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**STATISTICAL COMMISSION and ECONOMIC COMMISSION FOR EUROPE  
CONFERENCE OF EUROPEAN STATISTICIANS**Forty-ninth plenary session  
(Geneva, 11-13 June 2001)**Sample survey characteristics in Bosnia and Herzegovina**Supporting paper submitted by the Agency for Statistics of Bosnia and Herzegovina<sup>1</sup>**I. Introduction**

1. The war in Bosnia and Herzegovina has had terrible consequences on the statistical system in the country. It caused large migrations of population and changed the administrative and political organization of the country. The new state organisation in B&H according to the Dayton agreement established institutes of statistics in the two entities in the country (the Institute of Statistics in the Federation of Bosnia&Herzegovina and the Institute of Statistics in Republika Srpska) and the Agency for Statistics at the state level. The entities' institutes of statistics are responsible for the development of the statistical system in their own entity and the Agency for statistics of Bosnia and Herzegovina coordinates activities and aggregates the data at the state level. The Federation of Bosnia and Herzegovina consists of ten cantons and the Republika Srpska consists of seven regions.

2. There were also changes in the economic system of Bosnia and Herzegovina. Its economy is in the process of transition, which has to be finalized before the participation of B&H in European and world economic activities. One part of this undertaking is related to the statistical system that has to be comparable to European statistical standards. It is also the reason that the three statistical institutions in B&H are also in a transition process. Doing that task, the statistical institutions have many kinds of problems. The previous war in B&H had of course a

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most negative effect on their activities. It interrupted the continuity of almost all statistical research and weakened the statistical infrastructure in B&H.

3. The purpose of this paper is to indicate the characteristics of the post-war situation in B&H that placed its statistical institutions in a much more difficult situation than in the neighbouring states. We would also like to show what is being done in the area of statistical systems after the war, to indicate the problems and to propose some possible solutions.

## **II. Sample surveys in Bosnia and Herzegovina**

4. One of the most affected areas of the statistical activities is the sample household survey. To illustrate this problem, it is enough to say that sample household surveys were not conducted after the war neither at the state level, nor at the entity level. This resulted in a lack of data at the household level and prevented formulation of policies and also precluded indicating its influence on households and the possibility of assessing their behaviour. To get such data the statistical institutions in B&H are preparing to conduct household surveys. Whereas the surveys are very large and expensive activities, our statistical institutions cannot conduct them without the help of international organizations. The World Bank is included in those activities and plays the most important role in the organization of those surveys. But also UNDP, EUROSTAT and the governments and statistical organizations of several European countries (Switzerland, Sweden, Denmark, Italy and United Kingdom) are actively involved in those activities. Their primary role is to give financial and technical support to the statistical institutions in our country, to train our staff and to find donors. The World Bank is interested in the Living Standard Measurement Survey and the statistical institutions are interested in the Household Budget Survey and the Labour Force Survey. All these surveys are very important for any statistical system because they provide data for different policy makers.

## **III. The main problems of sample surveys in B&H**

5. The main and also general problem is the insufficient financing. The Government of B&H does not have the finances for these costly surveys, so we need the support from other countries and their organizations. Due to this help our staff were able to participate in numerous international courses and to use this knowledge for the methodological developments in their own fields of work. So we made some important progress towards international comparability and the use of international statistical standards. All the activities related to the sample surveys in B&H, which did not require extensive funding and only involved the use of our own staff, were completed (questionnaire design, methodological instructions according to international standards, etc.).

6. Whereas each survey is based on a sample, the condition sine qua non is to have an adequate sample frame. This is the most important technical problem in B&H. Usually the previous population census data represents a sample frame for surveys. But the previous population census in B&H was in 1991. (Since then there was the war that significantly changed the demographic, political and any other situation in B&H.) From the statistical point of view, it made the 1991 Census data almost useless for surveys. More than 50% of the population in B&H were displaced into other countries or within B&H. B&H also admitted numerous refugees from

neighbouring countries. The result is that we cannot use the previous census data as a reliable sample frame. Moreover, the Dayton agreement established the entity's boundary that differs from the pre-war territory boundary. This boundary separates the territorial units, so we have more than one third shared municipalities in B&H, about 360 shared and 700 empty settlements.

