is a correlation between the period in which surveyed farmers are involved in farming and the period in which they have been engaged in environmental protection. However, the tendency is with the increasing the farming experience to decrease the share of farmers with the relevant experience in environmental protection. The

latter demonstrates, that the specific problem of “environmental management” is relatively new for the most farms in the country.

### **Forms and scope of environmental management in farms**

The knowledge and the implementation of the principles of environmentally friendly agriculture is the base of the effective eco-management in agricultural farms. None of the surveyed farms believe that it is “not important to know” the principles of the environmentally sustainable agriculture, which proves a good understanding of the importance of the integration of eco-management in the overall management of farms.

According to the more than a half of the surveyed farms, they know “well” or “good” the principles of environmentally friendly agriculture (Figure 1). With relatively highest internal capability for the eco-management are the Cooperatives, while the share of the Sole Traders with a great ecological competency is the lowest. The most numerous farms with a good eco-knowledge are specialized in the beekeeping, pigs, poultry, and rabbits, mix crop-livestock production, and mix crops production, while the least are among those specialized in the grazing livestock. The majority of large farms are characterized with a high knowledge acquiring capability for the eco-management, while the share of farms with small size with a high competency in the area of eco-management is relatively lower.

Relatively more farms in plain regions of the country know “good” or “very good” the principles of environmentally sustainable agriculture, while in the mountainous region the portion of farms with similar knowledge is less important. Also a bigger part of the farms in less-favored regions different from the mountainous are with a high eco-competency comparing with the farms in less-favored mountainous regions. The North-Western is with the most significant share of farms with a high eco-knowledge, while the South-Eastern region is with the smallest fraction of farms with a good eco-competency.

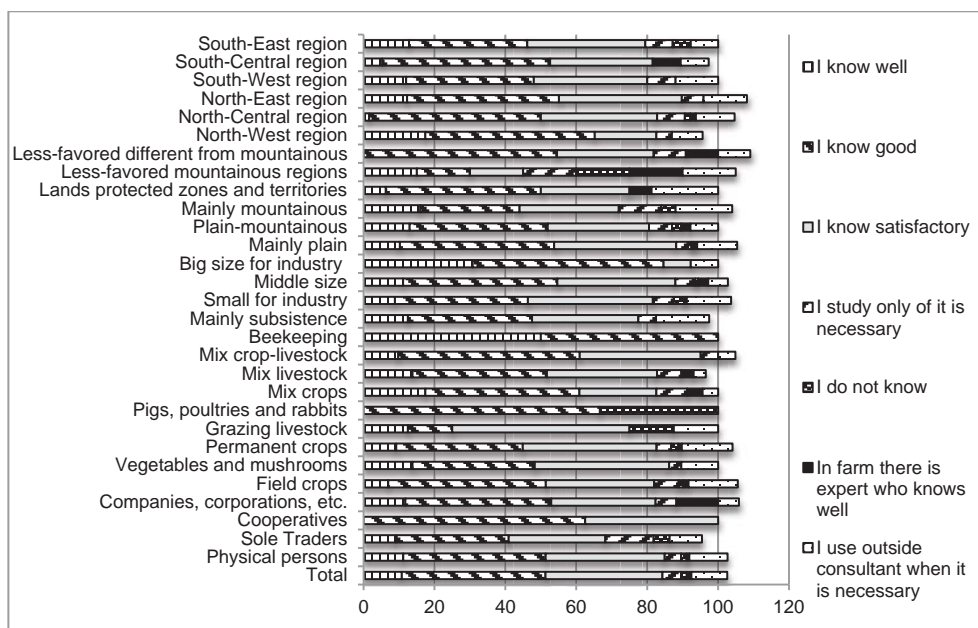
Some farms improve their eco-capability by hiring an expert as part of the Physical Persons and a larger portion of the Companies, Corporations, etc. point out that they “have specialists in the farm, who know well the principles of environmentally friendly agriculture”. Besides, each tenth farm “uses an external consultant if it is necessary”, as the external supply with the eco-knowledge in most popular among the Physical Persons and the Sole Traders, the farms which are predominately for subsistence and small sized, and those specialized in the permanent crops, field crops, grazing livestock, and vegetables and mushrooms, as well as farms located in the mountainous regions, with lands in protected zones and territories, and less-favored mountainous regions.

However, in a third of the farms, the level of competency in environmentally sustainable agriculture is “satisfactory”. The later means that the internal capability for the effective eco-management in the considerable portion of farms is low. The highest share of farms with such features are among the Cooperatives, small sized farms, those specialized in grazing livestock, vegetables and mushrooms and permanent

crops, and farms located in plain regions, in less-favored regions different from the mountainous, and in the North-East region of the country.

Figure 1

Extent of knowledge of principles of environmentally friendly agriculture in farms of different type and location\* (%)



\* Multiple answers.

Source. Survey with agricultural producers, May 2014.

Furthermore, a good portion of the Sole Traders, farms specialized in pigs, poultry, and rabbits and grazing livestock, farms located in the less-favored mountainous regions, mainly mountainous regions, and the South-East region of the country indicate that they “do not know” the principles of environmentally-friendly agriculture. Moreover, some of the farms study the eco-principles “only if that is necessary”, as a particularly big is the share of this type of farms among the Sole Traders, farms in the mountainous regions, and in the less-favored mountainous regions.

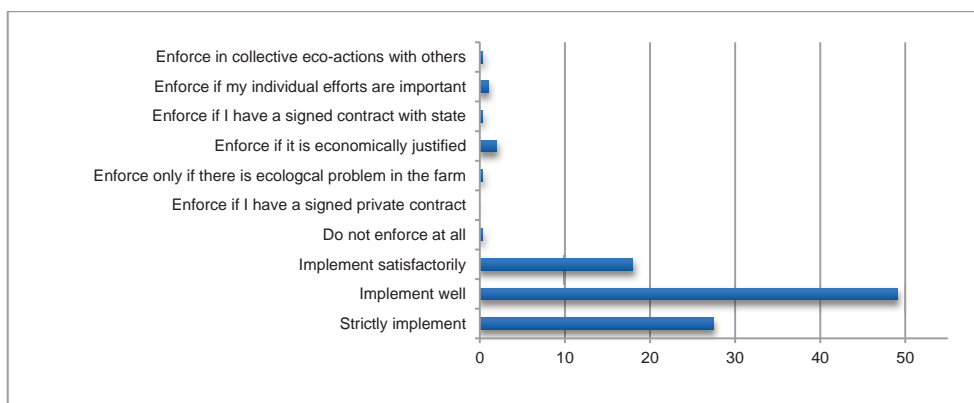
Therefore, in the future more efforts should be made to improve the eco-competency of farms in the later groups with a low eco-culture through education, training, consultation, advises, etc.

The eco-competency is a necessary, but not a sufficient condition for the effective eco-management. Due to various reasons (economic, technological, behavioral, etc.) and/or in different periods of time, the farmers do not always

implement strictly the principles of the environmentally friendly agriculture. According to the majority of surveyed farms they implement “well” or “completely” the eco-principles in agriculture (Figure 2). Nevertheless, the share of farms implementing these principles “satisfactorily” is not small, while those “not implementing at all” are a minority.

Figure 2

Extent and conditions of enforcement of principles of environmentally-friendly agriculture in farms (%)



Source. Survey with agricultural producers, May 2014.

A small fraction of the surveyed Physical Persons indicate, that the implementation and enforcement of the eco-principles in the farm depends on certain conditions, such as the economic justification, the importance of eco-actions, an ecological problem in the farm, a contract with the state, or the joint actions with other agents. For instance, for 2,3% of the later farms this is the “economic justification”, as these are mainly farms with a large size and farms predominantly for subsistence, specialized in field crops, vegetables and mushrooms, permanent crops, mix crops and mix livestock productions. A part of the Physical Persons (1,2%) implement eco-principles only “if their individual efforts are important”, and those are entirely small farms in permanent crops. A quarter of the farms specialized in beekeeping enforce eco-principles “only if there is an ecological problem in the farm”. A tiny portion of the Physical persons (0,4%) implements eco-principles “if there is a contract with the state”, and those are exceptionally subsistence farms, specialized in mix crops production. Another small section of the Physical Persons (0,4%) points out implementing the eco-principles in case of “collective actions with others”, and those are small farms in permanent crops and field crops.

