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The Human Settlements and Services Area

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PREFACE

This status report is the fourth of a series initiated in January 1979 with a review of the first 5 years of the Human Settlements and Services Area at IIASA, prepared for the first meeting of the Area's Advisory Committee (the members of which are listed in the Appendix). The 1981 issue again briefly describes the research carried out during the year. Lists of all publications are given by Task and a separate section includes the abstracts of the Research Reports. The status report ends with short biographies of those scientists who were with the Area for more than one month.

CONTENTS

RESEARCH

During 1981, the eighth year of its existence, the Human Settlements and Services (HSS) Area at IIASA continued to study patterns of population growth and spatial distribution, their economic antecedents and consequences, and the associated demands for resources and services. Research focused on interrelations between economic development, population change, and settlement structure at several different spatial scales: intraurban, regional, national, and global.

Human settlement patterns are undergoing important transformations throughout the world. In the less developed countries the large urban agglomerations continue to grow at alarming rates; in many developed countries population and economic activities have shifted away from traditional core areas toward smaller agglomerations and peripheral areas. These changes affect both public health and welfare and the quality of the environment, but experts disagree about what policies and programs should be adopted to deal with the resulting social, economic, and political consequences. It is therefore important to improve current approaches for analyzing and understanding these problems, in order to help in the design of equitable and efficient policies and programs for redirection and redistribution.

HSS research on population growth, urban development, employment, resource consumption, and service demand continues to be organized within three interrelated research themes: urban systems management, human resources and services planning, and human settlement systems analysis. The three themes are differentiated according to the time horizon usually adopted by decision makers involved with such issues: short-term, middle-term, and long-term. Last year, research results were presented at a conference on Urbanization and Development held at IIASA, a conference on Multidimensional Mathematical Demography at the University of

Maryland, a short course on Migration and Settlement in Mexico, and over 50 individual contributions to external conferences and seminars. The work also was reported in 8 IIASA Research Reports, 1 Status Report, and 41 Papers,* which appeared during 1981.

Twenty-five scholars from 15 countries were in residence for periods of one month or longer, and a much larger number visited the Area for shorter periods of time. All contributed to research activities carried out in the Area's Core Task and its five subtantive tasks.

The Core Task
(Andrei Rogers, USA, Chairman)

As in 1980, the principal activity of the Core Task in 1981 was the coordination of the dissemination phase of the former Migration and Settlement Task. Three more national case studies were published as Research Reports—Austria, Poland, and Bulgaria—bringing the total number of national reports to 12. In addition, seven methodological research reports were published as a single collection entitled *Advances in Multiregional Demography*, subsequently reprinted as a special issue of *IIASA Reports*, 4(1) July-September 1981. Finally, a draft of the book *Migration and Settlement: A Comparative Study*, to be published in IIASA's State-of-the-Art Series, was in its final stages of production.

In April, the Core Task co-directed a conference on multidimensional mathematical demography, which was held at the University of Maryland, USA, and supported by the US National Science Foundation. Six scholars from the HSS Area participated in the conference and presented work carried out at IIASA; the proceedings will be published by Academic Press in 1982. Also in April, the Core Task, together with El Colegio de Mexico and Mexico's National Council on Population (CONAPO), organized a short course in Mexico City to disseminate the methodology and empirical results of the Migration and Settlement Task. Over 30 demographers from Latin America participated in the course; the lectures will be published in Spanish as two special issues of the journal *Demografia e Economica*.

References to applications of IIASA's multiregional work are appearing frequently. The demographic computer programs, for example, are being used by scholars at the Institute of Social Management in Sofia, Bulgaria, Statistics Canada, the Mexican

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*The Research Report (RR) is IIASA's formal vehicle for reporting Institute research, intended for broad distribution to the scientific community. RRs receive careful review and appear as typeset booklets. A less formal IIASA publication is the Working Paper (WP), which provides a means for distributing intermediate results to colleagues within and outside the Institute. Also in the papers series, Collaborative Papers (CP) are used to report results of research done jointly with other organizations and the proceedings of conferences and workshops.

Ministry of Human Settlements, the Netherlands Interuniversity Demographic Institute, the Urban Institute in Washington, D.C., and a large number of universities in IIASA's member nations.

