



United Nations
Framework Convention on
Climate Change

TEC Brief #12

TECHNOLOGY
EXECUTIVE
COMMITTEE



Energizing entrepreneurs to tackle climate change

Addressing climate change through innovation



*A person who sees a problem is a human being;
A person who finds a solution is visionary;
And the person who goes out and does something about it is an entrepreneur.*

– Naveen Jain, Indian entrepreneur

Why this TEC Brief?

From the backstreets of Addis Ababa to the offices of Silicon Valley, people are transforming ideas into products that are used by society. Entrepreneurs, as such people are known, are vital to the growth and prosperity of communities. But what role can entrepreneurs play in tackling climate change? How can we help entrepreneurs to rise to this challenge? This policy brief seeks to answer these questions. It highlights the role of entrepreneurs in developing technologies, business models and services that society can use to achieve low-emission and climate-resilient sustainable development. It also suggests ways of encouraging, guiding and supporting entrepreneurs in their efforts to innovate climate technologies. This TEC Brief is part of a long-running series of policy briefs on innovation produced by the Technology Executive Committee. It focuses on the central actor in the innovation process: the entrepreneur.



Key messages and recommendations

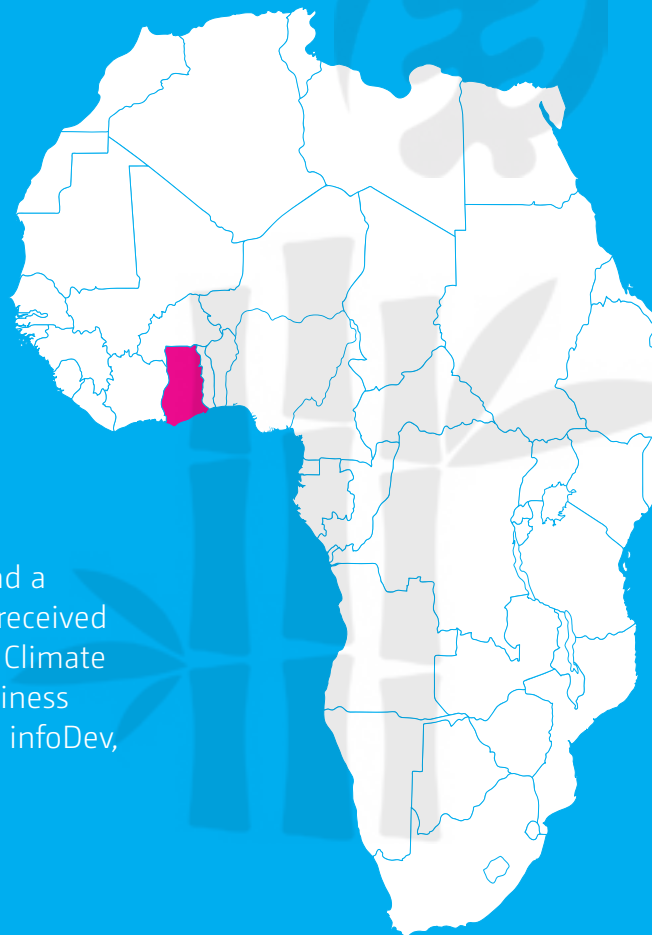
1. Entrepreneurs play an important role in developing climate technologies and face challenges in undertaking successful innovation in this field in all countries, often exacerbated in developing countries, including:
 - a. Limited opportunity to engage in entrepreneurship;
 - b. Lack of enabling environments to innovate solutions for addressing climate change;
 - c. Limited support for undertaking climate innovation activities.
2. Climate technology incubators and accelerators provide broad-ranging support to entrepreneurs, helping them to develop business know-how, market connections and technical capacity, and providing guidance on sources and procedures for access to finance.
3. The TEC recommends that the COP encourage Parties and non-state actors to enhance the effectiveness and impact of climate entrepreneurs by:
 - a. Developing a strong national entrepreneurial environment;
 - b. Promoting opportunities and providing incentives for actors to engage in entrepreneurship and focus on climate technologies;
 - c. Enhancing the effectiveness of incubation models for supporting climate entrepreneurs.



