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Establishing a Research University in Honduras

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Executive Summary

The Sida-UNAH cooperation: Was the short activity worthwhile? As a result of a policy change in Sweden the research cooperation between the National University, UNAH, in Honduras and Sida will end in 2011. This means that the period of active cooperation has been only six years, about half of the time that is usually recommended as a minimum for creation of research capacity in a developing country university. In spite of the very limited time, some important and seemingly sustainable results have been reached. This has only been possible because the two cooperative partners, Sida and UNAH, as well as the political leadership in Honduras, were dedicated to the goal, to transform UNAH into a modern research university.

The main goal of the cooperation: Transforming UNAH from a teaching school into a modern research university. Based on careful studies of the opportunities, UNAH and Sida agreed that a number of specific activities would be realistic and particularly useful in connection with the transformation of UNAH. These included:

- Reform of university management, including financial management and auditing
- Strengthening of the ICT systems and their use at UNAH, following an ICT Master Plan
- Upgrading of the library
- Reform of university research and educational strategies
- Strengthening of a few individual research activities (Civil Engineering and Microbiology were selected), including training of young researchers at the PhD and MSc levels at Swedish universities
- Improvement in the laboratory safety and environment, including waste handling

Successful outcomes, also within the UNAH bureaucracy. Several areas within the university management were successfully reformed. Especially the introduction of ICT on a large scale turned out to be useful. The efficiency was improved and will continue to improve in the coming years. The quality improved too; one example is the computerization of the payroll. Among other, this revealed several cases of overpayment, which has led to considerable savings for UNAH.

The UNAH bureaucracy: some difficult problems. Among several successful activities under the cooperation, a single failure stands out. From the start it was the hope that the financial management of UNAH would become modernized and much more efficient. This was needed, among other, to facilitate active research at UNAH. Considerable special support was given through the UNAH-Sida cooperation, for example through an international accounting company, but without satisfactory results.

It now seems clear that the leading staff in the financial administration at the time had no wish to become more efficient, a main reason that the efforts failed. Today, the situation may be better, although the practical results are so far limited. In particular, the leading financial administrators now openly express a willingness to improve the way they handle their tasks.

Modernizing and increasing the efficiency of the educational activities. The increased use of ICT has helped make the planning of educational activities, use of classrooms and labs, etc. more efficient. In addition, new educational programs, for example distance education programs based on the use of Internet, have become possible.

Even more importantly, the educational strategies at UNAH, formerly almost exclusively based on lectures and traditional laboratory exercises, are becoming modernized, allowing for more active student participation and work on real life issues. Research activities are becoming part of the undergraduate programs in a very successful way, although this is limited to fields with sufficiently strong research activities and infrastructure.

Improving and modernizing library services. A major upgrade of the library system at UNAH has been performed as part of the Sida cooperation, using a wide range of modern ICT tools. The International Network for Availability of Scientific Publications (INASP) is providing useful assistance in several ways. As a result the access to online research information has been improved and the availability of online bibliographic resources (especially research journals) expanded. Furthermore, a Honduran national library consortium was established together with an inter-library network for the country. Also cooperation with libraries in other countries has increased.

In addition to hardware and software improvements, considerable amounts of training for library staff and users has taken place, not only with regard to the new ICT based opportunities, but also, for example, English language training. It is the aim of the modernized library to further support UNAH researchers who want to publish their research internationally, a development of high importance.

Strengthening staff and student research. In order to provide efficient solutions for the many problems in the Honduran society, research based knowledge must be increased and become one of the foundations of the educational activities. At the moment research is very limited at UNAH, although especially the Medical Faculty as well as Microbiology in the Science Faculty traditionally have had active research projects. In order to widen the research activity at UNAH the university has increased the funding available for individual research projects. This support is given based on applications from research groups, individual staff researchers, or even students.

This is a clever strategy; it has often been demonstrated that potential researchers react constructively to such incentives and that the production of well-documented applications alone is a very constructive exercise. Also other reform activities support active research, especially the better ICT support and the modernized library.

The cooperation with Sida has been essential in the upgrading of research at UNAH. In particular, it has helped create some role models among research groups that may inspire other groups at UNAH to increase their own research activities.

The selected research activities: Civil Engineering and Microbiology. Civil Engineering and Microbiology were selected as target fields for the upgrading of research. Eight young, talented researchers from UNAH have already completed, or are close to completing, their research training in Sweden at the MSc or PhD levels. Five Microbiology students have done so at Karolinska Institute in Stockholm and three Civil Engineering students at Uppsala University and the Royal Technical University in Stockholm. Some have already located funding for further studies, such as post-doctoral work or continuation of the research from an MSc program to a related PhD program. It is satisfactory to note that the subjects of all study programs have been closely connected with severe problems in the Honduran society.

The degree studies took place according to the successful sandwich model, in which a developing country student alternate between home visits, typically for data collection or other kinds of fieldwork, and visits at an outstanding university in a developed country, in this case Sweden. All sandwich students have had two advisers, one in Honduras and one in Sweden.

Adviser cooperation in sandwich programs, a critical issue. In the Microbiology projects there has been a close cooperation between advisers in Honduras and Sweden and their research cooperation has often been extended beyond the work of the graduate student. This has led to many advantages, for example in the handling of the graduate research programs, laboratory improvements at UNAH, general research activities, etc.

Unfortunately the cooperation has not been as close in the Civil Engineering projects. There are several reasons, lack of good Internet connections at UNAH at the start of the cooperation, frequent changes among the Engineering staff involved, etc. Furthermore, a shortage of qualified civil engineers in Honduras make it difficult for the staff to find enough time for research. At times the Honduran advisers have been uninformed about the activities of their students in Sweden. This has led to missed opportunities and has made the cooperation less satisfactory.

Establishment of modern laboratories. Most importantly, the cooperation with Sida also covered equipment and other support for experimental research; this was matched by UNAH, which provided better space for some of the upgraded laboratories. As a result, quality laboratories are available for the researchers as well as for groups of selected undergraduate students. The new laboratories in Microbiology have also demonstrated their usefulness in connection with national health threats.

Are the results obtained sustainable? The answer to this key question depends on the commitment of UNAH and the Honduran Government to the continued establishment of a modern research university. The ICT improvements in administration and education management are likely to continue. It is hard to imagine that a return to old practices can take place. Chances also seem fair that the financial management eventually gets its act together and become more supportive for the education and research activities.

The library has made significant steps towards a becoming a modern e-library, supporting the whole country. However, it will continue to need financial support to follow up on this development and to satisfy the present and future research groups, e.g. with journal access. If this

support is provided, the improvements are likely to be sustainable. The research groups, strengthened under the cooperation, will have to demonstrate a new ability to attract the required funding; the question is if they have reached a standard that makes this possible.

Microbiology research. Among the research activities supported under the cooperation, the Microbiology research projects in Tuberculosis and HIV are obviously both strong and sustainable. Five young research trained Microbiology staff members will return to Honduras in the future, and this will add to the present, quite solid competence. The cooperation with Karolinska Institute and other foreign institutions will continue to be important, and chances are good that funding for this cooperation and the research can be located. It seems that increasing the number of research active undergraduate students, as well as students in graduate programs, would be a constructive strategy, as long as UNAH can help satisfy the space requirements.

Civil Engineering research. The situation is more difficult in Civil Engineering. Three well-trained and bright young researchers will return, but they will not find strong research groups at home and it will require some determination to proceed with their research activities. It is important that a more institutionalized cooperation is established as soon as possible with the two host Engineering groups in Sweden.

Team spirit. Poor team spirit has for years been a problem at UNAH. The staff and students at the university does not take pride in the main university outcomes: education and research. Loyalty is usually not directed towards the colleagues in a work group, but rather towards labor unions, etc. Furthermore, UNAH has also traditionally had bad press coverage in Honduras. It is important that these problems are solved in order for UNAH to continue along the important reform path it has started on.

1. Introduction: The Project Background

Poverty reduction through knowledge based development. Honduras has one of the lowest per capita incomes in Latin America and the Caribbean. The frequency of AIDS is high in the country, while most social indicators are weak, including the educational indicators. The hurricane Mitch caused extensive damage in the late 1990s. Partly as a result of this, the country formulated a poverty reduction strategy in 2001, in which an improved education sector, including the higher education sector, is an important part.

Several Central American universities are these years undergoing extensive and badly needed reforms. Among several expected outcomes, they hope to produce both more qualified university graduates as well as research results that can help solve problems in society. They also hope to strengthen industrial and agricultural development, and support poverty reduction. It is also a goal that the universities should be able to take part in the very important, ongoing internationalization (even globalization) of higher education and research.

Research in Honduras. The number of researchers per million inhabitants is about 50 in Honduras, which is among the lowest for all countries in Latin America. Two organizations, the Honduran Council of Science and Technology and the National Council of Science and Farming Technology are formally responsible, but they have little clout. Most research takes place within the fields of Health and Biology at the universities (especially at the Tegucigalpa campus of the National University, UNAH, see later); Honduras lacks almost completely national research based expertise in several other important fields. However, the Sida cooperation has clearly demonstrated that there is no shortage of research talent in the country.

Higher education in Honduras. The higher education system in Honduras, which includes three public and seventeen, mostly smaller, private universities, has expanded significantly with respect to student numbers in recent years, although it still can accommodate only a small fraction of the relevant age group. Furthermore, the dropout and repetition rates at the university level tend to be high, and average study times are long. While the number of students at the Tegucigalpa campus of UNAH in recent years has been well over 60,000 – it grew from 61,174 in 2008 to 65,665 in 2011 – the number of graduates was only 4,617 in 2010. Until May, 2011, 1,694 had graduated, and the total number of graduates with a first degree is expected to be at most around 5,000 in 2011. It may be added that about 65% of the UNAH graduates are women.

Thus, in spite of the large number of students, the output of graduates for the Honduran labor market is modest. Nevertheless, the university students (and graduates) represent a huge amount of talent at all levels, a talent mass that deserves to be used better for the sake of national development.

The universities are mainly teaching schools and, as indicated above, university research is very limited with only a few percent of the university teachers being research active. As a result, research based education is rare, and the opportunities for even the most talented student to learn about and get inspired from research activities in their field are low.

Research activities have over the years also been limited by insufficient and old-fashioned university infrastructure, such as libraries without computerized facilities and access to important research books and journals, primitive laboratories and equipment, a lack of modern computers and ICT infrastructure, etc. The main shortcoming, however, has been the lack of a widespread research culture. Many do not fully understand the power of research based knowledge and others fear research based changes in the work demands, even when they realize that the present system is insufficient.

It is an additional problem that public universities in Honduras have often been highly politicized with frequent strikes; even corruption has been a problem. Thus it is not surprising that the academic performance at times has been low. An additional and quite different problem, limiting the usefulness of the research activities, is that the scattered research activities have often been chosen for purely academic reasons and thus have often been separated from real life needs in the Honduran society.

An urgent need for university reforms. For years it should have been clear that drastic university reforms were needed in Honduras. But although some realized the wastefulness of the present practices, including the waste of human talent, most students and staff were only moderately concerned. Many, for example within the labor unions, were directly opposed to university reforms. However, the Honduran political system became increasingly aware of the need for change, and this was the main reason that higher education reforms were initiated. This was a serious initiative – the National Congress was not only demanding university reforms, it was also willing to provide funding for such reforms.

Universidad Nacional Autónoma de Honduras (UNAH). UNAH is the largest and most important university in Honduras, with a specific obligation to develop higher education and research in the country. In some ways UNAH acts as a ministry of higher education, a ministry that otherwise does not exist in Honduras. Therefore, UNAH was selected as the target point for the reform efforts. UNAH is also by far the largest university in Honduras, with 9 campuses and about 100,000 students. The main campus in Tegucigalpa enrolls well over half of the students (presently about 66,000) and has 3,500 teachers and over 3,000 administrative staff members.

Like other universities in Honduras, UNAH has for many years had considerable weaknesses, from a bureaucratic and inefficient management, especially financial management, to lacking research facilities and research traditions as well as old-fashioned educational strategies. However, after the National Congress demonstrated its determination to improve this situation, UNAH has started to change.

The Organic Law for the University. It was a major step forward when a new law, the "Organic Law for the University", was adopted in 2004. It emphasized the need for university reform and demonstrates that the Government is clearly aware of the potential benefits of a stronger higher education sector in the country. Among other, the law reduced the

extensive power of students in the UNAH government, a power that had not always been used constructively. During the first years of the reforms a Transition Commission (TC), nominated by UNAH constituencies, was given the power to implement reforms.

Research at UNAH. UNAH was not well equipped to be a national leader in research. Less than a fourth of the academic staff had research degrees, and these were usually only at the Master level. It is estimated that the total number of PhD holders at UNAH is below one hundred. In spite of this, UNAH has several graduate programs, including PhD programs in some social sciences, and a range of Master programs. A survey in 2007 showed that only about one hundred of the academic staff members at UNAH were research active.

In recent years UNAH has been able to increase its funding for research (see below). The main channel for research support is presently able to distribute grants to active researchers corresponding to a total of about USD 500,000.

It is part of the official research policy at UNAH to encourage active involvement of university researchers in the real life needs of Honduran people. This is highly commendable, as long as basic research is also supported when called for. The recommended kind of targeted, applied research is also important in another sense, since it may help improve the recognition of university research in the media and general population in Honduras – UNAH often has suffered from a bad press. Furthermore, it may improve student and staff motivation. However, there is a limit to how far applications can go: the academic research quality cannot be sacrificed. Research without acceptable academic quality is not likely to produce reliable results.

