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PARTICULARITIES OF AGRICULTURE DEVELOPMENT IN THE BLACK FOREST: CLIMATE CHANGE AND MANAGEMENT ASPECTS

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The current European Union's and state agricultural support is more focused on the modernization of farms in technological terms, coupled with the intensification of production, and weakly focused on the farm exclusivity and diversification. This creates a minor motivation for farmers to address the issues related to climate change mitigation. The main attention in the article is concentrated on two themes: climate change and forest management. The main research methods were used: analysis and generalization of scientific literature, interview, logical and systematically reasoning, comparison, abstracts and other methods. The farms in the lower mountain ranges of Germany will change different climate conditions analyzed in the 2017 summer. Sustainable framing wide term in black forest, forest lands, organic farms, are depending or considering the climate cycles. In economic social conditions of Germany, black forest farming is so sensitive towards ancient methods of farming and their equations with the current environment. In simple terms, black forest sustainable framing is farming ecological by promoting methods and practices that are economically viable. It does not only particular about economic aspects of farming perhaps on the use of non-renewable factors in the process of thoughtful and effective farming. Agriculture land of Black Forest contributes to the nutrient and healthy food to reach high standard of living of the black forest society

Keywords: forest management, climate, sustainability, black forest.

INTRODUCTION

Climate change is wide term related to different patterns of metrological conditions, the processes present in the earth's climatic procedure – which is related to stratosphere, Ionosphere, hydrosphere, global land surface of the earth (Richardson, Steffen, Liverman, 2011). According to IPCC (2007), the world atmosphere and temperature has risen by 0.74 degrees. For the black forest sustainable farms, current climate is a more effective for agriculture. Global warming becomes extreme issue in Europe, for example, black forest had heavy sunny days in summer 2017, whereas Eastern European countries, Lithuania, Estonia, Latvia, had rainy days. In this scenario, Western Europe sustainable farming some have benefited, perhaps Eastern Europe farming damaged due to rain fall.

The flora/fauna and agriculture are indirectly or directly showing impact on black forest economy (Wilmanns, 2001). Climate change and sustainable agriculture are internal processes; both are take place on a global scale. The climate change affects sustainable agriculture in number of ways, including productivity, management, metrological parameters (e.g. rainfall, sunny days, and heat waves). The Black Forest belongs to the most favored landscapes of Germany (Beniston, 2003). The reflection on 'Functions of farm forestry from a socio-political point of view' and the review of the hypothesis 'Preservation of structure by environmentally sound agriculture management.

Black Forest agriculture extremely connected to climate change. Variations in climate year by year eventually reduces or decreases the productivity of sustainable farms, while Governmental organizations encouraging the local farmers with subsides, loans, perhaps more attention need on climate change and management aspects, the overall impacts of climate change on agriculture are expected to be negative, threatening global food security. The current European Union concerned about population growth in the world as well in the Europe, which are already vulnerable and food insecure, because climate change happening it may lead to unsustainability in agriculture in 2016, the world embarked on implementing the 2030 Agenda for Sustainable Development, with the goal of eliminating extreme poverty and hunger. The Paris Agreement on Climate Change also entered into force. Progress in many places on reducing poverty and malnutrition has been notable, with extreme poverty at the lowest level ever. Hunger rates have fallen substantially in recent years, even dramatically in some countries, accompanied by falling levels of child stunting and other indicators of malnutrition. Agricultural production was up in 2016, and as a result, food prices were down, with benefits for consumers (Global Food Policy Report, 2017).

The research aim – to identify the particularities of agriculture development in the black forest according the climate change and management aspects. To reach the research aim there were used both theoretical and applied scientific research methods that are necessary to improve agricultural and forest management.

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APPROACH

The study of climate change and land management are always dealing with subjectivity, whether it is seen as a black box or put explicitly into the foreground of scientific inquiry. However, although it is clear that every human action is motivated by subjective perceptions and interpretations, the question of how and why exactly people see their world as they do confronts the agriculture practice in black forest with serious climate problems. Should see subjectivity as rooted so deeply within each individual that it is impossible to make any form of generalization or should consider subjectivity as influenced, or even determined, by external forces to such a degree that can ignore the individual person and instead focus on social variables (e.g. gender, age or social status) or disembodied discourses. Both approaches have serious methodological shortcomings; either restricted to exploring subjectivity only on the level of profound but isolated case studies or to neglect the concept of the 'subject' and understand it as a shallow reflection of external structures and forces. To understand the ground level scenario traveled in villages (Waldshut-Tiengen, Gurtweil, Witznau, Uhlingen). Interviews, face to face discussion made with middle private 40 farmers, how the rainfall, sunny days, natural parameters are considered in sustainable farming. The methodology used in this research is an inductive approach; through addressing the concept of with its main pillars particularities of agriculture development in the black forest to develop and climate change and management aspects. This pragmatic approach associated with quantitative and qualitative methods simultaneously with the use of a variety of data sources to study the research problem. As part of research travel, the villages in black forest to understand the climate effects on farm management, in six month period collected data from the farmers as far as possible.