Meet a climate entrepreneur

Gloria Asare Adu

Gloria Asare Adu is the founder and owner of Global Bamboo Products Limited, which has developed an innovative way of turning bamboo into charcoal. She started realizing her dream of a bamboo and rattan business in Ghana 12 years ago. Compared with firewood and other fossil fuels, her bamboo briquettes burn longer, produce more heat and are smokeless. This solution helps to preserve forests, cut emissions and reduce the health risks associated with indoor fires. Her company has won various international and local awards, including a United Nations Environment Programme SEED Initiative Award in 2011 and a Ghana Climate Innovation Center award in 2015. Ms. Adu received support from a World Bank funded incubator – the Ghana Climate Innovation Center – which enabled her to develop her business and commercialize this low-emission technology (sources: infoDev, 2017; SEED global partnership).





The need for innovation

The Paris Agreement and the 2030 Agenda for Sustainable Development both set out a vision of a low-carbon, climate-resilient and sustainable future for all. That vision needs to be urgently pursued. 2017 was the third warmest year on record, and the average global temperature is now almost 1 °C above the pre-industrial level. Climate change effects of ever greater intensity are being observed more and more frequently in all corners of the world, threatening the prospects of sustainable development. Under the Paris Agreement, countries have developed nationally determined contributions to the global response to climate change, national adaptation plans and mid-century strategies. Now, countries and the international community are focused on implementing them.

Technological innovation is a key catalyst of efforts to implement national climate action and realize the above-mentioned vision. The Paris Agreement explicitly refers in Article 10 to the need for such innovation. In the 2030 Agenda for Sustainable Development, technological innovation is mentioned under several of the Sustainable Development Goals, particularly goal 7 (affordable and clean energy), goal 8 (decent work and economic growth), goal 9 (industry, innovation and infrastructure) and goal 17 (partnerships for the goals).

Since 2015, the Technology Executive Committee has analyzed how we can accelerate and scale up technological innovation in order to achieve the purpose and goals of the Paris Agreement and the Sustainable Development Goals. The outcomes of its work are reflected in a series of publications on topics such as strengthening national systems of innovation and enhancing financing for climate technology research, development and demonstration. In 2018, it worked together with the Green Climate Fund and the Climate Technology Centre and Network to improve understanding of the role that incubators and accelerators can play in assisting entrepreneurs to innovate climate technologies. This has helped the Green Climate Fund to explore how it may support such incubators and accelerators. The work undertaken has also resulted in a publication by the three organizations titled *Catalysing Finance for Incubators and Accelerators*. This TEC Brief complements that publication by highlighting policies and measures that can help entrepreneur in innovating climate technologies.



What is an entrepreneur?

An entrepreneur is someone who transforms an idea into a product that is of practical use. In the field of technology, this generally means that the entrepreneur takes an invention and turns it into a technology that benefits and is used by society. However, the scope of an entrepreneur's activities is much wider. An entrepreneur may devise and implement a new business model that uses existing technologies in innovative ways. An entrepreneur may also tailor an existing technology to the needs of a new market or community. Entrepreneurs are not inventors as such (although they can be). Rather, an entrepreneur is an individual who works on turning an invention into a product that meets the needs of certain users. Similarly, an entrepreneur is not a financier (although they can be that too). Rather, entrepreneurs develop a product they hope will prove attractive to investors and, consequently, secure their financial support. Thanks to this injection of capital, the entrepreneur is able to transform their prototype into a fully fledged product that is used on a broad scale. The above-mentioned activities may be undertaken by entrepreneurs as individuals or as a team of people engaged working together. Furthermore, entrepreneurs can pursue these activities under their own enterprise or as part of the operations of an existing company or organization.