For none of the farms the “existence of a private contract” is a condition for the implementation of eco-principles, which shows that this form is not important for the Bulgarian farms at the current stage of development.



To the greatest extent (“strictly” or “well”) implement the principles for environmentally-friendly agriculture the large-scale farms (100%), the Cooperatives (87,5%) and the Companies, Corporations, etc. (82,3%), the farms specialized in beekeeping (100%), mix crop-livestock production (82,9%) and mix crops production (82,6%), and those located in the plain regions (77,9%), with lands in protected zones and territories (87,5%), less-favored mountainous regions (80%), and in the North-East (85,7%) and the South-West (80%) regions of the country.

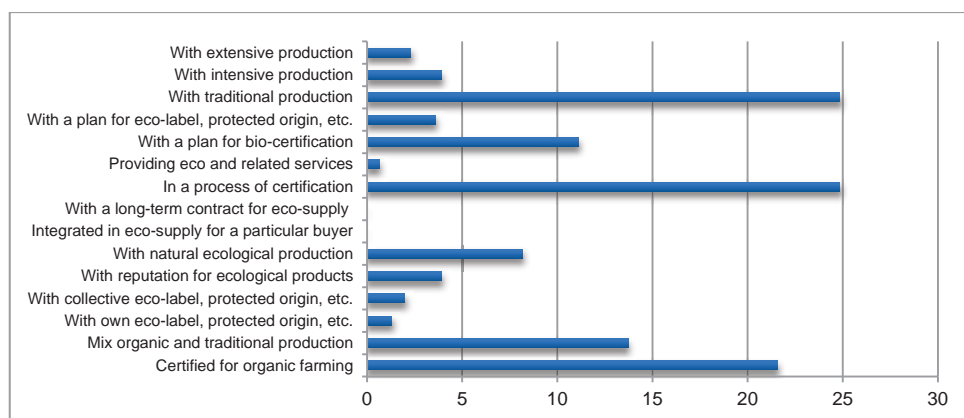
On the other hand, the share of farms “not enforcing” eco-principles is relatively smaller for the Sole Traders (63,6%), farms specialized in pigs, poultry and rabbits (33,3%) and vegetables and mushrooms (58,6%), those with a smaller size (73,5%), and farms located in the mountainous regions (72%), in less-favored regions different from the mountainous (54,5%), and in the North-West region of the country (69,6%).

The transition to officially certified organic production is a major form for the eco-management in Bulgarian agricultural farms. Here the eco-behavior of the agricultural producers is regulated and stimulated by the dynamics of market demands and the premium to the market prices of certified organic products. Simultaneously, the authenticity of products and the adequacy of the eco-activity with the officially set up standards is controlled by independent bodies.

Our survey has also confirmed, that a relatively bigger portion of the eco-active farms are already “certified for the organic production” and around a quarter of them are “in a process of certification” (Figure 3).

Figure 3

Share of farms applying different forms of eco-management (%)



Source. Survey with agricultural producers, May 2014.

A part of the farms “experiment” with the organic agriculture along with the conventional production, as almost 14% of the surveyed inform that they are “with mix organic and traditional production”, including 14,3% of the Physical Persons, 23,5% of the Companies, Corporations, etc., and 4,5% of the Sole Traders.



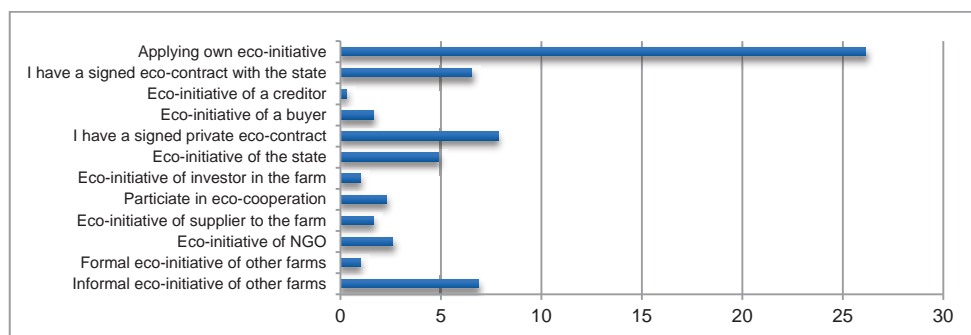
The other private and market forms for the eco-management are less used in the surveyed farms, predominately by the Physical Persons. For instance, merely 1,5% of the Physical Persons are “with own eco-label, protected origin, etc.”, 2,3% have “collective eco-label, protected origin, etc.”, and 0,8% “provide eco and related services”. At the same time none of the surveyed farms is neither “integrated for eco-supply for a particular buyer”, nor has any “long-term contract for eco-supply for a particular buyer”. Nevertheless, there are widely employed informal private and market forms for the eco-management as 9,3% of the surveyed Physical Persons point out that they are “with naturally ecologically pure production”, and 4,6%, of them having built a “reputation for ecologically pure products”.

In addition, a good portion of the farms has plans for a “bio-certification” (above 11%) or for a “eco-label, protected origin, etc.” (5,9% of the Companies, Corporations, etc., and 3,9% of the Physical Persons). About a quarter of the surveyed farms estimate that they are with a “traditional production”, including a three-quarters of the Cooperatives, 31,8% of the Sole Traders, 23,5% of the Companies, Corporations, etc., and 22,4% of the Physical Persons. A bigger share of firms characterize their production as “intensive” (13,6% of the Sole Traders and 17,6% of the Companies, Corporations, etc.), while among the Physical Persons this percent is 2,3% and zero for the Cooperatives. At the same time, only 5,9% of the surveyed Companies, Corporations, etc., and 2,3% of the Physical Persons describe their production as “extensive”.

A portion of the surveyed farms (with exception of the Cooperatives) also have their own initiatives or participates in another private, collective or state initiatives for the protection of the nature (Figure 4). For instance, 28,2% of the Physical Persons, 18,2% of the Sole Traders, and 17,6% of other type of firms “implement their own eco-initiatives”.

Figure 4

Share of farms participating in various initiative for protection of nature (%)



Source. Survey with agricultural producers, May 2014.

Furthermore, some of the farms implement a contractual form as 9,3% of the Physical Persons report having “a signed a private eco-contract”, while 6,4% of the

Physical Persons, 5,9% of the Companies, Corporations, etc., and 4,5% of the Sole Traders having “a signed an eco-contact with the state”.

A part of the farms participate in the eco-initiatives of other farms and organizations. For 8,1% of the Physical Persons this is “informal initiative of other farms”; for 17,6% of the Companies, Corporations, etc., and 4,5% of the Sole Traders, and 3,9% of the Physical Persons that is an “eco-initiative of the state”; and for 5,6% of the Companies, Corporations, etc., and for 1,5% of the Physical Persons this is an “eco-initiative of the supplier to the farm”.

Besides, a small fraction of the Physical Persons participate in an “eco-initiative of a non-governmental organization” (3,1%), “eco-initiative of a buyer” (1,9%), “formal eco-initiative of other farms” (1,2%), “eco-initiative of the investor in the farm” (1%), and “eco-initiative of a creditor” (0,4%). Also a portion of the surveyed Companies, Corporations, etc. (5,9%), and Physical Persons (1,9%) report that “participate in an eco-cooperative”. The later farms use the cooperative form for realization of a higher (“collective”) eco-effect or as a necessary condition for the participating in some public or private initiative (program).

Certified for the organic production, in a process of bio-certification or with a plan for the bio-certification are entirely the farms of Physical Persons and Sole Traders, where each second applies (“officially certified” or “in transition to”) the norms of the organic agriculture. On the other hand, none of the Cooperatives, Companies, Corporations, etc. is using or is planning that particular form of eco-management.

The greatest part of the certified for the organic production is among the farms specialized in the permanent crops (39,8%), vegetables and mushrooms, (20,7%), mix livestock production (24,1%), and mix crop-livestock production (19,5%). At the same time, the share of farms with complete certification among those specialized in field crops and mix crops production is small (accordingly 5,5% and 8,7%), while none of the farms with “pure” livestock specialization (grazing livestock, pigs, poultry, and rabbits, and beekeeping) has been officially bio-certified.