Publications in the
Migration and Settlement Series in 1981

Advances in Multiregional Demography
A. Rogers, editor RR-81-06

The one-year/five-year migration problem
P. Kitsul and D. Philipov

Constructing multiregional life tables using place-of-birth-specific migration data
J. Ledent

Multistate population projections
D. Philipov and A. Rogers

Entropy, multiproportional, and quadratic techniques for inferring patterns of migration from aggregate data
F. Willekens, A. Pór, and R. Raquillet

Age patterns of migration: cause-specific profiles
A. Rogers and L. Castro

Multiregional zero-growth populations with changing rates
Y. Kim

Aggregation of population projection models
R. Gibberd

Migration and Settlement: 10. Austria
M. Sauberer RR-81-16

Migration and Settlement: 11. Poland
K. Dziewoński and P. Korcelli RR-81-20

Migration and Settlement: 12. Bulgaria
D. Philipov RR-81-21

Berlin: A Demographic Tale of Two Cities
P. Just WP-81-26

Simplified Multiple Contingency Calculations
N. Keyfitz and A. Rogers WP-81-54

Dynamics of Multiregional Population Systems: A Mathematical Analysis of the Growth Path
F. Willekens and D. Philipov WP-81-75

Multiregional Population Projection: An Analytic Approach
K. Liaw WP-81-81

Data Bases and Accounting Frameworks for IIASA's Comparative Migration and Settlement Study
P. Rees and F. Willekens CP-81-39

The Public Facilities Location Task
(Giorgio Leonardi, Italy, Task Leader)

The spatial separation of public facilities, such as hospitals, schools, and libraries, from their customers gives rise to a common planning problem of location allocation. Where should one locate several urban facilities of differing scales to serve a spatially dispersed population? Since no market signals exist to identify efficient geographical arrangements, the problem is one that arises both in planned and in market economies.

The Public Facilities Location Task continued in 1981 to examine alternative approaches for locating public facilities and services in urban areas. Much of the work carried out this year focused on the design of computational algorithms and computer programs. A very general program for multisectoral, hierarchical service location problems was developed by Giorgio Leonardi and Cristoforo Bertuglia (Italy) and applied to the practical problem of locating high schools in the city of Turin, Italy. Also studied was the problem of hospital location, carried out in collaboration with Les Mayhew (UK) of HSS's Health Care Systems Task. Important methodological contributions to the state-of-the-art emerged from collaborative research with mathematicians in the System and Decision Sciences Area at IIASA. Two special issues of the Italian journal *Sistemi Urbani*, devoted entirely to the work of this Task, were in press by the end of the year.

Publications in the Public Facilities Location Series in 1981

A Unifying Framework for Public Facility Location Problems
(Reprinted from *Environment and Planning A* 13:1001-1028 and 1085-1108)
G. Leonardi RR-81-28

Optimal High School Location: First Results for Turin, Italy
G. Leonardi and C. Bertuglia WP-81-05

The Stochastic Quasi-Gradient Method Applied to a Facility Location Problem
Y. Ermoliev, G. Leonardi, and J. Vira WP-81-14

The Use of Random-Utility Theory in Building Location-Allocation Models
G. Leonardi WP-81-28

Facility Location with Spatially Interactive Travel Behavior
D. Erlenkotter and G. Leonardi WP-81-97

Equity, Efficiency, and Accessibility in Urban and Regional Health Care Systems
L. Mayhew and G. Leonardi WP-81-102*

*Published in the Health Care Systems Series.

Towards a Comprehensive Framework for Location-Allocation Models
J. Beaumont CP-81-22

The Health Care Systems Task
(Pavel Kitsul, USSR, Acting Leader)

The cost of health care continues to outstrip the rate of national economic growth almost everywhere. Thus the provision of adequate health care services at reasonable cost for all segments of a national population is a perplexing problem challenging health planners in both market and centrally planned economies. The development of tools for improving the efficiency and equity of health care service provision is the principal goal of the Health Care Systems Task. Its objective continues to be the construction of a family of simulation models that describe the main aspects of the health care system and its responses to policy interventions.

The principal activities in this Task during 1981 were the integration of the family of resource allocation models and the dissemination of the system of simulation models to outside institutions. Les Mayhew (UK) expanded and developed a common theoretical basis for a group of resource allocation models that characterize the health care system as operating along the following five dimensions: resource types, modes of care, patient categories, place of patient residence, and place of treatment. Case studies to apply these models were initiated in the USA, Australia, Poland, Czechoslovakia, and Canada.

Pavel Kitsul (USSR) in addition to further disseminating the Task's morbidity estimation model, established potential collaborative links with external institutions in Italy and with the World Health Organization's Regional Office for Europe. New research on the mortality characteristics of heterogeneous populations was initiated by Anatoli Yashin (USSR), who arrived in September of this year.