CASE STUDY AREA

Under natural conditions, the majority of the German territory would be covered mainly by European beech (Fagus sylvatica L.) and mixed beech forests. Due to socio-economic, ecological and political requirements at the beginning of the 19th century (wood scarcity and deforestation), coniferous tree species were favored. Farmers of Black Forest wear obtain hereditary land among that few of them had planted forests; perhaps majority farmers are has created landscape patterns. In general forest landscape of Western Europe, landscape pattern is young stands of Norway spruce (Picea abies (L). Efforts intend to partially reverse this development and to increase the proportion of broadleaved, site-adapted forest stands. In the course of restoration of forests during the 19th century, arouse the need for forest planning in order to ensure sustainability of timber production. There is interlinking between forest science and sustainable farming and climate change aspects. In black forest monocultures wear, developed and artificial regeneration was introduced. Based on the statement of old generation farmers of black forest, instead of clear –cutting, different silvicultural methods were developed. The important tree species commonly found is spruce, particularly in low mountain regions of black forest (Eckert, Popp, 2000). In Baden-Württemberg, forestry accounts only for 0, 2-0, and 3 percent's of the overall gross domestic product (GDP). The tree species composition in Baden-Württemberg exhibits a high degree of naturalness. 48,5 percent's of the forests fall into the categories 'very near-natural' and 'near-natural', 28,9 percent's are 'relatively near-natural' and only 22,6 percent's are considered as 'strongly cultural' or 'cultural'. The dead wood volume exposes values noticeably above previous estimations (Spielmann, Bücking, Quadt, Krumm, 2013).

The case study area - Black Forest belongs to the most favored landscapes of Germany and the geographical location of the place is very good (Fig. 1 and Fig. 2).

Figure 1. Route map of Ühlingen - Birkendorf

Figure 2. Route map of of Ühlingen - Birkendorf connecting to the mountain range of different countries

NOTE: Management aspects of natural forestry in Germany strongly root back to world war 11, the federal state of Baden-Württemberg, had resealed data of the forest area, which is secondary data of results.

The nature park of the Southern Black Forest serves as a reference for this investigation. It extends over 320,000 ha (Table 1.), from 20 km north - east of Basel to about 20 km north - east of Freiburg. Environmentally sound forest management as multipurpose forestry should be able to fulfill multifunctional goals on large areas (Selter, 2003).

Table 1. Distribution of land-use in the Southern Black Forest nature park

Land type	AREA
Forest land	State forest : 36,900 9 (ha) Community forest : 66,500 (ha) Private forest > 200 ha : 12,950 (ha) Private forest , 5-200ha: 51,800 ha (3,150 owners) Private forest , <5ha: 16,500 ha (16,970 0wners) Total forest land 184,650
Agriculture land Settlements and roads Other land use Total area	111,750 ha 23,500 ha 3,600 ha 325,500 ha

Source: Forest Research Institute of Baden-Wonnhaldstabe 4, D-79100; A. Selter (2003).

In low mountain region of southern black forest of Germany, Farmers had unique idea and strategy of multipurpose forestry, perhaps majority parts of the forest land are connected to agriculture land, nearly 62,400 ha of the forest land and 80,350 ha of the agricultural land.

According to Forest Research Institute of Baden-Wonnhaldstabe the black forest mountainous and wooded region peak with an altitude of nearly 1500 Meters above sea level (M.a.s.l). The nature park is created an environmental sustainability ,which had balance achievment between measures to protect of the black forest flora and fauna, helpful to farmers, local residents, by doing level best to protect countryside. It also aimed towards an enduring form of sustainable climate compatible to preserve the special chracter of this region and its countryside in the long term. The region economic activity including farming, forestry, and tourism relatively depends on the basis of regions climate. The important task will be to study aims and interests of current climate change factors, protectionon on rural structure of agriculture, to improve the basic knowledge about climate change its affect on agriculture farms with a dynamic systen of research on black forest region.

The available metrological data was obtained by the computation of thermal and aesthetic methods the common AIB scenario is used. The statistical calculation was carried out by use of source available regional climate model REMO from the MAX-PLANCK-Institute of Meteorology in Hamburg with a space distance of 10 km. and data is available for long term from 1950-2050. The past reference period used for climate change was 1961-1990 (Jacob, 2001; Jacob et al., 2007). The future climate change considered until 2050. The parameters chosen for climate change and sustainable agriculture: thermal comfort, heat, and cold stress, sunshine, fog, sultriness, sun days, rain days, potential climate for agriculture. The computation, of parameters like thermal comfort and discomfort in common terms of physiologically Equivalent temperature (PET).

