PARTNERSHIPS BETWEEN ACADEMIA AND NGOs
IN TECHNICAL STUDIES IN ITALY

Guido Zolezzi*, Angela Ortigara*, Marco Beazzi*,
Emanuela Colombo**, Lorenzo Mattarolo**
Carlo Collivignarelli***, Sabrina Sorlini***, Mentore Vaccari***, Francesco Vitali***,
Francesco Mongera °
Italo Rizzi°°, Giovanni Armando°°
Giorgio Cancelliere°°°, Fabio Fussi°°°

*UNESCO Chair in Engineering for Human and Sustainable Development, DICAM, University of Trento, Italy, guido.zolezzi@unitn.it
**UNESCO Chair in Energy for Sustainable Development, Department of Energy, Politecnico di Milano, Italy, emanuela.colombo@polimi.it
***CeTAmb, DICATAM, University of Brescia, Italy, cetamb@ing.unibs.it
°TCIC – Training Center for International Cooperation, Trento, Italy, info@tcic.eu
°°LVIA Solidarity and International Cooperation, Cuneo, Italy, direttore@lvia.it
°°°MSc in Water resources management in international development aid, Milano Università Bicocca, Italy, giorgio.cancelliere@unimib.it

ABSTRACT

This paper presents selected partnership experiences between technical universities and NGOs in Italy aimed at promoting Sustainable Human Development (SHD) through formal higher education initiatives. It stems from the GDEE project (Global Dimension in Engineering Education) as part of a series of actions aimed at assessing and reinforcing cooperation between NGOs and academia which is recognized as a key factor in reinforcing the presence of SHD in formal teaching programs at all levels of university education. Four higher education programs based in technical (science and engineering) university departments are presented, which reveal several common traits in their goals, approach and activities. The paper is co-authored by both academic and NGO staff. In all the examined initiatives, partnerships between academia and NGOs both at local and international level are seen as a fundamental element of the educational approach. Thanks to the adopted multi-perspective viewpoint, the paper critically discusses the main strengths, open challenges and future perspectives of the selected initiatives. This preliminary analysis can serve as a basis for programs aimed at systematically reinforcing NGO-University partnerships as a win-win strategy within both the higher education and international development cooperation systems.

INTRODUCTION

Higher education has a great potential of promoting Sustainable Human Development (SHD), although such potential is often exploited only to a limited extent, particularly in technical studies such as those in science, technology, engineering and architecture, despite considerable progress has been made at international level especially in the past two decades [1]. Within the current international framework, actions that positively impact on the knowledge, skills and attitudinal values of future professionals in relation to SHD are increasingly needed.

There is an increasing demand of future professionals to be equipped with appropriate knowledge, skills and attitudinal values needed to interpret the dynamics that lie and emerge from completely different cultures, traditions, experiences, environments and economies. This need is not restricted to the actors of international cooperation for development but rather it is expressed by a much broader ensemble of private and public actors at both local and international level, as it emerges clearly from different sources, like a 2011 survey carried out by Politecnico di Milano in collaboration with Fondazione Politecnico di Milano and Assolombarda: engineering companies operating in the global context ask for highly specialized technical skills and also for a set of soft skills (interpersonal skills, teamwork, communication, etc.) which represent an added value in the modern context. For this reason, the promotion novel educational opportunities and approaches is increasingly being adopted by several universities at international and national level, often integrating academic curricula with “on the field” activities jointly developed with civil society organizations, thus improving the services offered by academia in terms of professional learning opportunities. The competencies the students can develop within such learning programmes are well recognized by a variety of stakeholders therefore also bringing a competitive advantage to the students in their future hiring process.
However, one of the main gaps that need coordinated action among networks of higher education institutions is the still significant shortage of academics actively involved and committed in fostering and directly introducing the SHD dimension, together with these related learning goals, in teaching activities, particularly in technical studies.