Publications in the
Health Care Systems Series in 1981

Adding Demand, Incentives, Disequilibrium, and Disaggregation to Health Care Models
M. Pauly WP-81-04

DRAMOS: A Multi-category Spatial Resource Allocation Model for Health Service Management and Planning
L. Mayhew WP-81-39

RAMOS: A Model Validation and Sensitivity Analysis
L. Mayhew and A. Taket WP-81-100

Equity, Efficiency, and Accessibility in Urban and Regional Health Care Systems
L. Mayhew and G. Leonardi WP-81-102

Automated Isochrones and the Location of Emergency Medical Services in Cities: A Note
L. Mayhew WP-81-103

Estimation and Evaluation of Some Inter-dependencies of Environmental Conditions, Welfare Standards, Health Services, and Health Status
M. Bojańczyk and J. Krawczyk CP-81-29

The Manpower Analysis Task
(Andrei Rogers, USA, Acting Leader)

Demographic surprises have clouded our understanding of today's patterns of labor-force dynamics in the more developed countries. Surprisingly steep fertility declines, surprisingly rapid shifts of wives into the workforce, surprisingly large inflows of legal and illegal immigrants have combined with lengthening life expectancies to dramatically alter the impacts of population change on labor supply. Members of the Manpower Analysis Task in 1981 have sought to clarify some of the dynamics at work and to develop an "early warning system" for detecting significant departures from past demographic trends, assessing their likely impacts for such governmental programs as social security.

Four subtasks defined the 1981 research activities in Manpower Analysis. Klaus Neusser (Austria) analyzed the interrelationships between female labor-force participation and fertility using Austrian data. Philip Martin (USA) focused on the current policy debate in the United States regarding legal and illegal immigration. Cornelis Bartels, in a series of papers, examined regional economic policies and spatial labor mobility in the Netherlands. And Nathan Keyfitz (USA) investigated how emerging demographic trends and political forces have combined to create today's tensions over the social compact between generations manifested in social security programs.

Publications in the Manpower Analysis Series in 1981

Diminishing Qualitative Discrepancies in Regional Labor Markets: A Discussion of Some Policy Options
C. Bartels WP-81-27

Fertility and Female Labor-Force Participation: Estimates and Projections for Austrian Women Aged 20-30
K. Neusser WP-81-40

Earnings Growth without Investment
J. Abraham WP-81-56

Estimating Impacts of Regional Policies: A Review of Applied Research Methods
C. Bartels, W. Nicol, and J. van Duijn WP-81-59

Implementing Regional Economic Policy: An Analysis of Economic and Political Influences in the Netherlands
C. Bartels and J. van Duijn WP-81-61

Regional Economic Policy in a Changed Labor Market
C. Bartels and J. van Duijn WP-81-64

The Dynamics of Spatial Labor Mobility in the Netherlands
C. Bartels and K. Liaw WP-81-87

Estimation and Interpretation of a Non-linear Migration Model
K. Liaw and C. Bartels WP-81-88

How Secure is Social Security?
N. Keyfitz WP-81-101

A Time Series Analysis of Regional Migration in Finland
I. Leveelahti WP-81-121

Immigration 1981: The US Debate
P. Martin WP-81-129

Policy-Relevant Characteristics of Spatial Labor Mobility in the Netherlands
G. Evers and C. Bartels WP-81-157

The Urban Change Task
(Piotr Korcelli, Poland, Task Leader)

Most large urban agglomerations in the developed countries are either experiencing population decline or are growing at rates lower than those of middle-sized and small settlements. This tendency is in direct contrast to the one for large cities in the less developed world, which are growing rapidly. Current patterns of urban contraction and decline are generating fiscal pressures and fueling interregional conflicts in the developed nations. These population shifts may also have important consequences for economic development at the national level. Understanding the dynamics that have led to the reversal of the historical patterns of urbanization has been a principal goal of the Urban Change Task.

Declining birth rates and changes in regional migration patterns have dramatically increased the influence of internal migration in determining which parts of a nation grow and which do not. Thus a central concern in this Task has been the analysis of geographical mobility. Kao-Lee Liaw (Canada), working with Cornelis Bartels (the Netherlands) of the Manpower Analysis Task, examined patterns of migration in the Netherlands and found a strong association between labor mobility and job opportunities and housing supply. Piotr Korcelli (Poland), examining a large data bank on patterns of migration and urban change, discovered a number of regularities linking rates of growth with urbanization levels, city size, and urban hierarchy in national settlement systems. Dimiter Philipov (Bulgaria), in collaboration

with Nathan Keyfitz (USA), explored the relative contributions of migration and natural increase to the growth of cities. Finally, Jacques Ledent (France) focused on demographic-economic models of city economies, carrying out a detailed demoeconomic analysis of the city of Tucson, Arizona.

In collaboration with the University of Dortmund, and supported by ICSAR* funds, research has recently started on interrelations between industrial restructuring and residential location within the Ruhr conurbation of the Federal Republic of Germany. This case study on urban change complements earlier work that analyzed the effects on a large-city economy of intersectoral shifts in Sweden, of spatial and sectoral policies in the Netherlands, and of the supply of labor force in Poland.