The results shows that there will be climate change in 2021-2050, respectively, in Bad Rippoldsau-Schapbach the average days with thermal comfort will be standard (72 days). In heat stress prospective 13 days will raise. On other hand sultry days will increase by about 36 days for the period 2021-2050. Due to global warming there will be changes in air temperature, the days with cold stress will decrease by 14 days. The climate tendencies might effect on temperature of low mountain regions significantly, moisture conditions normally elevated CO2 levels, and thus the farmers had to rethink on seed varieties, bio chemicals, dates of sowing .Further efforts are need to analyze climate change impact on rural agriculture

The data also shown the climate change happened in the past years 1961-1990, in Bad Rippoldsau-Schapbach the average days heat stress was 9 days, and Sultry days will increase by about 14 days (Table 2). The tendencies projected that number of days with precipitation, threshold, might have significant impact in future.

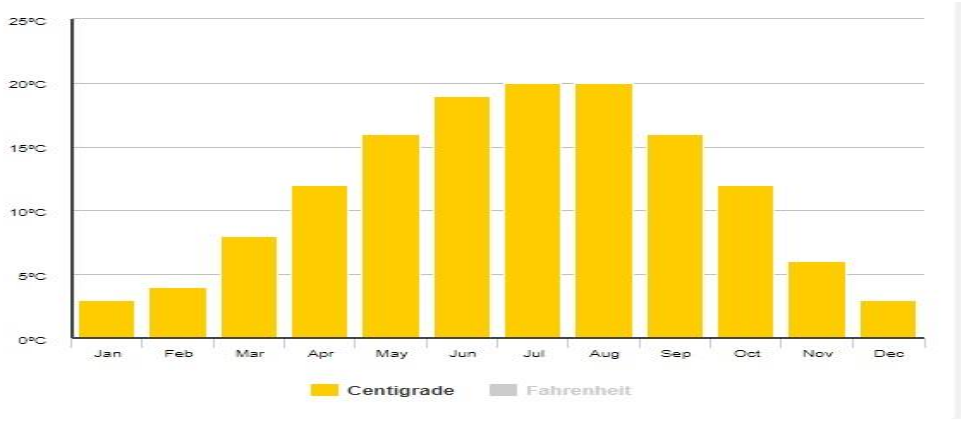
Table 2. Trends for Bad Rippoldsau-Schapbach (in days)

Parameter	1961-1990	2021-2050
Cold stress	103	89
Thermal comfort	72	73
Heat stress	9	13
Dry days	188	188
Wet days	97	13
Sultriness	22	36
Strom	18	20

Source: A. Matzarakis, C. R. de Freitas, D. Scott, (2007)

Note: Trends for Bad Rippoldsau-Schapbach was projection of metrology, there might be variations in future analysis.

In the given below (Fig.3) July is the hottest month in the Black Forest with an average temperature of 20°C (68°F) and the coldest is January at 3°C (37°F).



Jan	Feb	march	April	May	June	July	August	Sep	Oct	Nov	Dec
3	4	8	12	16	19	20	20	16	12	6	3
37	39	46	54	61	66	68	68	61	54	43	37

Figure 3. The bar chart of weather, average weather °C

The result shows that climate change will play huge role in agriculture sustainability in Black Forest. The fallowing aspects recommended to management: harvest at physiological maturity preferably in June. The suitable months for harvesting in June and August. The post harvesting practices started September months, recommendations are given to farmers avoid harvesting and transportation on wet days. The infection of grain by fungi and subsequent mycotoxin contamination depends on weather conditions as well as pre and post-harvest handling of the crop.

CONCLUSIONS AND DISCUSSION

Due to its climatic low mountain range character, the black Forest will continue to remain an interesting destination for the agriculture industry in the future. June, July, August remain as very important months in agriculture of Black Forest, due sunny hot days. The climate cause becomes very important in farm management, because the selection of seeds, diffusion mechanisms.

Adoptation of climate change become problem to farmers. The german extension system were encouraging village societies to understand consequences happened in climate recent years. Cold stress, thermal comfort and other tendencies influence on agronomical practices of field crops for example humidity, heat stress, was more in summer 2017, farmers daily work life become hard regards to climate change. In future climate play important role in economy arable farms, dairy farms, forest wood in the black forest.

In recent years, the Black Forest climate rising high towards more humid winters and heavy sunny days. The impact has to be noticeable to protect sustainable agriculture within Europe. The future generations of Black Forest and European countries cloud maintain sustainable agriculture to feed the entire population.

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