December, 1984, pp. 11–37.

ORIGINS, GROWTH AND FUTURE OF GEOGRAPHY IN INDONESIA
To the memory of Prof. Drs. Kardono Darmoisyawono

by
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1. THE BEGINNING OF EXPLORATION AND EARLY GOVERNMENT ACTIVITIES

Numerous investigators and voyagers have, since the early days of exploration, contributed to our knowledge of the geography of the territory covered by the Republic of Indonesia. Their publications are a primary source from which ultimately modern geography has emerged. It is not possible to mention the names of all these explorers, firstly because the list would be too long, and secondly because it could be difficult to draw a sharp boundary between geography and non-geography. In fact, most of them were not specialists in the modern sense of the word, but genuinenhets, which was in accordance with the concepts and the state-of-the-art then prevailing. An outstanding example from the 18th century is the well-known “Ambonische Randtatenkarte”, published by Rumphius (1805). The three-volume classic “Java zijn gedaante, zijn planten-tooi en inwendige bouw” by Junghuhn (1853), and “Java” by Verh (1903) deserve mention in this context as contributions from the 19th century.

Apart from the investigations carried out by individual scientists and/or naturalists, expeditions were initiated and wholly or partly financed by organizations such as the Royal Dutch Geographical Society (RGNAG), the “Freesb Society for Scientific Research in the Indies”, etc. The first one of these was the RGNAG expedition to Central Sumatra in 1877-1878. It was followed by such projects as

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the oceanographers. Skooge and Smelius expeditions of 1895 and 1929/1930 respectively, and by expeditions to the central range of Irian Jaya in 1959 and 1960. Data on the expeditions initiated by the KNAG can be found in the Centennial Jubilee Volume of this Society (Schrader, 1974). Since with the exception of the so-called "Military Exploration" (1907 - 1915) of Irian Jaya, the colonial government was not, or at least not directly, involved in these exploration activities, they lacked the continuity required for geography to really take root in this country as a scientific discipline. They certainly contributed to the creation of the appropriate scientific attitude and environments for this to happen, however.

The activities of several governmental departments through the years have had a geographical component. Most of these activities were marginal for these organizations and were related to specific aspects of geography, such as physiography and geomorphology. Because they were of a rather permanent nature, lasting effects were nevertheless achieved which, together, can be considered as a second source from which geography ultimately has emerged. Various chapters of the Centennial Jubilee Volume of the Koninklijke Nederlandse Vereniging (KNV, 1950), which may be considered a forerunner of the Lembeh-Ingur Pergantihan Indonesia (LIP), provide interesting reading in this respect. Most of these governmental organizations, however, were oriented towards topics of the earth sciences and natural resources, and thus physical geography rather than human geography has benefited from them. Numerous reports and maps produced by the Geological Survey, Bandung, contained substantial geomorphological information on features such as river terraces, coral reefs, plantation surfaces, etc. Since terrain configuration plays an important part in the type and distribution of volcanic hazards, emphasis was also given to volcanic geomorphology in the framework of the surveillance of active volcanoes. A first concise outline of the physiography of the country appeared in "The Geology of Indonesia" (v. Darmolen, 1949). The work of the Soil Survey Institute, Bogor, has also been of importance. Soil mapping was placed in a physiographic context, and further, topics such as accelerated erosion and laterization (by Mohr) were focu of interest. The Forest Research Institute had a long tradition of studying hydrology and erosion using experimental plots on forested slopes in the context of maintaining "hydrological" forests in the upper reaches of river basins and on steep slopes. The Laboratory for Investigation of the Sea, the precursor of LON, took an active part in the study of the coastal zone, including coral reefs, and supported others in this area. Since geography in those days was not a subject of university teaching, even these indirect geographical inputs by governmental organizations were not sufficient to build up lasting geographical expertise in this country.

2. THE EMERGENCE OF GEOGRAPHY

The first direct concern of the government with geography came when the so-called "Encyclopaedisch Bureau" was founded in the "Departement van Binnenlandse Zaken" in 1910, and this year may thus with some justification be considered the birthdate of Indonesian geography. Under the leadership of L. van Vugt (later years Professor in Human Geography, University of Utrecht), 36 regional studies were published by this bureau until it was discontinued for budgetary reasons in 1921. It was fortunate that the year before, 1920, the first geographer was appointed with the Cartographic Department of the Topographical Service. In a sense, this department thus became the successor of the Encyclopaedisch Bureau as a centre of geographical information of the archipelago. A major difference was, however, that the data gathered by this bureau had been derived mainly from reports written by district officers, whereas the Cartographic Department got its information from the numerous surveyors that were engaged in mapping the country, particularly since the reorganization of the Topographical Service in 1907 which then expanded its activities considerably outside Java. As a consequence, the publications of the Encyclopaedisch Bureau have a human-geographical orientation, whereas the activities of the Cartographic Department emphasized terrain forms and other matters of physical geography, as is evident from publications in the Annual Reports (Jaarverslagen) of the Topographical Service. It is worth mentioning in this context that in the same year, 1907, the Permanent Commission for Coordination of Survey and Mapping was founded which, although never quite effective, could be considered as a weak forerunner of the now powerful organisation known as BAKOSURTANAL (National Coordinating Agency for Surveys and Mapping).