Simultaneously, in a process of organic certification are farms of all type of specialization, as the biggest share is among the groups specialized in beekeeping (75%), permanent crops (37,7%), mix livestock production (34,5%), and pigs, poultry and rabbits (33,3%). Therefore, the majority of surveyed farms specialized in permanent crops (77,5%), beekeeping (75%), and mix livestock (58,6%), and a good portion of those specialized in mix crop-livestock production (46,3%), vegetables and mushrooms (37,9%), and pigs, poultry and rabbits (33,3%) practically implement (“officially” or “are in a transition to”) the principles of the organic agriculture.

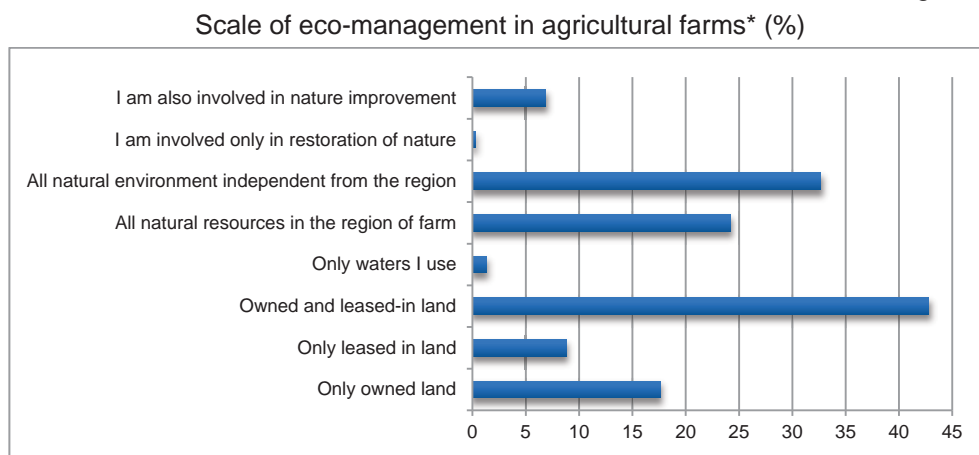
What is more, a part of the farms with different specialization have plans for the bio-certification, with the exception of those in grazing livestock, and pigs, poultry and rabbits. Consequently, in a near future, all farms specialized in beekeeping, and almost all holdings in the permanent crops, will apply the organic form of eco-management.

The largest part of the farms certified for the organic production or in the process of bio-certification are small and a middle sized farms for the sector. On the other hand, while the share of large-scale bio-certified farms is similar to that of small and middle sized, none of them is in a process or with a plan for bio-certification. The share of bio-certified farms among those for subsistence is small, but many of them are in a process or with a plan for bio-certification. Therefore, in the near future every second of the “non/semi-market” farms (predominately for subsistence) will apply this “market-oriented” form of eco-management.

The share of farms with bio-certification, in a process of certification, or with a plan for bio-certification, in the overall number of farms in the plain-mountainous regions is in a more advanced stage. The same is true for the farms with lands in protected zones and territories, and in the less-favored mountainous regions in contrast to the farms in less-favored regions, different from the mountainous where there is still no bio-certified farm. The South-West region is with the greatest share of farms, which are certified for the organic production. In the other regions of the country, the portion of farms in the process of bio-certification is considerable, with the exception of the North-West region with a comparatively small fraction of the farms implementing (officially or in transition to) the norms of organic agriculture.

The scope of the eco-management is not equal to all of the surveyed farms (Figure 5). For instance, for almost 18% of the farms the cares for protection of the natural environment are focused “only on owned land”, including for 19,3% of the Physical Persons, 13,6% of the Sole Traders, and 12,5% of the Cooperatives.

Figure 5



\* Multiple answers.

Source. Survey with agricultural producers, May 2014.

A portion of the farms are looking after protection “only of leased-in land”, and the latter concerns 12,5% of the Cooperatives, 9,3% of the Physical Persons,

and 9,1% of the Sole Traders. However, the greatest share of the farms concentrate their efforts on the protection of the “owned *and* leased-in land”, as such approach apply 64,7% of the surveyed Companies, Corporations, etc., 62,5% of the Cooperatives, 40,9% of the Sole Traders, and 40,5% of the Physical Persons. Also some small fraction of the Companies, Corporations, etc. (5,9%) report focusing its care “only on waters which they use”.

Besides, a considerable portion of the surveyed farms take care for “all natural resources in the region of the farm”, including 25,9% of the Physical Persons, 29,4% of the Companies, Corporations, etc., and 9,1% of the Sole Traders. What is more, for 32,6% of the surveyed farms the cares for the protection of natural environment cover the “natural environment as a whole independent from the region”, including for a half of the Cooperatives, 32,4% of the Physical Persons, 29,4% of the Companies, Corporations, etc., and 27,3% of the Sole Traders.

A small portion of the Physical Persons are “only involved in restoration of the natural environment”. A little bit bigger fraction of the surveyed farms “are involved also with the improvement of the natural environment” (6,9%), including 12,5% of the Cooperatives, 6,6% of the Physical Persons, 5,9% % of the Companies, Corporations, etc., and 4,7% of the Sole Traders.

### **Factors for eco-management in agricultural farms**

The different ideological, economical, market, public, etc. factors in various extent stimulate or restrict the activities of agricultural producers for the protection of natural environment.

To the greatest extent the eco-activity of a big part of the surveyed farms is stimulated by: the “personal conviction and satisfaction of farmers from the eco-activity”, farm “participation in the public support programs”, “received direct public subsidies”, “professional eco-training of the farmer and the hired labor”, “market competition”, “access to the farm and eco-advice”, “possibilities to increase profit”, “eco-benefits for your farm in the longer-term”, and “European Union policies” (Figure 6).

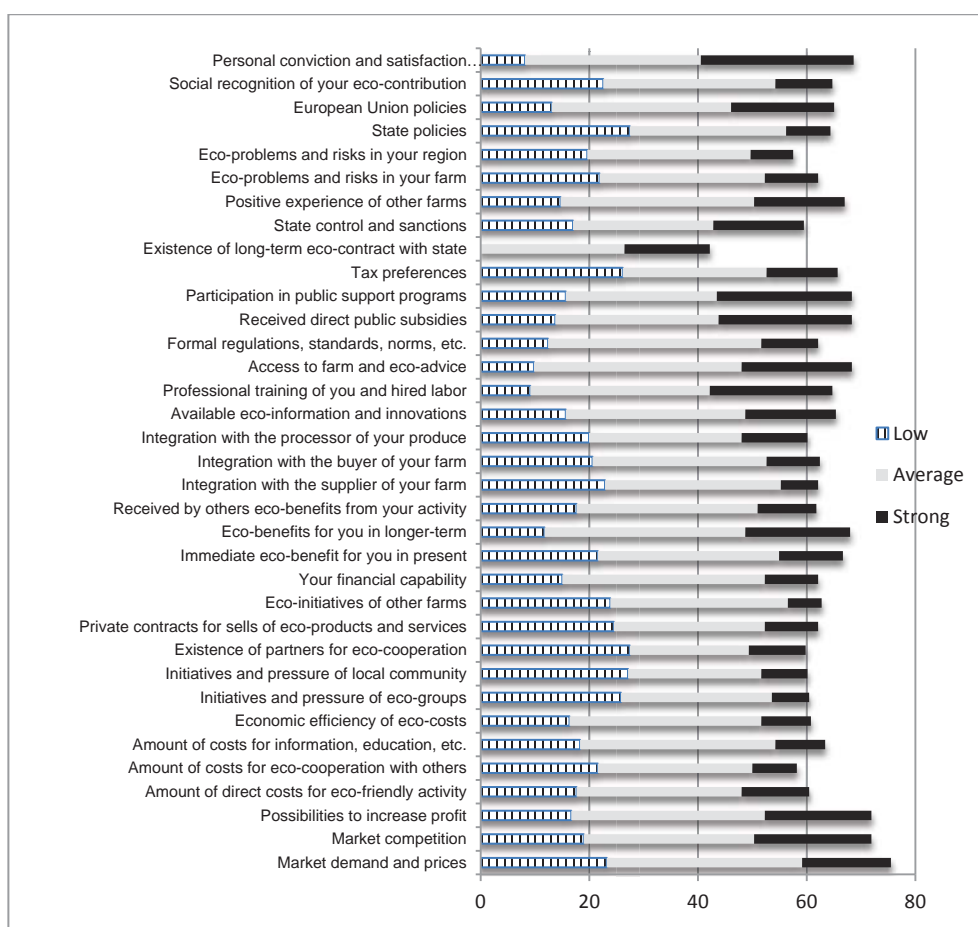
For the different type of farms there is a considerable variation in ranging of the factors, which stimulate their eco-activity. For instance, the eco-actions of the most Physical Persons to the greatest extent are stimulated by: the “personal conviction and satisfaction of the farmer from the eco-activity” (29%), “participation in the public support programs” (23,5%), “received direct public subsidies” (22,4%), “professional eco-training of the farmer and the hired labor” (21,6%), “access to the farm and eco-advice” (20,8%), “market competition” (20,5%), and “possibilities to increase profit” (20,5%).