There are many reasons why individuals engage in entrepreneurship. Being an entrepreneur is a profession and entrepreneurs thus generally seek to generate an income from the activities they undertake. However, entrepreneurs are often motivated by reasons beyond financial gain. For instance, recognition of their efforts and the prestige derived from this may be just as important, if not more so, as the economic benefits. Furthermore, entrepreneurs may wish to tackle specific social or environmental problems, such as creating jobs for women, lifting people out of poverty and responding to the challenge of climate change.

While entrepreneurs may innovate for a variety of reasons, they are inevitably engaging in a high-risk activity. Trial and error, often leading to failure, is an essential part of the process. Setbacks nonetheless often lead to the discovery of new solutions or solutions to problems different from those originally considered. The possibility of failure also means that not all entrepreneurs manage to achieve their objectives (whether these are financial gain, recognition or social or environmental solutions).

It is well documented that entrepreneurs play an important role in contributing to a country's growth and prosperity (Baumol, 1993). By engaging in innovation activities, entrepreneurs help to bring new and improved technologies into broad usage, facilitating economic growth and disrupting the stagnation and hegemony of existing technologies. Because dealing with climate change will require far-reaching economic and social transformations, entrepreneurs have the potential to play a significant role in developing climate technologies that can help communities to reduce greenhouse gas emissions and adapt to climate change. With the right encouragement, guidance and support, entrepreneurs can channel their efforts effectively into developing climate-friendly solutions.

There are many ways in which entrepreneurs can make a significant contribution to the global response to climate change. For instance, an entrepreneur may develop a new climate technology or adapt an existing one to the needs of a community that has not used the technology before. The recent release of a drought-tolerant lentil variety in Bangladesh is a good example. Another entrepreneur might develop a new business model that revolutionizes the use of an existing climate technology. The deployment of pay-as-you-go solar panels in Indian villages is an example of such a model. Alternatively, an entrepreneur may develop a service that enables the use of an existing technology in a climate friendly-way. The introduction of innovative car-sharing models is a case in point. Or a climate entrepreneur may focus on harnessing the power of emerging technologies that have the potential to transform the way we live, such as artificial intelligence, blockchain systems, the Internet of things, big data and nanotechnology.¹ In all these examples, the entrepreneurs identified an opportunity and demonstrated a willingness to seize it, applying their creativity to devise a ready-to-use solution.

There are thus many different types of entrepreneurs and entrepreneurial activities that can contribute to achieving the purpose and goals of the Paris Agreement and the Sustainable Development Goals. However, entrepreneurs are confronted with many challenges to become successful. Insufficient encouragement to undertake their role, limited incentives to work on climate action, and a lack of support (including access to finance) are three major challenges that exacerbate the risks faced by entrepreneurs. These challenges are amplified in developing countries, which often suffer from a shortage of capacity, knowledge and resources to address them. Moreover, although all entrepreneurs often struggle to identify funding opportunities, entrepreneurs from developing countries face even greater difficulties in that respect. The challenges related to financing are addressed in two recent joint publications of the Technology Executive Committee, the Green Climate Fund, and the Climate Technology Centre and Network (see www.unfccc.int/ttclear/incubators).

Bearing in mind the need to take urgent action on climate change, what can be done to assist entrepreneurs in overcoming the three major challenges mentioned above? The following sections of the brief are intended to help policymakers to identify ways of addressing these. Policy guidance is provided on the three interconnected areas of encouraging entrepreneurship as such, guiding entrepreneurs to focus on tackling climate change, and supporting them as they engage in their endeavours. By encouraging, guiding and supporting entrepreneurship, governments can provide local talent – young and old, women and men, and the poor and marginalized – with opportunities to find employment, build livelihoods and contribute to the global response to climate change.

¹ The Technology Executive Committee is currently analyzing the innovation of emerging technologies for addressing climate change. This work includes a study of zero-emission and negative-emission technologies.

