

THE INTERACTIVE SYSTEM OF REGIONAL AND GLOBAL POPULATION MAPS OF UNDER REPRESENTED GROUPS

Joanna Bac-Bronowicz, Halina Klimczak, Ewa Krzywicka –Blum

***Abstract** The project of Interactive System of Population Maps of Poland, Europe and the World has been proposed to be realized in the frame of the ICA's Commission "Gender and Cartography" during the period 2003- 2007. The system include carefully chosen set of interactive social maps of Poland, Europe and chosen parts of the World. Providing it with the relevant instruction should create conditions for individual work of the user. In Polish and English versions, the Atlas is to become an example of transfer's modernization and adjusting it to the different practical needs. Including database allows to treat the elaboration as the system – the user defines the function of the map and generate visual model choosing methodological variant, intentionally linking the reference units and establishing the points on time scale. They can extract data referred to the place of interest or to the values' scale division. Such a choice of possibilities opens the wide field of research activity for the user, at the same time deciding on practical usefulness of the solution.*

System is enlarged and interactive version of basic DEMOGRAPHIC ATLAS „POLAND” elaborated in the period 1998-2002 in the frame of the programme of „Gender and Cartography” Commission of International Cartographic Association (ICA) as the project sponsored by Surveyor General of Poland, included 18 tables with maps and 19 graphs and 18 pages of text commentary.

Up to day it has been elaborated four chapter of the System including 15 different map and graphs presenting the whole globe, Europe, Near East and Poland. A few possibilities of usage and suggestions for future maps of the interactive atlas (THE INTERACTIVE SYSTEM OF POPULATION MAPS OF POLAND, EUROPE AND THE WORLD) have been presented.

The interactive atlas is accessed in the webside International Cartographic Association [ICA "Gender and Cartography" Commission](#).

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1. INTRODUCTION

According to Phillip Muehrcke opinion [Muehrcke P. 1981] the geographic map is a magical tool. It assist in data collection, provides a convenient storage medium for geographical information, and through its immense abstractive and transformationals power, it provides creative views of the environment which would otherwise be unattainable'. Unfortunately, it is no concerned of social component of broadly treated 'human life environment'. The lack a complete and systematic cartographic documentation of the socio-economic spatial parameters creates a great scientific and development gap [Karanikolas N and 2 oth.,2001]. It can be observed that in many atlases number of maps included into the part 'population' is lower than in whatever one related to natural conditions. Moreover, the list of problems presented on demographic maps remains almost the same in the last few decades. There are usually maps of dens, ity, models of age or gender structural divisions and several basic socio-economic maps illustrating situation connected with education, medical care and labor market.

Considering the causes of such a stark contrast between development of maps uncovering natural processes and maps showing social problems cartographers mention the failure of globally accurate data, in conventional statistical senses appropriate for creations cartographic models. Of course, because of differentiation of cultural as well as political conditions, it is necessary to verify the univocal character of such a term as nationality, race, denomination, used language, level of education, used in censuses in different parts of the globe. It is also essential to define a range of specially compounded notions as diverse as: level of preserving of human rights, literacy rate, equalization of chance, ability to work or accessibility to standing positions, considered as a problems relating to different groups within given society.

But finally mentioned above difficulties are only the barriers that may be overcome to introduce cartography to the group of disciplines usable in steering different processes towards the sustainable development of the global environment.

2. PROBLEMS OF UNDER-REPRESENTED GROUPS OF PEOPLE IN ICA, IGU AND FIG ORGANISATIONS

Over fifteen years ago three 'sister commissions; 'Gender and Cartography' –within the International Cartographic Association, 'Gender and Geography' (and the second one 'Population and Environment') -in the frame of the International Geographic Union and working group 'Under-represented Groups and Geodesy' in International Federation of Surveyors were constituted. All these bodies, as one of the fundamental question to be solved, pointed the problem of possible equalization of activity in professional as well as in public life within different groups of people. As the most significant under-represented groups has been treated the group of women, but for many aspects also other groups like; minorities, young researchers, people living in the Third World have been taken into consideration during realization of commissions' programs.