The eco-actions of the majority of the Sole Traders to the greatest extent are stimulated by: the “participation in the public support programs” (50%), “professional eco-training of the farmer and the hired labor” (45,4%), “received direct public subsidies” (36,4%), “integration with the processor of the produce” (31,8%), “personal

conviction and satisfaction of the farmer from the eco-activity" (27,3%), "European Union policies" (27,3%), "possibilities to increase profit" (22,7%), "economic efficiency of eco-costs" (22,7%), "immediate eco-benefit for the farm in the present" (22,7%), "eco-benefit for the farm in the long run" (22,7%), "integration with the supplier of the farm" (22,7%), "available eco-information and innovations" (22,7%), and "tax preferences" (22,7%).

Figure 6

Extent in which eco-activities of farms is stimulated by various factors (%)



Source. Survey with agricultural producers, May 2014.

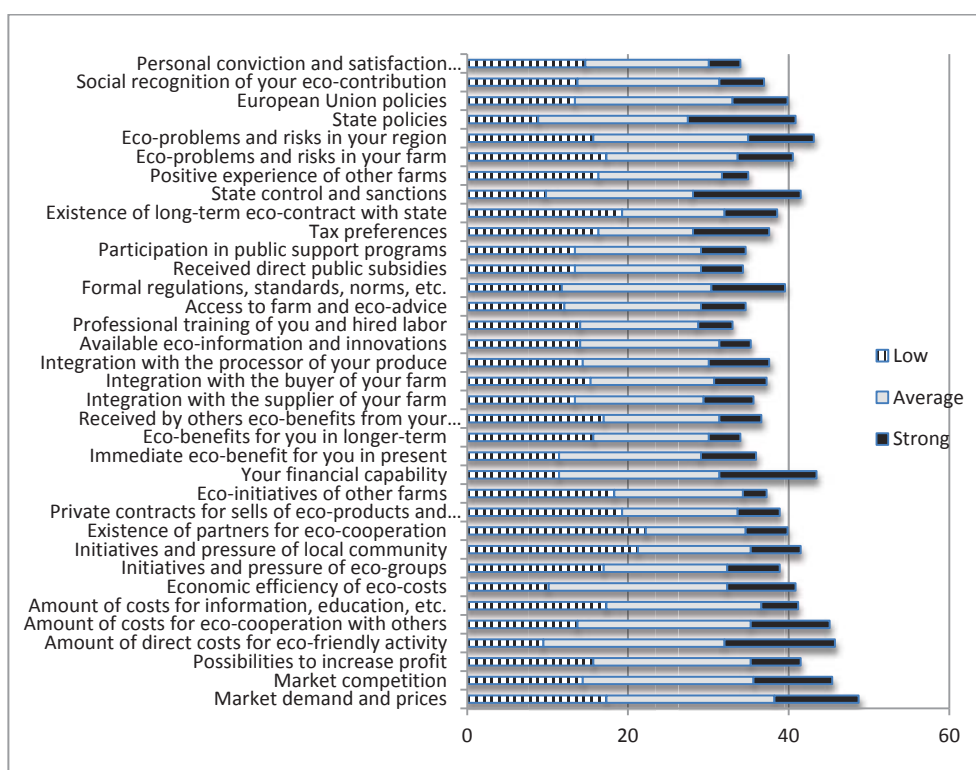
For the most Companies, Corporations, etc. the factors, which mostly stimulate the eco-actions are: the "received direct public subsidies" (47,1%), "market competition"

(41,2%), “European Union policies” (41,2%), “state control and sanctions” (35,3%), “eco-benefit for the farm in the long run” (35,3%), “personal conviction and satisfaction from the eco-activity” (29,4%), “immediate eco-benefit for the farm in the present” (23,5%), “market demand and prices” (23,5%), “participation in the public support programs” (23,5%), “access to the farm and eco-advice” (23,5%), “financial capability of the farm” (23,5%), and “social recognition of the eco-contribution of the farm” (23,5%). For the Cooperative farms there have not been reported factors strongly stimulating and restricting eco-activities, which are common for the majority of this type of holdings.

According to the biggest part of the surveyed farms their eco-activities to the greatest extent is restricted by the following factors: the “amount of direct costs for eco-friendly activity”, “state control and sanctions”, “state policies”, “financial capability of the farm”, “market demand and prices”, “market competition”, and “amount of costs for eco-cooperation with others” (Figure 7).

Figure 7

Extent in which eco-activity of farms is restricted by various factors (%)



Source. Survey with agricultural producers, May 2014.

For the different type of farms the factors, which mostly restrict the eco-activity are quite specific. The eco-actions of the biggest part of the Physical Persons to the greatest extend are restricted by: the "amount of direct costs for eco-friendly activity" (14,3%), "state control and sanctions" (14,3%), "state policies" (13,9%), "financial capability of the farm" (12,7%), "market competition" (10,4%), and "tax preferences" (10,4%). For the most part of the Sole Traders the eco-activity to the greatest extent is restricted by: the "amount of direct costs for ecofriendly activity" (9,1%), "financial capability of the farm" (9,1%), "market competition" (9,1%).

For the most Companies, Corporations, etc. the dominant obstacles for the eco-activities are: the "amount of costs for eco-cooperation with others" (29,4%), "official regulations, standards, norms, etc." (23,5%), "state policies" (23,5%), "amount of direct costs for ecofriendly activity" (17,6%), "immediate private eco-benefits in the present moment (17,6%), "private eco-benefit in the long run" (17,6%), "eco-benefits from your activity received by others" (17,6%), "access to the farm and eco-advice" (17,6%), "existence of a long-term contract with the state" (17,6%), "economic efficiency of eco-costs" (11,8%), "availability of partners for eco-cooperation" (11,8%), "financial capability of your farm" (11,8%), "integration with the processor of your produce" (11,8%), "available ecological information and innovations" (11,8%), "professional eco-training of the farmer and the hired labor" (11,8%), "state control and sanctions" (11,8%), "environmental problems and risks in your farm" (11,8%), and "tax preferences" (11,8%).

The incentives and restrictions identified above for the different types of agricultural farms are to be taken into account in the process of improvement of the public policies and programs for agro-ecology and eco-management.

The public support with diverse instruments of the EU CAP is an important factor for the improvement of eco-management of agricultural farms in the country.

For instance, the direct Area base payments are linked with the requirement to "keep farmland in good agronomical and ecological state", the participation in the measures of the NPARD is associated with the compliance of the "good agricultural practices" (including appropriate protection of soils, waters, biodiversity, animal welfare, etc.), the involvement in the "environmental measures" of the NPARD aims at implementation of higher eco-standards in comparison to the good agricultural practices, etc.