The first to hold the post of geographer with the Topographical Service was S. van Valkenburg, who, after his nomination as professor in geography at Clark University, USA, was succeeded by P.B. van Rees and, after the untimely death of the latter, by A.J. Pasnook. The systematic publication of the data gathered by explorers and surveyors as proposed by Van Valkenburg unfortunately never could be implemented because of the cartographic commitments, including in-service training in terrain representation to technical personnel. The data for non-surveyed areas of the archipelago were collated solely in the form of a 1:200,000 sketch map and even Pasnook's intention to add a concise description and explanatory note to every map sheet could not be realized. The need for geographical information became increasingly apparent in the late 1930s for both civil and military purposes. The latter resulted in a series of terrain studies by the allied forces during the war in the Pacific. JANIS (Joint Army and Navy Intelligence Service), ISIS (Inter-Service Intelligence Studies), and SES-TIS (Strategic Engineering
3. THE GEOGRAPHICAL INSTITUTE OF THE TOPOGRAPHICAL SERVICE, JAKARTA

Among the first to recognize the post-war needs for geographical knowledge was the—then—head of the Topographical Section, A. Kint. He had a keen interest in the interpretation of aerial photographs, and as early as 1934 he had authored a most interesting publication on terrain forms in the mangrove areas of Bangka which he studied in the context of the first photogrammetric mapping project of the service in the northern part of that island. He founded the Geographical Institute within the service in 1947 as an elaboration of the Cartographic Department, mentioned earlier in this paper. The availability of diverse sources of information on the geography of Indonesia, the vast map archives, and free access to the central archives of archives soon made this institute a focus of geographers’ activities, well-equipped and provided with substantial library facilities (6,000 volumes). The human geographer, F.J. Ormeling was nominated head of the Institute in 1948. He was assisted by the geologists G. Milis and D.G. Montagne and the photo-interpreter, B.H. Regenhoog. The physical geographer, H. Th. Verspagen joined the expertise staff in 1949. Later the physical geographer, Ph. A.C. Janssen (1953) and the (Indian) human geographer, A.C. Bhatia (1957) were also appointed.

The first Indonesian director of the Military Topographical Service, R.M. Sawijojonoarno, gave wholehearted support to the institute, of which Acoor Harmit became the Head after Ormeling’s departure in 1955.

The tasks of the institute were twofold (Ormeling, 1950). On one hand, the cartographic tasks of the former Cartographic Department had to be continued: this meant the production of small-scale maps, including ICAO aeronautical charts. On the other hand, the new task of geographical studies for—in Kint’s views—purposes of reconstruction needed full attention. Two unpublished geographical studies on Aceh and Kerinci were published in 1948. A publication series was started in 1950 and field research with related aerial photograph interpretation was organized in various parts of the country. In addition, both Ormeling and Verspagen wrote doctor’s theses (Verspagen in 1952 at the University of Utrecht and Ormeling in 1955 at the University of Indonesia, Jakarta). In-service training of Indonesian junior staff became a major issue. A number of them enrolled for the B1/B2 teachers’ training courses, the forerunners of IKP (see section 5). Four (Nadir Sjah, M. Huike, M. Martini and I Made Sandy) were sent for further (M.A.) study to Clark University (USA), where the latter subsequently obtained a Ph. D. degree. The Topographical Service furthermore sent R. Sulistyow, earmarked to become head of the institute, to the State University of Utrecht, the Netherlands, where he met a tragic death in a traffic accident.

The institute, being a production and research organization not linked with any university in the country, was not directly involved in the dissemination of geographical knowledge through university teaching. This was a distinct disadvantage which precluded the full use of its personnel and material potential for the purpose of training young Indonesian geographers. Indirectly, however, it lent full support to all activities in this area. It thus became a stimulating factor in all three streams of university-level education that gradually developed in Indonesia.
and that are described in section 4. The teachers’ training courses that started in Jakarta in 1953 were accommodated in the institute’s buildings, and three staff members acted as lecturers. Omeling lectured students in economics at the University of Indonesia, Jakarta, and Vestappen taught photo interpretation and cartography at ITB, Bandung. The fact that Vestappen became part-time lecturer at the Department of Geography of the Gadjah Mada University, Yogyakarta, is of special interest in the context of further development of Indonesian geography. In the meantime, attempts were made to establish links with the University of Indonesia and the—then—president of that university, Prof. Bashir Djohan, called a meeting on the subject in the Institute in February 1957. These plans did not materialize at that time, however. It was only when in 1960 Anwar Hamid managed to raise the interest of Padjadjaran University in erecting its new Geography Department on the premises of the Geographical Institute that a situation was created that, at least potentially, allowed for making good use of the resources of the latter. The importance of the Geographical Institute in the content of the Topographical Service of the army obviously preceded its integral transfer to the university community. It developed further and was ultimately divided into two independent departments of this service. The Cartographic Department now is responsible for small-scale topographic mapping and the Terrain Intelligence Unit (Intimekan) emphasizes military geography.

4. THE BEGINNINGS OF UNIVERSITY-LEVEL EDUCATION IN GEOGRAPHY

Geography first became a subject of university studies as part of the curriculum of students majoring in other fields of science. A chair in agricultural geography was established at the Agricultural University in Bogor, at the time forming part of the University of Indonesia. Dr. J.P. van Aarssen was the first to hold the chair and in this capacity became the promoter of F.J. Omeling at the University of Indonesia, Jakarta, in 1955. Omeling taught economic geography at the Faculty of Economics in Jakarta, a task in later years being continued by Drs. P. Pusuma.