Global Dimension in Engineering Education (GDEE) is a 2-years (2013-2015) EuropeAid-funded project that aims (i) at improving the competences of academics to introduce SHD in the curricula and (ii) at facilitating the engagement of both staff and students in academic initiatives related to SHD. The foreseen activities to achieve such outcomes are i) to produce and spread teaching materials, ii) to train teachers in SHD integration, iii) to promote networking among them, and iv) to link academics with NGOs through formal and non-formal actions at universities. The main foreseen outcomes are the integration of SHD in regular subjects and to set up, in collaboration with civil society organizations (NGOs), other SHD-related activities.

The present paper has been conceived within the fourth project activity, namely the one oriented at reinforcing the linkages between academics and NGOs, and it has been co-authored by both academics and staff from NGOs, with the aim to achieve a critical, multi-perspective view on the subject. It performs a preliminary investigation of the partnerships between academia and NGOs in a series of selected technical university curricula in Italy, which have commonly recognized the added value of such cooperation within their educational approach. More specifically the paper aims to: (1) present together four SHD-related higher education programs in four different technical Italian universities; (2) highlight the role of NGOs in those experiences; (3) discuss the main strengths and challenges of NGO-university cooperation in those programs and (4) briefly summarize the strategic perspectives of this partnership.

THE EXAMINED, SHD-ORIENTED, HIGHER EDUCATIONAL INITIATIVES

Four educational programs promoted by four different academic institution in Italy have been reviewed with a focus on the role of partnerships between academia and NGOs to promote the development of SHD relevant knowledge, skills and values for students of technical curricula. A summary of the main SHD-oriented experiences of these institutions in technical studies is reported in Table 1 and given below.

<table>
<thead>
<tr>
<th>CETAMB University of Brescia</th>
<th>Politecnico di Milano</th>
<th>Univ. of Milano Bicocca</th>
<th>University of Trento</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate level and lower</td>
<td>University seminars and other initiatives with high schools</td>
<td>University seminars and peer education (university and high school students)</td>
<td>Not examined within this study</td>
</tr>
<tr>
<td>Graduate level (Master)</td>
<td>Final degree theses</td>
<td>&quot;Energy for Development&quot; track of Energy Engineering program</td>
<td>&quot;Environmental Management in International Cooperation&quot; track of Environmental Engineering program</td>
</tr>
<tr>
<td>Graduate level (PhD)</td>
<td>PhD in Appropriate Methodologies and Techniques for International Development Cooperation</td>
<td>Individual PhD projects Staff exchange – PhD student from DCs</td>
<td>Not examined within this study</td>
</tr>
</tbody>
</table>

1. CeTAmb – University of Brescia

CeTAmb (Research Centre on Appropriate Technologies for Environmental Management in Developing Countries), a research centre of the Department of Civil Engineering, Architecture, Land, Environment and Mathematics (DICATAM) of the University of Brescia since April 2000, deals with international cooperation regarding the technical-environmental aspects, trying to work as a meeting point among the academic world, the international cooperation sector and the young people, in particular PhD, university and high school students. This summary presents the methodological approach proposed and applied by CeTAmb in the implementation of its training and research activities, aimed at playing a role as a scientific technical support for NGOs working in developing countries and, at the same time, involving and training young people (from high-school to PhD students) in this sector.
CeTaM’s main objective is the implementation of training and research activities to promote and share knowledge addressed to improve the quality of the environment and the promotion of the concept of sustainable development in developing countries (DCs) through the application of appropriate technologies. These technologies are designed, planned, implemented, managed according to criteria of simplicity, economy and sustainability, while respecting the peculiarities of the context of intervention. CeTaM’s main intervention sectors are: drinking water supply and treatment, wastewater treatment and reuse, solid waste management and improved energy access from solid fuels.

The activity is carried out through direct participation in international cooperation projects and through the education programs. This allows to achieve the general objectives of the centre:

- to contribute to the international cooperation sector through the direct participation in projects that are useful and sustainable over time.
- to apply scientific and rigorous methods, promoting research and innovation in the field of appropriate technologies for environmental management in DCs,
- to educate and train young people to the issues of international cooperation.

In order to adopt a multidisciplinary approach in the implementation of these activities, in the years CeTaM has created a network of contacts, including research centres (Italian and international), Italian and local Non-Governmental Organizations (NGOs) and involving actively high-school and undergraduate students and professionals.

