GLOCAL LEARNING FOR CLIMATE ACTION:
A Collaborative Program in Climate Change
and Development Economics (3CDE)
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A Collaborative Program in Climate Change and Development Economics (3CDE)

• Shared global and local ownership, in a network of recognized academic institutions, that covers Africa, Asia, North and South America, and Europe

• Courses specifically designed for the economics of climate change and sustainable development

• Courses and resource materials designed by top international and local scholars, collaborating to produce a multilayered understanding of global and local challenges

• Combining innovative teaching and learning techniques that create a global classroom for the exchange of ideas between students, teachers and civil servants

• Modular approach, that can readily be adapted to:
  i. A PhD program that secures local leadership in research, teaching and policy advise;
  ii. A MSc program that provides the backbone for project execution, policy planning and implementation of climate related action;
  iii. An International Training Program, to quickly reach leading civil servants with the relevant capacity to reform current policies: climate action cannot wait.
“The economics of climate change sits in the proverbial No-Man’s Land. Climate scientists would like to engage with it but feel they don’t have the expertise, while mainstream economists regard it to be a footnote to the theory of public goods. Both viewpoints are to everyone’s loss, because the field is not only socially important, but involves deep connection between climate science, the theory of capital, and inter-generational ethics. That makes the subject intellectually exciting. The proposal to establish a Global Scientific Capacity Building Programme on the Economics of Climate Change has the added virtue of being very, very inexpensive relative to what the world community spends on other academic pursuits. My own experience in helping to create teaching and training programmes in environmental and development economics for university teachers of economics in South Asia has been that vitally important research can be released from intellectual backwaters at very little cost, simply because there are wonderful talents everywhere that need to be encouraged and tapped.”

- Sir Partha Dasgupta, November 2015
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Executive Summary

The objective of the proposed 3CDE program is to train future policymakers, research leaders, negotiators, senior managers and their advisors in climate science, and in the use of economic methods and tools to tackle climate change-related challenges. 3CDE training will also focus on leadership and problem-solving skills that are essential for ensuring that solutions are anchored both in science and practice. Being climate change a global problem, the graduates of 3CDE training will be proficient in collaborating both locally and globally with stakeholders in governmental roles, industry, academia, and non-profit sectors. Graduates will be equipped either to become trainers-of-trainers or future drivers-for-change in their respective fields.

The program is aimed at top students from the areas of ecology, economics (and related social sciences), engineering, and similar fields coming from Africa, Asia, and Latin America and the Caribbean. Including one or two sites in developed countries will however ensure that the participants get the opportunity to exchange ideas, experiences and perspectives with a global network and acquire skills to be able to work collaboratively with people from a wider range of contexts.

The consequences of climate change are vast, uncertain, and unequal, as the world’s most vulnerable people are the hardest hit. Climate change stands out from other societal problems because it spans generations and international borders. Solutions require long-term planning horizons and complex coordination on a truly global scale. At the same time though, solutions must be tailored to the special needs and conditions of the developing parts of the world most affected by the increasingly frequent climate disruptions.

Collaborative work between highly trained local and global actors is needed to successfully confront the complexity and interdisciplinary challenges of this urgent contemporary problem. Because of the special impacts and vulnerabilities that disproportionally affect developing sectors of the world, local actors throughout the developing world need to be educated for the mission of finding and putting in place effective solutions. Such solutions must be anchored in evidence-based science and need to provide concrete mechanisms to avoid and reverse the impacts of global climate change. Global and local actors need to significant leadership skills to find ways to move toward a common agenda around the issues at stake and the alternative solutions at hand.

Despite the existence of high-quality graduate programs in the developed world, opting for overseas training still remains a luxury for the very few. Limitations to international academic opportunities include - but are not limited to – lack of funding, connections, English proficiency, and family obligations at home, among other factors. The large majority of decision-makers in the developing world started young in governmental positions, and reach key positions (e.g. negotiators in COP meetings) without the necessary training. Current and future policymakers are dependent on skills to make informed decisions, but they cannot afford to pursue training in Europe or the United States. Also, they are often underrepresented at key negotiations on
a global arena, putting developing countries at a disadvantage at the negotiation tables –
despite being at the forefront of the impact and consequences of climate change.

To level the playing field, developing countries require a multilayered approach to education
on climate change and development, that includes on-the- job training for those currently
responsible for making decisions on climate change issues, a PhD education that creates
leadership in research, teaching and policy advise, and finally a MSc. Program that provides
the backbone of capacity to implement projects, and policies.

There is probably no academic discipline that is better at covering so many diverse elements
of social decision making than economics. Unfortunately, current educational programs
in economics are not used to dealing with a question like climate change. Additionally, in
the arena of international climate politics, the possibility of effective and equitable global
policy hinges on each country’s expertise in climate change impacts and mitigation and,
consequently, its ability to participate effectively in climate-related negotiations. The deficit
or outright absence of such expertise in developing countries needs to be remediated
immediately.

