

Training in the North of Researchers from the South: Experiences from Nordic-African collaboration

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Abstract

Norwegian universities have trained students and other scholars from the South within fields related to African plant diversity through the last decades. The activities were funded by NUFU, the Norwegian Council of Universities Committee for Development Research and Education, and 30 students successfully obtained PhD degrees in taxonomy and other biodiversity related fields, and all but a few have entered into scientific position at universities or other relevant research institutes in Africa. Most collaboration involved Zimbabwe, Malawi, Ethiopia, and Kenya, and though successful, they all faced the challenges of multi-institutional and multi-cultural teaching and research collaboration. Basic research within botanical diversity is better taken care of when the university councils own and administer the projects, compared to the alternative ownership by aid agencies.

Key Words: botanical diversity, university education, sandwich model

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In this paper we present experiences from mainly Norwegian collaboration with African universities through the last 30 years, within the field of African plant diversity (including ecology, ethnobotany, medicinal plants, mycology, phylogeny, plant geography, and taxonomy). In the programme for this symposium (Organising committee 2015), the 5th Session, “The North-South synergy”, was presented with these words:

‘In recent time the relationship between North and South with respect to maintaining tropical plant collections has changed. Initially institutions from the North

were dominating, but influence from the South has been continuously increasing – changing roles fostered by mutual interests and complementary possibilities with regard to access to technology and resources. This session explores options for developing further North-South synergies centered on the use of tropical plant collections’.

We will show that this synergy is particularly strong when it comes to education and joint supervision, teachers from the North and the South co-supervising MSc and PhD students, mainly from South, but also from North. Students from an early phase, often have become collaborators/co-supervisors later on.

Olov Hedberg: A Nordic pioneer in training researchers from the South

In Scandinavia, the training of African botanists largely began with the late professor Olov Hedberg, who was an enthusiast, a driving force and a great source of inspiration when it came to training in the North of researchers from the South (Fig. 1A). He was in particular a stimulating supervisor, always involving his students with optimistic encouragement. When he started a postgraduate course at Uppsala University in 1960, focusing on one of the most fascinating plants of the East African mountains, *Canarina* L., it was an innovation in the teaching of taxonomy. His program was ‘learning by doing’. He supplied the students with plant material from all relevant herbaria, sometimes also providing living material, and taught them how to make observations, to look for literature, use the modern taxonomic methods of that time and draw conclusions. Through teamwork, he trained the future taxonomists in relevant methods in taxonomy, morphometry, cytology, palynology, plant geography, etc. In 1966 he, together with his wife Inga Hedberg, organized the 6th plenary meeting of AET-FAT (Association pour l’Étude Taxonomique de la

Flore d’Afrique Tropicale) in Uppsala entitled *Conservation of vegetation in Africa South of the Sahara*. The proceedings of this conference were published under the same title (Hedberg & Hedberg 1968). In 1969 he invited students to participate in an intensive year-long PhD course, specializing in tropical African taxonomy or ecology. In the taxonomy group there were three students: Ib Friis from the University of Copenhagen, Inger Nordal from the University of Oslo, and Mats Thulin from University of Uppsala, all three obtaining their PhD degrees in Uppsala during the 1970ies on African Urticaceae, Amaryllidaceae and Campanulaceae, respectively. Later, the three obtained professorships at their respective home universities, and have since themselves been active in supervising African students. Hedberg and his three early Nordic taxonomy students have through the years altogether supervised 38 students (of which 24 African) to PhD degree in projects related to African biodiversity (Nordal 2011).

One of the Hedbergs’ most successful initiatives was the Ethiopian Flora Project. Inga Hedberg, who herself has played an important role in this project, wrote (Hedberg, I. 2011)