Research infrastructure. Like at other universities in the developing world and specifically in Honduras, researchers at UNAH must struggle with several problems. First of all, the research infrastructure at UNAH is weak. While only few buildings are very old and a considerable amount of new construction is going on, laboratories tend to be poorly equipped with modern instrumentation for research and laboratory education.

In recent years, construction of several new buildings at the Tegucigalpa campus of UNAH and improvements of other buildings have been funded by the state and more recently also by savings in the UNAH payroll. After a fire in the old Chemistry building, the facilities have been rebuilt to provide a convenient frame for Physics, and a new, beautifully designed Chemistry building has just been taken in use. It is interesting to note that it has facilities specifically suited for laboratory research, including work within Applied Medicinal Chemistry.

In addition to these physical improvements, library support for researchers has been strongly upgraded and improved grant opportunities within UNAH have been put in place.

For years, a majority of the research activities at UNAH has taken place in biological and medical fields, and only to a smaller extent in Engineering and Social Sciences. The last few years of cooperation with Sida have resulted in a modest number of new research highlights; in particular some active research groups in Microbiology have become more visible.

Reform work at UNAH and the Transition Commission (TC). With the political support as the background and with highly competent members, the

TC was given a realistic chance to make substantial improvements at UNAH. The TC defined a set of guidelines for the new UNAH, and thus for the reforms; the guidelines emphasized research as a key to the solution of severe national problems in Honduras. On the whole, the TC managed to successfully start a modernization of the UNAH establishment on several fronts until the end of its mandate in May, 2008.

The cooperation with Sida. From the start, the Swedish development organisation, Sida, had taken a constructive interest in the reform plans at UNAH. Sida found it interesting that many in Honduras, including leaders within the political system, had become aware that research based knowledge must play a significant role in the solution of the many severe problems and challenges in the country. This situation was important for the Sida – both the political will in Honduras, and the obvious national needs. It also helped that the new TC guidelines agreed well with traditional Sida goals. As a result a cooperation seemed both highly relevant and attractive for Sida.

Sida became involved already during the preparation of the university reforms and started a dialogue with UNAH in 2001. In June, 2005, an agreement was reached on a 3-year cooperative program. It was clear that UNAH, especially the Tegucigalpa campus, had to be the key cooperative partner for Sida. The initial cooperative program contained the following activities:

- Reform of university management, including financial management, auditing, and administration
- Strengthening of the ICT systems and their use at UNAH, development of an ICT Master Plan
- Reform of university research practices
- Reform of educational practices
- Strengthening of a number of individual research and research training activities within civil engineering and microbiology (originally, social sciences were also included). This includes an upgrading and modernization of equipment for research and education
- Provision of training at the PhD and MSc levels for a number of young, talented students in Microbiology and Civil Engineering, according to the sandwich model, in cooperation with Swedish universities
- Upgrading of the library, including an INASP subscription/cooperation
- Improvements within a number of specific areas, such as laboratory safety and environment, including biological laboratory safety and waste handling.
- At a general level, planning and evaluation of the reform processes

The costs to Sida of the cooperation during the first 3-year pilot phase were close to SEK 40M (about HNL 100M). About half of this amount was spent on strengthening ICT, especially the hardware side, while research projects in Engineering and Microbiology received over SEK 12M, and reform activities in the university administration well over SEK 5M.

Some early studies of the Sida cooperation were carried out (Thulstrup, 2007). These were an important part of the background for the later reform plans at UNAH, in particular the report "Institutional Reform Projects of UNAH" by Yarzabal (2003). In 2007 the first com-

prehensive evaluation of the cooperation was made; it led to the report: “Improving University Research and Education in Honduras” (Thulstrup, 2007). Following this evaluation of the initial phase of the cooperation, Sida and UNAH agreed on a continuation of the cooperation until mid-2011, with an additional total budget of SEK 26M, as described in more detail below.

Problems in the financial management. As a result of obvious weaknesses within the financial management at UNAH, Sida financed an extensive “pedagogical” assistance through the international accounting company KPMG, especially targeting the handling of external (Sida) funding. This produced some interesting progress reports (KPMG, 2005 and 2007), but in practice the effect at UNAH was very limited.

In other words, one of the expected early outcomes of the Sida cooperation, a strengthening of the ability to handle finances effectively at UNAH, did not appear. On the contrary, from the start a slow and inefficient handling of the Sida funding was a serious, practical problem for the individual research projects. At one time, for example, two graduate students had to reorganize their study plans in Sweden on a short notice because UNAH did not process their air-tickets within a reasonable time. This was highly frustrating for the researchers: while researchers without funding are in a difficult situation, those with funding, but without access to it, may be even more frustrated.

Following extensive complaints by the researchers involved in the Sida cooperation, a series of tests of the financial management at UNAH were made, especially of its ability to handle research funds efficiently. The last test was made in 2008; it showed that the UNAH bureaucracy was still not able to handle the task, in spite of the considerable investments in targeted training. As a result, the management of funding from the cooperation was placed in the hands of the Swedish partners. The fund management in Sweden has worked well, but has also been expensive (due to Swedish overheads). More importantly, this arrangement has not provided much needed, additional financial management training at UNAH.

Research funding for the second phase of the Sida cooperation. It was agreed that the financial support for the cooperation in the second phase would be within a total of SEK 26,000,000. The second phase runs from July 1, 2008 to June 30, 2011, and the following distribution of funds between the years was planned:

Table 1.1. Second phase: Expected expenditures in SEK	
2008	5,600,000
2009	9,500,000
2010	8,000,000
2011	2,900,000

One third of the total amount, almost SEK 9,000,000 was earmarked for ICT activities, the library was to receive SEK 4,000,000, Microbiology SEK 7,500,000, and Civil Engineering close to SEK 4,000,000. In addition SEK 1,500,000 was reserved for upgrading of the UNAH research management and a small, special grant was reserved for an interesting initiative providing guidance within Biological Waste Management, a field for which upgrading was badly needed in Honduras.

2. University Management Reforms

The UNAH reform plans. The Organic Law for the University from 2004 has remained the backbone of the university reforms. In addition, the National Congress is still an important supporter of the modernization of UNAH. This means that Government funding for the reform activities is not only available at the moment, but may also be relied upon in the years to come.

The set of guidelines adopted by the Transition Commission defines the key priorities for the reforms. Research has a prominent position among these; not only research in itself, but also the actual use of research based knowledge in the solution of real life problems in Honduras. At the same time it is clear that the strengthened research ability must also be used for an important upgrading of the educational quality at UNAH, as well as at other Honduran universities.

For a while real progress in the reform of the university management was stalled by weak leadership at UNAH, but these problems now seem to be solved. As indicated above, even the particularly troubled financial management demonstrates improved attitudes, but so far this has not led to significantly improved performance.

Transforming a traditional teaching university into a research university: a challenge to the university bureaucracy. Much of the bureaucratic inefficiency at UNAH has become clear only after the transformation from a teaching institution to a research institution started to take place. Similar problems have been observed elsewhere in similar situations, for example in Bolivia (Thulstrup, Muñoz, and Decoster, 2006). In a teaching university the demands to management do not change much from one year to the next. New potential needs may be predicted long in advance, and urgent actions are rarely needed. In a research university new and unexpected demands may appear on a short notice. An instrument may suddenly require repair, or an air ticket is needed within a month or two in order to take advantage of a research opportunity.

This means that the university management, especially the financial management, can no longer be in complete control in the same way as before; instead of rulers they become servants of those who produce the main university outputs, education and research results. This is a considerable cultural change and it may be difficult for individual bureaucrats to accept such changes. Presently, there is some hope (although not yet proof) that new leaders in the UNAH administration are not only willing, but also able to adjust to the new culture.

Inefficient financial management is an increasing problem in connection with the emerging research activities also because the researchers must be able to attract international support. In order to do so, the ability to handle external funding efficiently must be satisfactory. With a few showcases of good research activities, there may be some hope that other external donors will consider supporting research and educa-

tion at UNAH after the end of the Sida cooperation. However, this is not likely to happen unless the university can demonstrate not only promising research outcomes but also sufficient management ability.

Transferring the financial management to Swedish partners. As mentioned above, a major early effort within the Sida cooperation targeted the UNAH commission responsible for financial management, but these efforts failed. As a result, the funding from Sida has mostly been handled by the Swedish counterparts, especially Uppsala University in Engineering, Karolinska Hospital in Biology, and the company SPIDER, the partner within the ICT activities. On the whole this has been satisfactory, both for the researchers and IT experts at UNAH, but due to Swedish overheads, it has taken some funds away from research and it has not provided the wanted financial management training in Honduras.

Important improvements in university management through better use of ICT. In other areas the modernization of management at UNAH has continued as planned in the second phase of the cooperation. Major progress has been achieved through the improvement of ICT services and opportunities on campus, which has led to both higher efficiency and better quality. Also the information level from the university management to staff and students have been significantly improved, not only through Internet communication but also by using large screens, placed in strategic positions on campus. It is the hope that this, among other, will strengthen the spirit at UNAH.

Even the financial management has had a major success: the computerization of the UNAH payroll gave a much clearer picture of university expenditures, and this has led to substantial savings for the university.

The insufficient UNAH team spirit in the university management. One reason that the central university management often have seemed to care little about the working conditions of the researchers may have been that the bureaucracy did not feel as part of a UNAH team, producing research results and research based training. The management staff felt that they had a life (and a justification) of their own, following the many complicated regulations. It is important that everyone at UNAH, including management, feel that they are part of a productive institution and that they feel proud of the UNAH accomplishments in education and research.

It is a promising development that the new leadership within the UNAH financial administration seems to take a fresh view on the matter. They have stated that they feel a true responsibility towards the directly productive parts of UNAH, teachers, researchers and students. Although they still at times will have to struggle with complex bureaucratic rules, there may be a hope that in the future they will be able to contribute significantly towards an improved university performance.

3. Research Funding and Infrastructure, Including the Library

Improved funding opportunities for research at UNAH. As discussed above, funding for research at UNAH used to be very limited. Today the situation is much better. Not only has the special funding and guidance through the Sida cooperation created new research flagships at UNAH. Equally important, substantial amounts of state funds provided through UNAH have become available for active researchers in any field.

The state funds for research at UNAH has made it possible for it to act as a “research council” for its researchers, providing grants opportunities for research active groups and individuals. Presently about USD 500,000 per year is available. This amount is divided into grants for research groups and grants for individual researchers. The former grants have a maximum size of USD 28,000; 7 grants of this kind were awarded in the last round. The latter grants fall in several categories, from USD 13,000 for outstanding individual applications to USD 1,400 in support for individual, outstanding research students. It may be noted that these latter grants are also available as co-financing for graduate students who are otherwise supported through the Sida cooperation or other outside sources.

It is of great importance that the Honduran Government provides more substantial research funding on its own and does not leave this completely to foreign agencies, as it is often seen in developing countries. The interaction and complementarity between Sida funded activities, with stricter “international” guidelines and rules for evaluation and accountability, and the more flexible funding through UNAH, is likely to be beneficial.

Improved library support for research and education. The upgrading of the library at UNAH is an important part of the modernization of the university. It is to a considerable extent financed through the Sida cooperation and has received important intellectual support from the UNAH ICT group. Also the International Network for the Availability of Scientific Publications (INASP) has been helpful in several ways, not only for UNAH, but also for other Honduran institutions. The support from INASP include a number of specific activities, including:

- Improvement of the access to online research information
- Training in the use of online library services, especially with regard to the needs of researchers
- Expanding the availability of other online bibliographic resources in Honduras
- (English) language training for the Library staff from UNAH and other universities as well as for researchers
- Development of a national library consortium in Honduras
- Development of a Honduran inter-library network

As a result, a number of leading international journals is now available for researchers at UNAH and other Honduran institutions through an INASP program. Further courses and workshops have been held at a number of Honduran campuses on efficient use of bibliographic resources, for both librarians and library users (especially researchers). This will be of great value in connection with the expected future increased production and publication of scientific articles. Among the training activities was a post-graduate diploma course at Universidad de Pinar del Rio in Cuba in which 25 persons, mainly librarians, from nine Honduran institutions took part.

A software package called ALTAIR has been purchased and installed in the library. ALTAIR replaces the traditional, inefficient manual library procedures in connection with book classification, cataloguing, book loans, etc. It also can be used to establish a user database, useful for many purposes.

A special, advanced scanner was purchased for several purposes, but especially in order to digitize (and secure) the Honduran bibliographic heritage. It will now also be possible to make such documents available on the UNAH Intranet.

Honduran research journals. Honduran research journals are generally weak, and are read by few. Nor do most local journals provide enough editorial support for inexperienced authors. It is thus important that UNAH (including the Library) provides as strong support as possible for researchers who want to publish internationally.

For authors who publish locally, a special effort has been made to improve the knowledge about Honduran research, and to increase the availability of research papers by Honduran authors, both within and outside Honduras. This has, for example, been done through INASP guided online journals. However, this is an emergency solution. It must be stressed that publication of research results in traditional, well-recognized international journals should be preferred, whenever possible.

The urgent need for UNAH researchers to improve research dissemination. The commendable efforts to improve research dissemination are still quite new, and international publication of research results from UNAH is still very limited. International publication of research results is important for several reasons; thus the limited publishing is a fundamental problem for UNAH. Getting feedback on a paper from international researchers is necessary in order to improve the insight of the authors and an important way to upgrade research quality. However, another obligation should not be forgotten, not only other researchers but also research users (in industry, the public sector, etc.) should be informed about ongoing research in their field. At the moment much of the research at UNAH is not well known outside the university (or even outside the department of the author).