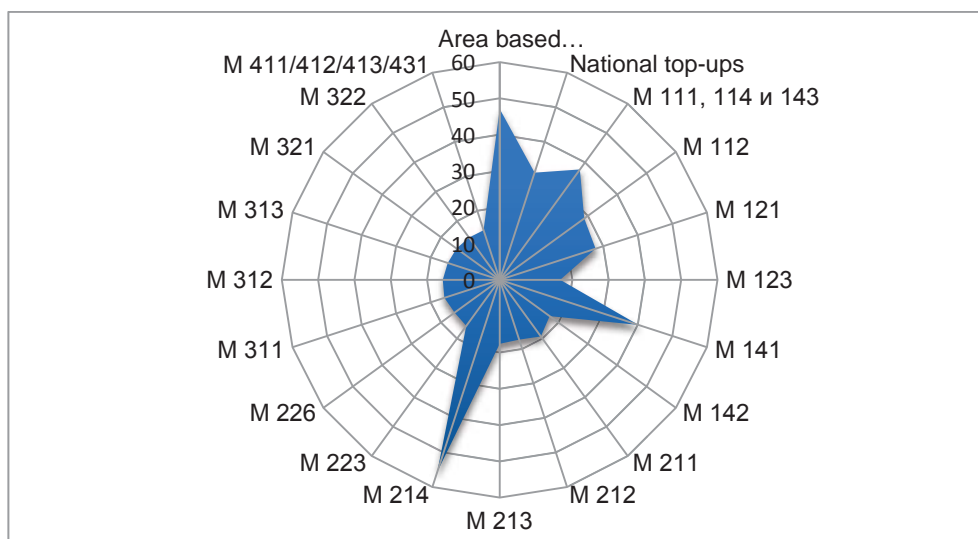
What is more, the public intervention (subsidizing, zoning, mandatory eco-norms and standards, market support, etc.) leads to development of diverse bilateral, trilateral, hybrid, etc. forms of governance of the agrarian sphere as well as of the eco-management in the sector. All they let improve the overall and the environmental protection capabilities of agricultural farms, and conserve, restore and/or improve natural resources through agricultural activity. In particular, the public subsidies make "economically possible" the agricultural activity in "less-favored" regions and in protected zones and territories (national parks, reserves, etc.) supporting conservation of the soil fertility, natural biodiversity, services of (agro)eco-systems, etc.



The received public support by the surveyed farms with higher eco-activity is relatively higher than the average in the country for the farms of a similar type and location<sup>5</sup>. Most of the farms received in the past or are currently receiving support through Measure 214 “Agro-environmental payments” of the NPARD, the Direct Area-based payments from the EU, Measure 141 “Semi-subsistence farming” and Measures 111, 114 and 143 “Professional training and advise”, the National top-ups for products, livestock, etc., Measure 112 “Setting up of farms young farmers” (28,8%), and Measure 121 “Modernization of agricultural holdings” (Figure 8). For other Measures of the NPARD the shares of participating farms in the forms of direct public support in relatively small.

Figure 8

Share of farms supported with different instruments of EU CAP (%)



Source. Survey with agricultural producers, May 2014.

Nevertheless, compared to the rest of the farms in the country, the “eco-active” farms take advantage to a greater extent from the “environmental measures” of the NPARD such as Measure 214 “Agro-environmental payments”, Measure 211 “Natural handicap payments to farmers in mountain areas”, Measure 212 “Payments to farmers in areas with handicaps, other than mountain areas”, and Measure 213 “Payments for NATURA 2000 for farmlands”.

<sup>5</sup> The assessment of the level and impact of the support of the agricultural farms of different type in the country with individual instruments of the EU CAP is done by *Bachev H, N. Koteva and M. Mladenova* 2014. Effects from applying European policies on agricultural farms in Bulgaria. - Economics-21 Magazine, N 1.

The actual public support with the various mechanisms of the EU CAP to farms of different juridical type is quite different. For instance, a comparatively higher share of the Companies, Corporations, etc. have taken advantage of the Area-based payments (70,6%), Agro-environmental payments (70,6%), and the National top-ups for products, livestock, etc. (47,1%). On the other hand, the relative portions of the beneficiaries from the Measures 111, 114 и 143 "Professional training and advises" is higher for the Sole Traders (40,9%) and the Physical Persons (39%), while of the Measure 141 "Semi-subsistence farming" for the Physical Persons (43,6%). The surveyed Cooperatives are leaders only for the Measure 121 "Modernization of agricultural holdings" (37,5%), while their relative share is lower for the "area-based payments" and the "national top-ups" (12,5%), and Measures 112 "Setting up of young farmers" (12,5%), 213 "Payments for NATURA 2000 for farmlands" (12,5%) и 214 "Agri-environmental payments" (25%), and without beneficent for all other measures from the NPARD.

There is also a great differentiation in the support through various measures for the farms with different specialization, size and location. For instance, to the largest extent from the area-based payments have been taking advantage the farms specialized in mix crops-livestock (63,4%), in less-favored regions different from the mountainous (63,6%), and those with lands in protected zones and territories (62,5%). Simultaneously, the relative portion of the beneficiaries from the direct area-based European subsidies for the farms specialized in mix livestock (24,1%), beekeeping (25%), vegetables and mushrooms (34,5%) is lower or zero (pigs, poultry and rabbits).

Likewise, comparatively the biggest share of the beneficiaries of the "agro-environmental payments" are among the Physical Persons (56,4%), large-scale farms (61,5%) and those with lands in protected zones and territories (75%), and farms specialized in field crops (66,7%), mix crops-livestock production (63,4%), and mix livestock production (62,1%). At the same time, a relatively smaller-share of farms specialized in vegetables and mushrooms (34,5%) and grazing livestock (37,5%), and none in these in pigs, poultry and rabbits have received this type of subsidy.

In another main eco-measure "Natural handicap payments to farmers in mountain areas" the greatest share of the beneficiaries are among the Physical Persons (20,5%), farms specialized in vegetables and mushrooms (27,6%), predominantly subsistence holdings (37,5%), farms with lands in protected zones and territories (56,2%) and located in less-favored mountainous regions (40%). Simultaneously none of the farms specialized in pigs, poultry and rabbits, and beekeeping, and relatively a smaller portion of the farms in grazing livestock (12,2%) and large size (7,7%) have got this type of payments.

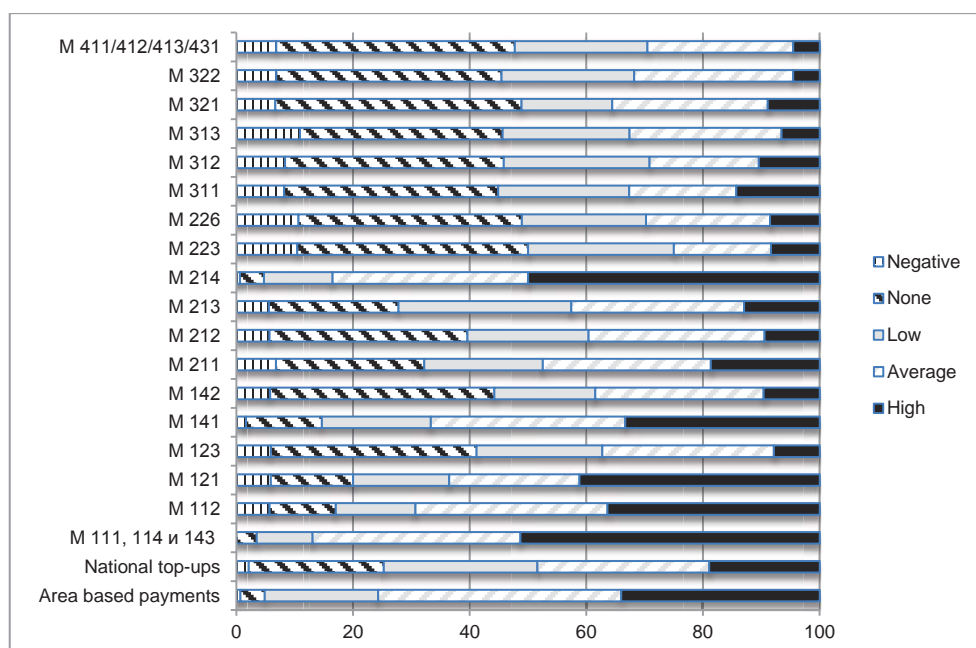
There is also a great variation in the support by the individual measures in different regions of the country. For example, the relative share of the beneficiaries of the Area-based payments in the North-West and the North-East regions are higher than in the other regions of the country – accordingly 56,5% and 53,1% of the surveyed farms. On the other hand, the beneficiaries of the National top-ups from the South-Central and the South-East regions are relatively more than in the other regions of the country – accordingly 42,1% и 41% of the farms. Likewise, the North-West region,

South-West region and South-East region are among the leaders regarding the numbers of supported farms by majority of the NPARD measures, including the special “eco-measures”. For instance, the biggest share of farms with “Agro-environmental payments” and “Natural handicap payments to farmers in mountain areas” are in the South-East (66,7% and 33,3% correspondingly) and the North-West (60,9% and 30,4% correspondingly) regions. On the other hand, the North-East and the South-Central regions are among the leaders only for one of the measures (accordingly Measure 141 and Measures 111, 114 и 143), while the North-Central region for none of the public support instruments.

