

Chapter 8

ANNA ZBIERSKA
CZESŁAW PRZYBYŁA

NATIONAL AND REGIONAL ROAD INFRASTRUCTURE, ECONOMIC DEVELOPMENT AND SPATIAL DEVELOPMENT CHANGES AT A LOCAL LEVEL

Introduction

Road transportation in Poland plays a crucial role in servicing cargos and people transport, as a result of which it constitutes a significant element of development of the Polish economy. Despite many general trends directed at creating a more balanced transportation system (intermodal transportation) with a greater share of rail, air, sea and river transport in the forwarding market, it shall be expected that road transportation in Poland will remain its dominant role. It is confirmed by analysis of the last ten years in which the share of car transportation in forwarding goods increased several times and, at the same time, development of road infrastructure was not so fast. In “the Transportation Development Strategy for the years 2007 and 2013” (TDS) prepared by the Ministry of Infrastructure, it is assumed that there will be a further increase in the demand of cargo transportation connected with an assumed economic growth as well as an increase in foreign exchange of goods. It will also be connected with a further increase in the number of passenger cars, estimated at as much as 40–60%, and decrease of city transportation by 5–10% by 2020. Since 2000, the number of passenger cars in Poland increased by 78% reaching in 2010 the number of more than 555 passenger cars per 1000 potential drivers; i.e. persons at the age of more than 17 years and 89 trucks (Fig.1). In the region of Wielkopolska (WLKP.), this ratio is the greatest in Poland and amounts to 636 passenger cars per 1000 persons at the age of more than 17 years, and still increasing.

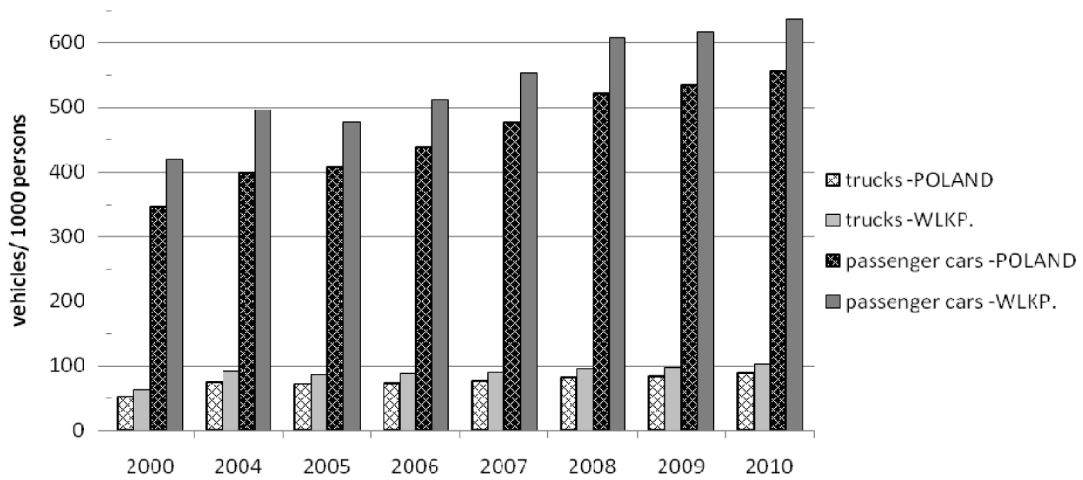


Fig. 1. Number of passenger cars and trucks per 1000 potential drivers, i.e. persons at the age of more than 17 years in Poland and Wielkopolska (WLKP.) (source: Regional statistical data BDR, 2011)

It shall be expected that there will be great pressure on the road network, both in the scale of Poland and the region. As a result, one of the main strategic aims is to establish effective transportation connections with the rest of Europe by means of a modern network of motorways, expressways and other national roads as well as satisfying such needs of the nation by 2020 in the field of transportation (Fig.2). Additionally, an impulse to speed up the investments was granting Poland and Ukraine the right to organise the European Football Championship EURO 2012.

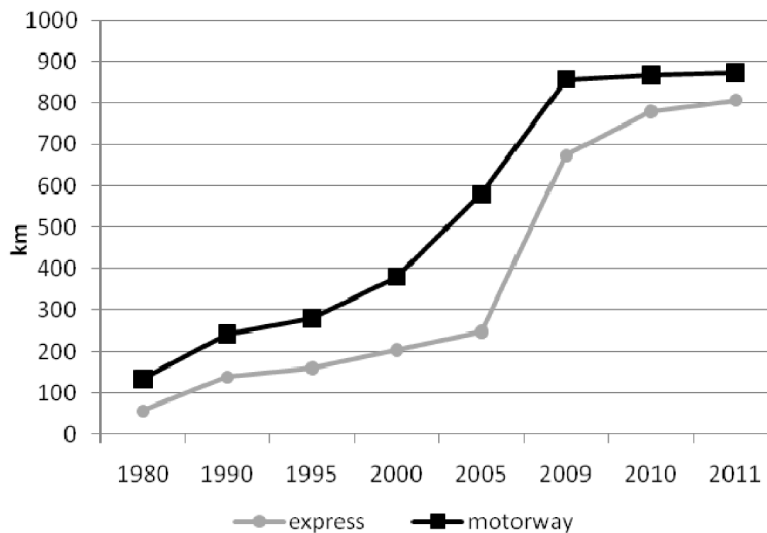


Fig. 2. Motorway and express roads length in Poland (source: Regional statistical data (BDR) and General Director for National Roads and Motorways (GDDKiA), 2011)

All of this causes that the transportation policy of the Polish government is focused on issues connected with international and intercity transportation, and to a lower extent regional. However, the majority of forwarding work in Poland is performed in cities, agglomerations and regions. There (at a local level) is a majority of environmental and social problems connected with transportation. A question appears of how much vicinity of roads determines economic development of communes and when it may inhibit when it constitutes a chance for a local society and a source of conflicts? In this thesis, an attempt was made, to answer the aforementioned questions and assess the directions as well as the scale of impact of national and voivodship roads, to some extent centrally imposed on communes, on the changes in economic and spatial development at a local level. The analysis were performed on the basis of 3 communes (Dopiewo, Buk and Duszynki) located in The Wielkopolskie voivodship, in the vicinity of Poznan agglomeration and located within the most important transportation routes in Poland: motorway A2 (Trans-European passage no.II East – West) national road no. 92 Berlin – Warsaw – Moscow, and a newly built expressway (S11) which links the north-south axis. By now, communes have had a typically agricultural character which changes gradually along with an intensive economic development and urbanisation growth. Specific attention was paid to investments executed in the years 2000–2010.