In summary, publication of research results usually has several purposes and it must target both:

- International experts in the given field, for quality control and exchange of information. This is usually done through subject-specific international research journals. This is also how new researchers are accepted in field-specific, informal research networks
- Local users of the research results, such as small industry, authorities, local communities and others. This may best be done through local or national publications, in-service training, seminars, or even through the media.

In addition to the traditional research outlets, journals in paper format and books, online publishing is becoming increasingly important. This kind of research dissemination may have a great future. However, the strongest journals with the widest distribution and the best support for authors (especially the best and most supportive reviewers) are still of the traditional kind.

Another obstacle to international publishing is insufficient (English) language skills. The library has therefore also provided special English language training for potential authors at UNAH. Presently, English is the dominant language for international research communication in essentially all fields.

4. Important Progress in the ICT Services at UNAH

The ICT Master Plan for UNAH. Among the most ambitious activities under the Sida cooperation is the upgrading of ICT hardware and software on the campuses, especially the one in Tegucigalpa. Since provision of hardware does not accomplish much on its own, a substantial amount of training is also carried out, both of those responsible for the ICT hardware, software, and training provisions and of the numerous (potential) users among staff and students. Since the start of these activities the work has been guided by the ICT Master Plan for UNAH.

This plan includes:

- Improvement of the capacity through provision of modern ICT infrastructure and information systems to UNAH staff
- Transformation of the educational system through e-learning, e.g. by supporting a shift from the reproduction to individual design (demands for memorisation to be replaced by creative tasks)
- Transformation of the library from a traditional library into an information and knowledge center to a large extent based on ICT services
- Improvement of the efficiency and effectiveness of library services at UNAH through advanced ICT based solutions
- Production of local content, especially in digital form and on the Internet
- Streamlining administrative and managerial processes and management reporting, both at the national level and the university level by means of a computerised Management Information System
- Promoting a wider use of computers in the university management, for example the financial management
- Development and implementation of ICT training programs at different appropriate levels for different categories of ICT end-users among staff and students
- Development of a data communication network spanning all locations at UNAH
- Establishing a dedicated, service oriented organisation through a secretariat for ICT support, responsible for management, control and maintenance of common ICT resources at UNAH

As an added benefit, the openness created by the expansion of ICT services at UNAH has helped increase the understanding of the UNAH reform plans among staff and students.

Co-financing between UNAH and Sida. The total budget for the ICT upgrading up to 2011, and especially for the hardware provisions included in the Master Plan, is about SEK 50M, of which the Sida cooperation will cover close to half, UNAH the rest. This co-financing, which is also seen elsewhere at UNAH, is an interesting model. While Sida not only provides funding, but also outside expertise, strict rules

and evaluations, the considerable UNAH investments in the activities ensure that the university can claim ownership and that it feels fully responsible for the ICT development.

The ICT Master Plan does not only cover the main campus in Tegucigalpa, but also other campuses. San Pedro Sula and La Ceiba are major ICT centers among these, but also Choluteca, Danlí, Olancho, Comayagua, Olanchito, and Copán are included. The ICT upgrading is a very important ingredient in the UNAH reform – one might say that a successful implementation of the ICT Master Plan is a necessary condition for the success of the UNAH reform processes in general.

The Executive Directorate for Technology Management, DECT. The extensive effort within ICT on the UNAH campuses, both hardware and software related and training, has been directed by a directorate called DECT (Executive Directorate for Technology Management) in cooperation with the company SPIDER, located at the IT University in Kista, Sweden.

Connecting researchers, teachers and students at UNAH with the Internet. An underground fiber-optical ring, connecting many important buildings on campus, now serves the main UNAH campus in Tegucigalpa. High priority was given to the buildings in which the most research active staff members, including those involved in the Sida cooperation, are located. The ring has a total length of about 3 kms. Within the individual buildings wireless connection are used. Also some permanent radio links have been established with university departments further away from the main campus, e.g. the Medical Faculty located at the University Hospital.

The three main UNAH campuses, Tegucigalpa, San Pedro Sula and La Ceiba now have a total of 34 telecommunication rooms with optical fiber and UTP cable connections. These rooms make it possible to have Internet connection in all classrooms in 27 buildings in Tegucigalpa, and two in San Pedro Sula and La Ceiba. Furthermore, special software provisions have been made for the regional centers. For example, the San Pedro Sula and La Ceiba campuses has been given special access to the PERI Program (Program for Enhancement of Research Information), which gives access to important research databases.

Work is in progress connecting remote faculties to the central ICT platform. So far the faculties of Medicine, Dentistry, and Distance Learning have had computer labs installed to secure this, but many additional computer labs are still required.

The UNAH web services. Among many other important tasks handled by DECT are the improvement of the UNAH web-page, publication of an ICT bulletin, strengthening of the UNAH management information systems, for example the financial management information system (part of which is still operating without computers), creation of a curriculum management information system, etc.

The very important UNAH web portal has now been complemented with a back-up system. UNAH intends to use e-learning extensively, and for this purpose a platform called Moodle has been installed. The Distance Learning activities at UNAH will benefit greatly from the technology platform that has been developed and installed. Presently 20 courses are available on this site.

Meetings based on Internet connections. The availability of Internet connections open up many new opportunities. A major meeting called

“UNAH Virtual Campus First Meeting” has been organized. It had both national and international participants and almost 2000 additional participants were connected by the Internet. This was a success that demonstrated to the many participants some of the ICT opportunities for academic purposes and the fact that UNAH is becoming active in this area.

Many consider videoconferencing a useful replacement for personal visits, saving both travel time and money. Videoconference equipment has been purchased and installed on individual UNAH campuses. It has already been used for communication between different campuses, which was considered the main purpose. However, the equipment has also been used to connect UNAH with universities in Spain, Brazil, Mexico, and other countries. Both thesis presentations and virtual classes have been carried out with the new equipment.

Extensive ICT training activities. In parallel with the hardware and software provisions a huge training effort has taken place, both of ICT staff and users. Fourteen ICT technicians and managers were sent to the Royal Technical University, KTH, in Stockholm, Sweden, and the Technical University in Delft, the Netherlands, to undergo extensive training within information systems and networking. Furthermore, 34 instructors and 19 technicians have been trained as Microsoft Office Specialist Instructors.

About 60 persons, not only from Tegucigalpa, but also from other UNAH campuses have been trained as Cisco Certified Network technicians; DEGT wants at least two with this background at every regional center in order for them to be responsible for several aspects of the local ICT development. Among other, they will perform standard maintenance of the equipment.

In addition to these different training activities for specialists, primarily ICT staff, large amounts of training, usually in the form of workshops, have been provided to ICT users among students and staff at UNAH, both specifically in connection with library activities (see above), and for other applications.

5. Integrating Education With Research and Real Life Issues

Bringing research and real life issues into the education. In real life, after graduation, subject matter competence is only one of many required skills. Competencies within communication and ability to work in teams are, for example, among the skills that are rated highest by employers of university graduates. Also innovative and critical skills are very important in the modern workplace. Such abilities are often not developed by educational strategies that place high priority on lectures and memorization of textbook material. Not does the traditional academic emphasis on ivory tower subjects prepare the graduates for the real life problems they are likely to encounter after graduation. Thus, other methods must be included in the educational strategies.

Education, research, and real life. The proposed reforms can only be realized if the traditional curricula are reformed. Inclusion of real life concerns in the educational materials would be a highly useful part of a curriculum reform, including concerns for the environment, poverty reduction, health, and many other fields. Often research activities may be directed towards specific aspects that play an important role in real life. This is both motivating and beneficial for the students involved; very efficient learning may result from student activities within the center area in Fig. 5.1, where research, education and real life activities overlap.

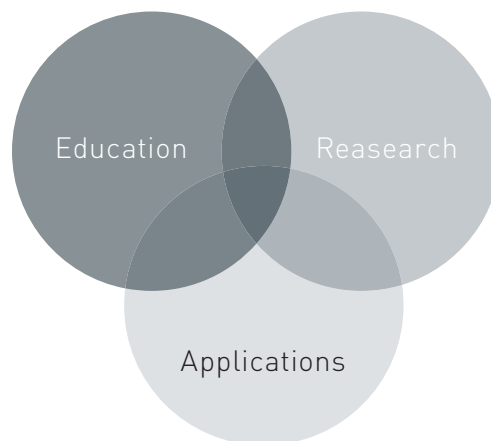


Figure 5.1: The relation between Education, Research, and Applications in efficient curricula (Thulstrup, 1999).

In some ways UNAH has excellent opportunities for integration of real life applications into the educational activities. One reason is that Honduras has many unsolved problems that require research based solutions and may motivate students; another reason is that many students have jobs and consider the university studies as a kind of in-service training. This might make it possible for them and their teachers to locate relevant real life problems.

Introducing research activities is difficult in many fields, because of the limited number of active researchers at UNAH. However, even without strong research activities it may be possible for the students to experience their own ability to create new, relevant knowledge through small, research-like projects. However, the best experience may come from small student projects connected to ongoing stronger research activities.

Undergraduate research. In some of the Sida-sponsored research groups undergraduate students are given a chance to do their own research projects; this may replace the required community service project in their last undergraduate year. One important motivating factor for these students is that they are given a chance to work in up-to-date laboratories, established under the Sida cooperation. It seems like access to modern laboratories provide a particularly strong incentive in developing countries. Similar observations were made in Bolivia a few years ago (Thulstrup, Munoz and Decoster, 2006)

The internal, Government sponsored research grants at UNAH may in some cases be given to students, which may further facilitate research at the undergraduate level. Undergraduate research is important for several reasons. In addition to the high student motivation and the feeling of self-reliance that may come from active research, these undergraduate students may become motivated to enter graduate programs. At the same time it will be possible for those responsible for the graduate training to select the most talented and motivated young researchers.

Earlier emphasis on memorization by students at UNAH. Among several severe weaknesses of traditional, lecture-based education, one of the most dangerous is the encouragement of extensive memorization, even among bright students. It is highly shortsighted to replace the understanding of key concepts and of the relation between theory and practice with memorization. This is not a problem only in developing countries, it is a problem in universities around the World. One solution that has worked well in China and elsewhere is to replace some of the traditional lecture based courses by problem based learning (PBL) activities and, especially, by allowing open book examination (which by itself eliminates the need for extensive memorization). Undergraduate students at UNAH must perform a community service project during their last year, unless they can replace it by a research project. Such community service projects may also provide an ideal setting for PBL activities.

6. Research Capacity Building in Specific Fields: Civil Engineering and Microbiology

6.1 GENERAL OBSERVATIONS

The selection of individual research projects. An extended dialogue at the start of the cooperation between UNAH and Sida (Yarzabal, 2003) led to an agreement about a limited list of carefully chosen research projects that initially should be given support. All these projects deal with issues of essential importance to Honduras and they are staffed by senior researchers with at least some research experience. Most importantly, they all include a number of talented students, suited for research training.

The fields chosen were:

- Civil Engineering - Hydrology related to the Choluteca River Basin
- Civil Engineering - Landslide safety related to El Reparto
- Microbiology, Tuberculosis
- Microbiology, HIV
- Microbiology, Malaria

Originally, some support (in total around SEK 1,000,000) was also given to a Social Sciences project dealing with municipality, decentralization, and development, but this did not lead to a proper long-term research project under the cooperation.

The main purposes of the support for individual research projects under the cooperation include:

- To create experience at UNAH on how to best strengthen research to a high level in specific fields
- To train present or future UNAH staff members to the level of MSc or PhD in order to improve both education and research in specific fields at UNAH
- To build up the research infrastructure in the specific fields at UNAH
- To create experience elsewhere at UNAH (within management, finances, libraries, etc.) on how to deal with active researchers involved in international research
- To demonstrate the benefits of active research, both academically (e.g. as support for educational activities at UNAH), and in relation to the needs of the Honduran society (by helping solve real societal needs)
- To provide experience on the opportunities and problems in international research cooperation between UNAH and foreign (in the present case Swedish) institutions – in the future UNAH is likely to have to increase such international cooperation extensively
- To serve as role models for other research groups at UNAH. Earlier only a limited number of other strong research groups had been established at UNAH, mainly in medical fields

- To create insight and positive publicity within and outside UNAH about research activities, research results, and research based training. So far much of the public in Honduras has mostly heard negative news about UNAH

The training of future research staff: A highly important task. The training of young talented researchers, who already have (or are guaranteed) full time research positions at UNAH after graduation, is given the highest priority in the cooperation. The training takes place in cooperation with leading Swedish universities, many of which have extensive experience in research cooperation with developing countries (Thulstrup, 2009). The research training level aimed for was (whenever possible) a PhD, otherwise, at least initially, the target was an MSc degree¹. The fact that the studies aim for Swedish degrees has some important advantages. In particular, it means that strict quality demands apply; these formal Swedish requirements may, for example be the number of papers in international research journals, etc.

The fact that the graduate students under the Sida cooperation are guaranteed proper employment at UNAH after graduation is an important issue. Some Sida-cooperation countries, from Ethiopia to Bolivia (see Thulstrup, Munoz and Decoster, 2006), have had problems placing such graduates in proper positions at their home universities, in spite of a severe need for research trained academic staff. It has also been a strength that all graduate students were young; in some other cases there has been a tendency to reward deserving old staff members with a foreign degree.