Fig. 1. Examples of training in North of researchers from South. **A.** Olov Hedberg with his plant press outside his tent in Ethiopia in November 1982. He was then leading an expedition aiming to collect as many specimens as possible for the benefit of the future *Flora of Ethiopia* (which was finished in 2011). **B.** Ezekeil Kwembeya and Brita Stedje outside his new institution, the National Botanical Research Institution, Namibia, in 2006. Kwembeya, originally from Zimbabwe defended his PhD on ‘The genus *Crinum* (Amaryllidaceae) – its taxonomy, phylogeny and conservation in Southern Tropical Africa’ at the University of Oslo in 2006. **C.** Elizabeth Mwafongo from Malawi, studying Hyacinthaceae in the herbarium at the Royal Botanic Gardens, Kew, in 2007. She defended her PhD on ‘Studies of *Albuca* and *Ledebouria* (Hyacinthaceae) in the *Flora Zambesiaca* area; aspects of systematics, ecophysiology and ethnobotany’ at the University of Oslo in 2009. **D.** Pressing plants by the camp fire in Zambia in 2002. From left Ezekeil Kwembeya, Jamestone Kamwendo, Brita Stedje and Gladys Msekandiana. Jamestone and Gladys were Malawian MSc students. **E.** Mary Namaganda and Charlotte Sletten BJORÅ working in the Makerere herbarium, Kampala, in 2012, in connection with a visit to discuss a NORHED application. Namaganda defended her PhD on ‘A taxonomic review of the genus *Festuca* in Uganda: AFLP fingerprinting, chromosome numbers, morphology and anatomy’ at the Norwegian University of Lifesciences in 2007. **F.** Students from The University of Zimbabwe attending a course in ‘Modern Methods in Plant Taxonomy’ given by Inger Nordal in January 1988. Of the students, Shakkie Kativu (to the right) and Clemence Zimudzi (standing as number four from the right) were selected from UZ as candidates for NUFU stipends. In 1994, they defended PhD theses on taxonomic and evolutionary studies on Anthericaceae and Hypoxidaceae, respectively.



‘After many years of fund hunting, the Ethiopian Flora Project was launched July 1st 1980, financially supported by SAREC (Swedish Agency for Research Cooperation with Developing countries) later SIDA (Swedish International Development Cooperation Agency) and the Ethiopian Science and Technology Agency. Though, per se, a Flora covering Ethiopia and Eritrea, was badly needed, the training of Ethiopian botanists for the project and for the future would also be an urgent task ...’.

Sponsored, promoted or associated with the Flora project were 10 Ethiopian PhD candidates, who all have obtained permanent positions at Universities, at the moment eight of them in African universities (Sebsebe Demissew 2011). For the completion of the Ethiopian Flora Project, the following of Olov Hedberg’s students have been particularly important and contributed considerably: Mesfin Tadesse (PhD on Asteraceae 1984), Sebsebe Demissew (PhD on Celastraceae 1985) and Ensermu Kelbessa (PhD on Acanthaceae 1990). They, again, have supervised students at all levels on topics related to biodiversity in Africa, a further example of scientific proliferation (Fig. 1). The proliferation of the Ethiopian Flora project has been described by Sebsebe Demissew *et al.* (2011).

Student Initiative in Norway to Strengthen North-South Links in the 1970s

After the ‘1968 student uproar’, and possibly as a by-product of this event, an increasing awareness of North-South University relations arose and gained momentum during the following years. At the University of Oslo (UiO) this led to the establishment of the Council of International Developmental Studies (Rådet for internasjonale utviklingsstudier), which initiated the first attempts to organize teaching and supervising within the frame of North-South activities. The ideas behind the establishment of this council came from an interdisciplinary group of students, who asked for a more intentional and dedicated engagement from the University of Oslo on North-South relations. After years of disputes the Council was established by the University Board in Oslo in 1977. It

soon became a tool for North-South university cooperation. Obviously, a geographical focus in the South was needed, and from the start there were four main candidates for collaboration: The universities of Botswana, Mali, Sri Lanka, and Zimbabwe. The collaboration between the University of Oslo and the University of Zimbabwe (UZ) was the first to be established. After the initial ‘bottom up’ initiative, the discussions on collaboration were soon conducted on the top level between the two universities. However, this collaboration was not supported on all levels. At the Faculty of Mathematics and Natural Sciences at the University of Oslo several faculty members did not approve of the initiative, claiming this was not science, but ideology – and that it should therefore not be a part of the strategic program of the university.