Fully fledged university-level studies in geography were not started, however, until the early to mid-1950s, since the need for geographical knowledge for the construction of independent Indonesia was soon recognized in several circles, a number of young Indonesians were sent abroad to get the education required. Apart from those already mentioned in section 3, mention should be made of Khoe Soe Kiam, who studied human geography/sociology at the

University of Amsterdam, and of Achsan Sumatradirja and Soeparto Adikusumo, who slightly later started their studies at the University of Utrecht and continued in Germany following the rupture of political relations between Indonesia and The Netherlands as a result of the Ian Jaya dispute. They ultimately returned with doctor’s degrees, specializing in physical and human geography, respectively. Others followed suit, such as Abdul Rahim who obtained a doctor’s degree in Ghent (Belgium), Suderdja (Ph.D., USA), and Mantra and Sudirman who got Ph.D. degrees from the East-West Centre of the University of Hawaii. In later years, numerous Indonesian geographers also pursued studies abroad, but the tendency then became more oriented towards specialized training in specific subjects in institutes, such as the International Institute of Aerospace Survey and Earth Sciences (ITC) in The Netherlands. In fact, study abroad, that at first served a primary function, became supplemental to the educational facilities that had gradually become available in Indonesia.

Among the first needs in that period was the development of an Indonesian vocabulary of technical terms in the field of geography and the spelling of Indonesian geographical names. Starting in 1954, the Komisi Isitiah Geografi tackled these problems under the leadership of Dr. Adam Bachitar Sr.

Three main streams can be distinguished in the development of geography as a subject of higher learning in Indonesia, namely:
1. The establishment of teachers’ training courses (BI/BZ) in geography that evolved into Geographical Departments of Faculties of Education (FKIP) and ultimately into Independent Institutes of Teachers Training and Education Science (IKIP). Especially the one in Bandung has become a centre of activity.
2. The foundation of a Geographical Department (Ajarusan) in the Padjadjaran University, Jakarta, that was later incorporated into the Faculty of Mathematics and Natural Science of the University of Indonesia.
3. The foundation of a Geographical Department (Jurusan) within the Faculty of Letters (Arta) at the Gadjah Mada University, Yogyakarta, that later evolved into a fully fledged Faculty of Geography.

These three main lines of development will be elaborated upon in the following sections (5—7).

5. THE BEGINNING OF GEOGRAPHY TEACHERS’ COURSES (NOW GEOGRAPHY DEPARTMENTS OF IKIP)

The urgent need for geography teachers arose soon after independence when a rapidly increasing number of secondary schools, both SMP and SMA,
were founded in all parts of Indonesia in the context of the educational expansion programme of the Ministry of Education. In 1961, a so-called "B1" geography teachers' training course started in Jakarta under the leadership of N. Huygen. It was soon followed by a follow-up B2 course in that same location and by B1 and B2 courses in other towns in Indonesia, such as Semarang, Bandung, etc.

The teaching staff in this period was still almost exclusively composed of expatriates. In the early 1960s, however, this picture had changed completely; teaching staff then was 100% Indonesian. In Bandung, for example, in the early 1950s names such as Dra. D. Oetv, Dr. v. Eyken, Drs. Suyderhoudt, et al. appear, whereas in 1961 Dr. Kastri, Drs. Sukendar and Dr. Triono Suwardjo were among the teaching staff. Prof. Dr. Soeparto Adikusumo soon became the pivotal figure in Bandung. Prof. Dr. Sutan has played a comparable part in Jakarta and even held the post of rector, IKP-Jakarta. This rapid transition to Indonesian staff reflects the effects of education in the preceding years and, of course, the economic and political developments in the country.

The structure and level of the teachers' training was also favourably affected by developments in the country. To cope with the growing needs, both qualitative and quantitative, for geography teachers, it was decided in the early 1960s to better co-ordinate the existing B1/B2 courses and to raise them to academic level. To this end, geographical departments were founded at several universities in newly established faculties of education (FKIP). This happened, for example, at the University of Indonesia, Jakarta, the Padjadjaran University in Bandung, and the Hasanuddin University in Ujung Pandang. The one in Bandung opened its gates in 1961. An important second step towards the full deployment of education in geography was the transformation of the Faculty of Education into independent institutes for university-level education (IKIP) in 1964. The educational aim of the study was given more emphasis and matters such as pedagogics and didactics received more weight.

At present, there are geography departments of IKIP at Bandung, Jakarta, Jayapura, (FKIP (Faculty of Education), Cenderawasih University), Medan, Padang, Semarang, Solo, Surabaya, Ujung Pandang and Yogyakarta. Each has approximately 300 students. There are two levels of education: a diploma course (D) lasting three years and a Sarjana (S1) course leading to a degree lasting four years.

In many parts of Indonesia, there is still a substantial shortage of secondary school (SMK, SMA) teachers; there is a continuous flow of alumni to the teaching profession. Postgraduate studies at the Sarjana Utama (S2 = M.A., M.Sc.) and Ph.D. (S3) level in Indonesia being concentrated in so-called "centres of excellence" (five universities and three IKIP institutes); these IKIP degree can be obtained only in Jakarta "Pavasa Safira" (Postgraduate School) of IKIP institutes in Bandung, Jakarta and Medan. A number of geographers have opted for this line of study.

Apart from the primary use of training geography teachers for secondary schools, a second task of IKIP, which is gradually developed is active participation in the development of geography as a science in the Indonesian context. IKIP in Bandung is particularly strong in geography and thus gradually evolved into a centre of geographic studies, particularly in the area of rural and regional development.