This concept note below describes a proposal for the creation of an ambitious capacity-
building program: The Collaborative Program in Climate Change and Development Economics
(3CDE for short). 3CDE is a program for graduate studies at the MSc and the PhD level, as
well as an associated on-the-job training program for policy makers. The 3CDE will directly
target the lack of competence and skills needed by developing countries to become active
managers of their own future at all three levels of capacity building. It will be constructed in a
modular way, with building blocks (videos, seminars, courses, reading materials, case studies,
exercises, group activities and teaching manuals) being rearraigned and reorganized to fit
the needs of: i. a full time, highly ambitious PhD program, ii. an action oriented MSc Program,
and iii. a series of capacity building courses targeting those needing on-the-job-training.
Such a modular design will not only result in significant cost reductions, but it will also take
full advantage of the synergies between the three activities, with for example PhD students
taking a central role as local instructors, and decision-makers trained by the on-the-job training
program opening doors for internships and graduates from the MSc. Program.
In short, the 3CDE program will:

1. operate in a close collaboration between global and local stakeholders, ensuring a strong anchoring in the developing country context,

2. use teaching resources that have a modular structure, combining lectures, videos, reading materials and courses into either the PhD program, the MSc program or the on-the-job-training program.

3. Have courses and materials that are specifically designed to address the climate challenge;

4. Combine innovative teaching and learning techniques (e.g., videos, blended learning, student exchange) that effectively turn the learning experience into a global, collaborative process;

5. Depart from a strong sense of local ownership sustained by an existing network of recognized academic institutions.

The 3CDE program will be designed and managed by the Environment for Development (EfD) Initiative.\(^1\) The EfD Initiative has over two decades of capacity-building in science-based environmental economics and will provide the management support to ensure the successful implementation of the 3CDE program. The proposed glocal 3CDE program will build upon the backbone of the existing EfD capacity, drawing from the network’s science-based capacity in environmental economics, and with academic capacity and institutional structures across EfD centers located across six regions (Europe, North America, Central America, South America, Asia and Africa). This unique network of academic grounding provides a unique platform on which to create and operate the 3CDE program.

It is envisioned that the program will be developed in phases that will allow for piloting and scaling of the program over time to include more courses, sites and students. Phase 1 involves the conceptualization and proof-of-concept. This phase includes testing methods for effective collaborations within the course design, so that the program is developed, evaluated, and adapted to the site and local context in 1-2 sites and for 1-2 chosen courses from the course curriculum. In Phase 2 the proof-of-concept is expanded to cover the entire course curriculum.

\(^1\) Details about the EfD Initiative, its institutional capacity, global network and local presence in developing countries, see Section 4.
of the MSc program, and extended to 2-3 sites for further evaluation and development, which also includes the development of program accreditations and diploma. Phase 3 is where the full program is ready to scale up to more sites. This roadmap takes the MSc program as the backbone of the whole 3CDE capacity building program.

When it comes to the PhD program, it will be rolled out in Phase 2 to selected sites, i.e. those places in which conditions are most favorable for PhD education, that at the same time can act as conveners of high level education for other sites, at least at the beginning of the program.

The on-the-job-training program will be rolled out as courses become available, starting already in Phase 1.
Motivation

Climate change stands out from other societal problems because it spans generations and brings highly uncertain outcomes in terms of human welfare and costs, all of which require a very thoughtful and long-term planning horizon. The effects of current emissions pose a massive negative externality, or unintended cost to society. The problem is complex for three reasons: (1) because we are speaking of a public good of planetary dimensions that requires coordinated action by all countries; (2) because the problem is one of accumulation over time and there is enormous inertia, possible thresholds and irreversibility, and time horizons that surpass most human perspectives; and (3) because there is considerable uncertainty in outcomes and respective consequences.

“The World is facing a situation where it has to deal with global public goods at an unprecedented scale. The future climate depends on actions by all of us. We will in the future all have to bear the consequences – although some countries will be more affected than others. The situation requires a global discussion and negotiation, but the poorest countries (which often will be the most affected) hardly have the academic capacity to participate in the discussion or even make use of the instruments supposedly available for them – let alone to assert their interests in a fair and equitable manner. We have assisted at meetings of the COP or IPCC where the US or Japan can have a delegation of a few dozen with PhDs and lawyers, whereas several African countries have just a young Master’s student or no one to represent them. The need for capacity building is very striking and urgent. *The proposed program fills an important gap, and does so using eminent global scholars and a strong local anchoring. Developing countries must get access to top-level education in order to be proactive in the global climate change agenda, and to form effective domestic policies supporting sustainable development.*” Prof. Thomas Sterner, IPCC Lead Author.
Furthermore, research points at a distribution of climate change impacts and vulnerability that will hit the developing world the hardest, while the historic bulk of the emissions have come from the developed countries. Due to vast asymmetries of responsibility, impacts and vulnerability of climate change, reaching policy agreements between countries becomes extremely difficult. Furthermore, asymmetries also exist between developed and developing countries around the distribution of climate change knowledge and skills, impacting informed decision-making and diminishing the voice of many developing countries at the negotiating table.

To address the climate challenge and its asymmetries, the world needs science based economic tools that are fully compatible with the developing-country context. A pre-requisite for that to happen is well trained, informed leaders that represent the developing world: policy-makers, negotiators, and other relevant stakeholders in the public and private sphere need to understand the multiple perspectives and issues at hand, they must ask the right questions, they must be able to judge the likely impact of proposals under negotiation, and have the negotiating skills necessary to make their voice heard at the negotiation tables.