1. Procedure of roads location – participation of the local self-government and society

The high priority which is attached to building and modernising roads and the specific character of road investments going through many properties, resulted in establishing a special act of 10 April 2003 on specific principles of preparing and executing investments in the scope of national roads (consolidated text Journal of Law of 2008, No. 193, item 1194 as amended), so called “*Spec Act*”. It constitutes a legal tool which significantly simplifies the procedures of establishing new locations of roads, defining technical conditions of their building, and principles of purchasing properties for such aims (Szafranko 2010). Since September 2008 the act is an exclusive regulation preceding building of public roads of all categories in the light of the act on public roads (Journal of Law of 1985, No. 14, item 60 as amended) and is to be binding by the end of 2020. In practice, it means that the act resulted in connection of several procedures (phase of locating roads, phase of purchasing real properties and phase of construction permit) in one decision on locating a roads investment; which constitutes the basis for commencing roadworks. Filing an application must be preceded by an opinion of self-government authorities i.e. powiat management and commune leader, mayor

or president of a city. Self-government has 14 days for their issuance. If not, it is assumed that there are no reservations to the application. Commune authorities also include announcements on commencing proceedings by the Voivod on issuing a decision on permitting location of the road investment, in the commune office of proper venue for the road, on websites and in local newspapers. At this stage, it is possible to familiarise with the documentation and stating an opinion by any interested parties, which have defined their interest. However, there are no regulations conditioning the manner of considering such remarks at a further stage of the proceedings. The Parties may only appeal from the decision on permitting the execution of road investment to the authority of higher level. With the moment at which the decision on permitting the execution of the road investment becomes final, it causes a legally free transfer of properties belonging to the commune in the management of the General Directorate for National Roads and Motorways or a self-government organisational unit, there is no compensation for the self-government properties taken within the belt of the road. In case of private properties or their parts, they are automatically the properties of the State Treasure or proper self-government units for which the perpetual users are entitled to compensation on a general basis. The amount of compensation is established in a separate decision within 30 days since the moment at which the decision on permitting the execution of road investment becomes final.

At the stage of issuing a decision there are no possibilities of influencing the change of an investment location. The earlier stage, at which it is possible to submit remarks and motions relating to the location of national and voivodship roads is the stage of consulting the national or regional strategic documents i.e. the National Road Building Programme, Transportation Development Strategy, spatial development plans and strategy of regional development. The participation of self-government and society is possible on the basis of the act dated 27 March 2003 on planning and spatial development (Journal of Law of 2003, No. 80, item 717 as amended) or the act of 03 October 2008 on making information available on the environment and its protection, participation of the society in environment protection and assessment of impact on the environment (Journal of Law of 2008, No. 199, item 1227). Another stage at which there is a possibility of filing remarks or motions is the procedure of issuing a decision on environmental determinants of the road location preceded by performing an assessment of an influence of the undertaking on the environment. The final stage at which self-governments may comment on location of roads is described at the beginning, issuance of the decision to the application on permitting the investment location.

In all aforementioned legal regulations, it is about opinions or remarks, which self-government or society may file. It is not about the consent on an investment location. The “*Spec Act*” of 2003 does not assume not granting permit on an investment location within the assigned period of 90 days, introducing even administrative penalties for delay. From the spatial planning viewpoint, it is also significant, that on the basis of the “*Spec act*”, included in the permit on executing a road investment, regulations on protection of farm and forest lands does not apply. The Environment Protection Act does not apply in the scope of the obligation of gaining permits on eliminating trees and bushes and related fees which should be theoretically included in the commune budget. In the matters related to the permit on executing a road investment, spatial planning and development do not apply. It means that for the decision on establishing the location of the road, it is not important whether there is a local spatial development plan (MPZP) and what its contents are, the former may be contradictory to the latter, yet still valid. In practice, apart from natural determinants (significantly negative influence on the areas of Natura 2000) or agreement of the Parties, there are no possibilities of influencing the course of national or voivodship road investments at a local stage, which may cause significant sources of conflicts.

In case of the analysed communes such conflicts did not appear. The plans of the motorway A2 going through all three communes were established in 1930s and were included in spatial development plans in later years, and despite the fact that the intensive construction of a modern motorway commenced in 2001, the said section was accepted to be used in October 2004. Thanks to many years of planning there were no conflicts with the housing development and impact on environment was minimised. It was similarly in the case of a ring road of Buk within the course of the voivodship road 307 and presently performed investments in the form of building a western ring road of Poznan within the course of an expressway S11 and the extension of voivodship road 307. Despite the fact that the plans of S11 appeared in 1990s these are unanimous with local spatial development plans and longing investments on the areas of communes by local society.