6. THE JURUSAN GEOGRAFI (FKIP), UNIVERSITY OF INDONESIA, JAKARTA

The foundation of this centre of university education in geography goes back to negotiations between Prof. Dr. Mohammed Yamin, then minister of Education and Sciences, and the deputy chief of staff of the Indonesian army, Lt. General Gatot Subroto. The rector (Prof. Mr. Iwa Komeste Suhartono) and the dean of the Faculty of Physics and Mathematics (Prof. Dr. Mintono) participated in the talks on behalf of Padjadjaran University, and Lt. Col. Anwar Hamid, then head of the Geographical Institute, on behalf of the Directorate of Topography (Topographical Service of the Army). Lt. Gen. Gatot Subroto granted permission to erect a two-storey building for the Department of Geography, Padjadjaran University, in the compound of the Geographical Institute of the Topographical Service that could render all services required. The Jurusan Geografi was formally installed in 1949 (29/11) as part of the Faculty of Physics and Mathematics, Padjadjaran University, Bandung.

The Jurusan had the advantage that it could form the onset benefit from the material and personnel capacity of the Geographical Institute (P本田). Lt. Col. Anwar Hamid became the first head and Ms. Martini M.A. the first secretary of the Jurusan. The early development was comparatively slow, notwithstanding the proximity of the Geographical Institute. The main factor was then isolation. Padjadjaran University was located in Bandung and the Jurusan was its only part situated in Jakarta. The administrative problems thus created, in combination, with budgetary constraints, led to lack of permanent staff which for years was limited to the secretary. Furthermore, part-time work was easy to obtain, and contributed to the unduly long continuation of the inadequate staffing situation.

1. Bandung (ITB), Bogor (IPB), Jakarta (UGM), Surabaya (PBI), Yogyakarta (UGM).
The transfer of the Jurusan to the Faculty of Physics and Mathematics of the University of Indonesia in Jakarta in 1967, intended to solve the isolation problem, did not yield the immediate success expected. Rapid improvement came in 1975 when 250 students were brought to the University of Indonesia by Prof. Dr. S. Somadjijata, the deputy dean of Academic Affairs. Study houses were provided to create the environment required for further growth of the Jurusan. Dr. I Made Sandy was nominated head of the Jurusan (1977) and in 1978 the Jurusan was moved to the campus of the University of Indonesia at Jl. Salemba Raya 4, Jakarta Pusat. The isolation thus came to an end. At present (1984), 40 staff members (of which 13 are full-time) are responsible for the education and research. The student body was raised to 180; 120 alumni have found their way to various positions in geography throughout the country.

7. THE FAKULTAS GEOGRAFI, GADJAH MADA UNIVERSITY, YOGYAKARTA

The Gadjah Mada University (UGM) established a Jurusan Geografi (Department of Geography) at the Faculty of Letters, Pedagogy and Philosophy in 1950. The Jurusan initially specialized in training of geography teachers but, in view of the absence of lecturers having an educational background and taking into consideration the needs of the country, the curriculum was soon changed to produce geographers ready to meet various other tasks. A geophysicist, Dr. T. van der Min, was initially appointed head of the Jurusan, but he left after the first year.

Thereafter the Jurusan depended on part-time input from other departments of UGM and from outside. External support was given by Drs. H. Bass (human geography), attached to the Christian University, Salatiga, Mr. Cisniter (ethnography), Mr. Suyudhoud (human geography) and Dr. H. Th. Vastappen, physical geographer at the Geographical Institute (Janapla), Jakarta. Internal (UGM) support was given by Prof. A. Sigit, who taught psychology and acted as dean of the faculty, and by Prof. B. Haryono Danuastro from the Faculty of Agriculture.

The Faculty of Letters, Pedagogy and Philosophy was split into two faculties in 1955, i.e. the Faculty of Letters and Culture and the Faculty of Pedagogy and Philosophy. The first was composed of four departments, one of which was the Department of Geography. External support was given by Dr. H. Th. Vastappen, Drs. Ph. A.C. Janssen, J.H. Bhata M.A. and Drs. Rosdito. Internal UGM support was given by Prof. B. Haryono Danuastro, Prof. Isi Rekikhadjoprdjo and Prof. Gembong Tyrossopomo from the Faculty of Agriculture, Prof. Soerono Notohadjaworo from the Faculty of Engineering. Within the faculty, support was given by Prof. Soemadi Soemowidjaja, who taught ethnology.

The first batch of six students (Kardono Darmoyuwono, Basuki Sudharsidjo, R. Hinarto, Suderono, Soepangat and Bambang Soeroro) graduated with BSc degrees from the UGM at the end of 1957. The first named four of these graduates were immediately appointed by UGM to become the first full-time Indonesian staff of the Department. Kardono lectured in geomorphology, Basuki in cartography, Bintang in human geography, and Suderno in cartography. The human geographer, Prof. Dr. M. Halim Khan Sindai, became the first full-time ex officio staff. He worked in Yogyakarta from 1960 to 1966 as head of the Jurusan Geografi.

The Department of Geography was upgraded into a Faculty of Geography in 1963, and Prof. Haryono Danuastro became the first dean of the faculty. His successors were Prof. Kardono Darmoyuwono (1965—1967 and 1972—1976), Prof. Bintang (1968—1972), Drs. Sugeng Manoto (1976—1979), Prof. Suwarno Hadikusumono (1979—1985). In the course of the years the number of full-time staff increased from 4 in 1957 to 16 in 1963, and to 66 in 1984 in accordance with the growing number of students (15 in 1957 to 550 in 1984).