Science and economics as a tool to address the climate change challenge

There is probably no other academic discipline that is better at covering so many diverse elements of social decision making than economics. The Intergovernmental Panel on Climate Change (IPCC), a scientific body that provides the internationally accepted authority on climate change, extensively professes the role of economic tools, methods, and decision-making in addressing our planet’s climate challenges. It recently stated that “Economics provides useful tools for assessing the pros and cons of taking, or not taking, action on climate change mitigation, as well as of adaptation measures, in achieving competing societal goals” (Kolstad, C. et al. 2014, p. 211). Moreover, the economics profession has a critical role in terms of designing policy instruments that provide climate-intelligent signals via price, quantity, or regulation.

However, current educational programs in economics are not used to dealing with a question like climate change. This is primarily due to its inter-generational and global nature, resulting in problems whose complexity is unprecedented in the field of economics.

The classical concepts and methods in the field of economics: (i) are designed for marginal changes, while the scale of impact of climate change is massive; (ii) are all too frequently agnostic to the distribution of wealth, yet climate change is associated to extremes of poverty and wealth within and between countries; (iii) are better at handling private goods and services, yet climate change is a massive public bad, and many of the problems and solutions involve public goods; (iv) are better at handling reversible decisions, but damages from climate change will be many times irreversible; (v) are best when analyzing specific outcomes, yet damages and costs resulting from climate change are to a large degree uncertain and, finally, (vi) are designed for planning horizons that extend to a few decades, yet under a changing climate the planning horizon extends to centuries and beyond.
Designing capacity building programs in economics that suitable address the technical complexities described above is hard in general, but it can prove to be an impossible task for isolated education programs in the developing world. A global program that pulls together the best of capacities and experiences from a broad network of universities in the developed and the developing world would have a much better chance at closing the educational gap in the economics of climate change and development.

**Importance of the 3CDE program**

High-level capacity in climate economics that is created and sustained domestically in developing countries will be essential to meet the challenges posed by climate change. Such capacity-building has also been called for repeatedly by the international community, such as in the Paris Declaration for Aid Effectiveness, the Johannesburg Plan of Implementation and, very specifically, in the UNFCCC’s capacity-building framework for developing countries.

Through training in leadership and international collaboration the students will be especially well equipped to participate in international negotiations. They will be able to access funding opportunities within IPCC, and will design mitigation and adaptation strategies with a developing-country perspective, i.e. with the particular insights that can only be gained by actually being there, sitting next to a policymaker, and understanding the local culture, political system and media landscape. Graduates will be able to design and campaign for climate-smart policy instruments and, crucially, will also be trained in how to evaluate the performance of these instruments. Finally, our graduates will be able to provide guidance to firms that must adjust to new regulations, and will be adept at finding new business opportunities that result from the need to mitigate and adapt to climate change.

The 3CDE program builds on the premise that local insights lead to better policies. “[I]t is through building capabilities to learn that a country grows its ability to catch up (Kruss et al, 2015, p.23).” The global nature of the proposed program means that the same basic course
curriculum, course activities, teaching materials, exercises and assignments will be used in every participating university, but integration to the local context is essential. Local instructors will be responsible not only for co-designing the courses, but will also make sure that the course content and its implementation reflects the local context. Well-tested and evaluated local course content that has been especially successful will be shared with the other program sites in a spirit of continuous program development and collective learning among teachers and students. World-class professors (hereafter referred as “global professors”) will suggest about half of the curriculum and work together with the local teachers (hereafter referred as “local professors”) for optimal course design and local anchoring. The local professors together with teaching assistants will lead the local interaction with students for the entire content of the program curriculum.
3CDE Program Description

To significantly reduce the capacity gap that puts developing countries in a disadvantageous position in the face of the climate challenge, a top level educational program is needed. The program needs to expose students to top level professors at the frontier of their practice, but it cannot be perceived as exogenous or strange to the reality of these countries. It also has to break the isolation (cultural and idiomatic) that frequently characterizes both the reality and the mindset of scholars and practitioners in the developing world, yet it should not uproot the graduates from their own reality and even their own current decision-making position. It has to be ambitious in every dimension but cannot be expensive, either to donors or to prospective students.

Moreover capacity is needed at all levels. A Phd level graduate is expected to assume a leading role in research, teaching and policy design in the future; she should spearhead national climate policies. Those with a master of science training should become the true workhorses of climate action. But the climate challenge needs immediate solutions, and those are in the hands of today’s decision-makers. These practitioners, sitting in ministries and governmental organizations, have managed to reinvent themselves as climate specialist in a brave attempt to stay on board the process of reducing emissions and adapting to a changing climate. The developing world would be in a much stronger position if we could offer today’s decision-makers a series of state of the art training courses, that can take place while they are still on the job.

This capacity building proposal is an attempt to provide the three types of training described above, with the characteristics mentioned in the prior paragraph. There are two keys to such an ambitious plan: i. an existing network of very well-established think tanks located in universities throughout the develop and developing world, and ii. state of the art pedagogical tools that allow us to break each learning experience into small, constituent parts, that can then be recombined both digitally and in the classroom to serve all three types of capacity building.