2. Road transportation as a determinant of social and economic development

The problem of seeking ways leading to optimal economic development was one of the most basic in economic sciences. Economic development includes both quantitative changes (i.e. economic growth), regarding an increase in production and services, employment, investments, functional capital, consumption and other measures per capita of a given area, region or country, as well as accompanying changes of a qualitative character (chang-

es in society's organisation) (Pangsy-Kania 2002). The benefits from economic growth and economic development shall include an increase of life quality, increase in production, better social situation and greater public security. In order to gain it, it is essential to develop determinants of social and economic development. Along with the thoughts of economics one of them is: human capital, land and resources, technical progress, investments (i.e. increase in material capital) and external environment. Road infrastructure influences each of these determinants providing transportation of resources and products, transportation of employees and transportation connections along with external environment. Proper extension of a transportation network constitutes a significant element conditioning economic development both in a national, regional as well as local scale. In the Wielkopolskie voivodship the most essential role is played by the motorway A2 allowing inclusion in the European network of express traffic roads and its complement in the form of the national roads no. 92, no. 5, and no. 11 along with the planned expressway S11, as well as a network of express and voivodship roads. These routes allow effective transportation and connection of economic areas around Poznan from the centre of Poland and other regions (Grabowski 2010). Their local impact of these significant transportation routes has been analysed in this article on the basis of 3 selected communes. Table 1 and Table 2 present short comparative characteristics of analysed communes comparing basic elements influencing economic development of the analysed areas (Tab. 1, Tab. 2).

Table 1. Transportation infrastructure characteristics (Commune Office data)

Parameter\commune	Dopiewo	Buk	Duszniki
Road density * [km/km ²]	1,56	1,60	1,31
National roads	- motorway A2 - 8,8 km (with 2 MOP**) - Western Ring Road of Poznan (S11 – under construction (<i>with 2 nodes</i>))	- motorway A2 -9,2 km (road node „Buk”)	- motorway A2- 3,5 km (with MOP**) - GP No. 92- 7,5 km
Voivodship road	7,3 km: - GP No. 307	20 km: - G No. 307 and 306	23 km: - G No. 306
Poviat road	52,32 km - 11 laps, class: Z i G	41,6 km (39,2 harden) 12 laps, class: L i Z	76,9 km, - 17 laps – class: L, Z
Commune roads	92,8 km (17,7 km harden)	74,6 km (20,2 harden)	94,3 km
Railway	E20 Berlin – Warsaw – Moscow		non

* All kinds of Road

**MOP - passenger service points

Table 2. Basic characteristics of Dopiewo, Buk and Duszniki commune
(source: BDR 2010)

Commune		Dopiewo commune	Buk City and village	Duszniki commune
Area		108,1 km ²	90,6 km ²	156,3 km ²
Location (powiat) - distance to Poznan (Ławica)		poznański 12 km	poznański 20 km	szamotulski 40 km
Land use structure [%]:	Farmland	70,2	82,9	85,0
	Forests	16,8	3,9	6,7
	Urban land	5,0	3,7	2,4
	Roads	4,1	4,2	2,9
	Water	1,9	3,1	1,1
	Other	2,0	2,2	1,9
Demographic index				
Number of citizens (including production age)		18 051 (11 918) ↑	12 157 (7 885) ↑	8 515 (5 538) ↑
Population density [person/km ²]		167 ↑	134 ↔	54 ↔
Demographic burden ¹ [per./100per.]		15,8 ↓	21,4 ↑	20,5 ↔
Population growth		10,1	3,7 (1,0/ 6,5)	6,6
Migration sold		798	18	27
The number of economic entities per 1000 citizens	2000	85,7	94,7	53,0
	2005	86,6	116,0	68,9
	2009	134,5	129,4	67,3
Education ² [%]:	higher	10,2	5,4	3,7
	secondary	25,0	26,2	20,8
	trade education	35,5	40,0	36,3
	primary or non education	29,3	28,4	39,2
Unemployment ³ [%]		2,1 ↓ ↑	2,5 ↓ ↑	5,4 ↓ ↑
Environmental parameters				
Protected area by law [ha]		205	0,1	0,8
Quality of the agricultural production space		65	75	63
Valuable areas and objects ⁵		5 PP, OchK, ZP	3 PP	4 PP, R, ZP

Direction of change in 2000-2010: ↔ – no change, ↑ – increase, ↓ – decrease

1. Person in after production age for 100 persons in production age
2. Economic activity by education (Census of Population GUS 2002)
3. Unemployment share in number of people in production age (2000–2008 decrease, 2009 increase)
4. PP – natural monument; R – reservation; OchK – landscape protection area; ZP – parks, greenlands

The commune of Dopiewo is distinguished by the fastest growth of dwellers at the level of 64% within the last 10 years and the greatest urbanisation pressure from Poznań resulting from a direct border with the city and assigning the role of the suburban “bedroom”. Ca. 70.9% of the commune area constitute arable lands, however, they include arable areas which are assigned for housing development on the basis of decision on development conditions and spatial development as well as economic activation, so the character of the commune will be gradually changing. Quality of the agricultural production space is assessed as medium beneficial for agricultural production, low class lands (VIa, VIb, V) predominating. Spatial connections with Poznań and other neighbouring communes result from: voivodship road 307, powiat road 2401P and railway E20 (2 stations: Dopiewo, Pałędzie). The section of the motorway A2 goes through the area of the commune (8.8 km) however without exits and entries. There are two passenger service points (MOP) “Konarzewo” and “Dopiewiec”. Along the motorway and express road S11, business areas are planned. The rest of area is mostly residential.

The city and village commune Buk is located 22 km from the boundaries of Poznań and the international airport “Ławica”, 250 km from Berlin and 330 km from Warsaw. The commune has a very beneficial transportation location at the international railway Berlin – Warsaw – Moscow. The framework of the road system of the commune is the section of the motorway A2 at the distance of 9.2 km with a direct exit (node “Buk”), two sections of voivodship roads (306 and 307) crossing in the area of the city of Buk, with total length of 20 km, 12 sections of powiat roads with total length 41.6 km, including 39.2 hard-surfaced roads and 74.6 km commune roads including 20.2 km hard-surfaced roads. The commune is characterized by the most intensive development of areas of economic activation, in particular in the vicinity of the motorway exit “Buk” and the lowest forested areas at the level of 3.9%. The number of economic entities within the last decade increased twice as much.