In the first years, the Jurusan was accommodated in a small building on Jalan Kaliurang (present enlarged, still in use as an SMP [junior high school]). Thereafter, it moved into the "lecture", Dalem Wijilan of the Sultan of Yogyakarta until 1960, and then moved into another "kotaan", Dalem Darmo, in the control of the campus. In 1963, it moved into a residential house at the UGM campus and in 1969 into a group of low buildings, newly constructed specially for the purpose at Jalan Kaliurang on the campus. Although new blocks were gradually added, the accommodation became inadequate for the growing faculty, and in 1988 it hopes to move into a new multi-storey building next to the existing low blocks, built with a World Bank loan. All lectures can then be given there and facilities for laboratories, library, etc., will be substantially expanded.

At its founding in 1963, the faculty was divided into two departments and eleven subdepartments. The Department of Physical Geography had seven subdepartments, i.e. (1) Geomorphology, (2) Cartography, (3) Meteorology and Climatology, (4) Geography of Natural Resources, (5) Oceanography, (6) Hydrology and Water Resources, and (7) [Physical] Regional Geography. The Department of Socio-Economic Geography counted five subdepartments, i.e. (1) Social Geography, (2) Economic Geography, (3) Agricultural Geography, (4) Population Geography, and (5) Socio-Economic) Regional Geography.

The faculty was reorganized in 1972 and was then composed of seven departments, i.e. (1) Geomorphology, (2) Cartography, (3) Hydrology, (4) Social Geography, (5) Economic and Natural Resources Geography, (6) Population Geography, and (7) Regional and Political Geography.
A Department of Remote Sensing was added in 1977. In 1985, the faculty is again scheduled to be reorganized and will consist of five departments and seven study programmes. The Department of Physical Geography comprises two study programmes, i.e. (1) Geomorphology and Land Resources, and (2) Hydrology. The Department of Human Geography comprises two study programmes, i.e. (3) Population and Development, and (4) Settlement Geography and Resources. The Department of Technical Geography consists of two study programmes, i.e. (5) Cartography, and (6) Remote Sensing. In addition to these six study programmes, there is one interdisciplinary study programme called (7) Regional Planning and Transmigration.

The Faculty of Geography of UGM in due time became a focus of geographical education and research in Indonesia. Many of its graduates were appointed to four important ministries, i.e. (1) Ministry of Public Works, (2) Ministry of Home Affairs, (3) Ministry of Transmigration, and (4) Ministry of Agriculture, and also to other institutions such as BAKOSURTANAL (National Coordinating Agency for Surveys and Mapping), LAPAN (Indonesian National Institute of Aeronautics and Space), LIPI (National Institute of Sciences), BPT (Agency for the Study and Application of Technology), and BKKBN (National Family Planning Coordinating Board). When the faculty assumed a Kembin function in 1980, staff of other universities received training and further upgrading at the faculty. The faculty is responsible for organized postgraduate (52) programmes, i.e. in Population Studies (1982), Geography (1983), Remote Sensing (1983), and Environmental Studies (1984). S3-level training resulted in a number of Ph.D. theses. The dissemination of geographical knowledge even spread across the border: when the University Kebangsaan Malaysia (National University of Malaysia) was founded in Kuala Lumpur in 1970, with the aim of providing university-level education in Malaysia using the Malay (Malaysian) language, Sarostoo Hadisumarto was attached to this university for four years. Some others also worked in Kuala Lumpur for some time.

The triple task of Indonesian universities (teaching, research and service to society) enabled the Faculty of Geography to carry out geographical surveys and contract research on behalf of and in co-operation with several Indonesian governmental organizations. Some of the projects are based on long-term agreements of co-operation in which several staff members and a number of graduates of the departments as well as assistants participate.

It is worthwhile to also mention the following research activities conducted in Indonesia by the Faculty of Geography in co-operation with other institutions, such as inventory and evaluation of natural resources, evaluation of development impact on environmental rehabilitation of land and water resources, utilization of coastal area, terrain traversability, estimation of water availability for irrigation, a search for domestic water resources, assessment of natural disasters, land capability and suitability studies, regional physical planning, application of remote sensing techniques to various geographical studies, thematic mapping, seawater intrusion, sediment transport analysis, water quality, studies on employment, transmigration planning, rural and urban development planning, family planning, small-scale industry planning, etc.

The Indonesian Journal of Geography, published by the Faculty of Geography, is the main geographical publication series of the country. It was founded in 1960, sponsored by the Ministry of National Research, with an interruption in 1966 when no funds were available. Since 1976 it has regularly appeared twice yearly. This journal serves as an outlet for Indonesian and foreign scholars for articles and reports on activities of a geographic nature. The articles have a particular emphasis on the geographic problems of Indonesia and Southeast Asia. In 1960, the chief editor was Prof. Dr. M. Halim Khan, and since 1976 it is edited by Sarostoo Hadisumarto. The journal is distributed to 120 institutions all over the world.

The faculty has for many years been involved in diversified international cooperation projects which complemented the University's own resources. Apart from loans from the World Bank and Japan, that were used mainly for purchasing equipment and financing building activities, staff-upgrading programmes were developed first with the University of Hawaii and later with several universities in the Netherlands through the Netherlands Universities Foundation for International Co-operation (NUFFIC) and through the cultural agreement between Indonesia and The Netherlands. The long-lasting and fully funded cooperation in the fields of education and research with geographers from the Netherlands in the context of the Serayu Valley Project, which was followed by the Earth Sciences Project and complemented by the Social Input/Human Geography Project, has been particularly effective as a booster of diversified geographical activities of the faculty. These projects thus merit some further elaboration.