Among terms of reference for the period 1999-2003 Gender and Cartography commission of ICA declared preparing Polish insertion to the socio-demographic atlas. Owing to the financial support of the Polish Head Office of Geodesy and Cartography the thematic atlas has been elaborated and edited. Apart of 53 maps and 20 graphs in textual part (18 pages) authors have present important commentary, references to sources and explanations of characteristics. The role of the special translator has been undertaken by prof. Michael Wood, the past president of ICA. The atlas consist of two parts: the first devoted to chosen under-represented groups of people and the second part – to the groups with special cartographic needs. Poland has been chosen as the region representative for the many Central and East European countries which have passed through the first decade of change caused by the new political and economic system. In the year 2003, during XII General Meeting in Durban the Executive Committee of ICA decided to hand the atlas, as an example of possible solution, to 68 delegates of national committees the countries belonging to the association. Actually similar atlas is prepared for part of Indonesia.

3. INTERACTIVE SYSTEM OF MAPS OF UNDER-REPRESENTED GROUPS OF PEOPLE

Since 2003 year members of the Gender and Cartography commission of ICA have a chance to continue the action of spreading the new methodological and technological solutions in socio-demographic cartography. For the time being owing to financial help of EC of ICA and the General Surveyor of Poland the general project as well as three of six planned chapters of the system of interactive population maps devoted to under-represented groups have been elaborated. The system will consist of 25 basic maps and 3 graphs (see Tab.1)

Table 1. Distribution of maps and graphs in the system

No	Title of part	Number of maps (graphs) of		
		Poland	region	world
1	Conditions of labor market	1 + (1)	1 Europe	1
2	Women versus labor market	2 + (1)	-	-
3	Education and professional activity of women	3 + (1)	1 Midl. East	1
4	Language and denomination minorities	3	1 Europe	1
5	Population groups according to educational conditions of maps' perception	3	2 Mid. East, Africa	1
6	Adults with physiological problems in map perception	2	2 Europe, USA	-

3.1. Data Base

Basic part includes tables with data related in dating to map creation and to current data (according to available data) in 1, 2 or 3 time sections.

3.2. Visual Part

Visual part is made of the set of 25 maps and 3 graphs all in digital form, with additional set of intentionally organized versions of basic materials. Among 25 maps 15 refer to the maps of the demographic atlas 'Poland' ["Poland", 2003] in the preserved or changed form, 10 maps make up new elaborations.

Territorial range of separate maps is adjusted to the scale of phenomenon changeability. Dynamic of increase in professional activity or availability of changes deserve attention in Middle East and in Africa whereas racial conditions of blindness in United States. Chosen in such a way maps become an example of methodological patterns for similar elaborations.

3.3. The Mathematical Basis Of A Maps' Background

Maps are elaborated using accepted equivalent projections or projections with minor distortion of area. In particular; for Europe – Longitude, Latitude, for the world – Robinson's projection or – anamorphically transformed.

3.4. Instruction

The set of operations enabling interactive way of using the system includes:

- map's actualization,
- change of observation's scale through linking reference area'
- choice of map's methodological option adjusted to map's function'
- separating information in chosen value range'
- simultaneous comparative observation of chosen surface units'
- simultaneous observation of the whole territory or its part in two time section,
- obtaining numerical derivative information (statistics, extreme values etc).

3.5. Text Commentary

The commentary includes synthetic description of chosen part's issues, explanation of observation's meaning, terms' definition, symbols explanation and presentation of patterns with reference to the literature of the subject. Crucial part of the commentary is indicating characteristics of individual solutions adjusting them to the practical needs, taking into account Polish administration system and public institutions and for the world's maps also over-regional or world's social organizations.

3.6 Sources And Bibliography Of The Subject

Apart from sources used directly while creating the system, also the list of available sources in the form of demographic yearbook, reference to Internet databases and other materials is included. There are also; the list of scientific papers and articles broadening the knowledge in the individual monographic issues as well as the place of their availability (where possible) and electronic address.