Moreover, since 2008, in collaboration with the Faculty of Medicine of Brescia, a PhD course in "Appropriate Methodologies and Techniques for International Development Cooperation" has been activated, aiming to strengthen research in the environmental and health sector.

2. UNESCO Chair in Energy for Sustainable Development – Politecnico di Milano (Polimi)

The challenge of supporting sustainable development and human promotion has become a mission at Politecnico di Milano in line with the international claim (Lozano et al., 2013), led through the collaboration with governmental, academic and international institutions. The issue has recently joint the specific activities of the Department of Energy, where initiatives like Sustainable Energy for All and the problem of access to energy are being faced, under the UNESCO Chair in Energy for Sustainable Development, which has been established in March 2012.

Activities have been tailored to combine the innovative and rigorous methodologies for the performance evaluation of energy conversion systems with a holistic and creative approach which aims at meeting the constraints of economic, environmental and social sustainability. Research and teaching are focused on strategies for improving energy access and for the impact evaluation of energy project. The activity also counts in the effective contribution of PhD students, coming from Developing Countries.

The general objective of Politecnico di Milano in this initiative is to enrich the new generation of professionals and citizens by promoting methodologies, contents and tools able to face current challenge with a multidisciplinary approach, merging technical aspects with social, economic, policy understanding.

The specific objectives are:

- Broadening Knowledge and Promoting Research for development
- Starting from this overall objective, courses and activities aim to prepare a professional figure with a broad knowledge in technical and scientific fields, able to operate in the energy sector at a multi-scale level, including the development of specific technologies and the energy analyses of different scenarios in different areas, by the choice of appropriate solutions and the attention to functionality and empowerment of people.
- Curricula innovation
- Courses link theory and practice and are implemented with several actors of cooperation to development, as the NGOs, with the presentation of real cases in which students are involved with a participative approach for their final project work. This gives the opportunity to students to face sustainable development with a comprehensive approach, analyzing international policies and legislation, understanding all interested actors in cooperation, highlighting the interrelation among economic, social and technical dimensions.
- Enforcing networking and knowledge sharing
- Staff exchanges and joint projects are implemented in line with the interest of Politecnico enforcing the SHD-oriented network especially with universities from developing countries. The staff exchange is tailored to knowledge sharing: incoming PhD students carry out part of their research activity at Politecnico in order to acquire the tools for effective development of cooperation projects, while outgoing PhD students develop such tools on the field, thus completing their formation.

To achieve those objectives, the main activities are structured as follows:

- Broadening knowledge and research for development
- Students are offered to work on MSc & PhD theses in joint cooperation with universities from Developing Countries. Contents are mainly related to: demand side planning in relation to the local framework, multi-
criteria, multi-objective and multi-stakeholders evaluation for selection of strategies in DCs, appropriate technologies and their integration in small scale grid based on RE sources, monitoring and evaluation of the impact for energy project and systems, result chain evaluation for project (from input to outcome), evaluation of the impact over the capitals of the local contest.

- Curricula innovation

- PoliMi has implemented a new track on Energy for Development within the MSc in Energy Engineering. It aims at combining engineering fundamentals with a multidisciplinary approach to address global problems by using the required methodology to assess impacts of technological solutions. Two courses within the track are specifically tailored towards these aspects: “Development Economy” and “Engineering and Cooperation for Development”. Students are introduced to the concepts of development, to the roles of the different stakeholders such as Academia and NGOs, and of Ethics and Human Rights. Staff from NGOs actively participate to the courses by presenting real cases where students are asked to solve and deliver a project work.

- Enforcing networking and knowledge sharing

- Partnership with universities in DCs has been enforcing through EC-funded projects proposals, aiming at upgrading higher education system on Sustainable Development, Sustainable Energy strategies and North-South cooperation and two lecturers (from Tanzania and Cameroon) are now developing their PhD research at the Department of Energy. Networking is also fostered through annual high level, multi-stakeholder international conferences on the necessary integrated approach to global resource management (water, energy, food), where technology, economic and policy aspects are faced together.