Publications in the Urban Change Series in 1981

Changes in Comparative Advantages and Paths of Structural Adjustments and Growth in Sweden, 1975-2000.
L. Bergman and L. Ohlsson RR-81-13

The Dynamics of Spatial Labor Mobility in the Netherlands
C. Bartels and K. Liaw WP-81-87**

Estimation and Interpretation of a Non-linear Migration Model
K. Liaw and C. Bartels WP-81-88**

Statistical Analysis of Regional Growth: Consistent Modeling of Employment, Population, Labor Force Participation, and Unemployment
J. Ledent WP-81-128

Migration and Urban Change
P. Korcelli WP-81-140

Growth and Change in Innovative Manufacturing Industries and Firms
M. Thomas CP-81-05

Environmental Quality, Abatement, and Urban Development
U. Schubert CP-81-16

Migration and Natural Increase in the Growth of Cities
(Reprinted from *Geographical Analysis* 13(4):287-299, forthcoming in the Research Report Reprint Series)
N. Keyfitz and D. Philipov

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*ICSAR funds are a part of the US National Academy of Sciences program of support for International Cooperation in Systems Analysis Research.

**Published in the Manpower Analysis Series.

The Population, Resources, and Growth Task
(Warren Sanderson, USA, and Andrei Rogers, USA, Task Leaders)

The cities of the less developed world will have to accommodate approximately one billion more residents by the year 2000. About one-third of today's urban population in such countries lives in settlements that have inadequate access to water, sewerage, transport, health, education, and housing, and as much as 60 percent of the urban population in some countries lives in squatter settlements. If rates of urban population growth and increased consumption, arising from a growing per capita income, maintain their current annual levels of 4 to 5 percent each, demand for urban goods and services will double every 7 to 8 years. A better understanding of the patterns and consequences of urban-rural population growth and economic development continued to be the principal goal of this Task's research in 1981.

Urban Karlström (Sweden), Hisanobu Shishido (Japan), and Ernö Zalai (Hungary) continued their national case studies of demo-economic growth using computable multisectoral (general equilibrium) models. Warren Sanderson (USA) focused on the development of a prototype demographic component of such models. And Luis Castro (Mexico) and Andrei Rogers (USA) continued their work on the design of model migration schedules, parameterized age patterns of geographical mobility that can be used to infer migration flows in countries that lack adequate migration data.

In June the Population, Resources, and Growth Task, together with the Urban Change Task, convened a conference on Urbanization and Development, at which over 60 participants from developed and developing countries discussed the diverse problems associated with rapid population growth and structural change, urban growth and decline, and the spatial concentration of national populations in a few large cities.

The Task's work on migration and demographic modeling also was presented at the UN Technical Working Group Meeting on Migration and Urbanization of ESCAP (Economic and Social Commission for Asia and the Pacific) held in Bangkok in December. Collaboration with this agency's comparative study is envisioned for 1982.

Publications in the Population, Resources, and Growth Series in 1981

Rural-Urban Labor Migration and Urban Unemployment in Kenya
H. Rempel RR-81-24

Model Migration Schedules
A. Rogers and L. Castro RR-81-30

Model Schedules in Multistate Demographic Analysis: The Case of Migration
A. Rogers and L. Castro WP-81-22

638 Model Migration Schedules: A Technical Appendix
A. Rogers and L. Castro WP-81-23

Modeling Dualism in Japan
H. Shishido WP-81-29

A Review of Four Demoeconomic General Equilibrium Models
H. Shishido WP-81-43

Status-Specific Age Patterns of Migration: Family Status
L. Castro and A. Rogers WP-81-60

Model Migration Schedules: A Simplified Formulation and an Alternative Parameter Estimation Method
L. Castro and A. Rogers WP-81-63

The Demographic State of the World
N. Keyfitz WP-81-80

An Analytically Based Two-Sex Marriage Model and Maximum Likelihood Estimates of Its Parameters: Austria, 1979
W. Sanderson WP-81-130

Projections of Population Growth and Urbanization for Five Southeast Asian Pacific Nations
A. Rogers WP-81-137

Advances in Multiregional Demography
Andrei Rogers, editor RR-81-06

The seven papers in this volume deal with the evolution of human populations over space and time, addressing such topics as data and measurement problems, methods of constructing life tables, and population projections. The authors all are or were members of an international group of scholars studying national problems of human settlement at IIASA.

The one-year/five-year migration problem

Pavel Kitsul and Dimiter Philipov outline a mathematical procedure using matrix theory to tackle the measurement problem in migration analysis of reconciling data collected for two different unit-intervals of time—in this case one year and five years. The method is illustrated with data for a three-region disaggregation of the population of Great Britain.

Constructing multiregional life tables using place-of-birth-specific migration data

Jacques Ledent considers two alternative methods of constructing multiregional life tables and demonstrates that a computational procedure based on probabilities specific to an individual's region of birth yields more accurate spatial allocations of life expectancies than the more conventional Markov-based solution.