The individual mechanisms for support of the EU CAP affect unequally the agricultural farms, which received or are receiving public support (Figure 9). According to the majority of surveyed farms, the biggest (“average” or “strong”) impact on their farms is due to Measures 111, 114 и 143 “Professional training and advices”, Measure 214 “Agro-environmental payments”, “Direct Area-based subsidies by the EU”, Measure 112 “Setting up of young farmers”, Measure 141 “Semi-subsistence farming”, Measure 121 “Modernization of agricultural holdings”, “National top-ups for products, livestock, etc.” and Measure 211 “Natural handicap payments to farmers in mountain areas”.

Figure 9

Scale of impact on supported farms of different instruments of EU CAP (%)



Source. Survey with agricultural producers, May 2014.

The impact of the remaining instruments of the CAP on the greatest part of the surveyed beneficiaries is "low" or "none". What is more, a part of the farms evaluate the impact of the public support instruments on their holdings as "negative". The latter concerns more than 10% of the beneficiaries from the Measure 223 "First afforestation of non-agricultural land", Measure 226 "Restoring forestry potential and introducing prevention actions", and Measure 313 "Encouragement of tourism activities".

The impacts of the eco-measures of the NPARD on surveyed farms of different type and location is dissimilar. For instance, for the two-third of the Sole Traders and the Cooperatives, supported in the past or currently with the Measure 214 "Agro-environmental payments", the impact of that instrument on their farms is "strong". Likewise, that measure effect is strong on the majority of farms specialized in the fields crops (64,6%), grazing livestock (66,7%), mix livestock production (61,1%), mix crop-livestock production (57,7%), the large scale farms (87,5%), and the farms located in less-favored mountainous regions (66,7%) and the North parts of the country (correspondingly for the North-West region - 64.3%, the North-Central region - 56.8%, and the North-East region - 55.6%). For the remaining fractions of the farms the impact of the agro-environmental payments is of lower significance. Moreover, according to one fifth of the supported farms in vegetables and mushrooms, and a good portion of predominately subsistence farms (17,4%), as well as farms situated in the South-West region of the country (18,2%) these type of payments has got no impact at all.

Similarly, according to the bulk of the supported farms in the less-favored mountainous regions (75%), those with lands in the protected zones and territories (44,4%), the Sole Traders (33,3%), the farms specialized in permanent crops (36,8%), and the holdings located in the South-West region of the country (37,5%), the impact of the Measure 211 "Natural handicap payments to farmers in mountain areas" on their farms in "strong".

Nevertheless, for the greatest part of the farms, the impact of these type of payments is "neutral", including for all of the supported Companies, Corporation, etc., a three-quarters of the specialized in mix crops production, 38,5% of the farms in field crops and 37,5% in vegetables and mushrooms, 37,4% of the holdings located in plain regions, a third of farms with middle sizes, with lands in protected zones and territories, and in less-favored regions different from the mountainous, 26,7% of the predominately subsistence farms, 22,6% of the Physical Persons, 22,2% of the mix crops-livestock holdings, and a considerable portion of the beneficiaries in the North-West (57%), North-Central (44,4%), North-East (40%) and South-Central (37,5%) regions of the country.

Furthermore, for a significant part of the beneficiaries the effect of that type of support on their farms is "negative", including for all large-scale holdings, one-third of the Sole Traders, 23,1% of the farms in the South-East region of the country, each fifth of the farms with mix livestock production, and 15,4% of the farms specialized in field crops.

### **Efficiency and perspectives of eco-management in agricultural farms**

Diverse activities of the agricultural farms is associated with positive, negative or neutral impacts on the different components of the natural environment (soils, waters, air, biodiversity, climate, etc.).

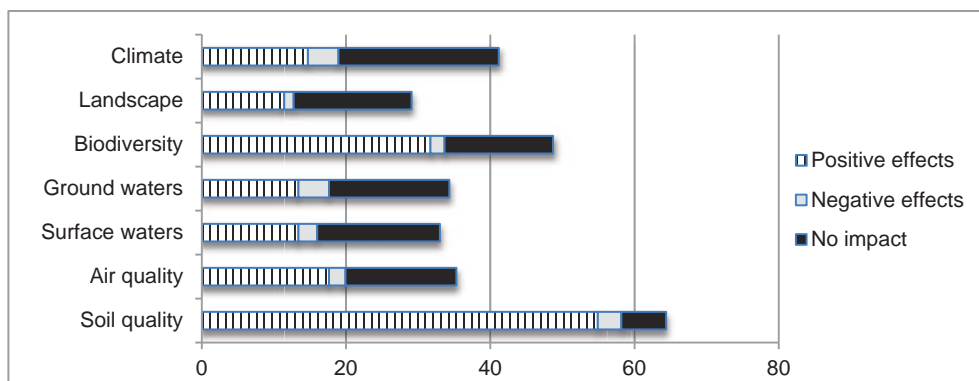
According to the majority of respondents to that question (74,8% of surveyed farms and 87,1% of the surveyed farms with crop specialisations), the crop production activity of their farms is associated with "positive effects on soil quality" (86%). A good part of the surveyed farms also believe that their crop production activity is associated with positive effects in terms of biodiversity (37,5%), air quality (27,1%), climate (21%), surface (18,3%) and ground (17,9%) waters, and landscape (15,7%). In addition, the majority of respondents believe that their crop production activity does not affect the climate (30,1%), ground (24%) and surface (22,3%) waters, and landscape (20,5%). Furthermore, a relatively small portion of the farms thinks that their crop production activity is associated with "negative effects" in relation to the different elements of the natural environment. The greatest is the share of the farms, which believe that their crop activity affects negatively the climate (6,5%), soil quality (5,7%), and surface waters (5,2%).

According to the most of the respondents (24.8% of the surveyed farms and 88.2% of the farms, specialized in livestock-breeding), the livestock activity of their farms is associated with positive effects on biodiversity (66,7%) and soil quality (65,3%). A good portion of the holdings also believe that this type of activity is associated with positive effects in relation to the climate (25,3%), landscape (17,3%), surface and ground waters (14,7%), and air quality (13,3%). The majority of farms also suggest that their livestock activity does not affect the climate (48%), air quality (42,7%), ground (40%) and surface (38,7%) waters, and landscape (32%). However, a relatively big share of the holdings believes that their livestock activity is associated with "negative effects" in terms of air quality (10,7%), surface waters (9,3%), ground waters (8%), and climate (6,7%).

According to a good part of eco-active farms, the overall activity of their farms is associated with positive effects in relation to soil quality and biodiversity (Figure 10). Also not so small fraction of the farmers believe that their activity has positive effects for the air quality, climate, surface and ground waters, and landscape. The majority of the respondent farms to that question (64.4% of all the surveyed farms) also think that their overall activity does not affect the climate, surface and ground waters, landscape and air quality. Only a small fraction of the surveyed farms believe that their overall activity is associated with negative effects related to the natural environment, and these is mostly true for the negative impact on climate and ground waters.

Figure 10

Impact of the overall activity of agricultural farms on individual components of natural environment (%)

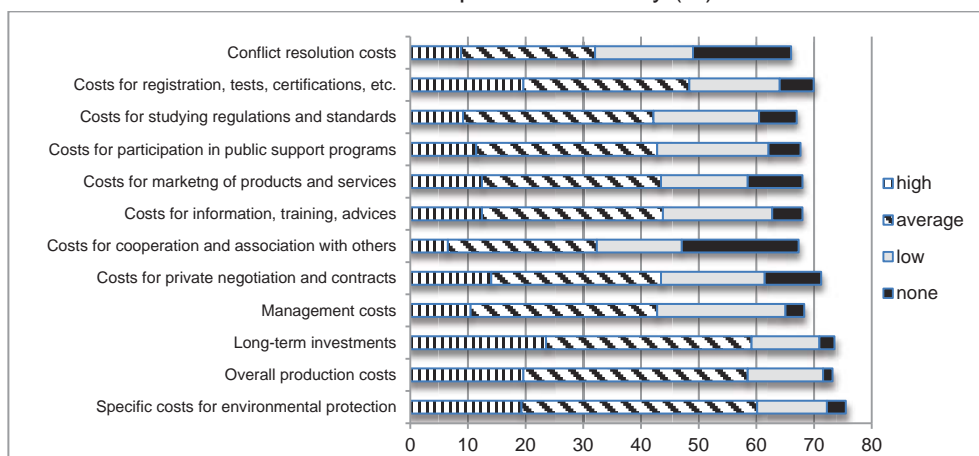


Source. Survey with agricultural producers, May 2014.