7. Concerned about the previously mentioned surveys the statistical institutions decided to make the Master Sample as a common basis for sample household choice for each survey. The shared settlements and District Brcko will be excluded from the sample frame. There are three alternatives for constructing the sample frame:

- a) the sample frame consists of all enumeration areas (EA's) in the whole country
- b) the sample frame consists of all EA's within sample of municipalities
- c) the sample frame consists of a number of EA's without respect to municipality

Each alternative has two possibilities:

- i) Total update of enumeration areas
- ii) Partial update of enumeration areas

8. Hence, there are six different alternatives: A1, A2, B1, B2, C1 and C2 and each of them provides different data quality and have different costs and time spans. After the international experts considered all advantages and disadvantages of each alternative, they decided to realize alternative B1, i.e. the total update of maps and the count of households in all enumeration areas within a number of selected municipalities.

9. The statistical institutions have to achieve their task in the following three stages:
- a) Stratification and selection of municipalities using probability proportional to size (PPS) approach
  - b) Update of all EA's in selected municipality with respect to new maps and lists of households.
  - c) Selection of a number of EA's using PPS. The size will be the updated number of households in the EA's. These EA's will be included in the Master Sample.

10. We have completed the first stage and half of the second stage. In the first stage we created the list of all 146 municipalities in both entities (84 in the Federation of Bosnia and Herzegovina and 62 in the Republika Srpska) with an estimated population size of 2000 and the estimated number of EA's.

11. We used this list to stratify the municipalities into three strata:
- 1-urban municipalities;                      2-mixed municipalities;                      3-rural municipalities

12. The basis for our stratification was the data on the number of urban households by municipalities from the 1991 Census and the accepted assumption that the proportion of urban household was not significantly changed after the war.

13. In the second stage two different options of sample municipality were proposed:
- Option A: Selection of municipalities using PPS within each stratum:  
Stratum 1: 100%; Stratum 2: 50%; Stratum 3: 20%

Option B: Selection from selected municipalities in option A:  
Stratum 1: 50% using PPS; Stratum 2: 40% using simple random sampling (SRS); Stratum  
3: 50% using SRS

14. The criteria were based on expert knowledge and the assumption that there is likely to be larger variability in the urban areas.

15. In option A 54 of 146 municipalities in B&H were chosen. That means that 11440 ES's and 679929 households (64% of estimated total number of households in B&H) will be updated, or approximately 2,3 millions inhabitants. This option covers 8 of 10 cantons in the Federation of Bosnia and Herzegovina and all 7 region in the Republika Srpska.

16. In option B only 25 municipalities were chosen in B&H, so that 9067 ES's and 379886 households (35% of estimated total number of households in B&H), or approximately 1,3 millions inhabitants will be updated. This option covers only 5 of 10 cantons in FBiH and 5 of 7 region in RS.

17. Although the statistical institutions in B&H supported option A, because of the inadequate funding from the donor countries and international organizations involved, it was possible only to implement option B. We only completed half of its stages. Actually, we selected 25 municipalities in B&H and for them new maps of ES's were made. The next step is the enumeration of all households in the selected municipalities. Households will be asked to give some main information about themselves. This task has not been completed because the international donors did not provide the finance for it.

18. The third stage should be the selection of a number of ES's as a basis for sample households for each survey. We would like to say that the number of ES's and also the number of selected households are to be considered and examined again. The international experts defined the sample size for the surveys (6,000 for LSMS and HBS, and 10,700 for LFS), without the precise scientific calculation and enough respect to the post-war situation in B&H. Such a sample size will have consequences on the estimate precision at all levels and preclude any possibility of producing estimates for small areas. This important problem is not solved and remains open for discussion.

#### **IV. The Master Sample choice and its repercussion on prospects of small area statistics in Bosnia and Herzegovina**

19. We consider that option B is not representative at the state level, at the entity's level and especially not representative at the small area level. This option does not make it possible to produce any statistical parameter of good quality for small areas in B&H. The administrative and political organization and high level of local self-administration in our country were used in the past to fill an important need of statistical estimations at the cantons and regions level. The governments of both entities conduct the policies of their regional development so they are interested in having good estimation of basic statistical parameters. Actually Bosnia and Herzegovina needs surveys with a representative sample frame at the state level, but also at both entity and cantons/regions level. The main reason for that need is the fact that the most important

policies (education, health and social policies) are made at the entities or cantons and regions level. The entities and cantons and regions have their respective governments that expect data at their level. Without these data it is not possible to make good policies of local and consequently of global development in the country.