1

Encourage the entrepreneur

A key challenge that many developing countries face is how to establish a constant supply of capable local entrepreneurs. While enthusiasm for entrepreneurship will always exist, it is often the case that would-be entrepreneurs in developing countries end up working in other professions, since the risks associated with becoming an entrepreneur are too high. Societal pressure, the local culture and a lack of economic incentives can discourage such individuals from entrepreneurship. If they do decide to take the plunge, new entrepreneurs in developing countries often lack the education and skills that they would need to make effective use of the opportunities they have identified. Female entrepreneurs often have to contend with additional hurdles. Globally, women are underrepresented in this space (GERA, 2018).

The foundation for encouraging new entrepreneurs is the country's entrepreneurial ecosystem, which can be defined as the set of "actors, institutions, social networks, and cultural values that produce and sustain entrepreneurial activity" (Roundy, Bradshaw and Brockman, 2018). In an entrepreneurial ecosystem, governments and relevant organizations do not target individual firms or sectors but whole groups of enterprises and entrepreneurs. They provide holistic, systemic support, reflecting the fact that the development of innovative solutions and their commercialization are the result of interaction and collaboration among a wide range of individuals and institutions (GCF, 2017). Hence, an entrepreneurial ecosystem is not a direct, top-down tool for the promotion of entrepreneurship, but a "complex adaptive system" that emerges from the "uncoordinated, semi-autonomous actions of individual agents" (Roundy, Bradshaw and Brockman, 2018), in which governments work alongside other agents while shaping the institutional framework.

A healthy entrepreneurial ecosystem fulfils two major functions: it encourages individuals to embark on entrepreneurial activities and supports them as they engage in these (see also section 3). Such an environment motivates individuals to become entrepreneurs by providing them with incentives and a supportive culture, including access to education and training, infrastructure, sources of finance, and policies and regulations to provide assistance (such as a safety net when entrepreneurs inevitably fail). At the same time, an entrepreneurial ecosystem ensures that there are few 'free-riders', discouraging those without entrepreneurial talent from continuing their efforts in that direction.



Actions

In order to encourage local entrepreneurship, governments, with the support of the international community, may wish to:

- Promote opportunities for entrepreneurship through targeted communication and awareness programmes;
- Incentivize individuals to become entrepreneurs by introducing policies that support entrepreneurship and job creation. These may include tax cuts for small businesses, microfinancing, social protection programmes and regulatory reforms that make it easier to do business;
- Build the capacity of would-be entrepreneurs by implementing suitable education and training programmes;
- Encourage the participation of female entrepreneurs by introducing tailored niche support programmes;
- Enhance the infrastructure required for effective entrepreneurship (e.g. Internet access);
- Promote international networking between local small and medium-sized enterprises and those of other countries.

Furthermore:

- Non-governmental organizations are encouraged to highlight the opportunities for entrepreneurship that exist in different countries, regions and sectors. They could also showcase specific countries' strengths and areas requiring improvement with regard to facilitating innovation (building on existing initiatives such as the Global Innovation Index);
- Interested potential entrepreneurs (and, more broadly, the private sector) are encouraged to contact local, subnational and national offices that promote entrepreneurship in order to gain a better understanding of relevant opportunities that are available to them.