The successful sandwich model. The graduate studies are carried out according to the highly acclaimed sandwich model, in which the graduate student spends periods, typically one semester, abroad (in Sweden), alternating with similar periods in their home country (Honduras). The duration of the visits at home and abroad varies according to individual needs. Compared with the traditional, overseas graduate training in which the student spends several years in a foreign institution without interruption, the sandwich model has a number of important advantages, including:

- Contact with the home environment is preserved.
- The visits at home makes it not only possible, but also much more attractive to work on project of national interest in the home country. Whenever required, activities such as field studies can be performed during the visits at home
- Upgrading of the research environment at home (especially laboratories) may take place during the studies, thus making it possible for the student to work more constructively during home visits as well as after graduation
- While the graduate students are abroad, they may gain experience with regard to the specific instrumentation to be procured for UNAH under the cooperation
- Having both a Swedish and a Honduran adviser (usually senior researchers) associated with each student may help increase the research cooperation between the two senior researchers and thus

¹ Note that MSc in this connection corresponds to a Swedish licenciate exam, which usually is considered a half-way control for PhD students

also between research groups the two universities. Such cooperation is likely to be highly beneficial for UNAH

Initially, the majority of the study programs were planned to target the PhD level directly, but after some experience had been gained about the student qualifications, it was concluded that most of the students should not proceed directly towards PhD degrees, but should aim for a Master (licentiate) degree first.

The status of the graduate studies. It seems clear that the present 8 Honduran students generally have satisfied their Swedish advisers and have had a reasonable degree of academic success. Presently, near the end of the cooperation, one PhD student has graduated and the remaining seven students are approaching graduation, as shown in Table 6.1. In spite of a few delays and other difficulties (see below) all of the eight students are expected to graduate successfully with MSc or PhD degrees during 2011.² The PhD student who graduated in early 2011 has accepted a post-doctoral position at Karolinska Institute in Stockholm as discussed below.

Table 6.1 Graduate students under the Sida-UNAH cooperation

Project, university	Students	Degree	Expected date of graduation
HIV, Karolinska Inst.	Wendy Murillo,	PhD	September 2011
	Leda Parham	MSc	Dec., 2011 or January, 2012
Tuberculosis, Karolinska Inst.	Senia Rosales,	PhD	Graduated in January, 2011
	Nancy Alvarez	MSc	December, 2011
Malaria, Karolinska Inst.	Irina Jovel	MSc	December, 2011
Hydrology, Uppsala U.	Jose Guerrero,	PhD	September, 2011
Uppsala U. -> KTH	Zairis Coello	MSc	June, 2011
Geotech., Uppsala U.	Elias Urquia	MSc	June, 2011

Funding for the second phase. Of the total funding of SEK 26,000,000 for the second phase, individual research projects received close to half, almost SEK 12,000,000. Of this amount Microbiology received SEK 7,500,000 and Engineering close to SEK 4,000,000. An initiative with in Biological Waste Management was also funded (see below).

As a result of the failure of the old financial management at UNAH to support the research projects effectively, the Swedish advisers and their universities had to take care of the management of Sida funds. This has worked in a satisfactory way, but the emergency solution has not been cheap due to Swedish overheads.

Gender balance. Both the Department of Microbiology and the Department of Civil Engineering suffer from severe gender imbalances, but in different directions. It is often assumed that an even gender balance improves the work climate in research projects. However, contrary to Microbiology, Civil Engineering must be complemented for having some degree of gender balance among their three sandwich students (one female and two male students).

The quality of the graduate students. As indicated above, a clear difference between Civil Engineering and Microbiology could be observed in the ability of the graduate students to perform research with their Swedish advisers. While the satisfaction among Swedish advisers with the graduate students from UNAH generally has been very high within Microbiology, the quality of the Civil Engineering students has varied more. A Swedish adviser of Civil Engineering students says:

“The main problem has been lack of understanding what research is and difficulties in seeing a future as researcher at UNAH (or in Honduras)”

This may be seen as a result of an insufficient introduction to research given at UNAH for the Engineering students. Another point mentioned by the Swedish Engineering advisers is that the selection of graduate Engineering students has been made more on the basis of language (English) competence than on the basis of research talent and motivation. However, these latter qualities were clearly hard to estimate without suitable research activities before the selection.

In Microbiology the research environment is stronger, and most potential graduate students have carried out research projects already during their undergraduate years. In general the satisfaction with graduate Microbiology students is high among Swedish advisers. When asked, one of the Swedish Microbiology advisers says:

“I feel that the students have been extremely well selected and prepared for the PhD and MSc studies in Sweden. It has been a pleasure to have them here. They have been very good in the lab, clever and hard working, their English has been surprisingly good. I appreciate that they have a very clear ambition to do something good for Honduras in general and for HIV patients and clinicians in Honduras in particular. I also appreciate that they clearly have the ambition to continue their work in Honduras, i.e. no brain drain”

This demonstrates the great importance of an early introduction to research, for example through undergraduate research projects.

The communication between advisers in Honduras and Sweden: an important factor. In the Microbiology projects the cooperation and communication between Honduran and Swedish senior partners have been highly satisfactory. In the Civil Engineering projects the communication has been less efficient, partly due to staff changes within the Engineering Faculty at UNAH and initially also due to insufficient e-mail possibilities.

In the Microbiology projects the efficient cooperation has resulted in joint research papers, published in good, international journals and regular mutual visits: the good communication has made it possible to instantly adjust study programs whenever needed. It seems likely that the research cooperation will continue in the Microbiology projects after the end of the formal Sida-UNAH cooperation.

In general the communication between advisers at UNAH and in Sweden has been less than satisfactory in Engineering. A Swedish Civil Engineering adviser says about his counterparts at UNAH:

“The main difficulties have been their occupation with other business outside of UNAH and their limited research experience. They have little time to devote to research. Most teachers we have met have been more like consultants in their way of thinking. We have seen five deputy supervisors over the years and the common problem (with one exception) has been keeping regular contact. On the other hand we have always been very well treated on our visits and the dean of the faculty has been a great facilitator.”

There was also occasional dissatisfaction on the Honduran side. An UNAH Engineering adviser felt that he did not received sufficient information from his counterpart in Sweden, clearly a result of insufficient communication between the two groups of Engineering advisers. The situation in Civil Engineering is a clear contrast to the satisfaction with the cooperation in Microbiology.

Continuation of the international cooperation after the end of the UNAH-Sida agreement. A continuation of the cooperation will be of great importance, not only for individual (former) research students, but also for their research groups at UNAH. It is therefore satisfactory that, irrespective of the various problems, most Swedish advisers in both Engineering and Microbiology would like to continue the cooperation with the UNAH students after their graduation and return to Honduras. However, some mention lack of financing and time as potential obstacles.

So far Swedish advisers of Sida partnership students and the Swedish institutions involved have received a satisfactory compensation from the Swedish Ministry of Education and Sida, covering both the direct research expenditures and the time spent on these students (Thulstrup, 2009). In the case of Honduras this fortunate situation will change after the present students have graduated and the UNAH-Sida cooperation has ended. As a result a continued close cooperation will require that the necessary funding can be found elsewhere.

Cooperation with partners in other countries is usually a necessity for researchers from small countries. There is no doubt that many Honduran researchers would benefit much from a closer cooperation with foreign researchers in their field. In Latin America several countries have excellent research facilities, and both Mexico and Brazil offer quite generous grants, including access to such laboratories, as described below.

Another possibility would be research cooperation with other small countries in Central America. Costa Rica has had a substantial amount of strong research activities in several fields for some years and Panama is expanding and improving its research activities very fast these years. The actual cooperative partners will have to be chosen in each different case, based on specific information about their research. However, some of the laboratories at UNAH are now so well equipped that this will make them attractive for others. Some might, for example, want to send research students to UNAH.

Funding research activities in the future. Not only within Civil Engineering and Microbiology, but also in other fields aiming to upgrade their research activities, funding must be located. One obvious source is the UNAH research grants, but even with the necessary increase of funding for these local grants other sources must also be found. Annex 4 describes some of these opportunities together with advice on how to best apply.

Among the opportunities listed in Annex 4 some may be particularly well suited for the (so far) Sida supported research projects and other projects at the same level. These opportunities include several hundred annual grants that are given by TWAS, the Academy of Sciences for the Developing World³ (see below).

The biological waste initiative. This special, small project serves an important role in Honduras where such safety concerns are still fairly new. Among the wanted project outcomes, that have already been produced, are

- to increase the awareness of the risks that may be associated with biological waste
- to train staff at UNAH and others so that they can handle these risks
- to produce a manual on the handling of biological waste
- to install an incinerator so that biological waste can be burned safely
- to distribute safety equipment such as garbage bins, masks, etc.

The incinerator and safety equipment have been provided through the cooperation between Sida and UNAH, but the project has had no foreign partner. There is, in fact, little doubt that cooperation with an experienced foreign partner would have made many of the tasks easier, but the researchers involved have managed to handle the problems on their own. Unfortunately the Honduran authorities have taken very long to give the needed permission to use the kiln. Instead unsafe biological waste has to remain untreated for months (or years).

Now the task is to make sure that the new guidelines are being used, both at UNAH, where the university leadership must take action, and elsewhere in the country, where biological waste may cause problems.

Another issue is that the project primarily deals with liquid waste. Extensions to other waste problems including waste in the form of solids and gases, which are not included in the project, would be of considerable interest. Guidelines for chemical waste are also needed. It may be added that the US National Research Council has recently produced a manual with quite complete guidance of this kind, particularly targeting chemical waste in developing countries⁴.

Celebrating the accomplishments of the UNAH-Sida cooperation. In late March 2011 two important meetings were held at UNAH, celebrating the results obtained during the cooperation between UNAH and Sida. The first, held on March 22–3, displayed both the impressive ICT advances and the research progress in Microbiology and Civil Engineering (as well as the waste project). A range of research related issues were also discussed. The second meeting, on March 24, dealt with the substantial progress made by the UNAH Library and the future of e-libraries. The programs of the two meetings are found in Annex 3.

The two meetings demonstrated clearly the significant impact of the cooperation, as well as the gratitude to the Swedish partners from both the groups directly involved and from the UNAH leadership.

³ For more information see <http://twas.ictp.it/prog/exchange/fells/fells-overview>

⁴ The highly useful guide with supplementary materials may be downloaded for free in developing countries, see <http://dels.nas.edu/global/best/Chemical-Management>

6.2 RESEARCH CAPACITY BUILDING AND EMERGING RESEARCH OUTPUTS: CIVIL ENGINEERING

The two Engineering projects. Both Engineering projects have dual purposes. On the one hand, the aim is to create research competence in the two fields at UNAH, on the other hand it is to contribute directly to the solution of important problems in the Tegucigalpa area. One of the projects deal with the upper Choluteca River, which runs through Tegucigalpa, the other with El Reparto, a major landslide, also located near (in) Tegucigalpa. The partner in Sweden was initially exclusively Uppsala University, with which some contacts existed before the start of the cooperative project. Today one of the graduate students has moved to the Technical University in Stockholm (KTH).

In Honduras, the opportunities outside academia are excellent for (civil) engineers and academic careers seem less attractive for many. Thus it may be difficult to attract a large talent mass to engineering research; it is often considered better to graduate fast and get a well-paying job. One solution to this problem may be to get a larger number of undergraduate engineering students excited about research, for example by engaging them in small research projects.

The Hydrology project. The Hydrology project deals with the Choluteca River, which causes several problems in Tegucigalpa, from flooding during the rainy season to pollution caused by sewage from the city when the water level in the river is low. This pollution is especially harmful for the aquatic life, and a plan for integrated water management is badly needed.

Several pieces of new, essential equipment have been provided for the Hydrology project under the Sida-UNAH cooperation. Among other, this makes new field studies of the river possible, both in the rainy and in the dry season.

Graduate studies. It was the intention that two Hydrology graduate students should start the training at Uppsala University directly in PhD programs. However, it was soon decided that they should instead start out with training for MSc (licentiate) degrees. In addition to their engineering studies, they have also received pedagogical training and have been able to practice these skills on students at Uppsala University. The first of the students has completed his MSc. He has produced two (so far unpublished) papers in 2007–8 and on the basis of these papers, the MSc thesis was submitted in 2009. Later he has published two papers in international journals with Swedish (but no other Honduran) co-authors. He is expected to graduate with a PhD later in 2011.

The second student started her studies later and she experienced an additional delay when she for personal reasons decided to move from Uppsala to the Royal Technical University in Stockholm (KTH). She expects to complete her MSc in a few months and Uppsala University has promised to help cover the cost of her further studies at KTH until the expected graduation with a PhD in 2013. The student has been working on two papers for some time, but they are not yet completed. It is not clear where they will be published; at the moment the MSc thesis is the main priority.

The landslide project. El Reparto is a large and deep landslide. During the rainy season it presents a severe threat to hundreds of citizens in Tegucigalpa. The project attempts to understand the factors that influence the movements of El Reparto and try to develop a warning system for the endangered Tegucigalpa residents.

The cooperative project has led to a substantial strengthening of the relevant infrastructure at UNAH, especially in the form of equipment for the Geotechnical Laboratory. The final purchases in connection with the UNAH-Sida cooperation are presently being made.