3. Water resources management in international development aid – University of Milano Bicocca

The origin of the MSc in “Water Resources Management in International Development Cooperation” is rooted in the cooperation among the University of Milan Bicocca and several national-level NGOs. Active participation of NGOs in the Master occurs both at the management and training levels: staff from the NGOs are part of the Management Board of the Master, together with academics, and are also strongly involved in teaching, where they facilitate tailoring the MSc topics to the evolving framework of international cooperation. Strategic choices related to the development and update of the Master contents have been promoted on the basis of indications and suggestions from practitioners who are active in the field, with the aim to increase the relevance of the taught modules for future employment of the participants. Overall, NGO staff and in general practitioners of international cooperation represent nearly 50% of the teaching staff of the Master.

Almost one third of the learning activities are part of a practical stage in the field with a project of one of the NGOs that is co-managing or externally supporting the Master. Each stage is jointly defined between academics and NGOs to reflect at best the interests of the NGO itself and the learning needs of each participant.

4. UNESCO Chair in Engineering for Human and Sustainable Development – University of Trento

The strategic goal of the Chair is to contribute to the growth of a new generation of engineers able to make technological choices that promote development in its sustainable, human, social, environmental and economic dimensions. Within such broad scope, education and research topics of the Chair preferentially focus on environmental engineering in a interdisciplinary perspective, in close partnership with actors from the developing world.

The institutional activities of the Chair are part of the undergraduate and graduate programs in Environmental Engineering at the University of Trento. Their general objective is to contribute to the creation of a new generation of engineers, socially and culturally aware and responsible, able to work in interdisciplinarity and intercultural contexts and to foresee and assess the overall impact of engineering projects on the local communities and on the environment. The key educational activities of the Chair can be grouped as follows:

- Undergraduate education: the main activity is CIVICAS, a 1 ECTS short course opened to last-year undergraduate students enrolled at the University of Trento, aimed at introducing the issues of international development in the education of young future professionals, using the perspective of international cooperation for development as a preferential viewpoint. It is a joint project between the Chair, other Departments and the Training Center for International Cooperation (TCIC) and it represents an innovative experience at a national level.

- Graduate education: the graduate courses are part of the Track “Integrated Environment and Landscape design in the context of international cooperation”, within the MSc in Environmental Engineering. The specific objectives of this curriculum, a core activity of the Chair, are: (i) to integrate the traditional skills of environmental engineers with knowledge of notions about human and sustainable development, international cooperation, multi-stakeholder participation; (ii) to provide engineering students a first awareness of the international dimension of environmental engineering, also fostering practical experiences in international development projects and (iii) to develop the necessary knowledge and skills for making engineering choices appropriate to the local environmental and social context.
This Track intends to develop professionals able to design, implement and coordinate environmental engineering projects and programs that fit with the specific social, environmental, economical and cultural context, both at an international and local level. This curricula therefore aims to equip students with the necessary technical knowledge, tools and critical skills needed to detect environmental problems, related causes and underlying processes and dynamics, to identify context-appropriate solution strategies able to integrate environmental protection with sustainable human development. The educational package comprises 6 courses of 6 ECTS each. The methodology integrates lectures with active learning approaches including group activities (Role plays, joint project development), field visits, practical fieldwork (including design and data post-processing). Two internship (short and long) can be part of the program on the basis of the student choice. The short internship is a group work [4], the long one is individual work on environmental issues within a development project.

*Research and knowtransfer:* the broad thematic competence areas of the Chair are: river management, water supply and sanitation, urban and environmental planning and analysis, biodiversity conservation and forest management, biodiversity policies and development, solid waste management. Within its mission, the Chair promotes applied research activities on the above topics. Research is strongly linked with real-world contexts and the Chair is committed to share and disseminate the research outcomes for practical uses in the field.

### THE ROLE OF NGOs IN TECHNICAL UNIVERSITY EDUCATION

The partnerships between the examined SHD-oriented technical academic programs and the NGOs working in international cooperation for development show that the cooperation between these two entities can take different forms. At the educational level they can be grouped as follows:

- **Direct involvement of NGO staff in university teaching:** NGO staff give seminars, series of lectures, often drawing from their direct experience in real project to present case studies, to deepen theoretical concepts, to link together topics that are usually taught under different technical disciplines, or to promote the active learning of the course participants through techniques such as role plays. This mode of cooperation is common to all the examined experiences.