The commune of Duszniki is characterised by maintaining an agricultural character of the commune within the planned directions of development with local points of tourist and economic activation, there are Passenger Service Points (“Zalesie” and “Sędzinko”) at the motorway A2 and a national road 92. There is also planned a quite large area for a wind energy farm. The commune has the lowest population density (52 persons /km²) with greater natural and landscape values among the analysed communes even with a low forested areas at the level of 6.7% of total commune area. The commune is located at the distance of ca. 32 km west from Poznań (distance to the Commune Office of Duszniki) and location of 120 km from the border

with Germany. Throughout the commune there are the most significant transportation routes in Poland: national road no. 92 Świecko – Warsaw – Terespol and the motorway A2 Warsaw-Berlin. Geographic location of the commune, in the aspect of economic development is very beneficial. Despite the fact that the commune area does not have a railway and the nearest railway station is in Buk and Opalenica, the location of the commune allows differentiated economic development, especially in the scope of services connected with the services of tourist traffic within roads no. 2 and A2. The nearest exit from A2 is the vicinity of Buk – 12 km from the border of the commune. In the vicinity of locations, passenger service points are being developed – for motorway users. The majority of the commune areas are agricultural areas which constitute almost 85% of the total area of the commune. It indicates a really agricultural character of the commune. Quality of the agricultural production space is assessed as medium beneficial for agricultural production. Low efficiency class lands (V-VI class) constitute 30% of total arable lands. The basic functions performed in the area of the commune area are: agriculture, small manufacturing, services and trade. In the vicinity of the national road there are new lands for intensive economic activation.

All analysed communes have good transportation connections with Poznan which favours an intensive housing development (as bedrooms for the city of Poznan) and economic activation. The given changes in the area of analysed communes constitute intensive development of transportation infrastructure, including the new section of the motorway A2 (accepted 27 October 2004) which imposes the changes in using lands and favours economic activation. Within the next few years, it is anticipated to further intensify restructuring of lands in these directions due to the further planned extension of express traffic roads, including the section of the western ring road of Poznan as well as including Dopiewo and Buk communes into the Metropolitan Zone of Poznan. The analysed communes are located in the most attractive zones for national and foreign investors, which are created along with the motorway A2 towards the west of Poznań. These are good examples of a direct influence of a motorway on the local development. Similar phenomenon, even clearly visible, however with a lower intensity is observable in the area of express and voivodship roads crossing the region of Wielkopolska. Transportation connections constitute a framework for an extended spatial structure at all levels of management. The analysis of development determinants shows that the most significant transportation passages are also the main development directions.

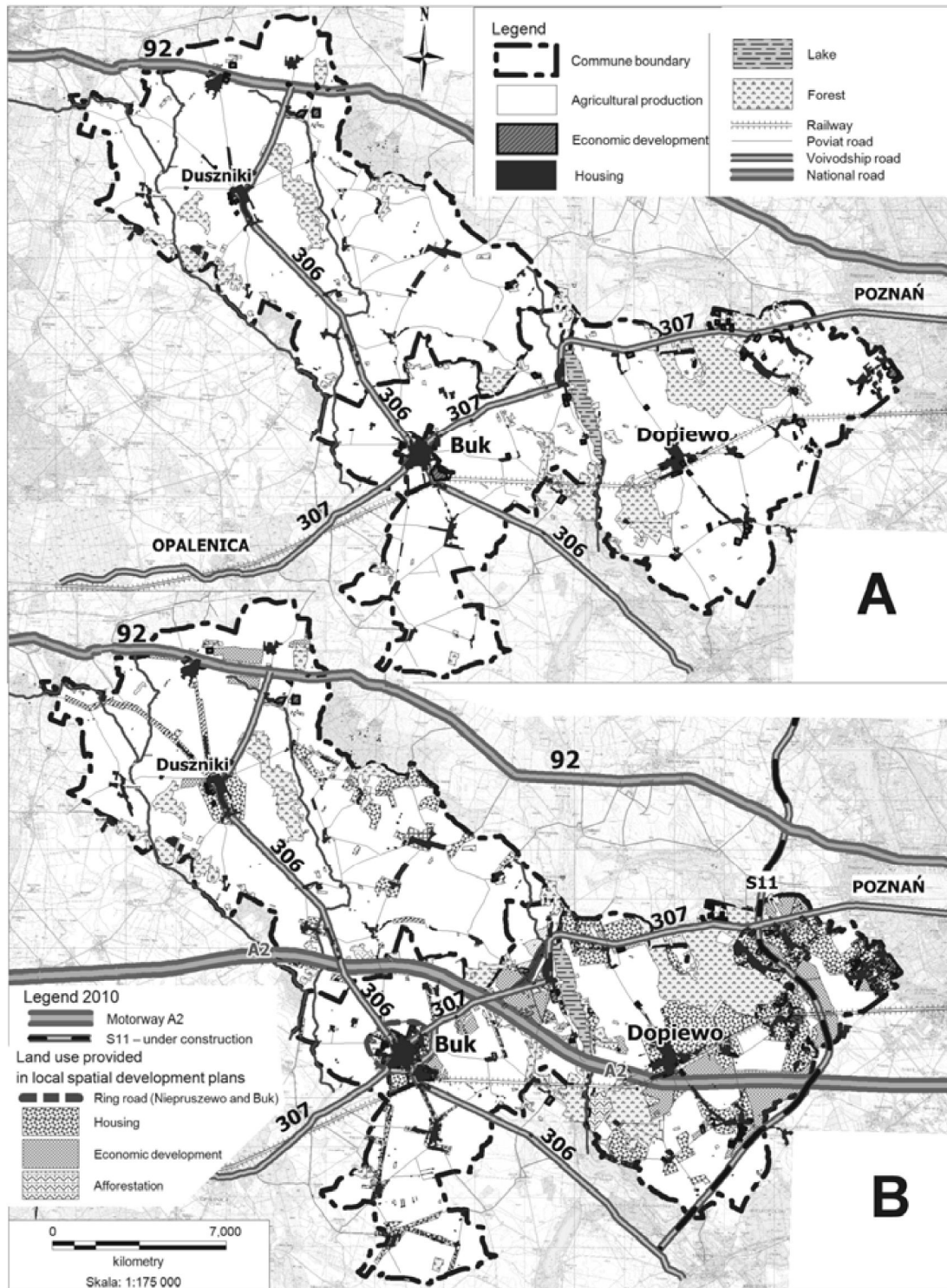


Fig. 3. Differences in land use in Dopiewo, Buk and Duszyniki communes in 2000 (A) and in 2010 (including land use provided in local spatial development plans) (B)