Graduate studies. The single graduate student started his studies late, partly due to a long planning process, but he is now making good progress at Uppsala University. He expects to complete his MSc in 2011 and to continue his studies towards a PhD. Uppsala University has promised to finance his further PhD studies after the end of the Sida-UNAH cooperation. The student is presently completing his first two research papers that will be part of the background for his MSc thesis.

6.3 RESEARCH CAPACITY BUILDING AND OUTPUTS: MICROBIOLOGY

The three Microbiology projects. The Department of Microbiology has been research active for several years and has earlier received some research support from international sources, among other from the European Union, USA, and Canada.

The purpose of the Microbiology research projects is not only to create basic research competence in the individual specializations, but also to work directly towards the solution of some severe health problems in Honduras. The areas covered are HIV, Tuberculosis, and Malaria. In all these fields the cooperative partner in Sweden is Karolinska Institute in Stockholm, where 5 graduate students have enrolled and one of them, from the Tuberculosis project, already has graduated with her PhD.

Overall, the UNAH-Sida cooperation within Microbiology has progressed very smoothly and productively, with some moderate delays, which are often seen in such cases. However, some of the delays were of another nature. During the years when the old UNAH financial management group handled the funding from Sida, major problems were created, and this led to seemingly unnecessary delays that are still felt in the projects.

The improved capacity in Microbiology has made it possible to strengthen graduate training activities at the MSc level in Honduras. Presently eight MSc students are getting ready to complete their degrees in infectious diseases later this year. Plans for further expansion of the graduate training programs exist; the scientific competence exists, but the plans will require more laboratory space. The UNAH leadership is aware of this situation.

Improved laboratories. The upgrading of research competence has been associated with a major improvement of the research laboratories as described below. The modern laboratory equipment in the Microbiology projects has had a range of positive effects, also outside the main research projects themselves. For example, it has been possible each year to attract groups of outstanding students for research projects at

the end of their undergraduate studies. Also other undergraduate students benefit from the improved facilities and the increasing research competence in Microbiology. An additional and important result of the active research is improved educational quality. Once these students graduate and enter the workplace (e.g. in hospital laboratories), this is likely to not only help patients, but also to improve the reputation of UNAH.

Chemistry is presently being upgraded at UNAH with a new and advanced building, not far from the Microbiology building. Among the key priorities in the new building is work on medicinal chemistry. It will be interesting to see how the expected better preparation of undergraduate students in Chemistry as well as an increase in the cooperation with pharmaceutical industry can influence education and research in Microbiology.

The Tuberculosis project. The research within the Tuberculosis (TB) project deals in particular with two specific problems:

- Drug resistance and the spread of drug resistant TB in Honduras
- TB-specific immune responses

In both areas, the goals are the creation of basic and applied research capacity as well as analytical capacity for practical purposes. In addition it is the aim to help reduce the related health problems in Honduras.

The project has managed to develop successful cooperation with relevant national laboratories, in particular the National TB Reference Laboratory in Tegucigalpa. This has made it possible to transfer technology and knowledge to key users in the country and several training activities for health staff outside UNAH have been organized. To some extent this ability for applications is a result of an earlier cooperation between the Department of Microbiology and Global Fund activities in Honduras. In this connection the Department provided technical advice, including the production of guidelines and manuals for diagnosis of Malaria and for how to incorporate TB and HIV topics in the curricula on higher education. The Department also organized round table discussions among stakeholders on antiretroviral treatment and helped establish national networks on the diseases. Finally the equipment in the Department was made available, e.g. in connection with the diagnosis of TB.

Equipment for about USD 100,000 has been provided through the Sida-UNAH cooperation. This has made it possible to create a modern and efficient Laboratory for Tropical Diseases, which is highly attractive, both for more senior researchers, but also for talented undergraduate students. It may be added that the cooperation has also covered the salary of a key lab assistant.

Publication of research results in international journals, co-authored by Honduran and Swedish senior researchers is continuing. It seems almost certain that the cooperation will continue, also after the end of the Sida-UNAH cooperation.

Graduate studies. Two graduate students from UNAH have been trained at the Karolinska Institute, according to the sandwich model. The first of these students has already graduated with a PhD and has received a postdoctoral fellowship from her host institute in Stockholm. The planned research will deal with how to improve prevention and control of infections in hospitals. It is interesting that this project is quite

closely related to the handling of biological waste and thus provides a useful follow-up of the pioneering efforts in this field at UNAH (see above).

The second graduate student is still working towards her MSc which she expects to finish late this year, after a small delay due a severe illness in her immediate family. She hopes to continue with her PhD studies at Karolinska Institutet, and her advisor there is positive, although funding has not yet been found.

The drug resistant HIV project. The project deals with the molecular epidemiology of HIV/1 in Central America, specifically in Honduras, but also in Belize, Costa Rica, El Salvador, and Panama. One particular interest is the drug resistance among infected babies and pregnant women.

The project cooperates with researchers at Karolinska Institutet and this has led to several co-authored publications in international journals. Much of the research is based on material collected among patients in Honduras. The chances seem very good that the cooperation with Karolinska Institutet will continue after the end of the Sida cooperation. Like the Tuberculosis project, this project also cooperates with important Honduran government laboratories.

A substantial amount of essential equipment has been procured for this project. So far, the cost of this equipment has been close to USD 150,000. Together with some UNAH financed building reconstruction it has made it possible to establish modern and highly attractive laboratories, which are used by many young researchers, including a number of talented undergraduate students.

It may be added that the instrumentation in these laboratories, which is unique for Honduras, has been important in connection with serious health threats to the country, including the H1N1 Influenza breakout in 2009, when foreign and local experts were given access to the modern equipment for essential tests. Also during a dengue fever breakout the well-equipped laboratories were used for such purposes.

Graduate studies in HIV. Also in this projects two graduate students have carried out their research training at Karolinska Institutet. The first of these has already co-authored her first international publication and she expects to complete her PhD in 2011. The second student is planning to complete her MSc very soon. It is not yet clear if she will be able to continue her studies for a PhD.

The Malaria project. Malaria is quite common in Northern Honduras and the Malaria project presently concentrates on the available drugs, drug resistance, and how this resistance spreads. This is done in cooperation with the National Malaria Laboratory and with the local health authorities in the main malaria region in Honduras. This way, it is possible to transfer new, research based knowledge to the areas in Honduras where it is needed the most.

Karolinska Institutet is also the Swedish partner for this project. The cooperation is progressing reasonably well although it has not yet produced common international publications yet.

Graduate studies. A single student has been working on her MSc at Karolinska Institutet. The studies have progressed well and she expects to graduate by the end of 2011. So far no agreement about continued studies towards a PhD has been made.

7. Conclusions

The reform process at UNAH. The reform plans designed by the Transition Commission were quite visionary and many of the ideas seem to succeed, although in some cases only gradually. There is little doubt that the early involvement of Sida was essential for the shape of the reform ideas.

The situation for research at UNAH is today constantly improving. Research activities are gradually becoming better recognized on the campuses and conditions for active researchers at UNAH have been improved in several ways, for example with respect to funding, ICT support, library services, etc. and in some cases also through improved physical facilities.

The National Congress seems to have a continued interest in the development at UNAH and to be aware that sufficient funding is needed in order to run a state-of-the-art research university. The research funding in Honduras is still very limited on an international scale (and compared with needs and opportunities). It remains to be seen if the media in Honduras will support the new development at UNAH. This would be an important improvement compared with the earlier emphasis on negative aspects at UNAH. However, the university is now in a much better position to demonstrate its increasing accomplishments.

The UNAH Team spirit: still a weak point. The insufficient team spirit at UNAH has over the years been a big problem for the university. The recent progress may help improve the situation. For example, ICT improvements, such as the UNAH web site, now make it possible to better inform staff and students, as well as people outside UNAH including the media. In particular, successes in research or societal contributions may become better known, both on campus and in the Honduran society. This kind of information services can be updated on a daily basis and may help change both the spirit at UNAH and the image of UNAH in the country. In addition to improving the team spirit at UNAH educational tasks are also important, for example explaining to everyone the immense power of research based knowledge when it comes to real life problems.

The improved availability and use of ICT at UNAH. A very important reform activity is the introduction of ICT on a wide scale at UNAH. Considerable investments in hardware have been made both through the Sida-UNAH cooperation, but also by UNAH itself. In spite of a few occasional problems, the coordination between the two investors has been satisfactory. As a result the initial master plan for use of ICT at UNAH has largely been followed. This plan was both ambitious and comprehensive and it now seems to be succeeding. This is essential for the overall reform efforts at UNAH.

Today many at UNAH, from researchers to teachers, other staff, and students are able to benefit from the new ICT opportunities. In addition, the level of information concerning university matters has been greatly enhanced.

Progress within the management reform. For several years the progress within management reform at UNAH was very modest, especially with regard to the financial management. This area resisted all attempts to modernize it, including extensive assistance by a competent foreign accounting expert. While some improvements took place in purely technical areas, new administrative manuals were produced, etc., the old-fashioned bureaucratic thinking among the leading staff members did hardly change at all.

Recently a new dynamic leadership of the university has taken over and an improved spirit in the UNAH bureaucracy can be observed. Although actual, practical improvements in the management of the finances are still barely visible, new and more modern managers are now in place. It is an urgent need that these, as soon as possible, become able to demonstrate a much more efficient managerial style. Until this has been done, the group of active researchers at UNAH will still have reason to complain.

In many areas of the university management improvements have been connected with the introduction of ICT. Some unexpected rewards have been obtained; one example is the substantial savings that appeared when the university payroll became computerized, which made it possible to remove some unwarranted and unnecessary payments.

A research library and an e-library at UNAH. Another important aspect of the strengthening of ICT services on campus is the modernization of the university libraries. A good library is able to provide essential support for active researchers as well as for students, especially those being trained at a research based level. This is the stage the UNAH library is presently about to reach. Without access to ICT a corresponding build-up of a research library would be immensely costly, but today it can be (has been) done at modest costs, partly due to assistance from the organization INASP.

It is not easy for a library to satisfy everyone in an academic audience and some staff members have expressed dissatisfaction with the limited selection of research journals available through the UNAH Library. However, this is a fairly normal situation for many university libraries; only very few, if any, can satisfy all wishes. As long as the UNAH Library is aware of such wishes, and attempts to satisfy them within the given budget, the researchers should accept the situation and try to solve their needs for additional literature in other way, for example through contacts at other universities.

Modernizing education at UNAH. It is still difficult to assess accurately the progress within the educational programs, but it is encouraging that many new curricula are being introduced, the use of e-learning is expanding, and various technological advances are being used. In addition, a renewal of educational activities at UNAH may be facilitated by the increased research activity among the academic staff. It is important that individual UNAH staff members, who would like to upgrade their research competence and renew their educational activities, are now able to apply for the needed financial support.

The pedagogical methods used at UNAH still tend to be quite traditional. They are usually based on lectures and students must often struggle with extensive memorization at the expense of understanding of key concepts and individual thinking. This does not prepare the students well for life after graduation. One obvious reform would be to introduce problem based learning (PBL), which may be performed as project work on real life problems in Honduras.

Undergraduate research. The increase in research activities at UNAH has created many new opportunities. One of these is the possibility of involving a larger number of undergraduate students in research activities. The benefits of this would be substantial, for example that undergraduate students would be highly motivated, would learn new skills, useful also after graduation, and would often be able to contribute constructively to the success of the research projects they are involved in. The students would also be able to experience the excitement in connection with the research work and their possible future research careers would become better prepared.

Research cooperation with Swedish universities. Some important outcomes of the UNAH-Sida cooperation are the results of the individual research projects within Civil Engineering and Microbiology. The cooperation with Swedish partners is generally highly successful in Microbiology, while the communication and research cooperation between senior partners in Civil Engineering have been less satisfactory. However, all graduate students are progressing reasonably well in their sandwich studies. By the end of 2011/early 2012 all the 8 students will have graduated, three of them with a PhD, the other five with MSc (licentiate) degrees (Table 6.1). Some of the latter will continue their studies towards a PhD in Sweden and have already funding in place for this.

A continuation of the cooperation with the Swedish partners will be of great importance and in general the Swedish advisers are positive towards such continued cooperation. However, in the future new funding sources must be found. Cooperation with research partners in other countries is also an important opportunity, for example in Central America, where other small countries struggle with similar problems as Honduras. Some of the laboratories at UNAH are now so well equipped that this alone will make them attractive for partners with limited physical resources.

The Sida cooperation: an important boost to research at UNAH. It has been decided that all eight students will be offered satisfactory jobs when they return to Honduras after successful completion of their studies. This is an important decision; surprisingly this is not always the case in similar situations (Thulstrup, Munoz and Decoster, 2006). Most importantly, all eight students are planning to return to UNAH. At the same time this part of the cooperation with Sida has been particularly useful by demonstrating on site for other potential researchers at UNAH how research at an international standard may be developed and performed.

Among the important outcomes of the cooperation with strong Swedish research groups is the publication of joint research papers by Honduran researchers and their Swedish colleagues in good international journals. This provides a valuable introduction of Honduran research to the international network in specific research fields. How-

ever, so far this has primarily taken place in the microbiological disciplines. It is important that the graduate students, if possible also senior researchers, in Civil Engineering increase their international dissemination activities.

A silver lining of the Honduran problem cloud! The fact that Honduras still struggles with problems, which have been solved in Sweden long ago, may increase the value of Honduras as a research partner. These severe problems, for example in the health area, offer material for research projects, which are not available in countries like Sweden. Also outside the health area such opportunities may occur, for example with regard to environmental problems, e.g. the Choluteca River, or geotechnical phenomena, such as El Reparto.