4. EXAMPLES.

The chapter 3 of the system is devoted to education and professional activity. Textual introduction to the chapter is as follows. Social politics which aims at eliminating illiteracy, increasing the level of education and equaling the educational chances of all the populations that constitute that politics, brings dynamic changes in many regions of the World in recent decades. Social education is one of the basic indicators of country's development. The differences result mainly from current cultural and political system's conditions. It's enough to mention the 69% reduction of illiteracy of women in the period 1970 – 1990 in United Emirates of Arabia [14], where the level of illiteracy is still high and current differences between the number of women and men among the population of higher education makes 1,4% of the population[15]. In the well-developed countries, where illiteracy is hardly noticed, the developmental changes concern increasing the percentage of population of higher education. To estimate the level of feminization of studying subpopulations, the percentage indicator of share i_{S_F} is used. It is defined as:

$$i_{S_F} = \frac{Ns_F}{Ns_F + Ns_M} \cdot 100,$$

where: Ns_F – indicates the number of female students,
 Ns_M – indicates the number of male students.

For men that is i_{S_M} indicator. To estimate the imbalance of the structure in the whole population(for example: of people of higher education in the countries of Middle East) the indicator of structure's imbalance $gi_{F,M}$ can be applied. It is defined as:

$$gi_{F,M} = \begin{cases} \frac{N_F}{N_M} & \text{for } N_F > N_M \\ \frac{N_M}{N_F} & \text{for } N_F < N_M \\ 1 & \text{for } N_F = N_M \end{cases}$$

In Poland the majority of studying people are women. In 1998/99 the value of is_F was between 53,1 %– 62 % depending on province. After five years the range of changeability in Poland decreased to 54,5 – 61,1 percent.

Despite such high percentage of women among the group of studying people, the family situation and conditions of custody of children

considerably constrain the women's possibilities when it comes to professional career. Among the group of high income in national economy in 2002, 68,6 % were men. At the same time among 10% of the employees with the lowest income women constituted 51,5% [16].

When it comes to the differences between the levels of mean incomes, that is the index of uneven access of men and women to the well-paid positions, Poland is placed among the countries of medium imbalance. Data from the period 1980 – 1990 [17] place Poland between two groups: Australia, Sweden, and England, Germany, France.

Socio – political activity of women, understood in global scale, is a function of cultural conditions. The level of feminization in parliaments is estimated to be the percentage index ip_F :

$$ip_F = \frac{Np_F}{Np_F + Np_M} \cdot 100$$

where: Np_F – indicates the number of women in parliament,

Np_M – indicates the number of men in parliament.

Nowadays, only in four countries the number of women in parliaments is bigger than 35% [18]. In Poland, similarly to many other European countries, the social activity of women is limited by family duties and conditions of custody of children and the elderly. A small progress can be observed when it comes to the level of women's share in self-governing

territorial councils: in the period 1998 – 2003 the percentage changed from 11 – 19% to 13 – 24% [19, 20].

Data base for this elaboration is at the end of the report.

In the next part, a few possibilities of usage and suggestions for future maps of the interactive atlas (**THE INTERACTIVE SYSTEM OF POPULATION MAPS OF POLAND, EUROPE AND THE WORLD**) have been presented in the website **International Cartographic Association** [ICA "Gender and Cartography" Commission](#).

Sources:

[14] Kuby M., Warner J., Gober P.: Human Geography in Action, ed. J. Wiley, New York

[15] ESCWA, CAWTAR Arab Women Statistical Database

[16] Główny Urząd Statystyczny, 2003, Struktura wynagrodzeń według zawodów w październiku 2002, Warszawa

[17] Pisz Z. (red.), 1999, Aneks w. „Zadania społeczne”, Wyd. Ekonomiczne, Wrocław

[18] <http://unstats.on.org> (Demographic Yearbook)

[19] Główny Urząd Statystyczny, 1999, Rocznik Statystyczny Województw, GUS Warszawa

[20] Główny Urząd Statystyczny, 2004, Rocznik Statystyczny Województw, GUS Warszawa

[21] Główny Urząd Statystyczny, 2003, Rocznik Statystyczny Województw, GUS Warszawa

[22] Główny Urząd Statystyczny, 2000, Struktura wynagrodzeń według zawodów w październiku 1999, GUS Warszawa

From the part of maps the first example (map 3.4 of the system) shows three following states (1998,2002 and 2003) of the same feature with suitable commentary and possible extended functions of basic map. As additional solution the derivative synthetic maps may be proposed. The second example (map 3.5 of the system) shows two different versions of the map.