The eco-management in the agricultural farms is associated with inevitable augmentation of the production and the transaction costs of different type. For a big part of the surveyed farms their natural environment protection activity is connected with a “high” augmentation of long-term investments, overall production costs, expenditures for registration, tests, certification, etc., and specialized costs for the conservation of natural environment (Figure 11).

Figure 11

Extent of augmentation of costs of agricultural farms associated with environmental protection activity (%)



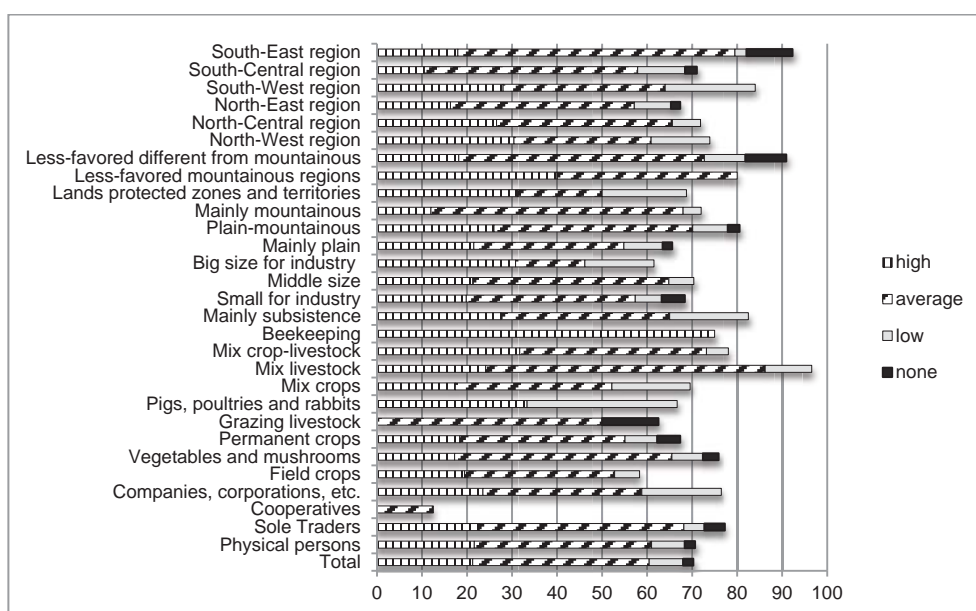
Source. Survey with agricultural producers, May 2014.

Also for the majority of farms, their eco-management is associated with “average” growth in the specialized costs for the protection of natural environment, the overall production costs, long-term investments, costs for studying the official regulations and standards, the overall management costs, costs for acquiring information, training, and consultations, costs for marketing of products and services, costs for participation in the programs for public support, costs for private negotiations and contracts, costs for registrations tests, certifications, etc., costs for cooperation with others, and the costs for resolutions of disputes and conflicts.

According to the predominate portion of the surveyed farms, their natural environment protection activity is also associated with the augmentation of farm economic efficiency, as for around one fifth of them that is to a “great” extent, for majority in “average” extent, and for a small portion in “insignificant” extent (Figure 12).

Figure 12

Share of farms in which environmental protection activity is associated with increasing of economic efficiency (%)



Source. Survey with agricultural producers, May 2014.

The eco-activity of farms leads to increasing the economic efficiency for the Sole Traders, the farms specialized in beekeeping, mix livestock production, and pigs, poultry and rabbits, and the holdings located in less-favored mountainous regions, and in the South-East, North-Central and South-West regions of the country.

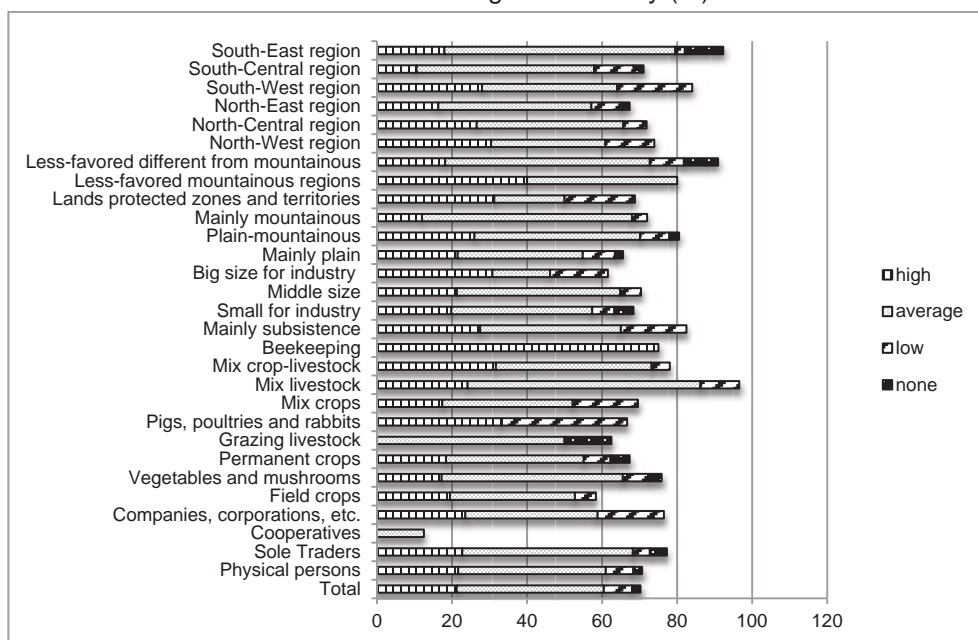


At the same time, for a relatively greater portion of the farms specialized in grazing livestock and permanent crops, the holdings with smaller size for the industry, and those located in less-favored regions different from the mountainous, and in the South-East region of the country, the eco-activity is not connected with any positive change in the economic efficiency.

According to the majority of surveyed farms, their natural environment protection activity is also associated with the augmentation of ecological efficiency of the farm, as for more than 21% of them that is in a “high” extent, for majority of them in “average” extent, and for a small fraction in “small” extent (Figure 13).

Figure 13

Share of farms, in which environmental protection activity is associated with increase in ecological efficiency (%)



Source. Survey with agricultural producers, May 2014.

The eco-activity of farms leads to increasing in farm ecological efficiency for a relatively large portion of the farms, specialized in beekeeping, pigs, poultry and rabbits, and mix crops-livestock production, large-scale holdings, and the farms located in less-favored mountainous regions, those with lands in protected zones and territories, and the farms in the North-East and the South-West regions of the country. On the other hand, for a good fraction of the holdings specialized in grazing livestock, those located in less-favored mountainous regions and with a small size for the industry, the eco-activity is not connected with any change in the ecological efficiency.

The eco-active farms have various plans (intentions) for the eco-management in near future.

The greatest part of the surveyed farms (43,8%) does not foresee any change in their eco-activity in the near future. However, a considerable fraction of them (31%) intend to “expend the current eco-activities”. At the same time, the share of farms, which are planning to restrict their current eco-activity is insignificant (1,3%).

In the near future, a relatively great number of farmers have intentions to “participate in the agro-environmental measures of the NPARD” (32%), for “eco-registration and certification” (16%), for “receiving the “area-based green payments” from the EU” (13,7%), and for “introduction of new eco-products” (13,7%). Also a good portion of the farms plan to “introduce new eco-services” (6,5%), “direct marketing of eco-products” (6,2%), and “participate in eco-cooperation with other farms” (5,5%). Furthermore, a relatively smaller fraction of the surveyed farms intend to “participate in eco-initiatives of other farms” (3,3%), “integrate closely with a trader of eco-products” (2,6%), “integrate closely with an eco-exporter” (2,6%), “participate in eco-association with non-farmers” (2,3%), and to “integrate closely with an eco-processor” (0,6%). Besides, a considerable share of the farms (12,1%) indicates to have a “plan for eco-actions in a more distant future”.

### Conclusion

The structure of eco-active farms is similar to the real structure of the farms in Bulgaria with more massive presence of farms specialized in the permanent crops, compared to the other farming activities. The owners and/or managers of most of the eco-active holdings are young farmers, indicating a considerable interest of this group of producers toward the amelioration of environmental efficiency of farms. Majority of eco-active farms are in regions with usual environmental problems, while recurrent droughts are the most frequent ecological problems of the farms. Almost 7% of the farmers are not aware of the environmental problems in the location of their farms. The biggest part of the eco-active farmers have a little “farming experiences” proving that the specific issue of the “eco-management” is new for most of the Bulgarian farms.