Satisfying the part of large need at UNAH for research trained staff. Most fields at UNAH need to increase the share of research active academic staff substantially. This is both costly and difficult. The cooperation with Sida has helped ensure this kind of progress in Microbiology and to some extent in Civil Engineering. Having these role models on campus is important, but much more is required in other subjects, from a dedicated group of researchers, a determined departmental leadership, to support from the university leadership and outside partners. Among the obvious candidates for research upgrading are the basic science fields that are central to many applications in health, industry, environment, agriculture, etc.

When a sufficient research base has been created in a field quality MSc programs may be established as it has been done in Microbiology. Even in the case of MSc programs, cooperation with foreign partners, e.g. universities or research institutions with good graduate programs, would be important. If it is decided to extend graduate training at the MSc level to the PhD level, such foreign cooperation becomes a must.

Life at UNAH without Sida. UNAH now enters a new era, without intellectual and financial input from Sida as a cooperative partner. Some would say that this happens too early, even with UNAH's new, efficient leadership, an improved and modernized management, new ICT facilities, the improved research competence in specific fields, and with reasonable research funding available. Still it seems that UNAH has realistic possibilities for a continuation of the reforms and quality upgrading in order to become a true research university. However, it will require a solid effort over many years by all stakeholders, from students and researchers to university management and leaders. Nor should the costs be underestimated; in order to create a wide research base at UNAH a massive research training effort will be required for a large number of talented young academic staff members.

Foreign research grants. Even with an increased research funding from UNAH, research support from other sources will also be needed. This will require a determined effort from both emerging and established researchers at UNAH. The university might be helpful by establishing a centralized unit specializing in foreign grants, which might advise individual research groups. For assistance here and now, researchers might take a look at Annex 4.

Important lessons learned. The effectiveness of the short-term research capacity building intervention, as the one in Honduras, is a highly interesting issue, but can only be evaluated in the coming years (see recommendations to Sida below). At the moment lessons learned are lim-

ited to less profound, but still very important issues. These have been highlighted in the report above, but a few will be summarized in the following.

Lessons learned 1: Early involvement in strategic planning pays off. The early involvement of Sida in the reform discussions at UNAH has been of great value, both for the development of reform ideas and for the transforming of these ideas into practice.

Lessons learned 2: Modernization of university management. The problems involved in the change of old (and inefficient) bureaucratic habits at universities, especially in the financial management, were at first underestimated by Sida, although similar problems had been seen elsewhere. The wanted (and needed) management reforms correspond to a cultural change of substantial magnitude and incentives for the old management hardly exist.

Although the original intention, to let UNAH manage all funds from Sida, is commendable (due to the expected learning processes in the UNAH management), this decision created serious problems for many individual researchers. At the end, the transfer of all financial management to Swedish partners clearly became necessary, although it was a very drastic action.

It might be worthwhile from the start of a similar cooperation to consider a compromise model, in which the responsibility for the financial management of Sida funds is transferred gradually to the normal university system. A similar compromise has worked well at San Simon University in Cochabamba, Bolivia (Thulstrup, Muñoz and Decoster, 2006).

Lessons learned 3: Upgrading of ICT capability. The ICT upgrading, which was co-financed by Sida and UNAH, was in general very successful. As described above, it provided substantial advantages, well beyond those originally targeted. Furthermore, these reforms were generally popular and the sustainability after the end of the Sida cooperation is almost guaranteed. The cost/benefit ratio has been very good and it seems likely that this kind of upgrading will also work elsewhere.

Lessons learned 4: Relations with foreign research partners. A comparison of the accomplishments within the two research areas supported by the Sida cooperation, Microbiology and Civil Engineering, is very educational. In Microbiology the activities did not target the graduate (sandwich) students alone, they also included research cooperation between senior researchers on both sides. As a result the cooperation was smooth and productive, and modifications of the detailed graduate study plans for individual students were made along the way.

In Civil Engineering this kind of close communication between senior researchers did not exist. At times the UNAH advisors were in doubt about the progress their students had made in Sweden, and common research projects outside the graduate student projects hardly took place. This reduced the value and efficiency of the research cooperation considerably.

It seems clear that, if at all possible, graduate sandwich programs should be part of a more general research cooperation between the research groups involved. This cooperation should include senior researchers on both sides; however, the graduate students might often be an important link between them.

Lessons learned 5: Undergraduate research. The numerous advantages associated with research projects performed by qualified undergraduate students are clearly illustrated by the cooperative activities in the Microbiology Department. The opportunity to be involved in an undergraduate research project was highly appreciated by most students. The reason was not only that it would replace another obligation (typically community service), but mostly because the chance to penetrate further into the chosen science field and to do this in state-of-the-art laboratories was considered highly attractive by the students.

These advantages for the students are matched by considerable benefits for the advisers and the university. These include the fact that more research work can be performed, a selection of students for later graduate studies will be greatly facilitated, and the reputation of research activities among other students will grow. Thus, allowing the best undergraduate students to perform small research projects is likely to be productive, whenever conditions make it possible.

8. Recommendations

8.1 RECOMMENDATIONS TO UNAH

Improving the team spirit at UNAH. Everyone at UNAH, from janitors, over students, secretaries, bureaucrats to teachers, researchers and the university leadership has an interest in the success of the process that will change UNAH from a teaching school into a research university. Since it is also of considerable national interest, the National Congress is an important stakeholder too.

In order to succeed it is important that staff and students at UNAH demonstrate a much stronger team spirit than before. Every UNAH employee and student should feel proud of working at UNAH, should feel some responsibility for the university, and should be willing to contribute to its success. UNAH should not waste any opportunity to demonstrate its improved capacity and determination; it must use its new technological (ICT) facilities to inform students, staff as well as the media about the main issues in its development process and about the progress it is making.

The UNAH Financial Management. The low efficiency of the financial management at UNAH has for many years been a major problem in the cooperation with Sida and for many UNAH researchers receiving other grants. In spite of a new good will among the financial management staff, the change of the bureaucratic spirit, which has dominated this area for years, is still too slow. UNAH must make sure that improvements of the practices take place as fast as possible. The financial management staff should be supporters of the active researchers, not the opposite.

Earlier, the management groups seemed to avoid self-evaluation exercises similar to those the researchers and the ICT staff have gone through. It is important that management in the future takes part in and learns from such evaluations.

The ICT activities. The expansion of ICT facilities and competencies at UNAH should be continued, although from now on most likely funded by UNAH alone. The continued improvement of ICT services on the campuses should be an obligation that UNAH feels fully responsible for. It may be assumed that by now a majority of UNAH academic and management staff as well as most students have become dependent on access to the Internet, e-mail, various web sites, etc. Thus provision of the needed funds for expansion and maintenance will be welcomed on Campus. Furthermore, after the UNAH management has seen the quality improvements (even savings) that may be obtained from the use of ICT in the university administration, this is likely to be a high priority for most.

Some universities in other countries have successfully offered all students and staff basic laptops at low prices. It may be considered if this

would be useful at UNAH. Many communication simplifications would result if it could be assumed that all had Internet access.

The library. The upgrading of the library facilities at UNAH has provided major improvements for both education and research. It is important that UNAH not only maintain the library support for these key areas, but also continues to improve and expand them.

In spite of the better funding, faster Internet access, and agreements about provision of journals and other literature, the UNAH Library will not be able to satisfy all wishes among the active researchers. However, the library should continue a dialogue with these researchers about their needs, and be aware of opportunities that may appear. In general, the Library should become an even closer partner of the active researchers. The library might also try to give credit to successful UNAH research activities, for example by displaying the outcomes (from journal articles to real life accomplishments) of the best research projects at UNAH.

Modernizing education. The modernization of the curricula and educational strategies should continue. This is in particular the case for efforts to integrate education with research and real life needs of Honduras.

UNAH may consider providing modest financial support for pedagogical pilot projects, for example within PBL. Courses or workshops on how to renew university pedagogy should be organized and participation by teachers encouraged. Groups with strong research activities should not only take advantage of these in their undergraduate educational duties, but should also be asked to inform teachers in other fields about their observations with regard to integration of research and education.

Demands for student memorization should be reduced and replaced by a stronger emphasis on the understanding of key concepts. Changing all examinations to open book examinations may be useful in this context.

The common problems with new students who lack basic knowledge in high school subjects should not be neglected. Instead the problems should be analyzed and proper courses offered to the students with problems, according to their needs. In addition UNAH may consider initiating a cooperation (e.g. in the form of in-service training programs) with secondary school teachers in the problem subjects.

Undergraduate research. Especially in Microbiology qualified undergraduate students have performed small research projects with great success. Undergraduate research may be similarly successful in other fields, especially if they are based on active research activities and sufficient research facilities. UNAH should to the extent possible encourage such activities in other fields, whenever conditions allow it.

Developing research activities at UNAH on a larger scale. The overall successful efforts within the upgrading and expansion of research activities in Microbiology and Civil Engineering must continue. However, from now on the researchers in these fields will have to increase their efforts to locate new funding and to find new research partners.

The MSc graduate training activities in Microbiology are presently limited, not by a lack of academic skills, but by a lack of suitable space. When the young staff members in the near future start returning from their training in Sweden the academic capability will increase further.

It would be a mistake of UNAH to let the lack of space prevent the expansion of the MSc training in Microbiology.

Using the Civil Engineering and Microbiology research projects, together with other successful research projects, as role models, an attempt should be made to spread research activities to other fields, including the basic sciences. UNAH may promote this development by providing proper incentives and making competent guidance available for the many inexperienced researchers. The incentives may be in the form of research grants, salary increases, promotion, etc. based on research accomplishments, while guidance may include courses and workshops on research and dissemination practices (“How to do research”, “How to write a paper”, etc.).

Expanding research training? When the graduate students supported by the UNAH-Sida cooperation return home from Sweden, the academic capacities (in terms of knowledge and experience), make it possible to offer good quality graduate programs on a larger scale, especially in the Tuberculosis and HIV projects. Such graduate programs at UNAH may also be attractive for qualified foreign students. If foreign students can be attracted it may further improve the academic standards. Often such students are prepared to pay for their graduate education, which would make it possible to cover part of the research costs.

Evaluations. Annual self-assessments should take place for all research projects as well as other activities receiving substantial, targeted support from UNAH and research evaluations, providing constructive advice to the researchers, should be performed regularly by independent experts.

As much as possible, good research performance should be rewarded both locally and centrally at UNAH. In general the incentive structure must be strengthened in order to improve productivity.

International publishing. It is important that researchers at UNAH increase the frequency of research publication in recognized, international journals. Good journals often provide critical, but constructive reviews, publication in good journals makes the research known where it counts the most: among other researchers in the field. It is also a way of locating useful research partners. Having published research papers in good, international journals is an important stamp of approval from the international research community in the field.

Although high priority should be given to international publishing, local knowledge users in industry and the public sector should not be overlooked. The HIV and Tuberculosis projects have both demonstrated how this can be done.

Research funding. If UNAH wants to continue its development into a research university it will be necessary to increase the total amount available at UNAH for grants to researchers. The incentives for obtained grants from sources outside UNAH should also be improved. However, a broad build-up of research activities at UNAH will not be cheap. The Government and UNAH must be prepared to gradually increase investments in these activities significantly. The grants awarded for research should to the extent possible be based on well-documented proposals from research groups or individual researchers.

As soon as research groups have documented their qualifications internationally, they should be ready to apply for grants from sources beyond the UNAH research funds. In general, UNAH may assist

researchers in need of funding by gathering experience on foreign grants in a centralized office.

Some suggestions on how to apply for outside (international) research grants and examples of possible granting agencies are given in Annex 4. Among the opportunities listed in Annex 4, some are well suited for the research groups in Microbiology and Civil Engineering, as well as other groups at this level. In particular the hundreds of grants that each year are given by TWAS, the Academy of Sciences for the Developing World, may offer relevant opportunities. These grants cover longer study visits at Centers of Excellence in the South and they target young, talented researchers. The different Centers have different specializations; altogether these opportunities include the following research fields:⁵ Agriculture, Biological Sciences, Medical and Health Science, Chemistry, Engineering, Astronomy, Space and Earth Science, Mathematics, and Physics.

The present TWAS Centers of Excellence offering such grants are located in the following countries: Brazil, China, India, Kenya, Malaysia, Mexico, Pakistan and Thailand.

International research cooperation. As a result of the cooperation with Sida, research partners have been found in Sweden. Other active research projects at UNAH may have located international partners elsewhere. If at all possible and relevant, such partnerships should be preserved or expanded in the future. UNAH may at times have to provide funding for study visits abroad in order to strengthen international cooperation.

As discussed above, the contact and cooperation between senior researchers in Honduras and Sweden is not yet perfect in the Civil Engineering projects. A serious effort should be made to improve this situation before the last graduate student return to Honduras.

Research cooperation with other small countries in Central America may, for example, be particularly worthwhile and UNAH researchers may attempt to improve scientific contacts with qualified researchers in these countries. Finally, the TWAS grants mentioned above would also be ideal for the creation of new international research partnerships.

8.2 RECOMMENDATIONS TO SIDA

Does Sida have a future role at UNAH? According the political decision Sida will no longer play an active role at UNAH and will not provide financial support to research activities at UNAH. Thus the list of recommendations to Sida is short. However, the short and fairly unique intervention in Honduras' higher education system may provide some useful lessons which should not be wasted.