The Collaboration between University of Zimbabwe and University of Oslo

As a consequence of the student initiative in the 1970s, there were reciprocal visits between the University of Zimbabwe and University of Oslo on the level of Vice-Chancellor or Rector. This took place during the first half of the 1980s and was followed by visits both ways by scientists to find research areas of mutual interest. The establishment of a program of formal collaboration became a time-consuming, but instructive and stimulating process, where research groups from both sides gradually established closer contact. The two universities agreed on specific projects of collaboration, and jointly applied for funding from the Norwegian Ministry of Foreign Aid (Departementet for Utviklingshjelp, DUH). The process of getting funding was complicated and took more time than expected. The Ministry of Foreign Aid wished that Zimbabwe should prioritize research collaboration within the bilateral aid program (Country Program) with Zimbabwe, which would have meant competition with e.g. projects in poverty alleviation and health promotion. From the Zimbabwean side this was not regarded as desirable. The process ended up with funds from the Ministry being earmarked for research collaboration, and in 1985 the first pilot projects were es-

tablished. Two years later, a three year agreement of collaboration (1987–1989) between the two universities and the Norwegian Ministry of Foreign Aid was signed. The emphasis was on: Staff development (allowing Zimbabwean staff members to acquire MSc- and PhD-degrees), joint research projects, support for participation in meetings and teacher-exchange. Projects launched in the first period were within the fields of economics, sociology, law (particularly law relating to women), education (particularly distant teaching), nutrition, pharmacy – and botany and biodiversity (Mohamedbhai *et al.* 1998). The botanical projects approved were ‘Plant taxonomy – Integrated Project’ by J.M. Gopo and Inger Nordal and ‘Macrofungi of Zimbabwe – Integrated Project’ by J.M. Gopo and Leif Ryvar den. Professor Gopo, a geneticist, facilitated the collaboration, although his field of expertise was different, because there were simply no trained plant taxonomist at the University of Zimbabwe (UZ) at that time. Nordal and Ryvar den spent January 1988 at the University of Zimbabwe and gave intensive courses within modern methods in taxonomy of plants and fungi, respectively (Fig. 1F). When these courses were finished, the University of Zimbabwe elected two candidates from each field (botany/mycology) for further training.

The NUFU Period in North-South Collaboration

NUFU is the Norwegian acronym for ‘Norwegian Council of Universities Committee for Development Research and Education’. It was established by the Norwegian Council of Universities in 1986, who established SIU (Norwegian acronym for the Norwegian Centre for International Cooperation in Education) to handle programs and general policy. This happened almost simultaneously with the establishment of the collaboration between the University of Zimbabwe and the University of Oslo described above. Five years after the establishment of SIU, in 1991, the Royal Norwegian Ministry of Foreign Affairs and the Council signed the NUFU agreement. The main objective was to fund long term cooperation be-

tween universities in developing countries and universities in Norway for the purpose of capacity and competence building at university institutions in the South. For the period 1991–1995, the NUFU program had a total budget of about 27 million US\$, for the period 1996–2000 this had grown to about 30 million US\$, increasing in the last period (2007–2012) to about 57 million US\$. Most of the NUFU projects were in collaboration with African universities in Ethiopia, Mali, Sudan, Tanzania, Uganda, Zimbabwe, Botswana, Namibia, Cameroon, and Ghana.

NUFU has been regarded as Norway’s flagship program for development in research and higher education. What is possibly unique about the NUFU-concept in an international context is that the activities were based on mutual interest between researchers in the North and researchers in the South, allowing them to carry out research activities within the frame of institutional cooperation. The basic principles have been equality and transparency in partnership, and equal ownership shared between the North and the South partners. The final report of NUFU states: ‘The NUFU Program has a recognized brand and is well known for its accomplishments in PhD education and research collaboration’ (SIU 2013). With regard to NUFU-projects within plant diversity in the wide sense, 30 successful PhD candidates have obtained their degree, and with very few exceptions the candidates now fill relevant positions at African universities or research institutions. Most candidates are from Ethiopia, Uganda and Mali (Fig. 2).