The first contracts were made in New Delhi, India, where Professor Kordomo Darmono met with Professors F.J. Ormeling, H. Th. Versteegh and J. Wiggers in 1968 on the occasion of the International Geographical Congress. Notwithstanding the good intentions, nothing of the ambitious plans could be implemented because the ample funds required could not be raised by organisations, such as the Royal Dutch Geographical Society. When new projects arose for raising funds, this time in the context of international contacts of the Netherlands universities co-ordinated by NUFFIC, Versteegh went to Yogjakarta in February 1971 (his travel being partly financed by the KNAG) and with Kordomo formulated the draft proposal for a NUFFIC-sponsored "Serayu Valley Project". Gadjah Mada University approved the project and in the Netherlands
the University of Amsterdam, the Free Reformed University of Amsterdam and the International Institute for Aerospace Survey and Earth Sciences (ITC) participated. When the project was accepted by NUFFIC and the funds were made available, the project actually started with the arrival of the first Dutch project assister, Dr. Th. Faber, in May 1973. Emphasis was on staff upgrading in the Netherlands and on-the-job training and joint research in the Seryau River basin where a field station was erected in Banjarnegara (and a smaller one later in Mojokerto). The Seryau Valley Project and its successor, the Earth Sciences Project, dealt with all major aspects of physical geography, such as geomorphology, soil science, hydrology, photo interpretation/remote sensing, cartography, etc., though not all subjects received equal weight simultaneously but in consecutive order depending on the growth and needs of the faculty. Since the administration of the project vested in the Bureau for International Relations of the Free University of Amsterdam, Verstappen (ITC) was succeeded as project co-ordinator by Wiggers (VU) in 1976 and by Verstappen in 1981. From the Indonesian side, the dean of the faculty acted as project responsible and Karmono was successor of many years for the Indonesian project leader and chief correspondent to the Dutch project assister. Other long-term staff of the project include Th. Beuleboom, R. Voskuil, A. de Goellau, P. v.d. Linden and A. Brown. Many graduate students of the faculty participated in the Seryau Valley Project, writing a script on specific problems. Several staff members embarked on Ph.D. studies and ultimately this resulted in the first Ph.D. degrees in geography at UGM (Sutikno, 1980; Sugeng, 1982; Karmono, 1984). Three Dutch physical geographers obtained doctor's degrees in Amsterdam on work carried out in the project (Van der Linden, 1977; van Erk, 1978; Speelman, 1979). The ITC staff contributed with a geomorphologic and a hydrogeomorphic survey and published the results and maps in the ITC Journal (1975). In the same period, some others also received Ph.D. degrees through different channels: Superno, director of National Institute of Economic and Social Research, who obtained the Ph.D. in 1982; and Abdul Sober, a staff member of the Faculty of Agriculture, Hassaruddin University, Ujong Pandang, detached to UGM for Ph.D. studies in 1982. Mohammad Amien, Lecturer at IUP Semarang, who completed his Ph.D study program in 1984, and Saladien, Lecturer at IUP Malang, who is expected to obtain the Ph.D. in 1985. In the meantime, the Seryau Valley Project was ended and followed by the Earth Sciences Project (ESP) that put emphasis on formal vocational training and on staff-upgrading studies in The Netherlands at M.Sc. level, particularly at ITC, Enschede, so as to provide the faculty with the appropriate staff composition now required for implementing S2-level education programmes.

Soon after starting the Seryau Valley Project, that related only to our country's geography, it was realized that for harmonious and balanced growth of the faculty support was also required in the area of human geography. At first, no funds from NUFFIC were available for this purpose, however, and for this reason Prof. H. Th. Verstappen and Prof. J. Hindersmink (University of Utrecht) formulated a plan for courses in human geography at UGM immediately after the cultural agreement between Indonesia and The Netherlands had been signed. The proposal was accepted, and for two years (1976 and 1977) Hindersmink, his collaborator Dr. M.J. Titus and others gave courses in Yogjakarta in this context. Since the orientation and size of the project appeared to be more in the line of NUFFIC, the project was transferred to this organisation when the possibilities developed to do so in 1978. In that year, several NUFFIC projects were incorporated in the so-called "Integrated Rural Development" (IRD) programme in which both the Earth Science Project and the "Human Input" (later renamed "Human Geography") Project were incorporated.

The Human Geography Project (HGP) started as a staff-upgrading cum research project. Four staff members from the faculty took part in the 1979/80 training programme. In a second phase, from 1981 onwards, the project's focus changed to staff-training for formal degrees in the framework of the S2 programme. Seven staff members followed a Master's programme in human geography - partly in Yogjakarta, partly at the University of Utrecht. The completion of this upgrading is envisaged in 1986, and by then the faculty will be in a position to implement the S2-level education programme in human geography without outside help. In addition to S2-training, the HGP offered a Ph.D. programme to two members of the staff. The third phase of the HGP covers the period 1985—1988. In addition to the ongoing and new Ph.D. programmes, the focus is now on curriculum development at the S1 level and associated staff training in Yogjakarta and at ITC, The Netherlands. In this phase, a two-year (3rd and 4th years) programme in regional and rural development planning will be developed by long-term staff from the University of Utrecht and short-term experts from both the University of Utrecht and ITC.