Multistate population projections

Dimiter Philipov and Andrei Rogers develop a procedure that generates multiregional population projections disaggregated by region of birth. The two classes of projections outlined-

native independent and native dependent—emphasize the importance of including region-of-birth-specific information in demographic analysis.

Entropy, multiproportional, and quadratic techniques for inferring patterns of migration from aggregate data

Frans Willekens, András Pór, and Richard Raquillet develop further the IIASA work on inferring age-specific migration flows from aggregated data. They outline a general estimation procedure that incorporates both maximum-likelihood and minimum chi-square estimates. Data for Austria and Sweden are used to illustrate the methodology.

Age patterns of migration: cause-specific profiles

Andrei Rogers and Luis Castro use a method to analyze migration rates that is analogous to the approach used in cause-of-death mortality studies. They show that different age profiles are associated with different causes of migration. Using data for Czechoslovakia, they demonstrate the ways in which levels and age profiles of different cause-specific migration schedules contribute to the aggregate age patterns of migration.

Multiregional zero-growth populations with changing rates

Young Kim considers how multiregional zero-growth populations evolve over time when experiencing variations in birth, death, and migration rates. Her paper identifies ways in which the age structure in each region is influenced by the pattern of recent rates and how the effect of the initial population distribution decreases over time until it is finally lost. Data for India and the Soviet Union illustrate some of the key concepts.

Aggregation of population projection models

Robert Gibberd develops a formalism for determining the relationships between a linear Markovian population model and the corresponding aggregated model. He begins by showing that an aggregated population model is generally non-Markovian and then suggests several Markovian approximations, including two which provide upper and lower bounds for the aggregated population distribution. Australian migration data are used to illustrate the results.

Changes in Comparative Advantages and Paths of Structural Adjustments and Growth in Sweden, 1975-2000
Lars Bergman and Lennart Ohlsson RR-81-13

The purpose of this study is to identify possible future development paths for the Swedish economy in a context where world market conditions, domestic factor accumulation, and technical change are explicitly taken into account. The main analytical tool used in the study is a general equilibrium model of the Swedish economy. World market prices and trade flows as well as domestic factor accumulation and productivity change are

exogenous to the model. The sectoral allocation of capital and labor as well as domestic consumption, foreign trade, and the domestic price system are endogenously determined variables. The study's projections indicate that Sweden is entering a period of considerably slower economic growth than occurred during the earlier part of the postwar period. Underlying this result is an assumed slowdown of the productivity growth rate. The assumed rates of productivity change do not differ significantly between the sectors. Consequently, reallocation gains can be achieved mainly through a reduction of the intersectoral differences in the marginal productivity of capital, characterizing the initial year of the projection period.

Rural-Urban Labor Migration and Urban Unemployment in Kenya
Henry Rempel RR-81-24

The starting point of this study is a model of rural household decision making, which generates a set of testable hypotheses regarding the determinants and consequences of rural-urban migration. A survey of one of Kenya's eight largest urban centers was carried out in December 1968 to provide data that were then combined with census data to test these hypotheses. The questionnaire that was distributed was designed to obtain the migration, employment, and income history of each migrant from one year before his move to the time of the survey as well as the migrant's opinions on why he moved, how long he intended to stay, and what he thought of life in urban centers. This volume is an analysis of those data. The basic thesis is that rural-urban migration is a rational response to development in Kenya. Migration does not shape this development; it is merely one symptom of growth. On the basis of the results obtained, the study concludes with a general discussion of several aspects of the urbanization process that can be influenced by policy actions.

A Unifying Framework for Public Facility Location Problems
(Reprinted from *Environment and Planning A* 13:1001-1028 and 1085-1108)
Giorgio Leonardi RR-81-28

This article, a condensed report of the present state of the work in the Public Facility Location Task at IIASA, has three main aims: first, to build a general framework for location problems; second, to use this framework to unify existing location models; and, third, to use the framework to develop new, more general, and more meaningful location models. Suggestions are also given on how to introduce multiple services and multiple time periods in location problems. The first part of the paper gives a nontechnical description of the proposed general framework for analyzing location problems. The second part describes mathematical models for static, single-service, facility location problems and their possible extensions and improvements.

Model Migration Schedules
Andrei Rogers and Luis Castro RR-80-30

This report draws on the fundamental regularity exhibited by age profiles of migration all over the world to develop a system of hypothetical model schedules that can be used in multiregional population analyses carried out in countries lacking adequate migration data. It begins with a comparative analysis of over 500 observed migration schedules, taken from the data bank assembled at IIASA for the Comparative Migration and Settlement Study. It then develops, on the basis of this comparative analysis, a family of hypothetical schedules for use in instances where migration data are unavailable or inaccurate. It is felt that such model schedules may be used to graduate observed data, thereby smoothing out irregularities and ascribing to the data summary measures that can be used for comparative analysis. They may be used to interpolate to single years of age, observed migration schedules that are reported for wider age intervals. Assessments of the reliability of empirical migration data and indications of appropriate strategies for their correction are aided by the availability of standard families of model migration schedules. Finally, such schedules also may be used to help resolve problems caused by missing data.