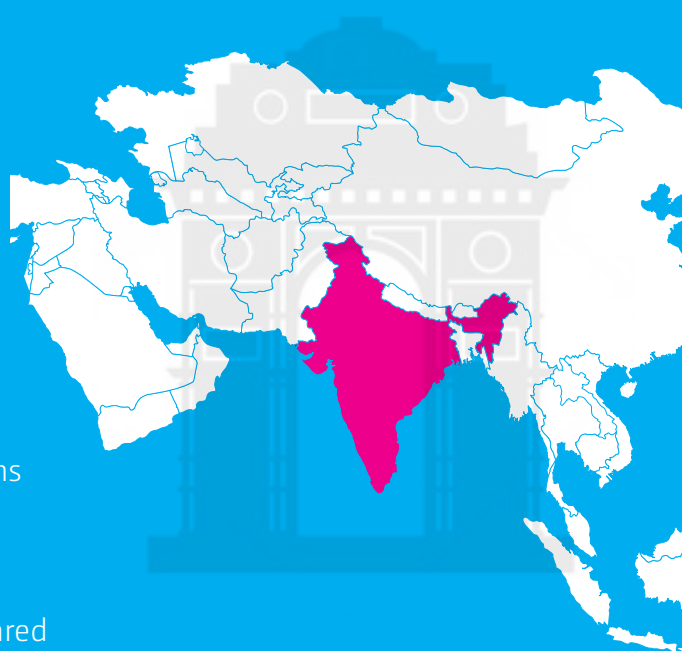


Photo: India Today

Meet two climate entrepreneurs

Arun Shenoy and Mandar Kaprekar

Arun Shenoy and Mandar Kaprekar are the founders and executive directors of Green India Building Systems and Services. The two entrepreneurs developed an air-conditioning system based on geothermal heat exchange, which allows for energy savings of up to 60 per cent (and water savings of 100 per cent) compared with conventional building cooling systems. What started as a three-member team based in the living room of a small flat is now a fully fledged company with 80 staff, offices in Mumbai, Bangalore, New Delhi and Singapore, and 85 corporate clients across India. In 2017, the company won the Global Cleantech Innovation Award, a prize supported by the United Nations Industrial Development Organization and the Global Environment Facility (sources: UNIDO, 2017; Arun, 2014; Your Story, 2016).



2

Guide the entrepreneur in the right direction

Even if a country is successful in encouraging individuals to engage in entrepreneurship, there is no guarantee that they will focus their energies on innovating solutions to climate-related problems. Thus, the second major challenge has to do with direction. How can we influence the preferences of entrepreneurs? How can we channel entrepreneurial efforts towards the field of climate technologies? Without encouragement to focus on climate technologies, entrepreneurs, unless they are passionate about addressing climate change, will tend to make use of the opportunities and incentives that exist in their country, regardless of whether those have a positive or negative effect on the climate. For example, continuing support for high-emission and non-climate-resilient technologies may induce entrepreneurs to undertake activities that will not help countries to achieve the purpose and goals of the Paris Agreement.

Governments thus need to design and implement push-and-pull policies that create incentives for entrepreneurs to focus on meeting market and societal needs through low-emission and climate-resilient solutions. In an earlier TEC Brief, *Technological Innovation for the Paris Agreement*, the Technology Executive Committee noted that one possible way of incentivizing climate technology innovation is through a strategic combination of financing and a long-term policy and regulatory framework that would encourage stakeholders to focus on a portfolio of technology options directed at a specific climate aim (Stern, 2007). Governments can achieve this by designing and implementing policies, regulations and standards that create enabling environments and favourable market conditions for climate technologies (e.g. through feed-in tariffs or auctions) and removing disincentives such as high-carbon subsidies (OECD, 2017). Governments can also encourage a long-term market pull for climate technologies through instruments that take into account the negative externality of greenhouse gas emissions, for instance by putting a price on carbon (OECD, 2017). The Paris Agreement, with its shared vision of a low-emission and climate-resilient world that everyone should aspire to, provides direction and an international framework encouraging countries to implement such push-and-pull policies. As already mentioned, financial gain is not the only incentive that entrepreneurs respond to: recognition, prestige and the opportunity to tackle social and environmental problems are also key drivers (Baumol, 1993).



Actions

In order to incentivize entrepreneurs to focus on climate technologies, governments, with the support of the international community, may wish to:

- Update national development and innovation strategies and align them with nationally determined contributions, national adaptation plans, mid-term strategies and other national climate plans;
- Design and implement policies, standards, regulations and financial instruments that help to create markets and provide incentives for entrepreneurship in accordance with the strategies above.² Such measures may include putting a price on carbon and introducing tax breaks for the development and demonstration of climate technologies;
- Encourage market development of and demand for climate technologies through mission-based government procurement (noting that a credible process and a long-term focus are key to the success of such measures). This may be especially relevant in the case of climate technologies that are not commercially viable on a broad scale;
- Encourage market development and stimulate demand by incentivizing behavioural change and guiding end-user preferences towards climate-friendly products and services through such means as education and awareness-raising activities;
- Facilitate the provision of ‘patient’ capital, which provide entrepreneurs with longer payback periods for climate technology start-ups with high capital expenditure.