The majority of eco-active farmers know and implement well the principles of eco-friendly agriculture. With the greatest internal knowledge capability are the Cooperative farms. With the lowest knowledge capability are small sized farms, holdings specialized in grazing livestock, vegetables and mushrooms, permanent crops, pigs, poultry, and rabbits, and farms located in mountainous regions and in the Southeast region of the country. *Therefore, more efforts are required to improve the eco-competency of farms in the groups with a low eco-culture through education, training, consultation, advises, etc.*

Some farms improve their eco-capability by employing an expert or using an external consultant. Internal integration is the most popular for Companies, Corporations, etc. while the external supply for the Physical Persons and the Sole Traders, the farms which are predominately for subsistence and small sized, and those specialized in permanent crops, field crops, grazing livestock, and vegetables and

mushrooms, as well as farms located in the mountainous regions and with lands in protected zones and territories.

The majority of eco-active farms implement well or accurately the eco-principles in agriculture, while 18% of them implement the principles satisfactory. For some Physical Persons the implementation is associated with certain conditions such as economic rationale, importance of the eco-actions, existing environmental problem in the farm, a public contract, or joint actions with other agents.

A good portion of the eco-active farms are certified or in a process of certification for the organic production, while others "experiment" with organic production along with the conventional farming. Certified for the organic production, in a process of bio-certification or with a plan for the bio-certification are entirely the Physical Persons and the Sole Traders. Majority of farms specialized in permanent crops, beekeeping, and mix livestock, and a good portion of those specialized in mix crop-livestock production, vegetables and mushrooms, and pigs, poultry and rabbits practically implement (officially or in a transition to) the principles of the organic agriculture. Most of these holdings are small and middle sized. The Northwestern region of the country is with the biggest share of farms implementing the norms of organic agriculture.

Other market, private, and collective forms of eco-management such as own or collective eco-label, protected origin, supply of eco and related services, establish good reputation, participation in diverse private, collective and public initiatives are less frequently employed, explicitly by the Physical Persons. Nevertheless, informal forms such as ecologically clean production or established reputation are widely used. Some farms (with exception of Cooperatives) have own or participate in another private, collective or state initiatives for environmental protection, as some are with a signed private or public eco-contract. A small fraction participate in eco-initiatives of the state, supplier of the farm, non-governmental organization, a buyer, investor in the farm, creditor, formal or informal initiative of other farms, or participate in eco-cooperative.

The biggest portion of eco-farms focus their efforts on protection of own and leased in land, take care after all natural resources in the region of the farm or the natural environment as a whole. Nevertheless, for a good part of Physical Persons, Sole Traders and Cooperatives the efforts for environmental protection are restricted to own lands. A small portion of Physical Persons are involved only in restoration of nature, and insignificant share of eco-farms are involved in environment improvement as well.

To the greatest extent the eco-activity of the farms is stimulated by the personal conviction and satisfaction of the farmers from eco-activity, the participation in the public support programs, the received direct public subsidies, the professional eco-training of the farmer and the employees, the market competition, the access to the farm and eco-advice, the possibilities to increase profit, the co-benefits for your farm in the longer-term, and the European Union policies. On the other hand, the factors mostly restricting the eco-activities of farms are the amount of the direct costs for eco-friendly activity, the state control and sanctions, the state policies, the financial

capability of the farm, the market demand and prices, the market competition, and the amount of costs for eco-cooperation. *The identified stimulus and restrictions for farms is to be taken into account in the process of improvement of public policies and programs for agro-ecology.*

The public support to the eco-active farms is higher than the average in Bulgaria for the farms of the similar type and location. The greatest fraction of these farms have been supported through the Measure 214 "Agro-environmental payments" of the NPARD, the Directs Area-based payments from the EU, the Measure 141 "Semi-subsistence farming", and the Measures 111, 114 and 143 "Professional training and advise", the National top-ups for products, livestock, etc., the Measure "Setting up of young farmers", and the Measure 121 "Modernization of agricultural holdings". There is a huge variation in the public support with individual measures for the farms with different juridical type, specialization, sizes, and location. The greatest share of the beneficiaries from the "agro-environmental payments" are among the Physical Persons, large-scale farms and those with lands in protected zones and territories, and farms specialized in field crops, plant-growing and livestock production, and mix livestock production. For "Natural handicap payments to farmers in mountain areas" are among the Physical Persons, farms specialized in vegetables and mushrooms, predominantly subsistence holdings, farms with lands in protected zones and territories and located in less-favored mountainous regions.

For most beneficiaries the biggest impact on their farms have been caused by the Measures 111, 114 и 143 as well as measures 214, 112, 141 and 211, the direct subsidied, based on a unit of area and the national top-ups for products, livestock, etc. As strong is assessed the impact of the "Agro-environmental payments" by the majority of beneficiaries Sole Traders and the Cooperatives, farms specialized in the fields crops, grazing livestock, mix livestock production, mix crop-livestock production, the large scale farms, and the farms located in less-favored mountainous regions and the North parts of Bulgaria. According to the bulk of the supported farms in the less-favored mountainous regions, those with lands in the protected zones and territories, the Sole Traders, the farms specialized in permanent crops, and the holdings located in the South-West region of the country, the impact of the "Natural handicap payments to farmers in mountain areas" on their farms in strong.

According to the good part of the eco-active farms, the overall activity of their farms is associated with positive effects to the soil quality and biodiversity. The majority of them also believe that their overall activity does not affect the climate, surface and ground waters, landscape and air quality. Only a tiny amount of the farms suggest that the overall activity is associated with negative effects to the nature, and that mostly concerns the negative impact on climate and ground waters.

For many eco-farms their environment protection activity is connected with a "high" augmentation of the long-term investments, the overall production costs, the expenditures for registration, tests, certification, etc., and the specialized costs for the conservation of natural environment. Furthermore, for the majority of farms, their eco-management is associated with "average" growth in the specialized costs for the

protection of natural environment, the overall production costs, the long-term investments, the costs for studying official regulations and standards, the overall management costs, the costs for acquiring information, training, and consultations, the costs for marketing of products and services, the costs for participation in the programs for public support, the costs for private negotiations and contracts, the costs for registrations tests, certifications, etc., the costs for cooperation with others, and the costs for resolutions of disputes and conflicts.

According to the greatest fraction of the eco-active farmers, their environment protection activity is also associated with the augmentation of the economic efficiency of their holdings, as for the majority of them that is an average extent. To the greatest extent the eco-activity of farms leads to increasing the economic efficiency for the Sole Traders, the farms specialized in beekeeping, mix livestock production, and pigs, poultry and rabbits, and the holdings located in less-favored mountainous regions, and in the South-East, North-Central and South-West regions of the country.

According to the greatest part of farms, their environment protection activity is also associated with the augmentation of the ecological efficiency of their holdings, as for the majority of them that is an average extent. Eco-activity leads to increasing in farm ecological efficiency for a relatively biggest portion of the farms specialized in beekeeping, pigs, poultry and rabbits, and mix crops-livestock production, large-scale holdings, and the farms located in less-favored mountainous regions, those with lands in protected zones and territories, and the farms in the North-East and the South-West regions of the country.

A great portion of eco-farmers is having intentions to extent the current eco-activities. A relatively big number of farmers intend to participate in the agro-environmental measures of the NPARD, for eco-registration and certification, for receiving the "area-based green payments" from the EU, and for "introduction of new eco-products. A good portion of the farms are planning to introduce new eco-services, direct marketing of eco-products, and participate in eco-cooperation with other farms. A relatively smaller fraction of the surveyed farms intend to participate in eco-initiatives of other farms, integrate closely with a trader of eco-products, integrate closely with an eco-exporter, and participate in eco-association with non-farmers.

Having in mind the considerable impact of agriculture on natural environment, the importance of the issue, and the size of public resources, the investigation on forms, factors, and efficiency of eco-management in agricultural farms as a whole and from different type are to extent covering all farms in Bulgaria. However, this type of studies require a close cooperation of all interested parties – MAF, farmers organizations, interest groups, NAAS, agri-business, research institutes, etc.

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