The rest of section 2 provides a description of the proposed capacity building efforts, and the linkages between the three types of capacity building from a technical and
Importantly, the final product is much more than just combining small modules into different packages; it is the result of the close interaction between practitioners, MSc and Phd students working with a common approach and with a shared goal.

Section 3 provides the explanation of the expected role of the EfD initiative in implementation, quality control and local ownership of the 3CDE capacity building program. As mentioned above, the EfD network is a key component of the plan.

The 3CDE MSc Program

The Collaborative Program in Climate Change and Development Economics (3CDE MSc program for short) should provide its graduates with the necessary skills to become actors of change. This of course goes far beyond simply providing them with basic knowledge of economics or climate science.

The 3CDE MSc. Program in short...

• Courses specifically designed to deal with development under a changing climate;
• Strong focus on leadership skills, collaboration, critical thinking.
• Program specific pedagogical training and blended learning;
• Continuous south-south interaction between students, through cross-nationality class-rooms, exercises, and student exchange;
• Curricula jointly created by global and local professors;
• 5-7 collaborating academic institutions worldwide;
• 10-30 students per cohort;
• Dual diploma—Local by host university and global
To start with, there is much room for improving the way that economics on the one hand and climate science on the other hand are thought in universities throughout the world. The 3CDE MSc program will have courses specifically designed to tackle the climate challenge, and not just courses in economics with a climate twist to it.

Secondly, the world needs a new kind of leader to tackle the climate challenge. It requires leaders that are comfortable dealing with complex ethical discussions, conducted in a multicultural context and under the pressure of multiple interest groups. Graduates from the 3CDE MSc program will develop such skills both through specific leadership courses but also by frequently interacting with their classmates, in a classroom that spans multiple countries, cultures and political interests. Group exercises for example will require classmates from multiple study sites to agree on the means on terms of collaboration prior to actually sorting out their homework.

Such ambitious educational targets are only feasible if supported by modern pedagogical tools. The proposed 3CDE MSc program will be constructed in a blended learning format, making full use of digital learning technologies. These technologies allow the decomposition of educational material into small parts (video lectures, classroom sessions, reading comprehension material, exercises, etc) that can be observed by students both privately and at home. Moreover, since courses will run at the same time in different academic sites, the MSc will demand a lot of cross-country interaction, turning the learning experience into a global classroom. Student exchange programs should also complement this multicultural environment.

Such a well-connected network of on-campus MSc programs, based equally on global and local expertise and the best available pedagogical tools, should equip the students with necessary competences and collaboration and leadership skills. This will give the graduates the experience needed to put their knowledge to practical work in any place or setting, being respectful of the values of others. Such competences and skills are necessary to face the challenges imposed by a changing climate, yet purely online programs cannot provide them.
The pedagogical design

To ensure that the 3CDE MSc program creates a learning arena that empowers student and teachers as agents of change, we propose to construct the 3CDE MSc program using a backward-design. This process starts from an assessment of the capacities needed by its graduates, establishing which competences, skill sets, and knowledge are needed and hence should be developed in the program: the actual design of the program should be a reaction to this. Based on this assessment, intended learning outcomes and pedagogics methods are chosen. This in turn guides the specifics of program content, delivery mechanisms, and teachers’ roles and training in order to help students excel in their fields and in their future roles as collaborative change agents. The different centers globally will support and strengthen each other in this process.

Figure illustrating the Backward-Design process applied:

Below, the steps of the backwards design are explained further. A description of the central coordination and management that surrounds and supports this design process are presented in Section 3.

Graduates in Action

In this step, we focus on what will be required of our envisioned graduates. As described earlier there is a need for locally anchored agents of change that can build bridges and involve relevant parties in a productive and well informed manner when taking on climate change and sustainable development challenges, be it on a local, regional, or global stage. In many developing countries there is also a need for local capacity building and for professionals that can research, understand, and explain the climate change mitigation potential and needs for adaptation measures in academia, government, and business.
**Competences, Skill sets & Knowledge**

**To have a concrete impact, future policymakers and their advisors in developing countries must be able to:**

1. Understand the problems climate change poses for livelihoods and economic development;
2. Design evidence-based policy solutions;
3. Predict and evaluate the consequences of these policy interventions;
4. Have skills to identify, collaborate, and coordinate with various local and regional actors; and
5. Assume a leadership role that is strongly anchored in its country’s context yet is respectful of cultural differences.

**State of the art pedagogical tools**

**3CDE MSc courses will be characterized by active learning activities, encouraging interactions between students and teachers through face-to-face and digital distance interaction.** Most face-to-face interaction will take place mainly at the local participating institutions, where a local professor will facilitate the students’ learning by being responsible for the local learning arena and guiding the learning experiences. For distance learning and interaction, parts of the program will take place virtually, together with students and teachers from the other program sites. Additionally, to get to know and understand the local stakeholders in the climate change arena, field experiments and internships in the surrounding community will be a part of the program curricula.

**The program will make use of “blended learning” which applies both digital and in-person interfaces.** In practice this means, for example, that students will learn in part through content delivered via digital and online media, and in part through direct contact with local professors, teaching assistants, and fellow classmates, who together will facilitate the students learning processes.