Short-time interventions – a more economical way of creating research capacity? Sida has had cooperative agreements with many countries; most of the successful among these have had a duration of well over 10 years, often longer than the time it took to create a sustainable research capacity in a number of specific fields. The cooperation with UNAH offers a rare example of a short-term, successful research cooperation. In order to gain experience for possible future activities of this kind, it may be

5 For more information see <http://twas.ictp.it/prog/exchange/fells/fells-overview>

worthwhile to follow the development of research at UNAH during the coming 5–10 years. Was the research capacity created sustainable? Did it continue to grow on its own? Did the new research capacity attract other donors? How long did the cooperation with Swedish universities last after the end of the Sida cooperation, etc.?

9. Acknowledgments

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Once again the cooperation with Sida staff has been both pleasant and useful. Special thanks should go to Veronica Melander for preparing the evaluation so well and for many constructive discussions.

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Annex 1: Terms of Reference

EVALUATION OF COOPERATION SIDA-UNAH 2005–2010

Evaluation Purpose

The evaluation purpose is to analyze and assess the results and sustainability of results of the Swedish Development Cooperation Agency Research Cooperation support to Universidad Nacional Autónoma de Honduras, UNAH.

The assessment should be made in relation to the overall goal of Sida bilateral university support, i.e., strengthen the capacity to develop methods to plan, conduct and use research for poverty alleviation in Honduras, through creating conducive research environments for research and research training. It should provide an independent view on the bilateral research support to UNAH.

The evaluation should be a follow up to the previous evaluation commissioned by Sida in 2007. It should be an assessment of the UNAH-Sida cooperation in relation to effectiveness, outcome/impact, relevance, sustainability and efficiency. It should also be an assessment of the progress of the University Reform. It should describe the achievements and shortcomings of the reform process and the perspectives for the future. The relative success of the reform and its implication/impact for the higher education in Honduras should be evaluated.

The evaluation shall cover the period 2005–2010.

The evaluation shall contribute to lessons learned for Sida bilateral research cooperation in general and institutional learning for UNAH.

Intervention background

It is a Swedish Government requirement that all Swedish interventions during the years of bilateral cooperation with Honduras (established after Hurricane Mitch in 1998) are subject to recording and final evaluation. This will enable Sida to identify the outcome and/or impact of the Swedish contributions and ways that achieved results can be sustained.

Sida support to research cooperation with UNAH started in 2005 and will end in 2011 due to the phasing out of Swedish development cooperation with Honduras. The support was initiated with an assessment of the education and research situation in Honduras in 2001 in an effort to respond to the government's and civil society's proposal to transform the education in order to contribute to democratic social development.

The overall goal of the Swedish research cooperation with Honduras has been to assist the country in its efforts to reform the higher education and research sector to attain human development. In order to do

so Sida entered into partnership with Universidad Nacional Autónoma de Honduras (UNAH) being the largest university with the mission to direct higher education and research in the country. The aim of the program has been to support an environment conducive for research and research training which depart from issues crucial to improve national development.

UNAH showed considerable weaknesses in management, research and educational results. However, the political will to reform the university was manifested by a new law. Also, university staff aspirations for a better university were strong. Sida proposed to support UNAH during a 3 year period during which the reform was to take off. The aim of the support was to establish some of the basic elements for reform and research at UNAH. Responding to an analysis, priority setting and sequencing made by UNAH and facilitated by Dr. L Yarzabal, the first agreement period 2005–2008 the Sida contribution included support to the reform process; support to individual research projects within faculty based research and research training programs; assistance to an ICT platform; and support for development of financial management and administration.

During the second agreement period 2008–2011 the support (26 MSEK) has been focused on continued support to the research projects, including 8 PhD students, and the ICT platform. The program also includes library development, research management and waste management. However, the support to development of financial management and administration was discontinued in the second agreement. Because of the Swedish government decision in 2007 to phase out cooperation with Honduras, support was concentrated to research and ICT, while support to the management reform was excluded. The reason was that Sida considered the time left in Honduras too short for achieving results in relation to the management reform, given the challenges the reform had displayed.

The last KPMG assessment in 2008 demonstrated that UNAH was still not prepared to handle the Sida funds. Consequently, financial management is still in the hands of the Swedish partners. The reform process has since its inception suffered delays due to various reasons, but it seems that it is making progress, even if slowly. The delays were caused by the political situation in Honduras as well as internal conflicts at the university. Resistance to the University Reform has been an important feature of the conflicts.

Stakeholder Involvement

UNAH will be able to take part in the development of the Terms of Reference and comments will be taken into consideration.

The consultant is expected to inform the parties concerned in advance of its visits, so those that want to participate in and contribute to the evaluation can do so. The consultant will also be expected to report the findings to all stakeholders.

A steering group consisting of representatives from Sida and UNAH will comment the draft and approve the final evaluation report (Norma Martin de Reyes and Lelany Pineda from UNAH, Veronica Melander and Maria Teresa Bejarano from Sida).

The final evaluation report should be distributed to all concerned stakeholders in Honduras and Sweden.

Evaluation questions

The evaluation shall specifically describe and analyze the following aspects of the research cooperation (see below). The evaluation shall also make an overall analysis of the research cooperation in relation to its effectiveness, outcome/impact, relevance, sustainability and efficiency.

University Reform

Evaluate the achievements and shortcomings of the University Reform in relation to modernization of administration, research environment, curriculum development, ICT implementation in all academic and administrative processes, legal framework and national system for Higher Education, Evaluation and Accreditation, and sustainability of the transformations.

How has the reform process been perceived by different actors at UNAH e.g. including management, research students, researchers and supervisors in the Sida program?

How has the politicization of UNAH influenced the reform process, governance and transparency?

Assess if, and in which ways, the research cooperation between Sida and UNAH contributed to progress of the University Reform.

Research Capacity Building

Analyze achievements in research training in terms of output; number of students enrolled in the program and their progress. Time needed for completion of PhD studies and reasons for having difficulties to finalize studies.

Assess to what extent the program has contributed to research capacity at UNAH and in Honduras.

Research environments and infrastructure

Assess the adequacy, functionality (use and maintenance) and impact of the research facilities (laboratories), equipment and infrastructure (ICT infrastructure and management and Library resources and services) that the program has contributed. Did these components of the Sida support facilitate or open up other doors for UNAH?

Research output

Assess the applicability of the research project results obtained so far from a Honduran and developing country perspective.

Assess the research conducted and results obtained in terms of publications in scientific journals.

Assess other considerations or viewpoints which may be of importance for the research cooperation.

Recommendations and Lessons Learnt for the Future

As the present support is being phased-out, recommendations on how to increase the relevance, efficiency and impact of the existing program is less relevant. However, the consultant is expected to provide concrete recommendations as follows:

How best take advantage of lessons learnt – positive and negative (for UNAH and Sida).

Possible short-term measures to be taken by Sida in order to increase sustainability.

Possible measures to be taken by UNAH in order to increase sustainability.

Methodology

The evaluation is seen as a process for learning and improvement and thus must be based on participatory evaluation methods. Representative samples of stakeholders, e.g. PhD students, supervisors (both Honduran and Swedish), the Steering Committee, shall validate the draft evaluation report before it is finalized. Comments should be considered before the final evaluation report is completed.

Sida will provide necessary information and documentation to the consultant about the program.

The methodology to be used must be identified and elaborated by the consultant, but will include:

Document review and analysis

Semi-structured interviews with individuals and groups, in Honduras and Sweden

Telephone communication and e-mails

All conclusions should be supported by data and if not, it should be stated that the conclusions are based on the opinion of the author.

The methodology used shall be described in more detail and annexed to the final report.

The evaluation should follow the DAC Evaluation Quality Standards.⁶

Work Plan and Schedule

The evaluation will be carried out between September 2010 and May 2011.

Reporting

A *draft evaluation* report should be submitted electronically to Sida and UNAH no later than January 31, 2011. Two presentations must be held where the draft report ought to be presented and discussed; one at Sida with participation of representatives from the Swedish collaborating partners and Sida and a second in Honduras with participation of the Honduran stakeholders.

The *final evaluation report* shall be submitted to Sida no later than May 31, 2011 in electronic form in Word for Windows.

The consultant will have the responsibility to develop the draft report and to conclude the final document to Sida. The report should be written in English and should not exceed 40 pages excluding annexes. The evaluation report should also consider the report format presented in Annex B of the Sida Evaluation Manual “Looking back moving forward” and an “Information to the Publication Database” form should be completed and submitted to Sida.

The consultant should adhere to the terminological conventions of the OECD/DAC Glossary on Evaluation and Results-Based Management as far as possible. The report must begin with an Executive Summary and close with a section of Conclusions, Lessons learned and Recommendations.

Subject to Sida’s decision the report may be published and distributed within the Sida Evaluation or Review series.

Annex 2: Questionnaire Completed by the Individual Research Projects

SIDA-UNAH COOPERATION, QUESTIONNAIRE, 2010

Name of the research project:

Home of research project:

Project leader/responsible person:

Main Swedish research partner(s):

A 5-10 lines description of the research project(s):

Main goals of the cooperation:

Input/output from the cooperation

No. of present PhD students: No. already graduated with a PhD:

No of present MSc students: No. already graduated with an MSc:

What is the present employment situation for the graduated MScs and PhDs?:

Technician training, etc.:

Equipment provided, main pieces and their approximate value:

Value of other support:

No. of conference presentations:

No. of papers published in international journals:

No of papers published in local journals:

No. of other publications:

Other grants in addition to those from the Swedish cooperation:

Does the UNAH management, including the financial management, support your research in a satisfactory way?: If not, what is the main problem?:

The most important result(s) obtained so far:

Will cooperation with the Swedish partners be continued after the end of the Swedish cooperation?:

How will the research be financed after the end of the Swedish cooperation?:

Is the cooperation with Sida useful for the project?:

Annex 3: Program for the Visits at UNAH

VISIT IN NOVEMBER 2010:

Monday 22-nov	Tuesday 23-nov	Wednesday 24-nov	Thursday 25-nov	Friday 26-nov
09:00:00 a.m. Ariana Ponce, DEGT assistant	09:00a.m. Waste Management Project: Reina Laura Rivera, Miriam Arias: Place: Microbiology School. Assistance of Ariana Ponce for traslation	09:00: a.m. Site Visit at Engenering Faculty: Dean Jose Oyuela. Place: Engenering Faculty	09:00:a.m Meeting with Armando Euceda.	09:00: a.m. Meeting with Control de Gestion, Administración y Finanzas. Assistance of Ariana Ponce for traslation
	10:30:00 a.m. HIV Project. Meeting with Ivette Lorenzana, Wendy Murillo, Leda Parham. Place: Microbiology School	10:00:00 a.m. Research Director: Leticia Salomon: Place: DICU Assistance of Ariana Ponce for traslation	10:00 a.m. ICT Project: Patricia Hernandez Place: DEGT	Meeting Academic Vice-Rector Dra. Rutilia Calderon
Meeting with UNAH Coordinators: Norma Martin de Reyes y Lelany Pineda.		11:00:00 a.m. Junta de Direccion Universitaria Place: Oficinas JDU. Assistance of Ariana Ponce for traslation		Meeting UNAH Coordinator, Norma Martin de Reyes and Lelany Pineda Final Remarks
	Lunch with Patricia Hernandez		Lunch with Patricia Hernandez	
13:30 p.m. Malaria Project Place: Microbiology School	13:30:00 p.m.. TBC Project. Meeting with Lelany Pineda. Place: Microbiology School	1:30 a.m. Geotechnia Project: Rafael Ferrera Place: Engenering Faculty	13:30 Library Project: Patricia Villalobos Place: DEGT or Library	
		15:00 Hydrology Project Gladys Rojas. Place Engenering Faculty. Assistance of Ariana Ponce for translation		

VISIT IN MARCH, 2011

This visit was carried out together with Veronica Melander from Sida. It was dominated by three meetings, a meeting on March 22 with key stakeholders (project managers, graduate students, etc.) in which the draft report was discussed, an impressive conference, starting at 6 pm on March 22 and continuing the following day, and a conference on the new e-library, held on March 24.

The meeting with stakeholders on March 22 was very constructive and much criticism of existing conditions at UNAH as well as many ideas were discussed openly. All participants promised to produce comments on possible weaknesses in the draft report.