Research Reports on the Comparative Migration and Settlement Study

This collection of national reports deals with the comparative analysis of internal migration and spatial population growth in the 17 National Member Organization countries of IIASA. Patterns of population change are explored by applying the new multiregional methodologies and computer programs elaborated in the HSS Area. All reports have the same structure and include multiregional data on fertility, mortality, and migration; multiregional life tables, spatial mortality, fertility, and migration expectancies; and multiregional population projections. Each Migration and Settlement report is authored by a native collaborating scholar familiar with the demographic setting of his/her country. (The first nine reports were completed in 1979 and 1980.)

1. *United Kingdom*
P. Rees RR-79-03

2. *Finland*
K. Rikkinen RR-79-09

3. *Sweden*
A. Andersson and I. Holmberg RR-80-05

4. *German Democratic Republic*
G. Mohs RR-80-06

5. *Netherlands*
P. Drewe RR-80-13

6. Canada M. Termote	RR-80-29
7. Hungary K. Bies and K. Tekse	RR-80-34
8. Soviet Union S. Soboleva	RR-80-36
9. Federal Republic of Germany R. Koch and H. Gatzweiler	RR-80-37
10. Austria M. Sauberer	RR-81-16
11. Poland K. Dziewoński and P. Korcelli	RR-81-20
12. Bulgaria D. Philipov	RR-81-21
13. Japan Z. Nanjo, T. Kawashima, and T. Kuroda	in press
14. United States L. Long and W. Frey	in press
15. France J. Ledent and D. Courgeau	being edited
16. Czechoslovakia K. Kühnl	forthcoming
17. Italy A. LaBella	forthcoming

THE RESEARCH STAFF

Twenty-five research scholars were members of the HSS Area in 1981 for periods lasting at least one month. Together with the much larger number of short-term visiting scholars, they brought to the Area a wide variety of disciplinary skills, cultural backgrounds, and national perspectives. The brief biographies listed below give an indication of the richness of this mixture.

Research Scholars

Cornelis Bartels, Netherlands (September 1980-August 1981), joined the HSS Area to work on regional labor supply, the educational/occupational compositions of regional labor forces, and regional policy. Dr. Bartels received his Ph.D. in 1977 from the Free University of Amsterdam and is currently with the Faculty of Economics, University of Groningen, where he is engaged in research on regional economics, research methods in regional sciences, regional labor market analysis, and regional economic policy.

Michał Bojańczyk, Poland (April-May 1981), an assistant professor and Chief of the Socioeconomic Development Modeling Group in the Systems Research Institute, Polish Academy of Sciences, joined the Health Care Systems Task to study health care resource allocation. He received his Ph.D. in systems analysis from the Systems Research Institute in Warsaw. His interests include control theory and its application in technological and socioeconomic processes, mathematical modeling of national and regional economic systems, and the allocation of health care resources.

Alberto Bonaguidi, Italy (May-June 1981), came to the HSS Area from the University of Pisa where he is a professor of statistics in the Department of Economics. His area of research includes population redistribution in Italy since the Second World War, changes in the pattern of population growth of Italian communes, and labor force mobility in Tuscany. While at IIASA, Professor Bonaguidi focused on the application of matrix analysis to describe systems of population flows in ways that would aid policy makers in specific Italian regions.

Luis Castro, Mexico (October 1977-), came from Mexico to work with the HSS Area on a comparative study of migration and settlement patterns in IIASA countries and on a case study of Mexico's urbanization and development. Professor Castro received his civil engingeering degree (1970) from the Universidad Nacional Autonoma de Mexico (UNAM) and his M.Sc. (1975) from the Urban Systems Engineering and Policy Planning Program at Northwestern University, Illinois. In Mexico, he was a professor at the Graduate School of Civil Engineering at UNAM and a project leader for a consulting firm.

Peter Fleissner, Austria (January 1975-December 1981), came from the Institute for Socioeconomic Development Research of the Austrian Academy of Sciences, Vienna. He joined IIASA on a part-time basis to develop frameworks for international comparisons of health care systems. Dr. Fleissner received his Dipl. Ing. in electronics (1968) and a Dr. Tech. in mathematics (1971) from the Technical Institute for Advanced Studies in Vienna and was a lecturer in econometrics at the Technical University (1971-1973).

William Frey, USA (September 1980-February 1981), came to IIASA to work in the Urban Change Task. Dr. Frey studied at Brown University and received his Ph.D. in sociology (demography) from there in 1974. He has been on the sociology faculty at Rutgers University (1973-1974), a research associate at the Center for Studies in Demography and Ecology at the University of Washington, Seattle (1974-1975), and a project director and research associate at the Center for Demography and Ecology, University of Wisconsin (1976-1980).

