

SYSTEMS RESEARCH INSTITUTE,
POLISH ACADEMY OF SCIENCES, SZCZECIN DEPARTMENT
AGRICULTURAL UNIVERSITY OF SZCZECIN
FACULTY OF ECONOMICS AND ORGANIZATION OF FOOD ECONOMY

MODELLING OF ECONOMY IN SPECIALLY PROTECTED REGIONS

*Proceedings of the international conference
held on 9-11 june 1994 in Drawno, Poland*

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1. General information

The city of Drawno is a seat of self-governing authorities for the town and the commune. Both, the town and the commune, belong to the Choszczno region in Gorzów Province.

The commune is inhabited by 5800 residents, which means that the average population density is about 18 people per 1 km². Arable land covers the area of 7300 hectares, i.e. 22.8 per cent of the total commune area. No industrial activities are run in the town and the commune.

Forests cover nearly 2/3 of the total commune area and are a part of Drawa Great Forest. There is a very rich flora and fauna

in these forests. Among the game inhabiting the woods we can find, among others, wild boars, deer, roe-deer, hares. There is also a lot of species of edible mushrooms.

There are 14 lakes on the territory of the commune. The River Drawa, one of the cleanest and most picturesque Polish rivers, flows across the commune on its stretch from Prostynia, through Rościn, Drawno, Barnim, Konotop and Zatom. Some parts of the river have a character of a mountain river. From the Adamowo lake to the border with Dobiegniew commune the Drawa flows through Drawa National Park. In the river many species of fish, living both in lowland and mountain waters, occur. One should mention, among others, trout, barbel, grayling, chub, sea trout, eel, pike, perch and sheatfish.

On the basis of water purity tests, carried out in the rivers of Gorzów Province in 1993, the Drawa River was classified in the 2nd class of water purity.

In 1993 a new sewage treatment plant was launched in Drawno which along with the expected completion of the town's sewage system should improve significantly the quality of water.

Drawno town and commune have the lowest emission of pollution among all the towns and communes of the Choszczno region. Most of the air pollution is due to municipal economy and households. The basic atmosphere pollutants are: dusts, sulfur dioxides, nitric oxides and carbon monoxides.

84 per cent of the Drawno commune area is subjected to preservation of natural objects. The highest form of natural preservation on the commune territory is the Drawa National Park. Besides, 9 village parks of the total area of 30 ha are under protection.

The Drawa River offers excellent opportunities for practising water sports. From the town of Drawsko Pomorskie (beyond the commune), through picturesque and uninhabited countryside to Drawno, and further through Drawa National Park to the river's estuary to the Noteć River, a route for canoeing run down is set up. Along this route a number of bivouac sites have been prepared in order to ensure the participants' needs for rest after successive stages of the canoe rally. Additional accommodation opportunities are provided by the riverside hostel owned by PTTK (Polish Tourist Country-Lovers' Association). The hostel, situated in Drawno on the Dubie Lake, offers 170 places in rooms and at the camp site. Moreover, there are also many villages in Drawno commune, which fulfil, or can soon fulfil, all the functions of summer resorts.

In summer time there are opportunities for inexpensive rest at several camp sites. As a rule they are located near rivers, lakes and forests, and they are supervised by Drawno Forest Inspectorate, which always furnishes tourists with all necessary information. All state-owned waters are accessible to the public for angling. However, in the case of angling within the terrain of Drawa National Park, a consent of the director of the park is required.

On the terrains of forest complexes and lakes, by a decision of Gorzów Voivode, zones of silence have been established. Within these zones, the use of vessels with combustion engines, radio and sound amplifying devices beyond closed rooms, as well as other, arduous for the natural environment sources of noise, are strictly prohibited.

In the period of late summer and early autumn there are

splendid opportunities for the rest, associated with mushroom gathering. Practically all species of edible mushrooms can be found in great amount in the woods, extending from Żółwino, through the environs of Dominikowo, Barnim, Niemieńsko, Brzeziny, to Prostynia. For the gatherers special car parks have been established, because the entry of cars into the forests is prohibited.