Furthermore:

- Non-governmental organizations are encouraged to highlight the opportunities that exist for climate technology entrepreneurship and to draw attention to the potential economic, environmental and social benefits of such efforts;
- Entrepreneurs (and, more broadly, the private sector) are encouraged to explore opportunities for innovation in the field of climate technologies. The long-term commitment made by all countries to achieve the temperature goals of the Paris Agreement means that substantial opportunities will continue to arise for facilitating low-emission and climate-resilient development. Local, subnational and national governments and authorities may be able to provide entrepreneurs with further information.

² See also: TEC. 2017. *Enhancing financing for the research, development and demonstration of climate technologies*. TEC working paper. Available at: http://unfccc.int/ttclear/docs/TEC_RDD%2ofinance_FINAL.pdf.

Climate entrepreneurs from around the world

REYHAN JAMALOVA, AZERBAIJAN



Reyhan Jamalova is a young inventor who founded Rainergy. The company has developed a smart generator which harvests energy from rain.

<https://climatelaunchpad.org/finalists/rainergy/>

ZIA IMRAN, PAKISTAN



Zia Imran is chief executive officer of Zaheen Machines. The company has developed a product which reduces household gas and electricity consumption through internet-of-things automation.

<http://www.zaheenmachines.com>

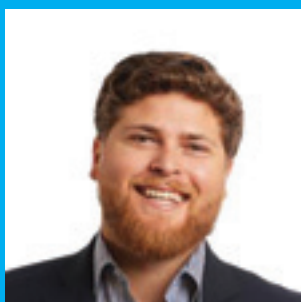
PETRA WADSTRÖM, SWEDEN



Petra Wadstrom is the chief executive officer and founder of Solvatten. This Swedish social enterprise developed a combined portable water treatment and water heater system that has been designed for off-grid household use in the developing world.

<https://solvatten.org>

GATOR HALPERN,
UNITED STATES OF AMERICA



Gator Halpern is one of the founders of Coral Vita, a company that restores threatened reefs by growing resilient corals and transplanting them into degraded sites.

www.coralvita.co

3

Give the entrepreneur a support boost

Even if a country is successful in encouraging individuals to engage in entrepreneurship and to focus on climate technologies, a significant challenge remains: how can we support entrepreneurs to innovate effectively? As noted in section 1, strengthening the entrepreneurial ecosystem is key to supporting entrepreneurs to innovate. A robust national system of institutions, stakeholders and linkages focused on entrepreneurship needs to be in place to facilitate entrepreneurial activities. In particular, such a system should provide entrepreneurs with constant opportunities for education and training, and should connect them to key actors, including the research community, industry (both supply and demand channels) and users. It should also unlock sources of financing for entrepreneurs, helping them to connect with holders of private finance and fostering, on both sides, awareness of each other's needs.

A strong entrepreneurial ecosystem is fundamental for sustained national entrepreneurial success. However, in developing countries such systems are often weak, underdeveloped and underperforming, which diminishes the ability of entrepreneurs to innovate effectively. For example, entrepreneurs in developing countries often have to contend with a lack of local manufacturing capability and weak integration into global value chains. In addition, local investors are generally unwilling to invest in high-risk entrepreneurial activities: there are very few venture capitalists and angel investors in developing countries. Although microfinance institutions can provide some investment, they may have limited scale or reach within a country.

Strengthening the entrepreneurial ecosystem is crucial, but this requires wide-ranging action and takes time. Is there a way of providing entrepreneurs with tailored support in parallel with broader efforts to strengthen the entrepreneurial ecosystem? In recent years, a mechanism known as 'incubation' has become increasingly popular. It refers to the process of providing entrepreneurs with conditions that are favourable to the development, or 'hatching', of their ideas into usable and practical solutions. This support is generally delivered through two similar institutions: an incubator and an accelerator.