Michael Hannan, USA (November 1981-), came to the HSS Area to work on the Manpower Task as well as on Organizational Innovation in IIASA's Management and Technology Area. He is professor of sociology and director of the Organization Studies Section of the Institute for Mathematical Studies in the Social Sciences at Stanford University. Professor Hannan received both his M.A. and Ph.D. degrees in sociology from the University of North Carolina at Chapel Hill. His current research focuses on the ecology of organizations and models and methods for analyzing social processes. He recently completed a large-scale evaluation of the impact of income maintenance experiments on marriage and family relations.

Peer Just, FRG (October 1981-), joined IIASA's HSS Area to work on multiregional demography. He studied computer science and statistics at the University of Vienna and obtained his Master's degree from there. In 1981 he received his Ph.D. from the same university after having completed his dissertation on theoretical extensions of multidimensional demography and its possible applications. Dr. Just's current research focuses on urban-rural population projections and multistate demography; he is developing a computer program, based on this theoretical work, that will enable one to project the urban and rural populations for all UN-member countries.

Urban Karlström, Sweden (July 1980-September 1981), came to the HSS Area from the Stockholm School of Economics where he was involved in a study of the influence of an aging population on economic growth. While pursuing doctoral studies focusing on macroeconomics, economic development, economic demography, and economic history, he became involved in the work of the Population, Resources, and Growth Task, expanding its collection of national case studies with his general equilibrium model of the Swedish economy from 1870 to 1914.

Pavel Kitsul, USSR (December 1977-), a research scholar at the Institute for Control Sciences of the USSR Academy of Sciences since 1970, came to IIASA to participate in the Health Care Systems Task. Dr. Kitsul received his Ph.D. in physics and mathematics (1973) from the Moscow Institute of Physics and Technology. His scientific interests include the theory and application of stochastic processes, identification, and control in complex systems.

Piotr Korcelli, Poland (June 1979-), has been associated with the HSS Area since October 1975, working at IIASA for short periods of time until 1979. He is currently on leave from the Institute of Geography and Spatial Organization of the Polish Academy of Sciences, where he heads the Department of Urban and Population Studies. Dr. Korcelli received his Ph.D. in economic geography (1968) from the Polish Academy of Sciences and a Habilitation Doctorate in 1973. In 1963-1964 he was a research assistant at the University of Maryland.

Jacques Ledent, France (February 1977-August 1981), joined IIASA to carry out research on the demoeconomics of migration and human settlement evolution. Dr. Ledent received his degree in engineering (1969) from the Ecole Nationale des Ponts et Chaussees, his Master's degree in civil engineering (1972) from Northwestern University, Illinois, and was recently awarded his Ph.D. (1981) from the same university.

Giorgio Leonardi, Italy (October 1979-), joined the HSS Area to work on problems of normative location modeling. Dr. Leonardi received his Ph.D. from the Polytechnic Institute of Milan, Faculty of Architecture, in 1969. On leave from the Polytechnical Institute of Turin, his research focuses on activity location-allocation models, optimal multifacility models, and dynamic spatial interaction models.

Kao-Lee Liaw, Canada (July 1980-June 1981), joined IIASA to work on multiregional demography. He is currently an associate professor in the Department of Geography at McMaster University, Hamilton, Ontario, Canada. He studied at National Taiwan University and Kansas State University, USA, and received his Ph.D. in geography from Clark University, USA (1974). Dr. Liaw is interested in the analysis of interregional population systems and in recent years has focused his research on dynamic analyses of Canadian interregional population systems.

Philip Martin, USA (August-September 1981), a member of the Manpower Task, received his Ph.D. degree from the University of Wisconsin, Madison (1975) and was a Fulbright-Foreign Area Fellow at the University of Gottingen and the University of Munich (1973-1974). He has been a consultant to the US Department of Labor and to the Urban Institute, a senior economist with the Select Commission on Immigration and Refugee Policy, and an assistant professor of agricultural economics at the University of California, Davis. Dr. Martin's research interests include microeconomic theory, income distribution, and the labor market and social service impacts of illegal immigration.

Leslie Mayhew, UK (March 1980-), came to the Health Care Systems Task from the Department of Health and Social Security in London. He received his Ph.D. in geography from Birkbeck College, University of London (1979). At the Department of Health and Social Security, Dr. Mayhew was involved in the mathematical modeling of the interaction between the supply and demand for acute hospital services in the London region. Dr. Mayhew's scientific interests include regional science, econometric methods, and computing.