The HGP is supervised by the dean of the faculty from 1978—1981 Dr. Sugeng Martopono, from 1981—1984 Prof. Sunastopo Harisumerbol and by Prof. J. Hindersmink from the University of Utrecht. The daily management of the project is carried out by Drs. J.G.L. Polte (until mid-1986) with Drs. A.J. Suhardjo M.A. as counterpart. The execution of the S1 programme in regional and rural
development planning is under the responsibility of the long-term expert Drs. H. Hulsmann, assisted by his counterpart Drs. R. Murtomoto.

8. GEOGRAPHICAL ACTIVITIES OF GOVERNMENTAL AGENCIES

The governmental organizations that in the past have been active in the field of geography in a broad sense (see section 1 and 2) have been increasingly engaged in the type of geographical research relevant in the context of their responsibilities. For example, the Directorate of Volcanology, now under the leadership of Dr. Adiyo Sudrajat, is concentrating on volcanic hazard zoning, which obviously has strong geomorphological and human geographical components. The Soil Survey Institute ( IPTT), Bogor, is using geomorphological terrain classification as a basis for soil mapping. The geological division of the Laboratory for Marine Research (LON), headed by Dr. S.R. Onghosongo, has the study of coastal dynamics and environments as one of its major topics of research. The Laboratory (Director Dr. Agung Suyanto), well-equipped and with spacious accommodation in Ancol, Jakarta, is a far cry from its predecessor, the LOZ (Laboratorium Onderzoek Zee) at Pasir Panjang (see section 1). Many geographers work at the Ministry of Public Works, etc. Two new governmental organizations, founded after independence, merit special mention here because of their important contribution to the geographical knowledge of the country: BAKOSURTANAL and the Deedee of Land Use, situated in Cibinong and Jakarta, respectively.

BAKOSURTANAL

This powerful organization is responsible for co-ordination and planning of all activities in the field of surveying and mapping. It is placed directly under the president so as to facilitate interministerial tasks. The organization can be traced back to 1951 when a Board of Survey and Mapping was installed by law for the co-ordination of all mapping activities on the national level and at the same time a directorate executive body was created. The secretaries general of all ministries involved in one way or another in mapping activities were members of the board, which was presided over by the chief of staff. The directors of the topographical survey and the Cadastre Survey were among the members of the directorate. The organization thus was considerably more highly powered than the “Permanent Commission” of 1907 (see Section 1). The administrative structure was further strengthened by a presidential decree of 1965 to form the Dewan Survey dan Pemerintah Nasional (DESURTANAL) and a Komando Survey dan Pemerintah Nasional (KOSURTANAL) that took the place of the board and the directorate.

BAKOSURTANAL was founded by presidential decree of 1969 to increase the effectiveness of co-ordinate activities in the area of surveying and mapping. During the first five-year plan the work was related mostly to topographic and hydrologic mapping. 1

During the second five-year plan more emphasis was placed on the inventory of natural resources at the instigation of the Minister of Research, Prof. Dr. Sumitro Djoharudinakusumo. He also sought support from the Canadian government and secured an important loan from the International Bank for Reconstruction and Development. Thus, underlining the importance of the organization for national development.

The organization, headed by the geodesist, Ir. Piasanto Asmoro until his retirement in 1984 (since by Prof. Ir. Jacob Rais. P.S.), is composed of two major divisions concerned respectively with topographic mapping in a broad sense and with natural resource surveys. The latter is of particular interest in the context of geography since its activities encompass such topics as the collection of geographical and environmental data, cartography (including national and provincial isolines), application of airborne and satellite remote sensing, geographical information systems, etc. Until his untimely death in 1981, this division was headed by Prof. Kardono Damayuwono, previously dean of the Faculty of Geography, UGM, Yogjakarta. He has been instrumental in the active involvement of geography in surveying and mapping for the economic development of the country.

A major achievement was the founding by BAKOSURTANAL of a training centre for remote sensing application and survey integration (FUSPIC) on the campus of and in co-operation with Gadjah Mada University, with the aim of providing the necessary expert staff required in this area. Its director, the geographer Prof. Dr. Sumanto, was assisted by various expatriate experts, first by Dr. J.P. Malingeau (USA), then by Dr. Gaspelis (France) and Dr. J. Fox (USA).

Of interest for the growth of physical geography was the execution of the GEOMAP Project in 1983 and 1984, which aimed at establishing the legend and

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1. Co-ordination in the field of hydrography had started earlier when the Hydrographic Bureau of the Ministry of Transport and the Hydrographic Office of the Navy, both founded in the present form by a law of 1951, were placed together under the aegis of the Navy in 1969.
working methods for a 1:100,000 scale geomorphological map of Java/Indonesia, for the purpose of environmental management, at the production of a number of pilot map sheets and at the training of staff required for the purpose.

Land Use Directorate

This organization (Direktorat Tata Gunung Tanah) was founded in 1960 and forms together with four related directorates (land reform, land ownership, land registration and administration), the Directorate General Agriculture of the Ministry of Home Affairs. It can be traced back to the Salai Penangun Tanah Bumi (Institute for Rural Planning) that existed in Bogor in the early 1950s, and some of the concepts employed were in fact initiated by Ir. Unger and Ir. de Haan in that period. The Directorate Land Use has since the beginning been headed by the geographer Dr. I Made Sandy, who developed the working methods and coordinated the landuse survey activities of the rapidly growing staff of the organization. The legend used for the purpose is relatively simple and correlates with the World Land Use Survey Classification elaborated by the IGU. Apart from the land use maps, terrain factor maps are also being made, including features such as slope angle, soil texture and depth, drainage, etc. They are intended for land evaluation.