2. Drawa National Park

The Drawa National Park, occupying the area of 7600 ha, is one of 19 national parks in Poland. It preserves an example of typical countryside of the southern slopes of Pomeranian Lake District, namely a part of outwash plain, formed during the last glaciation, and now covered by a large forest complex of the Drawa Great Forest. Into the sandy plain, however, the isles of other geological formations are included, and in numerous, formerly melting depressions, now many lakes and peatbogs exist, leading altogether to a diversification of biotopes on a scale rarely encountered in the Polish Lowland. Some other diversification is introduced by valleys of the rivers: Drawa and Płociczna, which cut the plain in two.

The rivers of the Park are typical lake district rivers, i.e. they are characterized by large hydraulic gradients and fast midstreams (which give them at many places a character of piedmont rivers). On the other hand, however, their annual flow variation is rather small. In the rivers rheophytic flora and fauna exist, which include such species as: trout *Salmo trutta m. fario*, bultrout *Salmo trutta m. trutta*, grayling *Thymallus thymallus*, and others). Beds

and valleys of the rivers are preserved in a nearly natural state, and the traces of past peoples's activities slowly disappear. It seems that among all the Polish national parks the Drawa National Park is the one, which preserves the nature of river valleys in the most complete way.

The lakes of the Park have a very diversified character from the viewpoint of ecology. Among them one can find examples of all, encountered in Poland, types of lakes: from common eutrophic lakes; through typical for West Pomerania calcareous oligotrophic lakes (with meadows of stonewort *Chara* at their bottoms; these lakes are also a biotope of european white fish *Coregonus lavaretus* and vendace *Coregonus albula*); to dystrophic lakes, overgrown by mossy peatbogs.

The forests of the Park have been considerably changed by the people's economy for the last several hundred years. Nowadays, at the sites of low-grade beech and oak-beech forests, which formerly occurred at this area, artificial pine stands dominate. However, some fragments of old forests, in which natural functioning mechanisms of such ecosystems are still alive, have been preserved. As an example we can consider the Radęcin natural reserve, which provides, unique on the all-European scale, picture of structure formation and dynamics of the Middle-European beech forest.

Well preserved mosaic of forests and waters causes that numerous animals, requiring such life conditions, still occur. Among them one can find such animals, as mammals: otter *Lutra lutra* and beaver *Castor fiber*, birds of prey: white-tailed eagle *Haliaeetus albicilla* and osprey *Pandion haliaetus*, water fowl resting in hollows scooped in trees: goldeneye *Bucephala clangula* and goosander *Mergus mergan-*

ser and, feeding on fish and preferring river valleys, kingfisher *Alcedo atthis*. Also the fauna typical for large forest complexes, such as eagle owl *Bubo bubo*, has found its refuge in the Drawa National Park.

The main objective of creation of the Drawa National Park (DNP) was to realize the protection of nature as a superior task. The nature protection within DNP has not been an easy task, because many, sometimes contradictory to one another goals, have to be squared: maximum preservation of natural fragments of environment, supporting naturalization processes, protection of naturally valuable semi-natural ecosystems, and maximization of DNP's contribution to preservation of diversity of the European nature. To some extent, also the needs of tourism have to be taken into account; especially it concerns the so-called exclusive tourism, for which the Park is a very attractive object. Within DNP also natural education programmes are realized, which is a statutory duty of the national parks in Poland. Agreement of all the above-mentioned tasks has been the main objective of the Park administration.

The Drawa National Park is a kernel of a larger region of relatively little deformed nature. The whole forest complex, surrounding the Park, and, adjacent to the protected area, forest clearings of agricultural character, can serve as a testing ground for new forestry management methods, as well as the region of development of pro-ecological tourism.

3. Forest economy

The Drawno Forest Inspectorate administers on the area of 20,180 ha, but the territory range of the Inspectorate covers the

area of 37,419 ha. The forestage index in the region being under the Inspectorate administration is equal to 55.3 per cent.

