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THE INFLUENCE OF EEC–AGRICULTURAL POLICY ON THE CONDITIONS FOR DEVELOPMENT OF BIOTOPE STRUCTURES IN RURAL LANDSCAPES – SOME DANISH EXPERIENCES.

J. Brandt and P. Agger

The agricultural policy within the Common Market has until now been based on prize– and purchase–garanties for the existing but steady increased production. The agricultural fonds amounted last year to 65% of the whole EEC budget and 96% of these agricultural fonds were used for the prize– and market arrangements. Only 4% has until now been used for structural purposes. This has not only created the wellknown problems of overproduction and huge and expensive stocks of agricultural products. It also means, that the necessary change of production amount and composition has been postponed through many years. The forthcoming surely rather drastical changes in the agricultural sectoris therefore not only a challenge to the traditional agricultural policy, it is also a challenge for our future work as landscape ecologists and landscape planners. How will this development affect the agricultural landscape? In Denmark, the conflict between the agricultural sector and the increased environmental pressure has become extremly critical, for various reasons, which has to be added to the problem of overproduction:

1. The general trends of concentration and specialization within the agriculture has accelerated since the 60ties. The average farm size has doubled from 15 to 30 ha. Today the former dominant mixed farming makes up only a quarter of the holdings. The changes in the biotope structure is continuing, too, as seen on Fig. 1 (for further details, see AGGER & BRANDT 1987):

Fig. 1: Rates of changes (% per year) of small biotopes (linear biotopes and patch biotopes greater than 10 square meters and lesser than 2 ha) in Eastern part of Denmark (average for 5 field study areas of total 20 square kilometer):

	1954–68	1968–81	1981–86
Line biotopes	-0.6	-2.3	-0.5
Patch biotopes	-0.5	-0.8	-0.2
below here:			
– wet patch biotopes	-1.0	-2.5	-2.0
– barrows	-0.4	-1.0	-0.0
– thickets *	+0.7	+0.3	+0.3
– other patch-biotopes	.	.	+6.7
*including solitary trees			

Allthough the general rate of removal of both line–formed and patch biotopes has slown down in the 80ties, this hides some very different trends for the different biotope types. Especially small lakes and ponds are still very threatend. As a new tendence, the group "Other patch–biotopes", comprizing first of all small given–up areas, is growing rapidly.

2. The agricultural intensification has let to serious pollution problems, too. First of all through an alarming situation for the freshwater resources and the sea around Denmark, resulting in a wide–spread fish–death during the last autumns. This almost led to a cabinet crises for our government this spring, where a bill was passed for lowering the pollution of the Danish seas, the most expensive antipollution program ever made in Denmark (to an equivalent of 400 US Dollars per inhabitant over the next 5 years). The agriculture was definetely seen as the big bad wolf in this case.

3. In the same period a growing pressure for planning of the open land for water supply, forestry, recreational use, nature conservation etc. has developed. Facing tendencies of declining agricultural prices and agricultural reconstruction within the Common Market, these interests has been coordinated within the Ministry of Environment as a general attack on the agricultural sector, traditionally the strongest, most well–organized and efficient economic lobby within the Danish society. In fact, up till now the socalled 'agricultural planning' in Denmark has almost exclusively been a question of keeping the open land free from any non–agricultural interference. The normal procedures for areal planning, f.ex. setting up binding land use plans for local areas, are in danish agricultural areas simply forbidden. But facing the agricultural and environmental problems; what is the tendencies, and what to do? In an official preliminary report from 1985 the futural marginalization of agricultural land has been estimated up to 15% of the total national territory. A comprehensive research programme involving more than 40 research groups from different institutions has been carried out last year as basis for formation of a policy on the socalled 'marginal soils' which has been discussed in the parliament in spring 1987. Our study–group has been responsible for the investigation of the tendencies of land use in the Weichel moraine landscape, forming 2/3 of the Danish territory, and responsible of giving proposal for a management for the marginal soils in these areas. This could partly be based on our investigations on the development of small biotopes carried out since 1978, see AGGER & BRANDT (1984), AGGER & JENSEN (1984), BRANDT (1986), BIOTOP-GRUPPEN (1986). Comparing our surveys in 1981 with 1986 we could in fact record clear tendencies of abandoning agricultural land in areas, where it was not seen 5 years earlier, as seen on fig. 1. Dispite these tendencies the decline of especially wet biotopes are still going on. But in fact two different directions of changes can be seen: Areas with poorer agricultural conditions might be more stabiliezed, concerning biotope structure, due to the general low pressure on the land use and due to growing environmental protection and recreational use. Areas with better agricultural conditions seems however to show a continued – and maybe strengthend – intensification of land use with the result of continued reduction of the number and areas of small biotopes. This has been studied especially in the surroundings of greater Copenhagen:

In the rather sandy and hilly landscape north of Copenhagen – traditionally the social upper class residential areas – we can see clear tendencies of more extensive land use. Small plantations are made, and former areas within the rotation are used for grazing sheep and horses. And within the rotational areas the character of the rural landscape is stabilized: Almost no reduction in the amount and composition of the biotope structure is to be seen during the last years. A growing part of the farmers has to be characterised as

spare–time–farmers, with other priorities and economic possibilities than full–time farmers. In the hinterland of Kge Bugt south of Copenhagen on the flat and loamy ground morains, some of the best soils in Denmark – where a row of new working class residential areas has been situated – the tendencies quiet opposite: Here no signs of spontaneous marginalization can be seen. On the contrary. The intensification goes further on. The majority of the agricultural land is cultivated by full–time–farmers. The amalgamation of production units goes on as well as the reduction of the biotopes. This happens in a region with a growing need for recreational areas. This diversion of developmental tendencies calls obviously for different recommendations concerning management strategies: In the areas with spontaneous marginalization the biotope structure can mostly be preserved through voluntary arrangements:

The main problem is the accessibility for the public due to private ownership. Allthough only a very minor part of the biotopes in the agricultural landscape from a biological point of view need to be protected against the public, it has nevertheless been used as a general argument to prevent increased rights on public accessibility to the open land. In the areas with good agricultural conditions more strict regulations seems to be needed:

Expropriative conservation can be used, but are extremely expensive, and are practically only used in areas of special natural or cultural interests, and such areas are seldom concentrated on the good agricultural land. The most important single mean of regulation is here the so called paragraph 43 in the nature conservation act, which states that changes in the beds of open watercourses, of lakes, bogs, moors, heaths, salt meadows and salt marshes of certain size shall be subject to the permission of the nature conservation authorities. Since 1972 the range of biotope types covered by this paragraph has been widened several times and the minimum size has been lowered, see KOESTER (1984). Today the paragraph comprizes the following types and minimum sizes, as shown in the first coloum of Fig. 2:

Fig. 2. Existing, recommended and governmental sugested minimum sizes in square meters for paragraph 43-areas in Denmark.
(): The percentage (of number (or lengh) of biotopes within the given group) that estimated would be covered by the recommended regulation.

	Existing	Recommended	Proposed
Lakes and ponds	500	100 (65%)	250
Bogs	5000	500 (80%)	4000
Meadows and commons	0	10000 (80%)	0
Woodlots	0	500 (65%)	0
Headgerows and dikes from before year 1900	0	All (50%)	0
Bufferzones around certain watercourses (meters)	0	10 (?)	6

Our recommondations, shown in the middle coloum was generally to lower the limits to secure the regulation of at least half of the existing biotopes. As a result of the debate in the parliament the government has suggested once again to reduce the minimum size of small lakes and ponds as shown in the right coloumn, and a majority in the Parliament (outside the Government) has suggested an even more radical reduction. Also the problem concerning connectivity has been taken up and supported by the majority in the parliament. A bufferzone of 2 times the bottom width on each side of the smaller watercourses is suggested, along with 6 m. broad bufferzones around all other biotopes protected by paragraph 43. Pesticide–free zones along hedges are discussed, too. In order to maintain a minimal connectivity in the landscape our study group recommends a set of structural models, see AGGER & BRANDT (1986), AGGER et al. (1987):

A. The corridor model, that guides the planning of connections between all the more important wetlands, forests or pasture areas – primary guided by bio–ecological principles.

B. The road structure model, that gives guidance to where marginalization of fields might be given opportunity to satisfy recreational needs(guided by recreational principles).