3.4. BASIC MAP

POLAND: WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS IN 1998

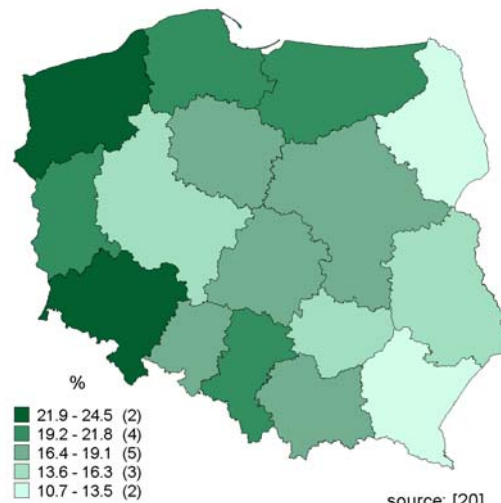
(. [1] map I.12)

SOURCE: [19]

3.4. POLAND: WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS IN 2003
([1] map I.12)

SOURCE [20]

3.4. POLAND: WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS
IN 2003



Commentary :

In the compound stripe of provinces along the west border of the country the effect of the highest and high level of women's share in councils can be observed. The lowest level can be noticed in two east provinces: podlaskie in the north and podkarpackie in the south. Compound central complex of five provinces: kujawsko-pomorskie, mazowieckie, łódzkie, opolskie and małopolskie represent dominant mean level of women's share from 16,4 to 19,1 percent.

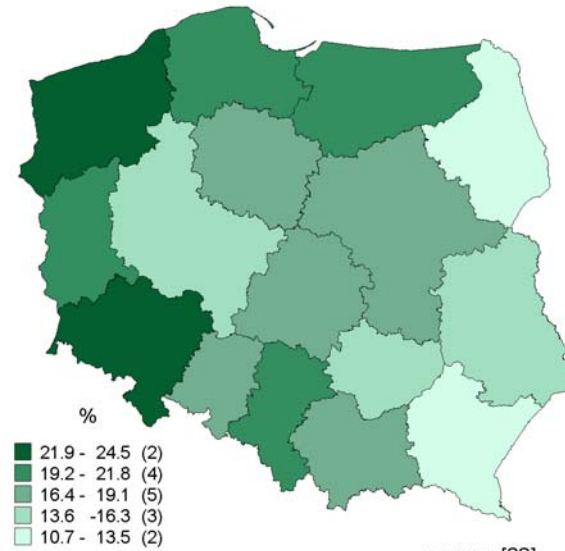
Extended functions of basic map

- change of dating -2003
- indicating the number of created subareas.

3.4. POLAND: WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS IN 2002
([1] map I.12)

SOURCE [22]

3.4. POLAND: WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS
IN 2002



source: [22]

Commentary :

Meridian layout with the tendency towards decrease in the number of women in self-governing territorial councils is observed. Between west and central zones, wielkopolskie province is characterized by the relatively lower number of women in councils.

Extended functions of basic map

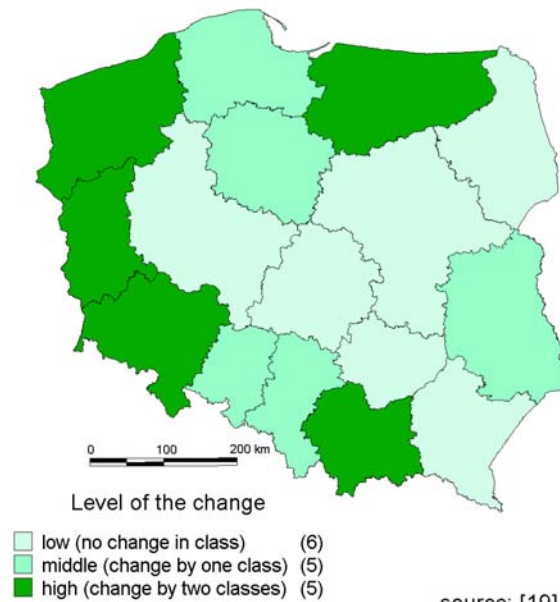
- change of dating -2002
- observation of the share's range
- indicating provinces of extreme values of share
- indicating the neighborhood of provinces with the greatest differences between women's share in councils,
- indicating dominant level of share in Poland.