The forest economy in the state-owned forests is run in compliance with the following three main principles:

- principle of general forest protection;
- principle of maintenance of the forest durability and usage continuity;
- principle of increase of forest resources.

The principle of general forest protection means that the protection of forests is a duty of each citizen, and in particular, the duty of forest administrators and owners. The forest protection consists, first of all, in:

- duty of carrying out some prophylactic measures, preventing rise and extension of forest fires;
- duty of prevention, detection and fighting organisms which occur in excessive amount and are harmful for the forest;
- duty of forest game management in such a way, that the forest durability and realization of economical objectives are ensured.

The principle of maintenance of the forest durability and the usage continuity requires that the permanent preservation of forest plants by means of current reforestation is assured.

By the usage continuity we mean that the forest is able to fulfil its various functions (protective, social and practical) in a continuous manner. This principle is especially important nowadays, because wide-spread air contamination causes intense

losses in the forests. Pollutants as well as other harmful factors are particularly dangerous in the one-century-old monocultures, where no biological diversity, manifesting in a variety of species and the forms of their occurrence, takes place.

The principle of increase of forest resources postulates that the area of forests is systematically increased every year.

An essential problem in the Drawa Forest Inspectorate is the problem of land and assigned to afforestation. There are many, agriculturally non-used grounds, left after the liquidation of the state-owned farms, which are planned to be transferred to the Inspectorate for the afforestation purposes. At the moment, in the Drawno community there are 407 ha of land assigned to afforestation, and in the remaining communities, being within the administration range of the Drawno Inspectorate, there are other 650 ha of land. These data are not the final ones, because up to date the Agency of Agricultural Property of the State Treasury has not transferred the afore-mentioned land to the State Forests.

An annual quota of forest clearings in the years 1992-2001 equals 51,300 cubic metres, including about 32,000 cubic metres for the timber cutting use.

A mean annual area of forest grounds intended for afforestation is 220 ha in open terrains and about 50 ha under the shield of forest stands.

Moreover, the Inspectorate performs some work in the field of forest protection, fire protection, nature protection, hunting economy and others.

An average annual employment ranges from 160 to 170 employees. In the forest economy administration in the Drawno In-

inspectorate a significant attention is paid to the matters of forest protection. From time to time, the forest are seriously imperilled by primary pests, such as fussock-moth *Lymantria monacha* L., noctuid *Panolis flammea* Schiff, *Bupalus piniarius* L. and *Dendrolimus pini* L. In the years 1979-1983, on the territory of the inspectorate fussock-mock occurred, which led to considerable gradual thinning of the forest stands.

As regards secondary pests, the most serious problems for the last years have been due to the occurrences of buprestid *Phaenops cyanea* F. as well as *Tomicus piniperda* L. and *Tomicus Monor* Htg.

Intensive occurrence of the secondary pests is closely related to significant thinning of the forest stands of the inspectorate as well as atmospheric conditions (mild winters and warm summers) in the last years, which especially favoured pests reproduction.

A sanitary state of the forests is good thanks to great effort put into setting in order the forest stands after mass occurrence of buprestid in 1992 and 1993. However, as an alarming phenomenon one should consider a worsening of the health state of the forests.

The forest stands, because of coincidence of many destructive factors (air pollution and, successively repeating for last years, droughts) reveal greater susceptibility to the occurrence of insects and fungal diseases.

A dominating species in the inspectorate forests is pine, which accounts for 89 per cent of the whole forest stand; the latter causes serious fire hazard in the summer period. The Inspectorate is included into the first category of fire hazard. Ad-

ditionally, the fire hazard is enlarged by intensive penetration of tourists, gatherers of forest ground cover, as well as by anglers.

In 1992, on the area of the inspectorate, 21 fires broke out, which causes losses estimated on 256 million PLZ. In 1993, 8 fires broke out, and the estimated losses were 718 million PLZ. The greatest fire occurred in 1987, when 51 ha of the forest burnt. In the current, 1994, year, the inspectorate expenditures on the fire protection amount to about 800 million PLZ.

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