3. Exclusion of lands for transportation purposes

Road system stimulates development but also the construction of new roads and extension of the existing ones is connected with permanent changes in using the land. At present, 1425 national roads are under construction or reconstruction (data of the Ministry of Infrastructure, as of 06 May 2011) included i.e. 32 sections of motorways (729 km), 37 sections of expressways (528 km) and 13 ring roads (92 km). Assuming a minimum width of a road in the bordering lines pursuant to the resolution of the Minister of Transportation and Marine Economy of 02 March 1999 on technical conditions which have to possess public roads and their location: 60 m for motorways, 50 m for expressways and 35 m for ring roads, which gives 7336 ha of excluded lands only for the course of national roads. Due to their location far from dense development, these exclusions regard agricultural or forest lands, which are connected with the loss of biologically active lands and decrease in food production.

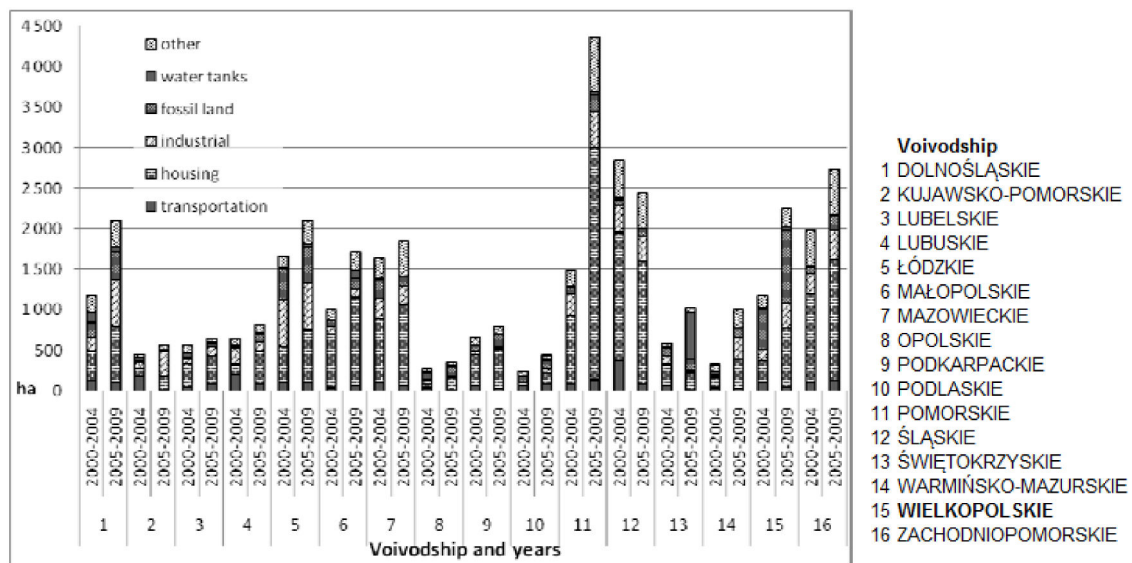


Fig. 4. The directions of transferring arable and forested lands under protection in compliance with the proper act by regions (Main Statistical Office, Environment Protection 2010)

Based on national statistical data regarding the directions of transferring arable and forested lands under protection in compliance with the proper act, it may be concluded that the exclusions for transportation aims constitute a relatively small part (3-10% of total area of the excluded lands under the act on land protection) in comparison to the exclusions for housing or industrial exclusions [Main Statistical Office, Environment Protection 2010] (Fig. 4). In many cases the development of transportation stimulates further transformations in other forms of use. Transportation investments attract further

investments and changes in development of its vicinity. These are areas of economic activity or housing development, which constitute a dominant direction of exclusions of arable and forest lands.

Spatial pressure of transportation infrastructure is clearly visible on a local scale. On the basis of analysing data and maps it may be claimed that in the 3 analysed communes the area of transportation lands (mainly under roads) increased by 249 ha i.e. 24% in the years 2000–2010 in comparison to the year 1980 by 32%. It was mainly thanks to the lands with class IIIb, IVa and IVb. In total, in the period 2000–2010, 242 ha of agricultural lands (mainly arable lands), 22 ha forest lands and 9 ha of other lands were excluded for national and voivodship roads. Within the framework of national and regional investments, which are under construction by 2015, it is assumed to exclude a further 20 ha of land (Tab. 3.).

Table 3. The directions of transferring lands in communes studied

Parameter \ Commune	Dopiewo	Buk	Duszniki	
Area [ha]	10802	9058	15630	
Lands excluded 2000-2010 [ha]	for national and voivodship roads	113	98	52
	for economic development areas	80	53	29
	for housing	170	42	1
TOTAL [ha] (% commune area)	363 (3,36)	193 (2,13)	82 (0,52)	
Lands assumed to exclude [ha]	for national and voivodship roads	32	14	-
	for economic development areas	1339	456	285
	for housing	2793	254	761
TOTAL [ha] (% commune area)	4164 (38,5)	724 (8,0)	1046 (7,0)	

4. Transformations of neighbouring areas

Transformations of lands into local transportation areas regard only 1% of total area of the analysed communes; however, it significantly influences further changes of using lands, both in the nearest vicinity and in the commune as a whole. In the area of the commune of Dopiewo, the dominant direction of changes in development is housing. In the years 2000–2010 170 ha were transformed for such purposes whilst the lands are connected with the vicinity of Poznań and settlement of Poznań residents on the outskirts of the city than the extension of roads which does not follow the expansion of dwellers. However the influence of extension of roads is clearly visible in the location of areas of economic activation (Fig. 3). Due to the lack of direct entry into the motorway, the areas are concentrated mainly on the modernised voivodship road 306 as well as along with the powiat road which

leads to the motorway. In the future, it is planned to develop in this capacity along with the built section of the road S11 with nodes: Zakrzewo, Dąbrówka and Głuchowo. Nowadays, the communes situated long the road S11 use it to promote by creating an initiative of Zachodniaobwodnica.pl. This website with current information about the progress of construction works and investment offers was developed. Passenger Service Points (Dopiewiec and Konarzewo) located at both sides of the of the commune are not fully used.