Course activities will be based on the flipped classroom modality, whereby a global (or local) professor will give mini-lectures using videos, recorded expressly for this MSc program. Students are expected to watch the videos prior to attending class. In the classroom, a local professor will guide the students learning by answer and asking questions about the recorded mini-lectures and readings, introduce group and individual exercises of various kind to promote active engagement of the students.

The teachers will, in turn, be specially trained in the logic and material of each class as well as suitable pedagogical approaches for that content. This will be done as part of the course development process and in close interaction with the global professor in charge of designing the frames of the course (Abeysekera and Dawson, 2015). Whenever possible, the local professors will be experts in climate or environmental economics. When that is not possible, and even when it is, the training of local faculty by top global experts in the field of climate economics will have its own inherent benefits in terms of increasing long-term local academic capacity.
The combination of the aforementioned teaching and learning techniques seeks to: ensure high-quality content and course activities for institutions that do not generally have access to expertise within this field; support students in learning not only with lectures but also through discussion, peer learning and written exercises; use local material, data, and discussions to make it relevant in a country context; build up local teaching capacity to work with new course material and new technologies; bridge the divide between the developed and developing world in terms of technology and new teaching techniques and classroom aids; and take full advantage of an international network, through tight collaboration between countries, peer-to-peer, and others.

**Teachers and Teacher Training**

In the case of the envisaged collaborative 3CDE MSc program in climate change and development economics, each course will be specifically designed for the program in collaboration between a hand-picked leading scholar in the respective field and a small group of local professors. To do this, the best scholars in the respective fields will be identified and evaluated before selecting one to contribute to the 3CDE MSc program. Similarly, for each course, the best suited local professors from some of the program’s sites will be chosen to collaborate in designing and developing the course. Each top scholar will be hired as a global professor to suggest and lead the work on creating the course curriculum and syllabus, generate content and produce recorded mini-lectures for about half of the course, as well as suggest reading materials and design exercises for the shared part of the course. These digital mini-lectures will be the same throughout all participating universities, thereby ensuring that students in the developing world have full access to the best available knowledge and educators.

The flipped classrooms will allow local professors to adapt the course materials to domestically relevant problems and issues. At the same time, the local professors will be free to teach in their own preferred way for a large part of the course. Students tend to appreciate a variety of teaching styles due to a variety of learning profiles. At the same time, the teachers will be encouraged to improve on their teaching in the way that serves them and their students best. Continuous evaluation and dissemination of best practice in the program will contribute to the improvement and success of the program.
Centrally organized teacher training will allow for hands-on pedagogical merit and capacity building. The 3CDE MSc program will develop and annually offer hands-on teacher training to give the local professors the tools they need to improve the learning arena of the centers they are involved in, with the local circumstances and the personal teaching styles as input for improvement of their teacher profession.

**Program Curriculum and Course Content Design Process**

Each course in the curriculum of the proposed M.Sc. program will be specifically designed to provide the necessary tools to analyze the many dimensions of the climate change problem. For example, the standard courses in statistics, econometrics, and microeconomics will be critically reviewed, and the topics, methods, and tools most relevant to understand and deal with the climate change problem will be selected as course content. In that sense, the proposed M.Sc. Program will be quite specialized, as opposed to a re-branded version of a standard program in economics.

Throughout their training, students will be equipped with a strong comprehension of the basic science of climate change. Climate change is a deeply interdisciplinary challenge and, for our program to create solution-oriented economists, students must develop a strong understanding of scientific dimensions of the problem. The scientific curriculum will include a critical appraisal of global and regional climate change models, as well as an in-depth understanding of the role of ecosystems and ecosystem services under climate change. It is also necessary that students be equipped with strong tools to judge the role of technological change within mitigation and adaptation strategies. In addition, students will go through a series of courses focused on the scientific fundamentals behind adaptation and mitigation options for different sectors (such as the agricultural, water, forestry, and transport sectors, among others).

The program’s curriculum will therefore be interdisciplinary but strongly anchored in economics. In broad terms, we shall cover three large areas of knowledge. First, we want students to gain a fundamental understanding of climate change from a scientific and biophysical perspective. Then, students should be able to evaluate the impact of climate change on ecosystem services and propose adaptation measures, while studying the vulnerability of people and productive means. Finally, we will include an array of specialization courses on mitigation and adaptation responses, which are critical to forming better policies.

Courses are thus divided between more general methods and concepts courses and more sectoral-specific courses. While improving methods and concepts that are of general relevance to the analysis of climate change, sector-specific courses will be provided to cover some of the main issues associated with climate change, such as forestry and agriculture. Appendix 1 provides a first draft of the program’s curriculum.

The program will last two years (following the Bologna process\(^2\)). Its modality will allow institutions to adapt courses to suit local calendars, as well as include some local courses.

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\(^2\) The Bologna Process and the Bologna Accord (1999) are an effort by European countries to standardize higher education, to ensure comparable quality across the region.
as electives to offer a degree of flexibility. To ensure a high standard of quality across the program, external evaluation will be carried out regularly and collaboration between participating institutions will be strongly encouraged.