- **Participation of NGO staff in the management of academic programs:** in many of the examined cases staff from NGOs take part in the decision making process that governs the educational program. This promotes a stronger partnership, allows to examine in detail the different interests and needs of both academics and field practitioners. This is seen as a key requirement for a complete development of the educational potential of NGO-University cooperation.

- **Practical experiences of university students in the field:** a shared opinion among the authors is that in all the examined educational programs a key added value is provided by the practical experience of students in the field, in the framework of NGO-led development cooperation projects. This most often takes the form of individual internships aimed at preparing the final degree thesis, but in some cases [4] it can be the stage of a team of students supervised by tutors in the field. In all cases, this constitutes a unique opportunity to translate theoretical knowledge into practical actions, to become aware of the reality of a completely different cultural, social, legal and often also environmental context, and of its implications for working as an engineer or, in general, as a technician. Students learn the basis of planning and conducting technical fieldwork in these contexts and are often involved in post-internship follow up with the partner NGO. It is not infrequent that the outcomes of the internship produce a positive feedback on the NGO’s activities in the project, either by promoting its development or by enabling the application of new methodologies for specific purposes.

These modes of cooperation have been developing along a period of time of roughly 10 years for almost all the examined programs. The collaboration often foresees other complementary ways of interaction concerning applied research, knowledge transfer and sharing, joint fund raising strategies, which are out of the scope of the present analysis and are not examined herein.

### DISCUSSION

The critical review of the university-NGO collaboration within the examined educational programs has allowed to point the main strengths and critical areas that require improvement and, in some cases, joint revision. The following items emerge as a preliminary interaction among the coauthors, and precedes a panel session at the CUCSTorino2013 Conference, where it is be expected that further relevant elements will be added to provide a more comprehensive picture.
Strengths of NGO-University cooperation

There is a clear mutual interest, which has been growing in recent years, to which the relative long duration and stability of many existing collaborations can be related.

NGOs increasingly need professional competencies, from the phases of needs analysis and project preparation to implementation, assessment and post-project monitoring. In all these phases the need emerges of continuously being up-to-date about relevant new theories and applications relevant to the evolving international framework, especially on key priority areas such as climate change, land use, food security, energy and water management. The size and organizational structure of most of the developmental NGOs in Italy does not allow the existence of a permanent, specialized technical staff within the organization able to fit these needs, and support from private technical consultants only is often useful in specific cases but cannot provide a systematic answer. On the contrary, partnership with universities has a strong potential to overcome such limitation.

On the other hand, many universities at the national level, coherently with a broader international academic wave in the past two decades, have been increasingly focusing on SHD in their educational and research activities. Academia can strongly benefit from the field experience of the civil society which can offer many chances to validate/revise their theoretical or modeling approaches based on real case studies. Within their educational domain, universities seek linkages with real-world applications and NGOs working in international cooperation for development represent the most suitable partners for this purpose, because they often have strong roots, established relationships and a privileged viewpoint both in the local and in the international contexts where they operate. The continuous interaction with the world of NGOs ensures the continuous relevance of the educational contents and approaches for the teaching activities themselves (i.e. for the field internships) and for the future students’ employability.

The above two viewpoints can match almost perfectly when both parties commit themselves to develop a common language, to understand each others’ needs and interests, with the ultimate aim of creating added values to their respective actions aimed at the promotion of sustainability, especially in relation to global priorities like poverty reduction and human development.

Critical areas of NGO-University cooperation

The first critical element lies in the “strategic” dimension of the collaboration. A proper planning and follow-up of the collaboration among NGOs and Universities and of each student involved in field internships is a key success factor for a fruitful interaction, able to produce positive impacts on both the educational and applied research dimensions. On the contrary unstructured collaborations frequently result into frustrating experiences for both sides that can be exacerbated by the context of isolation which is an inherent part of individual internships.