In the area of Buk in the vicinity of the main transportation systems, almost 55 ha were transformed into economic activity with regard to industry and trade character in 2000–2010, and another 455 ha are assigned for that aim in the review of conditions. Main directions of transformation rely on economic activation along with the voivodship road at the level of the motorway node “Buk” and in the vicinity of the ring road of Buk. Transformations in the directions of housing and commercial development are more visible in the vicinity of Niepruszewskie Lake and around the city. 42 ha were excluded for housing development in the last decade and according to the review, it is planned to exclude 254 ha for housing and trade purposes.

The influence of a motorway for the development of a commune is the least visible in the commune of Duszniki. The only stimulating element is a Passenger Service Point, the influence of which has a local character within the direction of servicing and tourist activation. Due to the lack of a motorway exit, an economic activation of a commune is concentrated on the areas in the vicinity along with the national road no. 92.

Apart from the aforementioned economic activation resulting from the location of national and voivodship roads, on the other hand, they may constitute a limitation for other directions of spatial development. While preparing spatial development plans and location of building structures in the areas neighbouring with the roads class G (general), GP (general with faster traffic), S (express), A (motorways) the zone of burden of the road for constant users of neighbouring communes, is a hazard to crops, buildings, and risks degradation of permanent components of the natural environment. Assuming the provisions included in The Road Guidelines for Road Design (appendix no. 2 to the decision of the General Director for Public Roads of 31 March 1995) and art. 43 of the act of 21 March 1985 on public roads and recommendations of assessments considering an impact on the environment with regard to minimum distances (from the external edge of the road) and a negative impact connected with road traffic which shall be taken into consideration while preparing spatial development plans¹ gives limitations in transforming the land in housing development in the area of 191 ha in the commune of Buk, 192 ha in the commune of Dopiewo and 212 ha in the com-

¹ For class A and S: 70 m; for GP: 50 m; for G 30 m

mune of Duszniki. For locations other than building structures, limitations regard ca. 250 ha in total. Moreover, it shall be considered that the transportation services of the lands located in the vicinity of national roads or faster traffic roads allows excluding the existing crossroads while maintaining proper distances among the neighbouring crossroads.

5. Local spatial barriers

Limitations in the possibility of including in the traffic on motorways and expressways only to selected nodes and great traffic congestion on voivodship roads contributes that the roads constitute barriers for the dwellers, in foot and bicycle traffic and for animals. The best example is the commune of Dopiewo, through which, in its central part goes a section of the motorway A2, (8.8 km) however without exits and entries. The commune of Dopiewo, formerly a single, but very differentiate spatial, social and economic organism has been divided spatially and functionally into the northern and southern parts, which does not influence favourably on: transportation connections, conducting agricultural economy and social bonds (maintenance of the existing and creating new bonds). The motorway cut off the villages from the commune seat: Konarzewo, Trzcielín, Lisówki and Podłoziny, which (due to limited passes through the existing railways) may contact with other areas in strictly defined points. The motorway divided many local roads, however, with flyovers. Only for two powiat roads, one common flyover was created. Another element imposing an additional division of the commune is the constructed express road S11 dividing the villages Skórzewo and Dąbrowa from the main area of the commune and south and western areas of Konarzewo and Gołuski from their houses. Maintained and strengthened - by building another lane - a division of the commune by means of the Bukowska road (307). In the aforementioned section, the motorway collides with housing, technical and household buildings which are located nearer than 50 m from the external edge of the motorway.

Road infrastructure and vehicle traffic also have a lasting impact on the natural world. There are many forms of negative impacts of roads but the most important environmental consequences are considered to create environmental barriers that prevent or hinder the movement of animals across the road [Workshop for All Beings, 2011]. This has a direct impact on the increase in mortality which depends primarily on the traffic of vehicles and type of area through which the road runs. It is assumed that road traffic over 1000 vehicles per day is an impediment to the movement of animals; road traffic over 10,000 vehicles per day or more, pose an insurmountable barrier for most terrestrial species. Similarly, use of protective fencing completely prevents the movement of animals, and keeping roads in the embankments

and trenches greatly hinders them. Moreover, the presence of ecological barriers leads to fragmentation and isolation of habitats. Theoretically, the transition for animals should be built on all roads with a protective fence or if traffic exceeds 10,000 vehicles per day. In communes analyzed, this type of solution was used only for the highway near the Niepruszewskie lake.

6. Influence of road investments on the environment

One of the main aims of building or modernisation of roads or other road structures are mostly economic and social benefits for the dwellers and road users. On the other hand, the construction of a new road is connected with many problems for the environment both natural and social, and cultural, directly influencing the conditions of human lives. That is why such investments included in the resolution of the Council of Ministers of 9 November 2010 on undertakings having a great influence on the environment (Journal of Law No 213, item 1397). As a result, before executing the investment an assessment of impact on the environment shall be performed in order to select the most beneficial variant of executing the investment and pointing out the most indispensable protection or compensating actions. The basic task and contents of the decision on environmental determinants is to define such conditions of executing the investment so as to protect the interests of environmental protection in the broadest extent, along with the interests for the execution of the investment.