Site’s Profile

Lastly, given the program curricula and the pedagogical methods to be used, the preconditions of a potential program site are inferred. This stretches from aspects of the student recruitment base to available local professors and organizational ease of establishing the program. Other, more technical aspects such as internet access and frequency of power shortage also play a role. In determining if a potential site is suitable for the 3CDE MSc program, it is not only the site’s capacity to “give the program” that is assessed but instead also its capability to contribute as an collaborative co-owner and co-creator to the program. Although the program will have central coordination (i.e. centrally designed course frames, a global program manager/coordinator, a global advisory board, and a global secretariat), it will also have an equally strong local ownership. The MSc program will be run by participating universities to ensure that the global and local certification rules, student recruitment strategies, and quality controls are tuned to each other. This implies that all of the sites will use the best practice processes adapted to the local institutions. The central coordination will be described in section 3.

The PhD program

The 3CDE PhD program is needed to secure teaching, research and policy incidence both for developing countries as a whole, and for the 3CDE capacity building program itself. In other words, PhD students and graduates are expected to assume leadership roles as teachers in the 3CDE MSc program and on-the-job-training program.

The 3CDE PhD program: Main features

• Modular construction of the educational experience (similar to MSc), but with higher criteria for success;
• Closer interaction between PhD students and global and local instructors;
• PhD students will be active participants in the educational experience, facilitating the construction of locally anchored case studies;
• Co-supervision between local and global instructors, but large emphasis in community of supervisors;
• Degrees provided by local university with EfD backing and eventual accreditation;
• Cross site exchange program to promote community of practice and networking.
The 3CDE PhD program will share some of the same building blocks of the MSc program described above, particularly regarding course materials. The level of ambition of the courses will of course be different. For example, PhD students will have to have a much broader grasp of the literature, will have to solve more complex exercises and will be expected to interact more closely and personally with global and local instructors.

The 3CDE PhD program will be rolled out in Phase 2 (see road map) only in those sites that are better prepared to offer a local degree or that already offer a PhD degree that can be expanded with the pedagogical tools and conceptual approach proposed here. We expect initially that formal degrees shall be issued by the participating university, with eventual EID accreditation.

The basic modular course structure will be expanded to add two key features of the 3CDE PhD program. First we expect PhD students to be themselves key actors as local instructors and in generating local material for the global MSc program. This will require much closer interaction between PhD students and global and local instructors. Secondly, the 3CDE PhD program will have a community of supervisors, that complements the work of the formally appointed supervisors. This community of peers is expected to bring a true global twist to the quality of research generated by the program.

Finally, the PhD students will be offered a cross-site exchange program, to make sure that they graduate with the collaborative skills needed to become true leaders in the area of climate change.

**On-the-job training program**

The on-the-job-training program will be rolled out as courses become available. Taking full advantage of our modular design, agencies interested in these courses would be included in the design from the start. For example, a particular agency might be interested in a course on fisheries and climate change, but as part of the course, might want participants to be exposed to economic valuation techniques, and the science of climate change when applied to marine issues. In response to such a request, a team of experts will choose to modules that are needed to produce such a learning experience, and will engage with the educators needed to actually deliver the material, both on site and digitally. In other words, each course will be specifically designed to meet the needs of potential clients and to provide the best learning experience.

The on-the-job training program will be rolled out in phase 1, and its level of ambition will increase as courses are added to the curriculum.

Importantly, we expect significant synergies between the on-the-job training program and the other two educational components of this proposal, as decision makers trained in our program will interact with MSc and PhD students and most importantly will acquire a taste of their strengths and abilities.
Management – Global Oversight With Local Ownership

A key feature of the 3CDE is the articulation of global and local components. On one hand, its global nature will require senior-level educators, who generate state of the art digital course content and guidelines for seminars and other course activities with the help of a pedagogical team. This setup will essentially provide a recognized, world class, quality certificate for students and practitioners worldwide.

On the other hand, the learning process will be anchored in the reality of each country. Thus, while global in nature, the program will have a strong local component centered on the adaptation of course material and content to the national and regional contexts. Local professors are both instruments for improvement of the course content and beneficiaries of the improved skill set resulting from a global program.

Environment for Development (EfD) Established Institutional Strength

The Environment for Development (EfD) Initiative is a capacity building program in environmental economics, with a focus on research, policy interaction and academic programs. The overall objective of the initiative is to support poverty alleviation and sustainable development by building environmental economics capacity in policy making processes.

The network consists of centers hosted by highly ranked universities or research institutions, and with substantial influence on local policymaking. Centers are located in Chile, China, Colombia, Costa Rica, Ethiopia, India, Kenya, South Africa, Sweden, Tanzania, USA and Vietnam, but the network spans to research associates and partner organizations all over the world. It also includes a full PhD program in Global Change and Climate Economics given at the University of Gothenburg, and four specialization courses in Environmental and Climate Economics, held every other year.
The EfD Secretariat, the administrative hub and the main support function of the EfD Initiative, is hosted by the Environmental Economics Unit, Department of Economics, University of Gothenburg in Sweden. Financial support is provided by the Swedish International Development Cooperation Agency (Sida). Other donors supporting EfD research include The World Bank, IDRC, Conservation International and The Swedish Research Council Formas.

While EfD Initiative is a global program, it has very strong local ownership as EfD academics and experts are based in countries at different stages of development. Member think-tanks in the developing and the developed world lead the Initiative, and strategic decisions are made in a Coordination Committee comprised of members from each member country.