20. Moreover, we also stress that in the actual (post war) situation it is too ambitious and unreal to speak about developing small area statistics in Bosnia and Herzegovina. As we can see, the recent intention of the statistical institution in B&H is to conduct three surveys in the next two years that can provide representative results not only at the state level, but also at the entity, cantons and regions level. Whereas we do not have the possibility to do it, we are far behind in comparison with other neighbouring transition countries. After the surveys are finished, our next target would be to continue with them on the basis of a better designed sample, based on the new Census data in B&H, which would create conditions to estimate the most important parameters even at the small areas level, for example at the city's level (cantons capitals in the first stage and other towns in the next). This target can barely be realized in the next few years because there are many constraints for it. It will be the result of the whole transition process in B&H (privatisation, law basis, new population census, registers, etc.). At that time we will be able to analyse our survey experiences and to discuss them from the empirical and theoretical point of view.

## **V. Use of Administrative Records in B&H**

21. In B&H we do not have the most important register - population register, and this fact complicates statistical activities. There were some efforts to create the population register in the former Yugoslavia ten years ago, but the war interrupted these activities. The establishment of the population register will remain one of our most important targets.

22. The statistical institutions in B&H have relatively good business register where we collect about 40 different characteristics about firms. The data are collected in cantons and regions and have to be aggregated at the entity's and state level. We created the unique firms codes and provided the conditions that will be used even in other institutions (banks, tax administration, social security, etc.). That created the possibility to use not only their data bases, but also the data bases from the ministry of law, the ministry of trade and the ministry of social affairs. There are some problems like duplicates, missing units, incorrect addresses, misclassifications, etc. We detected and solved those problems (sometimes too late) so that can lead to bad coverage and increase in the sampling variance of the survey estimates.

23. We also intend to create the craft register in the future. At the present time, municipalities collect data about small business and we are not satisfied with them. Our register division prepared the new methodology for this register that will be in use after our parliament creates the new art-law.

24. Our territorial register is updated to new administrative and political state organisation. It consists of the maps of the settlements, local communities and enumeration areas by entities. The enumeration area maps consist of addresses and house number (not in all municipalities) and are a very good basis for the selection of samples in future surveys.

## **VI. Conclusions and recommendations**

25. As we pointed out earlier, B&H is in a very specific transition situation. One thing is true, B&H cannot realize this process without help from the international community. We had some results in the transformation of the statistical system and adjusted it to international standards. In both entities' institutes of statistics the most important classifications are adjusted and are the basis for our recent and future activities. One of the most important activities is the household survey. As we said, the statistical institutions intend to conduct three surveys in the future: the Living Standard Measurement Survey, the Household Budget Survey and the Labour Force Survey. Many countries and international organizations are included in the survey organisation. With their help we created survey questionnaires and methodologies and started the most important task – the Master Sample design. The Master Sample will be the basis for sample selection for each survey. In that stage we have many problems. The main problem is managing survey costs. Although international donors provided the money for the surveys, there is one paradox: no finance for the updating of all households in the selected municipalities. The paradox is that there is money for the subsequent stages but not for the preliminary stage, which is the most important and would damage subsequent work if conducted badly. This impression becomes stronger when we consider the inadequate option B in the Master Sample design. This option is generated because of inadequate funding and it cannot provide the precise sample estimate even on the state and entities levels. Hence, it is not possible to use that sample for small area estimates (cantons, regions, and towns). That fact shows that B&H is in a much more complicated situation than other countries. If we want to have the precise sample estimates, we have to have adequate sample sizes. We think that the survey sample sizes for the LSMS and the HBS are too small to be able to realize our target. This because they are not defined on the basis of scientific calculations, than principally according to financial constraints and the previous experiences of several international experts, but without adequate respect to the recent situation in B&H.

26. We can find the solution to the problem in the effort, especially from the interested countries and the international organizations, to change the survey financial plan and to put more priority for the most important stage, better sample frame creation, which can be used to provide adequate samples for surveys.

27. Our plan should not be seen as being too ambitious. The recent needs of the statistical institutions and the potential data users, are to create adequate samples at least for the state, entities, cantons and at the regional levels. In the future, we hope to have better conditions in which to conduct surveys that can provide sample estimates for small areas, and to have better administrative registers and also to use auxiliary variables collected from small areas. The next population census will provide these better conditions, but at the moment we do not know when it will be conducted. The statistical institutions need surveys and are ready to conduct them using their infrastructure. We think we have enough staff that can successfully finish this work with the support of international experts.

## REFERENCES

- J.Bodin, C.Cassel (2000): Advice on master sample for B&H, part II, Report, Statistics Sweden  
C.E.Sarndal, B.Swensson,J.Wretman (1997): Model Assisted Survey Sampling, Springer  
Households by settlements in B&H (1999), Statistical Bulletin No. 272, Federal institute of  
statistics, Sarajevo

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