3.4.* DERIVATIVE MAP

POLAND: INCREASE IN THE NUMBER OF WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS IN 1998 – 2003

SOURCE [19, 20]

3. 4. * POLAND: INCREASE IN THE NUMBER OF WOMEN IN SELF-GOVERNING TERRITORIAL COUNCILS IN 1998 - 2003



Commentary:

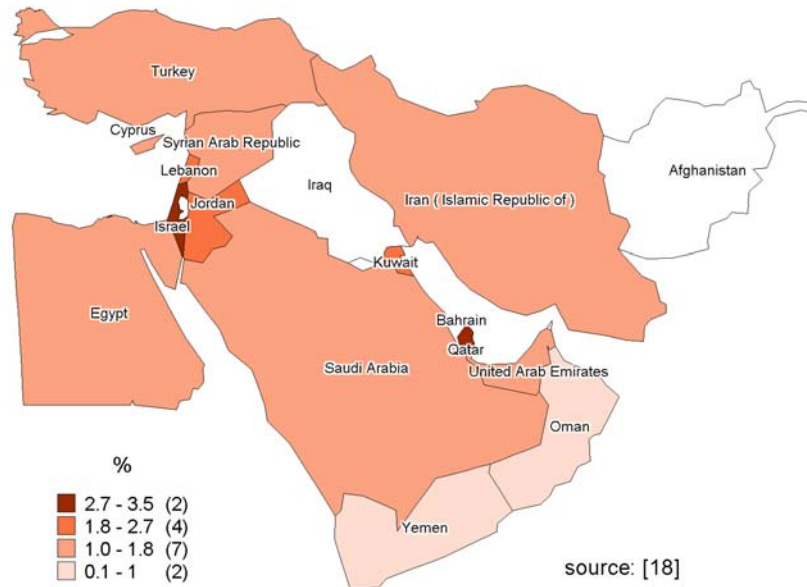
As low level, the changes in the frame of the same class have been accepted, as mean- on the level of one-class change, as high- on the level of two-class change.

Slow dynamics in central provinces can be observed. The fastest dynamics is in three west provinces, in one north and one south provinces.

3.5.A. MIDDLE EAST: SHARE OF WOMEN OF HIGHER EDUCATION IN THE POPULATION (YEAR 2004)

SOURCE [18]

3. 5. A. MIDDLE EAST: SHARE OF WOMEN OF HIGHER EDUCATION IN THE POPULATION (YEAR 2004)



Commentary :

Percentage share of women of higher education differs in Middle East depending on the country from 0,1 % in Yemen to 3,5 % in Israel.

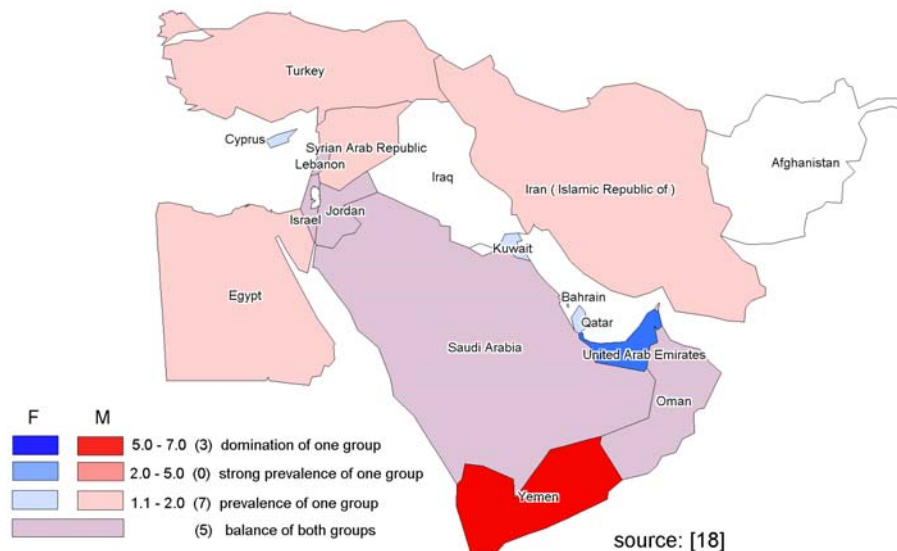
Operational functions:

- Indicating dominant level of share of observed subpopulation in the whole area,
- Indicating the sequence of neighboring four countries characterized by lowering level of share of educated women,
- Indicating the neighborhood of the areas of the highest differentiation of women of higher education share and trial to interpret the conditions of such a situation.