The last president of NUFU, Thorkild Tylleskär summarized the NUFU Program in the following way (SIU 2013):

‘The focus has been on international research and training collaboration with low and middle-income countries, and for many universities in Africa and Asia the program has been nothing less than a door-opener to the world of international collaboration both in research and in higher education. Many of these universities are now equipped with a basic understanding of both how to initiate and to conduct international research collaborations and of how to apply for grants. What we see now is that these early adopters of the

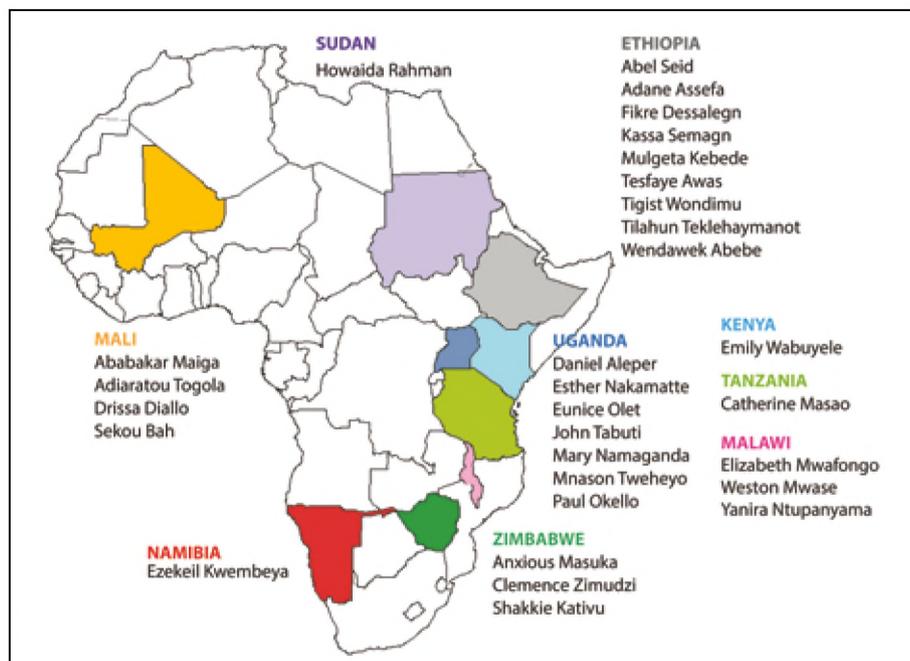


Fig. 2. A map showing the distribution of successful PhD candidates with project related to biodiversity of African plants. All, but a very few, have relevant positions within their home university or other African universities today.

NUFU Program are becoming leading institutions in their home countries, guiding other, younger universities into the international community of universities and other institutions of higher education’.

Born in Denmark and a Swedish citizen, Tylleskär came to the University of Bergen in 2000 and could look at NUFU from the outside. He reported that over the years he had heard so many academicians from the South testify to what their NUFU collaboration has meant for them: it had been a series of positive surprises! The first surprise for the researchers from the South was to sit down and sincerely discuss how to go about a project and plan all the details, including the budget in the North. This was distinctly different from receiving ‘orders’ from the North about how to run the project. This type of local ownership has been a real game-changer for the institutions involved, not least those in the South. The second surprise was the NUFU Program’s strong emphasis on capacity development. So many research projects in low and middle-income countries have focused on research, leaving the local partners behind when the foreigners moved on to obtain PhD degrees in the North, based on the research they had carried out to-

gether with scientists in the South. This inclusiveness was greatly appreciated, and it has also meant that the institutions in the South, in a sustainable way, were able to perform at a higher level than before. The third surprise came when researchers from the South visited the Norwegian institutions and witnessed the un-hierarchical interaction between professors and their students, in stark contrast to what many had experienced at their home universities. The fourth surprise was the NUFU Program’s strong emphasis on gender equity. After 20 years, it is easy to see the results: the proportion of female candidates at all levels has been considerably higher than in other comparable programs. This aspect has become increasingly appreciated and has contributed to a similar development in general in the countries concerned. The proportion of female graduates within the NUFU collaboration is 46 per cent at PhD level and 37 per cent at MSc level.

The benefit for Norway and Norwegian institutions has certainly also been substantial. Norwegian institutions of higher education now have first-hand contact with a range of institutions in the South. This is important for the understanding of global issues at

Norwegian universities, for setting goals and targets, and also for communicating the issues to the Norwegian society at large.