C. The boundary model, which states, that all farm–boundaries shall carry some sort of small biotopes –guided mainly by a historical–geographical principle, but in practise, the other principles are here in some way incorporated. Now, to elucidate these models, we have to go a little into the different experiances and philosophies concerning landscape development: From the very beginning of the formation of IALE, the linkage between landscape ecology and landscape planning has been stressed. The development of landscape ecology as an interdisciplineary scientific field of work is our main purpose, but it can only be developed in interrelation with practise.But practise is not only the physical planning, say the construction of an optimal biotope structure within an agricultural landscape. This is so to say the technical side of practise. But there are also economical, juridical, political and ideological preconditions, which has to be taken into consideration, if we want to take the linkage between theory and practise serious.A general – or probably the general – practical question concerning the theme 'connectivity in landscape ecology' within the high industrialized countries, has to do with the consequences of agricultural development – especially the intensification through industrialization, chemification, amalgamation and specialization of farm holdings. The very engaged "hedgerow movement" within IALE has also to be seen in this context.But different experiences within the study of agricultural development migth give rize to different ideologies concerning the status of the biotope structure and the landscape management: If we look at the development of the areal structure of agricultural areas of the mid–west of the USA during the period of European settlement, the patch biotope structure can obviously be seen as remnants of the former dominant forest (see WHITNEY & SOMERLOT 1985 and SHARPE et al. 1987). The development of the Danish agricultural landscape during the same period gives quite another picture. Around year 1800 the forest area of Denmark was on its absolute minimum of 4%. The non–reclaimed areas was mostly wetlands used as pastures and peatbogs. Almost none of the existing biotopes can be seen as primary biotopes, i.e. remnants from an original natural biotope structure. This is in fact the case for most european agricultural landscapes.In Denmark, the principal structure of the cultural induced biotopes in the agricultural landscape is indeed very old. It goes back to the beginning of the last century, where a very comprehensive land reclamation (in german: Flurbereinigung) was forced through all over Denmark within very few years. It was a real landscape revolution, which basically formed– designed – our present agricultural landscape for almost 200 years ago.The removal of small biotopes since the 50ties has been most comprehensive within the farms. So, in Eastern Denmark, some 80% of the remaining small biotopes are related to farm boundaries, of which a significant part goes back to the time of the big land reclamation. In the present context two points concerning practice should be stressed upon:

1. Aiming at maintenance and improvement of the living conditions for wild plants and animals – and human beings – in the

agricultural landscape cannot be separated from the general trends within the agricultural development. It has to be seen not as a supplementary, but as an integrated part of the planned and unplanned agricultural development.

2. Since the biotope structure has to be seen as an antropogenious structure, its management cannot and should not only be based on landscape ecological principles. Historical functional non-agricultural (e.g. recreational) and esthetical viewpoints might be of much more importance in the political proces, see BRANDT (1987). The philosophy behind the three models can be formulated in this way: Sience is normally a well reputated argument. But we might produce confusion if we to much stress upon the narrow bio-ecological arguments, wich probably will come out of our focusing on the problems of connectivity. In fact, a lot of other tendencies and interests concerning connectivity goes in the same direction. And these should not be underestimated. Finally we have to underline the first point mensioned above: We have to admit, that this way of conservation strategy is a very defensive and dangerous way of acting. Maybe it will not work at all. Probably the hole philosophy is wrong, unless it succeeds in taking the agricultural changes, which are taking place in the intensively used parts of the agricultural landscape into consideration.With the environmental political winds blowing for the time being we might secure a formal biotope structure and a certain connectedness. But it would not fit functionally – ecologically as well as economically – into the intensive agriculture. Despite of a lot of discussions an reports on the structural problems within the agricultural sector it is most probable, that general prize- and marked regulations will continue to dominate within the Commen Marked. With falling prizes the discribed diversion will be speeded up with the result of marginalization of great areas, and further intensification of the good agricultural areas.There is a strong connexion between the general landscape ideology within the population, and the understanding and acceptance of the functions of the landscape elements. So if the trend continues, we wonder if the political popularity of the very succesfull eureopean "hedgerow movement" would not suddenly disappear, and we would be blamed for keeping a system of quite artificial and academic landscape design principles, which nobody would understand and accept.

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