For all aforementioned investments executed after the year 2000, such assessment was performed. They specified the dominant source of elements and analyzed the impact of roads on the environment, including: changes in the natural environment and landscape (cutting off trees, conversion of agricultural land, the intersection of three forest sections, habitat fragmentation), changes in ground-water conditions (soil contamination, the formation of a cone of depression, rafting rain), noise, emissions of air pollutants and the impact on life and health of people and culture goods. In places where the impact was significant, actions were made to minimize these effects, such as protective green belts, noise barriers, trenches and mini mechanical-biological sewage treatment plant or water-retention tank and animal crossings. For control purposes, after investment monitoring is also recommended. A necessary condition for getting environmental decisions were to ensure that possible negative impacts will be housed within the demarcation line of the road. Only the noise range of influence extends beyond the area of 100-200 m distance from the axis of the road. The range depends on traffic and weather conditions. Hence the need for noise barriers in places of close proximity to buildings. Traffic noise, among other types of noise, due to the area and the number of people covered by its impacts and the limited possibilities

of its elimination or reduction is the most difficult problem. Under the Decree of the Minister of Environment dated. 14 December 2006 on the roads, and airports, whose operation may result in adverse acoustic impacts on large areas, which is required for the mapping of acoustic range (...) (Journal of Law of 2007 No. 1, item 8) for objects whose operations can cause negative effects of special acoustic territorial range in considered road sections, after which travel more than 6 million vehicles per year (an average of over 16,000 vehicles a day). Analysis of the results of the General Traffic Measurements from the years 2000, 2005, 2010 showed that sections of national roads in the analyzed area, where traffic exceeds the daily rate, include sections of road No. 2 and 92 and the A2 (Tab. 4). Very close to the assumed value of this indicator is also traffic on the provincial road 307, section Poznan - Wysogotowo. Another worry is the steady increase in the number of vehicles on all roads analyzed in the last five years.

Table 4. Traffic on national and provincial roads in 2000, 2005, 2010 r. (source: General Traffic Measurements)

Year	Road no.	Name	Motor Vehicles Total	Motorcycles	Passenger cars and minibuses	Light trucks	Trucks	Buses	Tractors
			SDR – average daily traffic						
2000	92 (2)	PNI EWY- SĘKOWO	16198	16	9444	1506	5054	178	0
2005			13490	45	8769	1781	2779	104	12
2010			14914	40	9503	1982	3256	112	21
2000	92 (2)	SĘKOWO- PRZEŹMIER OWO	14835	15	8989	1929	3709	163	30
2005			12863	33	8098	1800	2780	127	25
2010			13622	29	8687	1810	2976	98	22
2005	A2	NOWY TO- MYŚL -BUK	9439	4	3400	883	5076	76	0
2010			13659	12	6106	978	6505	58	0
2005	A2	BUK- KOMORNIKI	10074	4	3762	907	5314	87	0
2010			15946	12	7397	1022	7454	61	0
2005	306	SĘKOWO- DUSZNIKI	2315	5	1845	192	238	16	19
2005	306	DUSZNIKI- BUK	2872	6	2085	256	482	26	17
2010			3907	23	2532	383	922	27	20
2005	306	BUK (OB- WODNICA)	5759	23	4250	633	812	12	29
2010			10033	70	7827	1063	1033	10	30

2005	306	BUK-TOMICE	2546	5	1776	300	445	5	15
2010			3378	17	2412	429	493	3	24
2005	307	POZNAŃ-WYSOGOTOWO	14257	57	12204	1497	428	71	0
2010			15751	110	13923	1150	520	32	16
2005	307	WYSOGOTOWO-WIĘCKOWICE	8967	18	7550	807	502	81	9
2010			12847	90	10136	1195	1323	64	39
2005	307	WIĘCKOWICE-BUK	7318	15	6138	754	359	37	15
2010			8836	53	7025	1051	645	35	27

Results of acoustic surveys carried out by WIOŚ Poznan in 2007 presented in Tables 5 and 6 showed the excess noise from the highway at night on land and buildings in Dopiewo, Głuchów and average daily noise levels exceeded the limit on the national road 92 in towns and Sękowo judged in Duszniki commune (Tab. 5 and 6). Positively influenced the acoustic climate of the city ring road construction Beech, which greatly moved the transit traffic from the city centre. A positive aspect of the construction of the bypass in Buk was also the concomitant expansion of facilities to improve cycling and walking, such as sidewalks and bike paths.

Table 5. Results of acoustic surveys carried out by WIOŚ Poznan in 2007

Measuring point localization	L _{Aeq} [dB]			Traffic [vehicles per hour]	
	next to road	at a distance of		total	trucks
		10 m	20 m		
306 Lipnica-Duszniki above Sękowo	73	66,6	–	149	35
306 Buk-Duszniki next to Sędziny	72,8	64,4	60,9	158	42
306 Duszniki – national road no. 2	72,1	63,8	–	167	38

Table 6. Results of acoustic surveys next to motorway A2 (WIOŚ Poznań 2007)

Measuring point localization	Distance to motorway axis	Equivalent noise level L_{Aeq} [dB]		Traffic [vehicles per hour]			
		Day (norm 60 dB)	Night (norm 50 dB)	Day		Night	
				total	trucks	total	trucks
Odcinek Nowy Tomyśl – węzeł Komorniki							
Dopiewo, ul. Leśna 35	30	57,3	52,9	841	464	475	265
Dopiewo, ul. Wyzwolenia 38	30	60,2	55,4	875	469	485	272
Głuchowo, ul. Poznańska 2	25	57,5	54,6	751	411	434	233

In summary, as a fundamental tool to minimize the negative impact of roads on the environment, while enhancing the landscape, can be properly selected areas of green belts, which act at the same time limiting the role of the septum biotech impact of pollution of soil and air, and inhibiting the spread of noise. Its diversity also prevents the impression of monotony of the landscape.

7. Conclusion

Development of entrepreneurship in communes is connected with internal - local and external - regional - macroeconomic determinants. A high economic level of a commune is influenced by: high quality of labour market, favourable social climate, relatively high quality of technical infrastructure, effectiveness of transformations, marketing activity as well as transportation accessibility. The aims connected with transportation and municipal infrastructures are dominant among local policies in the entire Wielkopolskie voivodship. The least attention is paid to such fields as IT society, revitalisation or innovations.