Although there is no strict definition of either term, an incubator is considered to refer to any sort of environment designed to support start-up organizations (Malek, Maine and McCarthy, 2014). An incubator generally provides the following services to entrepreneurs: (1) a physical location; (2) business services; (3) marketing services; (4) technical services; (5) financial support (by linking entrepreneurs to sources of finance and investment); and (6) networking and information services. Generally, an incubator will support an entrepreneur for more than a year, and often for up to

five years. The incubator concept originated in the United States of America in the early 1950s. Accelerators are a more recent phenomenon: they first sprang up in Silicon Valley in the mid-2000s. An accelerator aims to speed up successful venture creation by providing specific support services during an intensive programme of limited duration (Pauwels et al., 2016). An accelerator operates by offering mentoring, peer review and skills transfer over a three- to six-month period to entrepreneurs in exchange for a small shareholder stake in the resulting venture (Mian, Lamine and Fayolle, 2016). Accelerators are often privately owned and financed, and have traditionally focused on the information technology (IT) sector.

Although incubators and accelerators have the potential to give a boost of support to entrepreneurs, one serious difficulty they face is related to financial self-sufficiency. It is estimated that fewer than five accelerators worldwide support themselves with the revenue generated from owner's equity in the ventures they have helped to develop. Incubators and accelerators in developing countries often depend on continued public funding. Another difficulty lies in devising incubator and accelerator models that work effectively in developing country contexts. The existing accelerator model was designed to support IT start-ups in Silicon Valley, which has one of the strongest entrepreneurial ecosystems in the world. With a few exceptions, developing countries (and many developed countries) do not have entrepreneurial ecosystems of comparable strength. The current accelerator model may also not be suited to the innovation of climate technologies, which often have a longer incubation period than information and communications technologies, and which, moreover, may have limited (or no) commercial profitability. Thus, it is necessary to design new incubator and accelerator models that address the financial and contextual challenges in developing countries. Incubators and accelerators in developing countries need to operate contextually if they are to support entrepreneurs successfully.





Actions

In order to support entrepreneurs effectively, governments, with the support of the international community, may wish to:

- Pilot new incubation models that address the specific needs of developing countries and can function effectively in those countries. Such models can serve as a local intermediary institution playing a leadership, coordination and advocacy role in developing the entrepreneurial ecosystem. They may also focus on market incubation, specifically on connecting entrepreneurs to local and cross-border markets for supply and demand. New models should pay greater attention to differences in cultural contexts, local communities and income levels, as well as to gender considerations. Such incubators could provide co-working spaces where entrepreneurs and other stakeholders can engage in joint innovation, mutual learning and the implementation of pilot projects;
- Encourage the co-creation of new incubation models by public and private financiers, which may result in greater financial sustainability;
- Incentivize well-functioning existing incubators and accelerators to expand into climate technology markets. Such high-performing incubators and accelerators may be more successful in attracting finance because of their proven track record;
- Implement education and training programmes, including through incubators and accelerators, which build the capacity of local entrepreneurs to engage in innovation;

- Strengthen linkages between entrepreneurs and other key actors in the entrepreneurial ecosystem, including industry, universities and the government;
- Strengthen the leadership of the national entrepreneurial ecosystem and support related coordinating institutions at the national, subnational and local level;
- Design financial instruments that reduce the risk and opportunity cost for local financial institutions to invest in the innovation of climate-friendly products and services. This would help entrepreneurs to access cheap capital for such efforts;
- Educate potential investors (such as microfinance institutions, angel investors and venture capitalists) on the nature of climate technology development (e.g. long payback times, type of market demand and broader benefits and returns);
- Facilitate access to foreign exchange for entrepreneurs so that they can purchase technologies not available in local markets which they may need to develop their products and services on an economically viable scale;
- Connect the national entrepreneurial ecosystem to regional and global entrepreneurial ecosystems, thereby helping entrepreneurs to access ideas, networks, knowledge and opportunities for scaling-up.