South-to-south as well as north-to-south learning is strongly encouraged through research and teaching collaboration, exchange of experiences, and participation in meetings and workshops. One forum for this is EfD’s annual meeting with keynotes, research presentations and interaction with leading researchers and policy makers from EfD centers, universities, government and partner organizations. Young EfD researchers also take part in other strategic conferences and meetings as well as arrange local workshops for researchers and policy makers. National processes play a crucial role in dealing with environmental challenges and local long-term presence is therefore fundamental for progress.

Finally, the EfD Initiative administration, financial oversight, and auditing procedures have been modeled on the standard practices of the Swedish International Development Agency (Sida). As such, the organization contains all the checks and balances needed to meet the requirements of the strictest donor.
EfD Capacity to Ensure Successful Delivery of the 3CDE Program

EfD will lend its capacity and expertise to the 3CDE program to ensure its successful implementation. This will ensure that the 3CDE academic MSc and PhD programs, as well as the on-the-job-training program will benefit from the established capacity and expertise of the global EfD network of environmental economics experts, with over two decades of experience in training environmental economists in developing countries. This capacity of science-based academic training combined with policy-relevant exposure and know-how makes the EfD unique in its ability to educate the future leaders’ that will address the challenges of climate change and sustainable development.

The EfD centers are located in academic environments that already have the capacity to provide Master of Science programs (even PhD programs in some cases), although not in a global learning environment and not with state of the art pedagogical tools. Scholars in those think-tanks meet regularly, and have long-term, high trust relationships that facilitate successful cross-country research processes. These relationships, or “social capital” in economists’ lingo, is at the heart of the proposed capacity building program. In essence, the EfD initiative acts already as a bridge between top scholars in the developing world and some of the best scientist in the developed world. The environmental economics field as a whole looks to the EfD as a rare example of such celebrated success in developing this kind of long-term capacity building in our field.

EfD graduates from Asia, Africa, and Latin America will be able to assert that they studied in a global program with the best educators from all over the world. However, their actual degrees will be conferred by the local university in each participating country.

Eminent global scholars will first be recruited as part of a scientific committee that will have the mission of producing the final design of the program curriculum. The preliminary curriculum presented in Appendix 1 as an example of the content of the MSc program, is meant to be interpreted as a template, which is to be refined with the input of the global scholars of the EfD network. Each one of those courses, and variations thereof, can be offered as on-the-job-training to interested policy makers.

A global manager and a Secretariat will coordinate the program as a whole. The Secretariat will be located in one of the Centers of the Environment for Development Initiative. The Secretariat will be in charge of coordinating all global activities, such as supervising course design and preparation, overseeing the technicalities of the local organization, the course implementation and quality control. In addition, it will actively seek new funds and identify new local academic institutions that can benefit from the proposed 3CDE program.

The Secretariat will rely on an Advisory Board, constituted by both policymakers and scholars in the field of climate change. The objective of this Advisory Board is to provide guidance on strategic decisions and processes, such as defining criteria for inclusion and exclusion of local participating institutions; recommending new funding sources; and providing support in quality control of course implementation. The Advisory Board will meet in person at least once a year, and potentially more often in the initial years.
In order for the program to become a truly collaborative program, the team behind this proposal consists of people from several potential program sites. To account for the large differences between countries, the 3CDE program will involve representatives from all of the EfD centers in order for creation process to be collaborative. We believe that this is essential for a successful future implementation of the program given its collaborative profile.

Furthermore, successful implementation of blended and active learning techniques requires long-term support and oversight from a global program secretariat. Significant up-front investment for development of course material is needed. However, course material in a modular format is dynamic, as it can be adapted over time and tailored depending on location. It is essential to enlist skilled local professors and teaching assistants, who receive training from pedagogical professionals with expertise in the program fields, in the described teaching techniques. The local professors are also inspired to take active ownership of the program, rather than just acting as program implementers. Again, senior local scholars at EfD centers are expected to be central to this process.

Local Anchoring of the 3CDE Program

As stated above, the program will be implemented by academic institutions that already have a graduate program - preferably in economics - and the local presence of capacity in economics. Depending on local conditions, the 3CDE program constitute an upgrade of already existing MSc and PhD programs. In other cases, the 3CDE MSc program will have to come first, potentially followed by the PhD once the local research and supervision capacity is of sufficient quality. For these places the capacity building process of 3CDE then becomes a two step process. All sites will have the capacity to offer the on-the-job-training program upon demand.

Local academic directors will administer the program, student recruitment, and local oversight, all in close interaction with the global Secretariat. It is important to acknowledge that this global 3CDE program will bring change (academic, technical, and organizational) to the local programs, so a good understanding of local bureaucracy is fundamental for its success. Again, local ownership of the program is a sine qua non requisite, and the EfD Initiative provides a good model of how a global program can be strongly anchored in local institutions, priorities and decision-making.

Initially, the 3CDE program will start with two to three preliminary program sites, chosen from the existing local EfD centers. The plan is to use their institutional framework and accreditation procedures to launch the new MSc and PhD programs. In the third phase of scaling up the program, approximately eight sites will join with a long-term goal of around 10-15 program sites. See Appendix 3 for a brief description of the Centers and their academic affiliation.