Klaus Neusser, Austria (January 1981-), is a part-time research scholar in the HSS Area, working on labor supply questions. Mr. Neusser received his diploma in applied mathematics and economics from the Technical University of Vienna in 1978. He is currently on the staff of the Economics Department of the Institute for Advanced Studies in Vienna, where he teaches monetary theory. He is also conducting research for a Ph.D. on the application of portfolio theory to the financial investments of insurance companies. Mr. Neusser's scientific interests include macroeconomics, econometrics, and monetary economics.

Dimiter Philipov, Bulgaria (September 1977-), came to the HSS Area from the Scientific Institute of Statistics at Sofia. Mr. Philipov studied mathematics, mathematical statistics, and probability theory at the University of Sofia. His scientific interests include the mathematics of population growth and demoeconomics. At IIASA, he is concentrating on comparative studies of migration and settlement patterns.

Pier Paolo Puliafito, Italy (May-June 1981), worked jointly with the HSS Area and the Management and Technology Area at IIASA on information technology, particularly its impact on the production of health services, such as health manpower and the spatial diffusion of health care delivery. Professor Puliafito received

his degree in electrical engineering (1965) from the University of Genoa and is now a professor of Systems Theory at the same university in the Department of Electrical Engineering.

Andrei Rogers, USA (July 1975-), has led the HSS Area at IIASA since 1976. Professor Rogers received his bachelor's degree in architecture (1960) from the University of California at Berkeley and his Ph.D. in urban and regional planning (1964) from the University of North Carolina at Chapel Hill. Since then he has been a professor in the City and Regional Planning Department at the University of California at Berkeley and the Technological Institute at Northwestern University, Illinois. His current research focuses on migration and the evolution of human settlement systems in both developed and developing countries.

Martin Rusnák, Czechoslovakia (May-June 1981), a medical doctor from Komensky University in Bratislava, joined the Health Care Systems Task to continue collaboration between the Ministry of Health in Czechoslovakia and IIASA. Dr. Rusnák graduated from the Medical Faculty of Komensky University in 1975 and since then has been an assistant professor in the Department of Pulmonary Diseases and the Department of Internal Medicine in the same University. He received his Ph.D. in 1980 from the Institute of Experimental Oncology of the Slovak Academy of Science in cybernetics. His scientific interests include oncological disease models and computerized medical data collection and processing.

Warren Sanderson, USA (September 1980-August 1981), joined the Population, Resources, and Growth Task to work on the demographic/economic modeling of urbanization and development processes. Dr. Sanderson received his Ph.D. in economics in 1974 from Stanford University. From 1969 to 1971 he worked with the National Bureau of Economic Research as a full-time scholar in New York and later as a part-time researcher at Stanford where he was also teaching. He is now an associate professor at the State University of New York at Stony Brook. Dr. Sanderson's scientific specializations are in economic history, demography, and models of household decision making.

Eric Sheppard, UK (October 1981-), is an associate professor in the Department of Geography at the University of Minnesota where he teaches economic and urban geography and geographical analysis. He came to IIASA to work in the Urban Change Task on settlement system geography. Dr. Sheppard began his studies in geography at Bristol University, from where he graduated in 1972. He then continued his studies at the University of Toronto, Canada, where he received both his M.A. (1974) and his Ph.D. (1976). He is currently involved in research on the modeling of dynamic interdependencies in urban and regional systems.

Hisanobu Shishido, Japan (April 1981-), a research scholar in the Population, Resources, and Growth Task, studied social sciences at Hitotsubashi University, Tokyo. In 1978 he entered the joint Ph.D. program of the Department of Economics and the Department of Urban Studies and Planning at the Massachusetts

Institute of Technology, Boston. His research interests lie in integrated rural and regional development planning, urban and regional economics, and macrodevelopment economics. He has published several articles on development studies and urban economics and has just completed a general equilibrium demoeconomic model for Japan.

Anatoli Yashin, USSR (September 1981-), came to IIASA from the Institute of Control Sciences, USSR Academy of Sciences, to work with the Health Care Systems Task. Dr. Yashin graduated from the Moscow Institute of Physics and Technology in 1967 and received his Ph.D. in physics and mathematics from the same institute in 1970. His scientific interests include the theory and application of stochastic processes, as well as identification and control in complex systems. He is the author of a number of papers on effective sequential estimation problems and on the socioeconomic aspects of health care planning.

Ernö Zalai, Hungary (August 1981-), came to IIASA to work on economic modeling in the HSS Area and the System and Decision Sciences Area. Dr. Zalai graduated from the Karl Marx University of Economics, Budapest (1966) with a specialization in mathematics and economic planning and received his Ph.D. from the same university in 1968. He is now the head of the Planning Methodology Section in the Department of National Economic Planning and Management at Karl Marx University and acts as a consultant to the National Planning Office regarding the application of mathematical models to planning problems.

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Kogler, Walter	Austria	September 1979	- November 1981
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APPENDIX: The Human Settlements and Services Area's International Advisory Committee

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