The conference held on March 22–23 was an impressive display of research results reached during the years of cooperation with Sida. The program for this conference is displayed below:

La unah y la cooperación sueca innovando en Programa 22 de marzo, 2011 Lugar: auditorium central juan lindo

6:00–6:05 PM	Palabras de bienvenida	
6:05–6:10	Himno nacional	
6:10–6:25	Antecedentes del apoyo de la cooperación sueca en el desarrollo de la unah	Dra. Norma martin Enlace ejecutivo cooperacion unah-asdi
6:25–6:40	Experiencia de la cooperación sueca en el proceso de la reforma universitaria	Dra. Veronica melander Agencia de cooperacion sueca para el desarrollo
6:40–6:45	Epidemiología molecular y resistencia del vih-1 en honduras	Dra. Ivette lorenzana Escuela de microbiología
6:45–6:50	Diseminación, resistencia y respuesta inmune de los pacientes con tuberculosis en honduras	Dra. Lelany pineda Escuela de microbiología
6:50–6:55	Diseminación y distribución de la droga-resistencia asociada en plasmodium falciparum	Dra. Irma gloria enamorado Escuela de microbiología
6:55–7:10	Presentacion artistica "trio mayab"	
7:10–7:15	Manejo integral de desechos bioinfecciosos	Dra. Reina rivera Escuela de microbiología
7:15–7:20	Evaluacion geotecnica del deslizamiento de el reparto en la ciudad de tegucigalpa	Ing. Rafael ferrera Facultad de ingeniería
7:20–7:25	Gestion integrada de los recursos de agua en tegucigalpa y características hidrologicas de rio choluteca.	Ing. Gladys rojas Facultad de ingeniería
7:25–7:30	Implementacion de las tic en la unah	Dra. Patricia hernandez Direccion ejecutiva de gestion de tecnologia

7:30-7:35	Proyecto de apoyo a los servicios de información e investigación de la biblioteca universitaria	Lic. Patricia villalobos Coordinadora biblioteca virtual unah
7:35-7:45	Palabras de agradecimiento	Lic. Julieta castellanos Rectora unah
7:45-7:50	Palabras de cierre	Dr. Olvin rodriguez Presidente de la jdu
7:50	Coctel	

PROGRAMA DÍA 23 DE MARZO, 2011
LUGAR: AUDITORIUM OSWALDO RAMOS SOTO

8:00-8:30 Am	Inscripcion	
8:30-8:40	Palabras de bienvenida y objetivos del evento	Dra. Lelany pineda Enlace academico cooperacion unah-asdi
8:40-8:55	Palabras de representante de la cooperacion sueca	Dra. Veronica melander Agencia de cooperacion sueca
8:55-9:10	Inauguracion	Lic. Julieta castellanos Rectora unah
9:10-9:30	Innovando el desarrollo universitario a traves de la cooperacion sueca	Dra. Norma martin de reyes Enlace ejecutivo cooperacion unah-asdi
9:30-10:00	El desarrollo de los paises basado en la ciencia y la tecnologia	Dr. Erik thulstrup de la universidad roskilde
10:00-10:30	Epidemiologia molecular y resistencia del vih-1 en honduras	Dra. Leda parham Estudiante de postgrado Escuela de microbiologia
10:30-10:50	Refrigerio	
10:50-11:20	Diseminación, resistencia y respuesta inmune de los pacientes con tuberculosis en honduras.	Dra. Lelany pineda Escuela de microbiologia
11:20-11:50	Diseminación y distribución de la droga-resistencia asociada en plasmodium falciparum	Dra. Irma gloria enamorado Escuela de microbiologia
11:50-12:20	Manejo integral de desechos bioinfecciosos	Dra. Reina laura rivera Escuela de microbiologia
12:20-1:30	Almuerzo	
1:30-2:00 Pm	Evaluacion geotecnica del deslizamiento de el reparto en la ciudad de tegucigalpa	Ing. Elias urquia Estudiante de postgrado Facultad de ingenieria
2:00-2:30	Gestion integrada de los recursos de agua en tegucigalpa y características hidrologicas del rio choluteca.	Ing. Gladys rojas Facultad de ingenieria
2:30-3:00	Implementacion de las tic en la unah	Dra. Patricia hernandez Direccion ejecutiva de gestion de tecnologia
3:00-3:20	Refrigerio	

3:20-3:50	Proyecto de apoyo a los servicios de información e investigación de la biblioteca universitaria	Lic. Patricia rodas Sub-coordinadora biblioteca virtual unah
3:50-4:00	Palabras de cierre	Dra. Lelany pineda Enlace academico cooperacion unah-asdi

This impressive meeting was followed by another high-level, international meeting on March 24, centered around the new e-library:

PROGRAMA DÍA 24 DE MARZO, 2011

Eje temático: La investigación y la e-biblioteca

8:00 - 9:00	Inscripción de los participantes y entrega de material	
9:00 - 9:20	Inauguración del evento	Julieta Castellanos Rectora UNAH
9:20 - 10:00	Charla Inaugural E-bibliotecas: el rol de la UNAH en la sociedad del conocimiento	Patricia Hernández Cañadas (Directora Ejecutiva DEGT)
10:00 - 10:30	Receso	
10:30 - 11:10	Videoconferencia La biblioteca como espacio de construcción y difusión de la producción científica de las instituciones académicas	Marcela Susana Fushimi Directora de la Biblioteca Facultad de Humanidades y Ciencias de la Educación Universidad de la Plata, Argentina
11:20 - 12:00	Como escribir y publicar artículos de investigación	Erik W. Thulstrup Profesor Emerito, Dr. Scient. Departamento de Ciencia, Sistemas y Modelos Universidad de Roskilde Dinamarca
12:00 - 1:30	Almuerzo	
1:30 - 2:10	Videoconferencia "Experiencia de SciELO Bolivia en el logro de estándares internacionales para la difusión de revistas científicas"	Mónica Moraes Presidenta Comité Consultivo SciELO Bolivia La Paz, Bolivia
2:10 - 2:50	Honduras: construyendo sus e-colecciones: Hazlo!	Marilyn McDonald Hendrick Representante de Springer Nueva York, Estados Unidos
2:50 - 3:20	Receso	

3:20 – 4:00	Videoconferencia Repositorios de revistas académicas: la experiencia en Costa Rica	Saray Córdoba Representante de Latindex Costa Rica
4:00 – 4:40	Evolución de las publicaciones científicas y su impacto en las e-bibliotecas	Roberto Sánchez Representante de Ebsco México
4:40 – 5:20	Honduras: casos de éxito en la publicación de revistas académica	Abelino Pitty Editor de la Revista Ceiba El Zamorano, Honduras
5:20 – 5:30	Cierre del evento	Patricia Hernández Cañadas Directora Ejecutiva DEGT

Annex 4: How to Write a Successful Proposal

Erik W. Thulstrup, Denmark, ewt@ruc.dk

THE GRANTING AGENCY

It is very important that a proper potential granting agency can be identified. Not only mentors and colleagues may be useful sources in this connection, the Internet may also have valuable information, see below.

The main concerns of the granting agency are usually that the proposed project is carried out successfully, that the goals of the proposal are reached, and that these goals correspond reasonably well to the mandate of the agency. The risk that no useful outcomes at all are reached is a serious deterrent. New applicants will have to keep this in mind. On the other hand, demonstrated earlier successes within similar projects are likely to improve the chance of success for the proposal.

It is a very serious deterrent for the agency if there seems to be a risk that the funds granted are used for other activities than the proposed ones, that the funds are used inefficiently, or, worst of all, that fraud may take place.

Added support (already available, promised or expected) from other sources for the same purpose is usually welcomed by the grant management and increases the chances for success. If the proposed activities support others – if, for example, funded equipment can be shared with colleagues – the chances of success may also increase. Agencies usually want to see facilities used as much as possible and do not want them to be idle most of the time. Sometimes equipment is expensive to run, if the application includes such equipment a guarantee must be included that the running costs will be covered.

The granting agency often indicates the level of expected support, or at least a maximum amount. This information – as well as other information provided by the agency, possibly informally – should be taken seriously.

How can sources for research funding be located? The number of available sources for scientific research are relatively small in most developing countries. If proper local (e.g. university) sources are insufficient, one may look at government sources, for example research council funds, if available. Individual ministries may at times provide funding for relevant research activities. Finally, financially strong industries may also want to support research within their area, but as in the case of ministries this research is likely to be primarily applied research.

In spite of such opportunities it may often be necessary to look for international research funds. Several different types of potential sources may be found:

- International foundations and similar organizations such as the Academy of Sciences for the Developing World, TWAS (<http://www.twas.org>) and the International Foundation for Science IFS (<http://www.ifs.se>)⁷
- Donors, such as Sida, Norad, Danida, etc. - these funds are often associated with specific programs. While many of these donors have reduced the number of eligible developing countries, funds without such restrictions can also be found. In Norway, for example, study visits may be financed for students from many developing countries.
- Some foreign embassies have funding available for smaller research projects
- Also some NGOs may provide support for specific research activities

Among the many grant opportunities found at the TWAS web-site are several hundred grants for study visits at Centers of Excellence in the South (often the national academy of sciences laboratories). The grants target in particular young, talented researchers. The different Centers have different specializations; altogether these opportunities include the following subjects:

Agricultural and Biological sciences, Medical and Health sciences, Chemistry, Engineering, Astronomy, Space and Earth sciences, Mathematics and Physics.

The Centers of Excellence are located in the following countries:

Brazil, China, India, Kenya, Malaysia, Mexico, Pakistan and Thailand.

More information is available on the web, at the TWAS web-site, or directly at:

<http://twas.ictp.it/prog/exchange/fells/fells-overview>

Note that a useful survey of possible funding sources may be found at: <http://fundingopps.cos.com/about/fundingopps.shtml>

WRITING THE PROPOSAL

The proposal writers must have the following concerns in mind:

- The goals of the project
- Although what you really want is the money to get started on the project, this should not dominate the proposal. First of all, the applicants must emphasize what (knowledge, insight, practical outcomes) they want to produce and how they plan to produce them. Then the demand for money should appear as a necessary, but much less central issue
- The goals must be clearly related to what the donor agency wants to support and accomplice and this must be carefully argued in the proposal. Read the guidelines of each potential donor carefully!
- There are often eligibility criteria (requiring specific research fields, setting age limits for the researchers, even gender limits, or requiring North-South or South-South cooperation, etc.) for applicants associated with the funding. Do not waste time writing proposals for which you are not eligible!

⁷ IFS support is only for natural resource related research

THE WORK PLAN AND ITS CHANCE OF SUCCESS

It must be clearly explained how the applicants plan to reach the stated goals - a convincing and realistic work plan is a must!

An attempt should be made to document to the agency that there is a good chance of research success, especially by demonstrating that the work plan is likely to be efficient and by referring to earlier, relevant successes

REVIEWERS

The evaluators of the proposal are in almost all cases busy persons. Presenting them with large amounts of less relevant material is likely to create a negative feeling, whereas a reasonably condensed proposal, containing all relevant information is likely to create a positive interest for the project

Even if it is not required, a list of respected persons as potential reviewers may be included with the application. These persons should be clearly competent and expected to have a positive view of the proposal. It may be useful to first ask their permission to mention them as potential reviewers

If you happen to know earlier reviewers for the funding agency in question, then seek their advice. In general, do not avoid critical advice; seek constructive criticism whenever available!

THE BUDGET

Is the budget realistic and sufficient? All relevant expenses should be included without being overly optimistic about the chances for obtaining, for example, local support? Support for operation and maintenance of existing, project relevant equipment may possibly be included in the proposal. If co-financing from another source is available, include this in the budget

Sometimes the funding agency demands some kind of supplementary funds. In some cases matching funds (support of the same magnitude) from your own institution may be required. In this case, look not only at what you can get from your department head, dean, or university president, but also at what you possibly can count as matching funding (your own and others' salaries, facilities, instruments, etc.)

Make sure that the budget appears modest and not wasteful. It makes, for example, a very good impression if expensive, imported items can be replaced by low-cost, locally produced items. Discount airfares and modest hotel rates should be used in travel budgets and quotes from several different suppliers may be included in the budget for equipment. In general, an attempt should be made to demonstrate that all opportunities for reasonable savings have been used

It must be made completely clear that the handling of funds will be competent and that fraud is very unlikely. An open discussion of budgetary (currency rates, etc.) risks would be considered an indication of competence and reliability among the applicants

The possibility of working with a smaller grant than the one the applicant first had in mind may be mentioned, especially if funds are sought from a new, but relevant and potentially long-term benefactor. If the applicants do well in a first, small project and become known by the agency, chances will be better for more extensive support in the long run. However, if a reduced, secondary budget is included, make clear that the outcome of the primary (larger) project would be much more worthwhile

THE STYLE OF THE PROPOSAL

Many agencies have application forms or at least application guidelines. Follow the guidance provided in the forms and the guidelines 100%.

If forms or guidelines are hard to understand (they often are!), ask for clarification in the agency. This way you will become known among the staff (however, do not ask too stupid or insignificant questions!)

Make a condensed application. Do not submit an amount of material that exceeds the recommended maximum – try to make a realistic estimate of the time evaluators are able to spend on the proposal

Quality and clarity of the submitted material is a positive factor; submitting too much is a negative factor – it may even demonstrate that the applicants are not realistic and practical persons, and this will seriously discourage the evaluators

When the applicants want to document their own competence, they have to concentrate on substance and quality, not quantity. For example, listing a large number of insignificant or weak publications, or conference abstracts, etc. will usually hurt their cause. List, for example, up to 10 substantial publications

If you know somebody who have already been supported by or involved in other ways with the agency, ask for their help and advice!

Sida works according to directives of the Swedish Parliament and Government to reduce poverty in the world, a task that requires cooperation and persistence. Through development cooperation, Sweden assists countries in Africa, Asia, Europe and Latin America. Each country is responsible for its own development. Sida provides resources and develops knowledge, skills and expertise. This increases the world's prosperity.

Establishing a Research University in Honduras

Sida support to UNAH in Honduras started in 2005 and ended in 2011. The support was an effort to respond to the government's and civil society's proposal to strengthen the national research capacity. The support was given in order to contribute in solving the most pressing issues concerning the areas of health and technology.

The overall goal of the Swedish research cooperation with Honduras has been to assist the country in its efforts to reform the higher education and research sector to attain human development.

This evaluation's purpose is to analyze and assess the results and sustainability of results of the Swedish Development Cooperation Agency Research Cooperation support to Universidad Nacional Autónoma de Honduras, UNAH during the period 2005–2010.

Sida does not necessarily share the views expressed in this booklet. Responsibility for its content rests entirely with the author.