The research confirmed that the development of road systems exerts a differentiated influence on social and economic development and (space quality) spatial development of communes depending on the rank of roads and their infrastructure. This influence may be positive or negative. Positive impact of road infrastructure may include:

- Faster over local transportation, access to main centres, R&D centres (Poznań), regional and super-regional integration.
- Lower load of local roads in transient traffic
- Increase in investment attractiveness for economic activation (if a transportation node is present) and an increase in number of workplaces and tax inflows,

- Possibility of developing the services activity in the scope of servicing drivers and touristic traffic.

Among the negative aspects of road systems, we may include:

- Exclusions of arable and forest lands from production and loss of biologically active surfaces,
- Fragmentation of eco-systems and natural space as well as the influence on fauna and flora
- Increase in flows of surface waters,
- Noise,
- Air pollution,
- Barriers in local traffic (i.e. foot, bicycle, access)
- Limitations in using lands in the vicinity of roads (housing construction, municipal infrastructure, local roads, crops)

The scale of influence depends on local determinants. Performing a simple balance of profits and losses (Tab. 7), it must be claimed that among the analysed communes, Buk gained the greatest profits on the extension of the national and voivodship roads. It was made thanks to: agreed location of the motorway within a safe distance from housing development, full motorway node along with a properly developed land under economic activation attracts investors as well as less loading of local roads and smaller transient traffic in the city of Buk, thanks to the construction of a ring road.

The commune of Duszniki has great benefits from the existing course of national and voivodship roads even if the motorway influence on economic activation is less visible. The stimulating element is only the Passenger Service Point whose influence may be local and directed at service and touristic activation. Economic activation (warehouse and industrial) of the commune is made mostly in the areas in the vicinity of the national road no. 92. Here, there are also troubles for dwellers due to road transportation which decreases the final assessment in the balance. The course of the national road through developed areas and its noise and pollutions emission made that in the final balance; the influence of road infrastructure was assessed at the level of average. The lowest assessment was granted for the commune of Dopiewo, as, despite a great stimulation of economic development of the commune due to the development of road transportation, there are many negative impacts due to roads and limitations in the social development and spatial order.

Table 7. The balance sheet impact of national and provincial road infrastructure for the development of analyzed communes.

Impact area	Commune (roads number)		
	Dopiewo	Buk	Duszniki
	A2,S11,307	A2,306,307	A2,92,306
Faster over local transportation, regional and super-regional integration	++	+++	++
Lower load of local roads in transient traffic	+	+++	+
Increase in investment attractiveness for economic activation	++	+++	+
An increase in number of workplaces and tax inflows	++	+++	+
Possibility of developing the services activity in the scope of servicing drivers and touristic traffic.	++	0	+++
Exclusions of arable and forest lands from production (loss of biologically active surfaces)	---	--	-
Fragmentation of eco-systems	---	--	-
Increase in flows of surface waters	--	--	-
Noise	--	-	--
Air pollution	--	--	-
Barriers in local traffic (i.e. foot, bicycle, access)	--	-	-
Limitations in using lands in the vicinity of roads (housing construction, municipal infrastructure, local roads, crops)	---	-	--
Summary	+1,8 -2,4	+2,4 -1,6	+1,6 -1,3

Influence: positive/ negative: (+) small (-) (++) medium (- -) (+++) big (- - -) (0) none

NATIONAL AND REGIONAL ROAD INFRASTRUCTURE, ECONOMIC DEVELOPMENT AND SPATIAL DEVELOPMENT CHANGES AT A LOCAL LEVEL

Summary

In this thesis, an attempt was made, to assess the directions and scale of impact of national and voivodship roads, on the changes in economic and spatial development at a local level. Polish government transport policy focuses on international and intercity transport, less regional ones. Meanwhile, all the environmental and social problems associated with the development of transportation focus on the local level. The analysis was performed on the basis of 3 communes located in the vicinity of Poznan City and located within the most important transportation routes in Poland: motorway A2, national road no. 92 Berlin - Warsaw – Moscow, and a newly built

express way (S11) which links the north-south axis. The research showed that the development of road systems exerts a differentiated influence on social and economic development, and spatial development of communes depending on the rank of roads and their infrastructure. This influence may be positive or negative.

**KRAJOWA I REGIONALNA INFRASTRUKTURA DROGOWA
A ROZWÓJ GOSPODARCZY ORAZ ZMIANY ZAGOSPODAROWANIA
PRZESTRZENNEGO NA POZIOMIE LOKALNYM**

Streszczenie

W pracy przeprowadzono cenę kierunków i skali oddziaływania dróg krajowych i wojewódzkich, na zmiany rozwoju gospodarczego oraz zagospodarowania przestrzennego na poziomie lokalnym. Polityka transportowa polskiego rządu koncentruje się na zagadnieniach transportu międzynarodowego, międzymiastowego, w mniejszym stopniu regionalnego. Tymczasem całość problemów środowiskowych i społecznych, związanych z rozwojem transportu koncentruje się na poziomie lokalnym. Analizy przeprowadzono na przykładzie 3 gmin położonych w województwie wielkopolskim w okolicy miasta Poznania. Gminy te leżą na trasie najważniejszych szlaków komunikacyjnych w Polsce: autostrady A2, drogi krajowej nr 92 relacji Berlin - Warszawa – Moskwa oraz nowo budowanej drogi ekspresowej (S11) będącej łącznikiem w osi północ-południe. Przeprowadzone badania wykazały, że rozwój sieci drogowej wywiera zróżnicowany wpływ na rozwój społeczno-gospodarczy i zagospodarowanie przestrzenne gmin, w zależności od rangi dróg i towarzyszącej jej infrastruktury. Wpływ ten może mieć charakter zarówno pozytywny, jak i negatywny.

„Praca naukowa finansowana ze środków na naukę w latach 2010-2011 jako projekt badawczy nr N N305 356038”

“Scientific work financed from funds for science in the years 2010-2011 as research project No. N N305 356038”