Case study 1: Zimbabwe and Malawi

Shakkie Kativu and Clemence Zimudzi were among the first NUFU students in the period 1991–1995. They were selected by the University of Zimbabwe (UZ) after the above mentioned course in plant taxonomy given at UZ in 1988 (Fig. 1F). At that time, they had just passed their bachelor's degree (with honors). In a Scandinavian setting, it would have been natural to go via a master degree before entering a PhD program. The first lesson for their Norwegian supervisors was that the MSc level, so obvious for the Scandinavian students, might be a blind alley for an African student aiming for a PhD, and consequently suitable PhD projects were organised for both. The so-called 'sandwich model', with alternating periods in Zimbabwe and in Oslo, was used. In 1994 they both defended their theses at the University of Zimbabwe, and by this they started a new era of systematic botany in Zimbabwe, being the first 'non-colonial' botanists with permanent positions at the university. This first step later built the foundation for further collaboration and further training of African students by co-supervision. Both Kativu and Zimudzi are contributors to the *Flora Zambesiaca* (Amaryllidaceae, Anthericaceae, Hyacinthaceae, Hypoxidaceae). The *Flora Zambesiaca* covers the countries Malawi, Zambia, Zimbabwe, the Kaprivi strip of Namibia, Mozambique, and Botswana. Very few African botanists were then and in the following year found among the authors.

In 1994 there were 29 scientists on the staff of the Department of Biosciences at the University of Zimbabwe, during the following years of political unrest, the staff was for a period reduced to two, of which Kativu was one. Zimudzi went abroad for a period, but is now back. Despite a difficult political situation, we managed to run two successive NUFU projects during the years 1996–2000 and 2002–2007, including research collaboration and supervision of master and PhD students. The first project was entitled '*Flora*

Zambesiaca: Systematic studies within petaloid monocotyledons and grasses' and the second 'Biodiversity of Southern Africa (Monocotyledonous plants) - Taxonomy, conservation and use'. In the last period the National Herbarium and Botanical Gardens, Zomba, Malawi were included as partners. Coordinators for the two mentioned periods were Brita Stedje from the University of Oslo and Shakkie Kativu from the University of Zimbabwe. Also Malawi lacked trained local botanists, and through the extended collaboration between the University of Zimbabwe and the University of Oslo Malawian students were included (Fig. 1C, D). This South-South collaboration between universities in Harare and Zomba, which was included in the NUFU projects, has raised the competence in botanical taxonomy in the region. One of the Zimbabwean candidates, Ezekeil Kwembeya, obtained the position as curator of the National Herbarium of Namibia (Fig. 1B), after he had defended his thesis at the University of Oslo, thus providing another example of scientific proliferation in the region.

Case study 2: Ethiopia and Kenya

In contrast to the situation in Zimbabwe and Malawi, the botanical institutions in Addis Ababa and Nairobi had a long history of research by African botanists and were more established than their sister institutions in Harare and Zomba. Both in Ethiopia and in Kenya there were already local botanists with a PhD degree in research positions at the universities and herbaria. However, the main aims for the NUFU project proposals were the same: to strengthen the institutions in the South through research collaboration and training of students. The formal collaboration started in 1996 with the project 'Biosystematic and Genetics in the Ethiopian Petaloid Monocots (Lilies) and the genus *Eragrostis*', a project which ended in 2001. The project of the second period (2003–2007) was 'Biodiversity of Eastern Africa (Lilies, Orchids and Sedges) - Taxonomy, Conservation and Use'. In both periods the coordinators were Sebsebe Demissew, University of Addis Ababa, and Inger Nordal, University of Oslo. In the second period, the project

included Kenya with Muthama Muasya as a coordinator, representing the National Museums of Kenya.

The general objectives of the NUFU project, formulated for the second period in this case study, might be considered representative for the NUFU concept when it comes to research and collaboration on biodiversity: (1) to contribute to the understanding of biodiversity in eastern Africa, a necessary prerequisite for the fulfilling of Ethiopia's and Kenya's obligations under the Convention on Biological Diversity (CBD, RIO 1992); (2) to sort out the taxonomy of complicated plant groups in order to define species delimitation, to define useful entities necessary to the understanding of biodiversity; (3) to identify evolutionary hot spots in eastern Africa, that will assist in decision making on issues related to conservation and management of the biodiversity; (4) to support the 17th meeting of the 'Association pour l'Étude Taxonomique de la Flore d'Afrique Tropicale' (AETFAT) to be held at the Addis Ababa University in September 2003; (5) to maintain and strengthen the the herbaria in Addis Ababa (ETH) and in Nairobi (EA) that house plant resources of eastern Africa (6) to upgrade the laboratories and computing facilities at the involved universities in the South.