Furthermore:

- Non-governmental organizations are encouraged to further analyse new incubation models that can effectively support climate technology entrepreneurship with the aim of providing thought-leadership on potential new incubation models. They are also encouraged to draw attention to the importance of supporting climate technology entrepreneurship in developing countries as a way of creating jobs and increasing national and local prosperity;
- Entrepreneurs (and, more broadly, the private sector) are encouraged to share, with national and international players, their experience with regard to attracting and receiving support for innovating climate technologies. This may help governments to design solutions that are better tailored to the needs of climate technology entrepreneurs.





Photo: UNFCCC secretariat

Strengthening incubators and accelerators to support climate technology entrepreneurs

In 2018, the Technology Executive Committee, the Green Climate Fund and the Climate Technology Centre and Network worked together to determine how incubators and accelerators can effectively support climate technology entrepreneurs in developing countries. They held a thematic dialogue that brought together more than 80 internationally recognized experts on entrepreneurship, technology innovation and climate change. On the basis of the findings from the dialogue, the three organizations developed two publications that provide policy recommendations on ways of strengthening incubators and accelerators so that they can support climate technology entrepreneurs more effectively. A key focus of their efforts was on understanding how to catalyse financing for supporting incubator and accelerator models. The outcomes of this work informed the Green Climate Fund on how it may provide finance to developing countries for strengthening incubators and accelerators. The three organizations found that:

1. A strong entrepreneurial ecosystem unlocks financing for incubators and accelerators. In particular, it strengthens linkages between private sector financiers and entrepreneurs and fosters greater awareness of new products on both the supply and demand side. It also

promote strong networks, opening up demand and delivery channels for climate technology solutions. While an ecosystem goes beyond providing support for climate technology, it is necessary for successful innovation;

2. Crowding in private finance helps to transform ideas into solutions. Enhanced provision of public and private financing for climate technology entrepreneurship is greatly needed. It would enlarge the pool of entrepreneurs and facilitate the development, scaling up and market penetration of climate technology solutions. Entrepreneurs in developing countries particularly lack access to non-dilutive low-cost capital and financial instruments that they could use to leverage loans and private capital. One way to crowd in private finance is by creating financial instruments that reduce the risk and opportunity cost for local public and private financial institutions seeking to invest in the development and demonstration of climate technologies;
3. New incubation models should aim for financial sustainability. Most current incubators and accelerators are not financially self-sufficient. Generally, incubators and accelerators are supported via a variety of sources. These include the government, international sponsorship, private investment and revenue from equity. Furthermore, current incubator and accelerator models might not be the best fit for developing countries. For instance, the current accelerator model is based on supporting start-ups in ICT in the Silicon Valley, which has one of the strongest entrepreneurial ecosystems in the world. Actors should encourage the co creation of new incubators and accelerators, with the participation of public and private financiers. Moreover, new incubators and accelerators should pay greater attention to the diverse needs of entrepreneurs and technology users in terms of different cultural contexts, local communities and income levels, as well as to gender considerations.

Read the publications and find further information at <http://unfccc.int/ttclear/incubators>.



Further information

This TEC Brief is based on the following documents and event, which provide more detailed information:

UNFCCC. 2018a. *Catalysing Finance for Incubators and Accelerators*. Bonn: UNFCCC secretariat.

Available at: <http://unfccc.int/ttclear/incubators>.

UNFCCC. 2018b. *Climate Technology Incubators and Accelerators*. Bonn: UNFCCC secretariat. Available at: <http://unfccc.int/ttclear/incubators>.

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United Nations
Framework Convention on
Climate Change



About the Technology Executive Committee

The Technology Executive Committee is the policy component of the Technology Mechanism. It was established by the Conference of the Parties in 2010 to facilitate the implementation of enhanced action on climate technology development and transfer. Along with the other component of the Technology Mechanism, the Climate Technology Centre and Network, the committee is tasked with facilitating the effective implementation of the Technology Mechanism.

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