Besides those related to unstructured collaborations, the main criticalities that have been pointed out within continued NGO-University educational partnerships can be grouped into the following three main categories.

- **Different basic priorities of academics and practitioners**: successful project implementation and ultimate achievement of development impact on the local context is often among the main priorities for NGOs, while Universities are characterized by increasing internal pressures to publish the research outcomes in indexed, peer reviewed scientific journals. While this is inherent in the nature of the two different types of institutions, the way it is managed by both sides can make a difference: in the worst cases is foster divergences and hinders a successful cooperation, with adverse effects on the learning process of the student.

- **Different constraints in relation to time**: this is highlighted by both academics and practitioners and is often related to the difference in priorities. When NGO project have a research component, which is partially delegated to supervised students, the timely and professional implementation of research is mandatory. If interests diverge and poor clarification has been made by both parties at the beginning of their cooperation, supervision from either the NGO or the academic side may not be as effective. Sometimes the students may be squeezed between the two constraints, with both positive and negative consequences on their learning process of learning. Theoretical studies might be partially discarded by the student in favor of the application to be completed, and also potentially relevant information cannot be included in the project.

- **Existing gaps in SHD competencies of academic staff**: While there is evidence of recent improvements on this side, still technical support often suffer from the limited knowledge and experience of academic experts about development issues, the local context thus making it hard to match the actual needs of the development programs. Addressing this gap is the key priority area of intervention of the GDEE project, which has motivated the present study.

- **Evolving international university context**: This has been highlighted by only one of the coauthoring institutions: the increasing know-how of local universities and of consultancy firms in southern countries has sometimes reduced the added value of a direct involvement of Northern Universities in technical assistance.
CONCLUSIONS AND PERSPECTIVES

Albeit preliminary and incomplete, this paper has attempted a first step towards a more comprehensive assessment of the present state, the strengths and critical areas, and of the future perspectives in strategic partnerships between NGOs and universities in technical university curricula in Italy. It stems from the GDEE project (Global Dimension in Engineering Education) as part of a series of actions aimed at assessing and reinforcing cooperation between NGOs and academia which is recognized as a key factor in reinforcing the presence of SHD in formal teaching programs at all levels of university education. It has been coauthored by representatives of all the involved institutions thus allowing integrating and comparing different views and perspectives on the topic. The paper precedes a related panel session at the CUCS Torino2013 Conference, where it is expected to achieve a more complete view of the relevant elements and actors.

The future perspectives of the cooperation between development NGOs and technical universities in Italy can be derived from an “appreciative enquiry” [5] perspective, through consideration of the positive elements that already allowed facing some of the described criticalities in past experience.

It is the opinion of several coauthors that the outlined challenges can find room for improvement when the cooperation becomes effective all throughout the project cycle, thus providing true educational and research opportunities for academics, who in turn commit themselves to create the necessary working conditions that fit the practitioners’ needs. Such enabling environment makes it possible to share the critical elements as they emerge, which can be better tackled together than separately. Also the inherent differences between the parties can be viewed as a continuous stimulus for a dynamical relationship that stimulates new questions with high potential for innovation.

There is a great, still largely unexploited potential for a broader sharing of practically relevant knowledge resulting from the large number of educational and applied research initiatives. University networks such as CUCS (the Italian University Network for Development Cooperation) can play an important role in increasing the dissemination and impact of new methodologies, theories and applications that are shown by NGO-University cooperation to be relevant in the field. Proper exploiting of this oppotunity would positively feedback in the education systems for young professionals of the future.

ACKNOWLEDGMENT

The contribution of the University of Trento and of TCIC for the work presented in this paper has been supported by the GDEE project, funded through EuropeAid/131141/C/ACT/MULTI 2-years grant (Coordinator: Polytechnic University of Catalonia, Spain) with title “Cross-cutting development education into technology studies”, under Lot 1: Global Learning in the formal education system. The contribution of the other co-authoring institutions has been supported through own grants. This paper does not correspond to one single abstract of the Conference “CUCS Torino2013”; but rather it stems from five abstracts separately submitted by the co-authoring institutions.

REFERENCES