Finally, although the program is intended to be set in motion by EfD centers, the intention is to expand it to other regions and countries. Once the course content and technical background have been developed and produced, and quality control has been mastered, the program could be open to be adopted by any institution.
### Appendix 1: Preliminary curriculum of the Global 3CDE MSc program

<table>
<thead>
<tr>
<th>Courses organized by topics</th>
<th>Semester 1</th>
<th>Semester 2</th>
<th>Semester 3</th>
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</thead>
<tbody>
<tr>
<td><strong>Understanding international negotiations on climate change</strong></td>
<td>Agriculture in a changing climate: reducing emissions from production and adapting agricultural practices to new climatic conditions</td>
<td>Climate change and infrastructure (e.g. roads, energy, sanitation): a look at mitigation and adaptation needs</td>
<td>Energy production and consumption under climate change: from industries to households</td>
</tr>
<tr>
<td>Forestry in a changing climate: reducing emissions from deforestation and degradation, and adaptation of forest ecosystems to new climatic conditions</td>
<td>Sustainable harvesting of marine ecosystems under a changing climate</td>
<td>Water and climate change: adaptation issues in the agricultural, residential and industrial sectors.</td>
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<tr>
<td><strong>Science of climate change I: from the greenhouse effect to understanding the impacts of a changing climate</strong></td>
<td>Science of climate change II: global circulation models, predictions</td>
<td>Cost benefit analysis: from evaluation of adaptation projects to discounting under very long term horizons</td>
<td></td>
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<tr>
<td>Microeconomics of mitigation and adaptation decisions of firms and households</td>
<td>Public economics and social welfare: climate change as a social dilemma</td>
<td>Policy instruments to encourage adaptation to climate change and reduced emissions</td>
<td></td>
</tr>
<tr>
<td>Modeling economic decisions under a changing climate: basic econometrics and statistics</td>
<td>Economic valuation of mitigation and adaptation alternatives</td>
<td>Qualitative methods for analyzing mitigation and adaptation decisions</td>
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Appendix 2 Centers in the EfD Initiative

**Kenya:** EfD Kenya is located at the School of Economics, University of Nairobi, which recently emerged top five in the African Universities and Higher Institutions ranking 2015. A Master’s program in environmental economics is offered at the School of Economics, University of Nairobi and at the Kenya Institute for Public Policy Research and Analysis (KIPPPRA), which could be combined with the proposed global Master’s program.

**Chile:** EfD Chile, the Research Nucleus on Environmental and Natural Resource Economics (NENRE), is hosted by the University of Concepción, a highly ranked university in Latin America. NENRE is supported by the Millennium Social Sciences Initiative, from the Ministry of Economics, Promotion and Tourism of Chile. Its graduate program in Economics is offered by the Facultad de Ciencias Económicas y Administrativas, Universidad de Concepción, and this program could incorporate a new global Master’s program climate change economics.

**China:** EfD China, the Environmental Economics Program in China (EEPC), is based at the National School of Development, Peking University, which is consistently ranked as the top higher learning institution China and top five in Asia. EfD China was established with three main objectives: building capacity of rigorous economic analysis into environmental policy in China, policy outreach and graduate education that emphasizes systematic training in modern environmental economics. Economics is offered as a field within a college in this structure, and the proposed Master’s program in the economics of climate change would allow the University to broaden the current curriculum further.

**Ethiopia:** EfD Ethiopia, the Environment and Climate Research Center (ECRC), is hosted by the Ethiopian Development Research Institute (EDRI), a semi-autonomous government development research institute. The center has a key role in the implementation of Ethiopia’s ambitious Climate Resilient Green Economy (CRGE) strategy. EfD Ethiopia has close links to Addis Ababa University, which currently offers a Master’s program in Economics, where a global Master’s in climate change economics could be incorporated.

**South Africa:** EfD South Africa, the Environmental Policy Research Unit (EPRU) specializes in environmental and natural resource issues, and was established to promote sustainable development and poverty reduction in Southern Africa. The center is based at the School of Economics at the University of Cape Town, ranked 4th fourth among universities in the BRICS and emerging market economies and it is the top university in South Africa. The university offers a Master’s program in economics, which could integrate a new global Master’s program in climate change economics.

**Costa Rica:** The Economics and Environment for Development Research Program is based at the Tropical Agricultural Research and Higher Education Center (CATIE, by its Spanish acronym), a well-renowned international university located in Costa Rica. CATIE currently has a M.Sc. Program in Economics and Climate Change, which can be upgraded under the proposed program.

**India:** The Centre for research on the Economics of Climate, Food, Energy, and Environment is located in the Economics and Planning Unit of the Indian Statistical Institute (ISI), Delhi. The ISI is a prestigious academic research and post-graduate teaching institution. The ISI offers a Master of Science in Quantitative Economics that may incorporate a new global Master’s program in climate change economics.

**Vietnam:** The Environmental Economics Unit in Vietnam (EEU_VN), established in 1994, is based at the School of Economics at the Ho Chi Minh city University of Economics - the largest institution of higher education in the south of Vietnam. The university currently offers a Master program in Development Economics which may integrate a new global Master’s program in climate change economics.
References