Multi-institutional and Multi-cultural Challenges

Collaboration on research projects of mutual interest can in a wonderful way wipe out differences in cultural backgrounds, age, status, and gender. Our main challenges have rarely been related to issues between persons, but have often been related to rigid systems and bureaucracy. One problem was because of differences in the support given from institutions in the South. Other problems that came out in our institutions in the North was that they have not always been as supportive as one could wish, and supervisors in the North have had problems getting a fair credit for the work done, particularly when the students have undertaken their final examinations or defended their theses in the South. The principle followed by NUFU has been that whenever feasible, the Ph.D. candidate

should defend their theses at their home university. In the transition between the colonial and post-colonial periods we have encountered extra challenges with resistance from the established faculty in the South, themselves with lower formal education, against approving degrees of young, successful local candidates with degrees from the North.

Differences in traditions and codes of conduct may sometimes complicate collaboration and may cause unintended reactions. Openness about such issues may simplify the communication, or may at least help unraveling misunderstanding. Students from the South do not only meet scientific challenges when coming to the North. Extra time to settle down and time to adapt to the new society should be allowed. Leaving family, particularly children, behind may cause homesickness and severe worries about the family's well-being. For some students this may become such an issue that their ability to concentrate on the scientific work is reduced. In special cases the only way to solve this should be to grant an extra trip home. When receiving students from the South, supervisors will have both the challenge and the privilege to act as a caregiver when the situation requires, and this to a larger extent than what is needed for local students.

The long, dark winters, and generally the climate in the North, may also be a challenge for a student from the South. This particular problem might be reduced if the 'sandwich model' is applied. With the sandwich model, where students divide their time more or less equally between North and South, the problems of long stays abroad become less straining. It is not only a good way for students to keep in closer contact with their families, but it does also make it easier for them to keep connected with their home institutions and local supervisors. For our botany students from the South it has been particularly convenient to mainly be in Norway during the summer months of the North, doing laboratory work, coursework and getting supervision, combined with going home during the dark, Norwegian winter months, which often coincide with the fieldwork season in the South. Even if some of our students from South have

experienced homesickness and problems adapting to dark and cold winter months, most regards the stay in Norway as an exotic experience. Many students have also expressed great pleasure in experiencing our society in general. The tax-system, health care and education in Norway is quite differently organized than in most of the countries where the students comes from. This part of the education is mostly neglected when one is counting numbers of degrees achieved, etc., but may represent quite an important part of the general education.

Other Financial Norwegian Sources for Students in the South

Under the Norwegian Quota Scholarship Scheme the Norwegian government provides students from developing countries with financial support to study for an MSc or PhD degree in Norway. The main objective of the Quota scheme is to contribute to capacity building through education that will benefit the home country of the students, when they return. The scheme is also intended to strengthen relations between Norway and the selected countries and thus contribute to internationalization of Norwegian institutions of higher education (although – in contrast to NUFU – there is no formal agreements at the university level North-South). Most universities and university colleges in Norway participate in the Quota scheme. The institutions involved are allocated a certain number of students under the program each year. The Norwegian State Educational Loan Fund is responsible for managing the financial support provided for the Quota students. The students from the South receive, as any Norwegian student, 75% loan and 25% stipend, the loan being transferred to stipend when they finish and return to their home country. This program is currently under evaluation and its continuation is uncertain.

The NOMA program (NORAD's program for Master Studies) started in 2006, building on a previous Fellowship Program (1962-2005) by NORAD, the Norwegian Agency for Development Cooperation. Students from Africa, Asia and Latin America

were offered opportunities for higher education relevant for their home countries. The program has provided diploma courses as well as two years MSc degree programs at Norwegian higher education institutions. Since 1962 nearly 6000 NORAD fellows have graduated with a diploma or an MSc degree from Norway.

The End of NUFU and NOMA, the Start of NORHED

The NUFU Program was subjected to an external evaluation in 2009. The evaluation report, which was presented in February 2010 (SIU 2013), concluded that the contribution by the NUFU and the NOMA programs to capacity building in research and higher education had been significant, and that this was both widely recognized and highly valued. At the same time, the report presented a number of recommendations for improvements in program design, management and administration. Partly based on the evaluation report, the Norwegian Ministry of Foreign Affairs and NORAD developed the Norwegian Program for Capacity Development in Higher Education and Research for development (NORHED), which was implemented from 2013 and replaced the NUFU and NOMA program.