Almost 12,000 landuse maps have been produced by 1983, most in black and white (222 in colour). Approximately 25% of the country has been covered by maps at scale 1:12,500—1:25,000 and 75% by maps at scales of 1:50,000—1:200,000. Urban landuse maps also exist, at scale ranging from 1:75,000—1:25,000. There are land evaluation (terrain factor) maps at scales 1:25,000—1:50,000 for 25% of the country. Furthermore, a number of medium- and small-scale maps have been prepared.

The survey methods used are traditional: the work is based entirely on ground survey (by foot). (Selkirk, 1984). The use of aerial photographs is considered ineffective and too costly and the use of modern satellite remote sensing technology is discarded as still being in an experimental stage. There is thus an obvious marked contrast in concepts between the Land Use Directorate and BAKOSURTANAL, the latter essentially concerned with the introduction and implementation of new survey technologies to cope with the growing needs for data collection, storage and processing required in the country. The Land Use Directorate, on the other hand, relies in the first place on manpower: almost 2000 people are carrying out the landuse survey programme, about 50% of which are academic (Sarjana and Sarjana Muda) including 20 master’s and doctor’s degree holders.

9. PRESENT TRENDS AND OUTLOOK FOR THE FUTURE

At present, geography is firmly established in Indonesia and numerous geographers are in many ways contributing to the development of this science and its applications for the development of the country. New developments are frequent and manifold. Geographical departments of universities are being strengthened, such as at the Universitas Pembangunan Nasional Veteran (Dr. R. Bambang Suerojo), or established, such as the Faculty of Geography, Muhamadiyah University, Solo (1963), the Jurusan Geografi at the Universitas Pancasila, Jakarta (1979, Drs. Budi Basri). Some specific fields for research have become foci of interest, such as coastal research and related subjects. The co-operation between the LON (Section 8) and the United Nations University (UNU) and also the Indonesian-Dutch "Snellius II" expedition must be mentioned in this context. Research related to transmigration project is another major field of interest. The new five-year plan illustrates the importance attached to geography by the Indonesian government: the plan provides for one geographer for every district to assist the district’s officers in his task.

The Indonesian geographers are united in the Indonesian Geographical Society “Besar Geografi Indonesia” that was founded in 1959. There is also a geographical society IGEGAMA in Yogyakarta (1962). Indonesia has been a member of the International Geographical Union since 1952. The Indonesian Academy of Sciences (LFI) acts as an (IGU) intermediary and has established the structure of the Indonesian National Committee of the IGU. The Indonesian Journal of Geography, edited by the Faculty of Geography, UGM (see Section 7), is the main geographical publication of the country. It was founded in 1960 and with an interruption in 1966—1975 it has regularly appeared twice yearly. Further strengthening of the national and international contacts of Indonesian geographers will be beneficial for the further development of geography in Indonesia.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge information received from Prof. Dr. Soerjono Adirumono and Drs. Sudomo (Section 5), Drs. Budi Basri (Section 6), Prof. Dr. J. Hindermik (Section 7), Drs. F.B. Soetarto and Prof. Dr. I Made Sandy (Section 8), that has been used in preparing this paper.
REFERENCES
K.N.V. 1950. Geschiedenis van de Kon. Natuurkundige Vereniging. 100 Yrs
Yubilee kase Chron. Nat. 106 (5-7): 139-408.
Ormeling, F.J. and D.G. Montagne. 1956. Het Geografisch Instituut van de
Ind. Geografische Mededeelingen, 1(1):14-16.
Karmono in the field (Lombok in 1978).
The beginning of the Serayu Valley Project [Right to left: Karmono, Verspeek.
Former building of the Department of Geography, University of Indonesia, Jakarta (Right: formerly Geographical Institute, JANTOP—now BAKOSURTANAL, Jakarta Branch).

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PATTERNS OF WATER RESOURCES UTILIZATION FOR DOMESTIC PURPOSES IN THE SERAYU RIVER BASIN*

by
Sutikno

ABSTRACT

Water supply for domestic purposes is not sufficient to meet the need of the major part of rural and urban population in many tropical countries. This unfavourable condition is likely in parallel with the population growth and the development of urban and rural areas. Therefore, the water supply system for domestic purposes should be reevaluated.

This study covers occurrence of water suitable for domestic purposes, development of water demand as a function of population growth, possibilities to improve and develop water supply system in the study area. Based on the physical environment, the study area can be divided into six zones with different conditions of water resources and the existing water supply system. The six zones are grouped into three major zones for sampling purposes. In each major zone an urban centre and its surrounding rural areas have been chosen as sample areas to investigate the water supply characteristics and their problems. The sample areas cover coastal area, volcanic slope area, and folded sedimentary area.

Serayu River Basin offers a fairly representative transect in terms of conditions encountered in the central portion of Java; therefore, the identification of spatial pattern of water utilization in the study area could lead to a conclusion that it is applicable to other but similar areas. It appears that the volcanic area is better supplied with domestic water than the coastal and folded sedimentary high

* Summary of the author’s doctoral dissertation submitted to Gadjah Mada University in 1990.
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