3.5.B. MIDDLE EAST: THE STRUCTURE OF THE GROUP OF PEOPLE OF HIGHER EDUCATION IN 2004 ACCORDING TO GENDER – INDEX $g_{F,M}$

SOURCE [18]

3. 5. B. MIDDLE EAST: THE STRUCTURE OF THE GROUP OF PEOPLE OF HIGHER EDUCATION IN 2004 ACCORDING TO GENDER - INDEX $g_{F, M}$



Commentary:

Most of the Arabic peninsula is characterized by balanced level of women's and men's share in the group of people of higher education. Such a situation occurs from Libyan, Israel and Jordan through Saudi Arabia to Oman and only in Yemen the dominant share of men can be observed. Dominance of women in the group of the best-educated people can be noticed in United Emirates of Arabia and in Qatar. Imbalanced structure with about 20-40% superiority of men ($g_{F,M}$ in the brackets 1.1 – 2) characterizes Egypt, Turkey, Syria and Iran – and with similar superiority of women – Cyprus, Kuwait and Bahrain.

Operational functions:

- indicating zones of dominance of each subpopulation,
- interpretation of location of the zone of women's dominance
- observation of Yemen and Oman in the map 3.5 and trial to interpret the number of both subgroups in the general number of people in those countries.

5. CONCLUSION

The new technical possibilities of creating different types of digital, interactive thematic maps should be broadly applied in social studies and should serve to decision making bodies, services and organizations for bettering human life not only in regional but even in global scale. Cartographers should undertake the effort to propagate usability of maps presenting not only natural but also social processes.

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 Karanikolas N., Lafazani P., Myridis M.: Designing and Electronic Socio-Economic New Atlas of Greece. Procc. of XX ICC ICA V.2, pp. 898-909, Beijing 2001.
 Muehrcke P.: Maps in Geography. Cartographica. v.18 no.2. Monograph 27, pp. 1-41. 1980. Canada

BIOGRAPHICAL SKETCH OF PROF. EWA KRZYWICKA-BLUM



Prof. Ewa Krzywicka –Blum is a retired professor at the Agricultural University of Wrocław and past head of the Department of Geodesy and Photogrammetry. Since 1995 she is chair person of the commission on Gender and Cartography within ICA. She is a member of the committee of geodesy of Polish Academy of Science where she is vic chair of cartography commission. She is an author over 150 published works.

BIOGRAPHICAL SKETCH OF DR. JOANNA BAC-BRONOWICZ



Dr. Joanna Bac-Bronowicz is an academic worker in GIS Laboratory at Agricultural University. Several years ago (1993–2002) she taught computer cartography in the University of Wrocław. Nowadays she deals with elaborating modeling and visualization of spatio-temporal data and for 10 years she has been constructing maps as a basis for GIS and thematic base for environment. She also works with Lower Silesia Spatial System led by Department of Geodesy and Cartography Office of the Marshal of Lower Silesian Voivodship. For six years Mrs. Bac-Bronowicz was a chairwomen of Cartographic Section of the Association of Polish Surveyors and a member of State Committee of Geodesy and Cartography of Surveyor General of Poland. She belonged to the group of people who founded Association of Polish Cartographers and from 1999 she has been a president of that association. She actively working in the Children and Cartography commission of ICA (1997 – 2001).

BIOGRAPHICAL SKETCH OF PROF. HALINA KLIMCZAK



Prof. Halina Klimczak is a graduate of Geodesy Course at Agricultural University of Wrocław. In 1981 she got PhD in Technical Science. She is academic worker in the Department of Geodesy and Photogrammetry at Agricultural University of Wrocław, Poland. In her research work she deals with usage of cartographic modelling in exploring natural environment; constructing GIS for land management. She was head and realized five projects sponsored by State Committee for Scientific Research. She is an author of 50 published works and many thematic maps. Prof. Halina Klimczak in her academic work conducts courses in fields of geodesy, mathematical and thematic cartography and cartographic modelling. In 2003 she published a work entitled “Cartographic modelling in studies on spatial phenomenon layout”. She works in ICA Commission on Gender in Cartography in which she is a representative of Poland.