Thorkild Tylleskär, chair of the Program board for NUFU and NOMA summarized (SIU 2013):

'The NUFU Program is now coming to an end, but the positive impact of the NUFU Program projects into the future. In the near future this means the completion of more PhDs, more publications, etc. In the longer term it means stronger universities better equipped to serve their nations and populations in their future development. We say thank you to NUFU and welcome to its successor NORHED!'

In brief, NORHED aims to increase academic capacities in Low and Middle Income Countries (LMIC). All the NUFU ideals were in principle transferred to NORHED: A long term perspective, based on mutual South-North partnerships and institutional commitment and involvement, and programs should be

South demand-driven, with thematic and/or geographic focus. However, the program is no longer administered by the Norwegian University Council (via SIU), but by NORAD. The experience, so far, when applying for funds under NORHED, has been that the focus are more on institutional collaboration and less on a researcher to researcher relationship. Institutional commitment is certainly imperative, but the value of personal involvement and close, good relationships between research partners should not be underestimated. When unforeseen problems suddenly arise the success or failure of a project will depend on the quality of such relations. In the NORHED framework, there is a limit on the number of project, and the budget of each project should amount to about 2 million US\$. The financial frame of any NORHED project is in general considerably larger than the frames for projects under its predecessor, NUFU. We realize that big projects may be powerful, but we also have the experience that smaller projects can work very well, be very cost efficient and build strong foundations for bigger projects later on. Big projects may also require much administration, which may totally or in part rest on the shoulders of the researchers involved and may thus steal valuable time from potential research. We would advise that at least a fraction of funds should be allocated to smaller projects. Under NORHED, the basic research components of the projects seem to us to be given less importance, and the demand for 'applied research' is particularly emphasized, logical enough for a program owned and administered by an aid agency.

We have experienced that the application procedure introduced with NORHED is more restricting than under NUFU. It has been widely felt that it might be more important to fit a previously fixed application format than to develop and formulate interesting research questions. In the NORHED application form, the available space for describing the scientific project is very restricted, implying that science was not the most important aspect, as it could scarcely be properly evaluated based on the limited description allowed. In an actual case (an application related to botanical biodiversity) one of the shortcomings mentioned in the

evaluation was that that the project was weak when it came to the possible application in society of practical results in practice. This was a surprise, as a main part of the project was to strengthen and modernize the local herbaria. The quality of the research seemed to be of less importance to the evaluators than the consequence for the local society in the low and middle-income countries (LMIC).

About 50 projects were approved in the first cycle of NORHED, which began in 2012. Of these, 12 were allocated to the theme 'Natural resource management, climate change and environment'. All of them were applied and related to agriculture, aquaculture, natural resource economics, sustainable livelihood, and plant diseases. No project had reference to basic research of biodiversity.

Conclusions

- (1) It is mainly when the universities in the North and the South, directly or indirectly, are the 'owners' of programs or projects, that the importance of basic research is fully appreciated.
- (2) When aid agencies (as e.g. NORAD) come into ownership and leadership, the focus changes, and the importance of basic research on biodiversity is reduced compared to what is seen as the 'needs of the society'.
- (3) It is important for the future success of 'Training in North of researchers in South' that they are based on formal agreements at the top levels of the involved universities. But it is just as important that the projects should be rooted in the community of dedicated researchers from both sides.
- (4) The 'sandwich model' seems to be the best model, meaning that the scholars and students from the South are allocated their time for study and research equally shared between residence in the North and the South.
- (5) Project allocation should not always be reserved the big project (sometimes even inflated to fit the donor organization). It is also important to include smaller pioneer projects, sometimes 'small is beautiful'.

- (6) What started out as ‘Training in the North of researchers in the South’ in the 1970ies, gradually changed to collaboration between equal partners with knowledge transitions floating both ways.
- (7) When researchers from the North and the South are collaborating, it will almost necessarily create a synergy effect, to the benefit of the researchers – and to the knowledge of biodiversity in the world!

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