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Skills for Green Jobs in **Costa Rica**



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First published 2018

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Skills for Green Jobs in Costa Rica

ISBN 978-92-2-132909-1 (print)
978-92-2-132910-7 (web pdf)

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Abstract

Through different national initiatives Costa Rica has been positioned as a leading example within the international community of the transition to a climate-resilient future. The country presented its Intended Nationally Determined Contributions (INDC) under the United Nation's Convention Framework for Climate Change in September 2015. The scope of the national measures will build up society's resilience and reduce emissions of greenhouse gases.

Technological achievements in sectors such as agriculture, energy, forestry and livestock represent opportunities to mitigate greenhouse emissions. Introducing skills and green jobs will guarantee and ensure the achievement of these goals.

The profile of current jobs will need to be modified and adapted to include green skills. Currently the country has been active in three particular initiatives that ensure such skills, namely in the Nationally Appropriate Mitigation Actions (for Coffee) in coffee production, in Carbon Neutral certifications and in sustainable tourism.

This study summarizes Costa Rica's environmental policy framework and the experiences of major actors in the provision and anticipation of skills for green jobs during the coming years.

Acknowledgment

This study was conducted by Instituto Centroamericano de Administración de Empresas (INCAE) Business School, as a part of set of national studies on skills for green jobs conducted in some thirty countries globally. The set of studies is the result of collaboration between the ILO and the European Centre for the Development of Vocational Training (Cedefop). Overall methodological guidance was provided by Olga Strietska-Ilina (ILO Employment Policy Department, Skills and Employability Branch). Coordination of country studies and technical backstopping was provided by a team led by Catherine Saget (ILO Research Department), Tahmina Mahmud (ILO Skills and Employability Branch) and Takaaki Kizu (ILO Research Department). Moustapha Kamal Gueye and Marek Harsdorff (ILO Enterprises Department) contributed to the studies' implementation on behalf of the ILO Green Jobs Programme. Alena Zukersteinova and Stelina Chatzichristou from Cedefop's Department for Skills and Labour Market coordinated studies among the participating EU countries. Valuable inputs were provided by the ILO colleagues: Christine Hoffmann, Laura Brewer, Maria Ilca Lima Webster, Alvaro Ramirez Bogantes, Hassan Ndahi, Fernando Vargas Zuñiga, Patrick Daru, Akiko Sakamoto, Mikhail Pouchkin, Gabriel Bordado, Julien Magnat, Kanae Tada, Tendy Gunawan, Bolotbek Orokov, Gwyneth Anne Palmos, Georginia Pascual, Badiane Cheickh and Kishore Kumar Singh. Massimiliano Leone, Ana Buzdugan (International Training Centre ILO Turin), Mariela Dyrberg and Annette Brandstätter (ILO Employment Policy Department), Solveig Boyer (ILO Green Jobs Programme) and Manuela Flamini (Edizioni Retrò s.r.l.) were responsible for editing and design.

1. Introduction

This update of *Costa Rica Skills For Green Jobs II* report has been prepared by INCAE/CLACDS with the purpose of exploring the needs for training in skills for green jobs in the country and of policies enacted to facilitate greener jobs.¹

These efforts are performed in compliance with climate change policies and programmes. Specific objectives include the following:

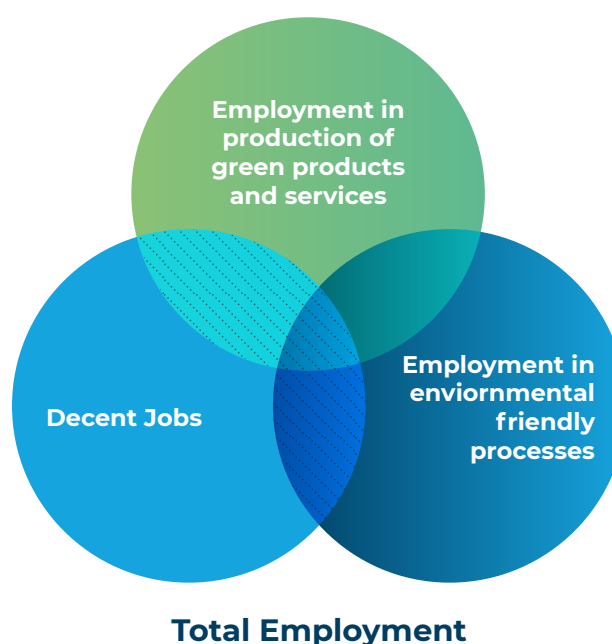
- 1) Identify major challenges and priorities related to climate change according to NDC;
- 2) Identify major sectors with greening potential in Costa Rica;
- 3) Analyze how skills response strategies are incorporated into wider greening policies and programmes;
- 4) Analyze skills needs for new occupations, new skills for greening existing occupations and retraining needs in sectors undergoing

structural changes as a result of policy implementation;

- 5) Identify methods, tools, systems and institutional frameworks for skills anticipation;
- 6) Analyze how the skills response is organized to meet the challenge of greening the economy effectively;
- 7) Generate policy recommendations for skills policies and strategies, skills provision at national, sectoral, local or enterprise level.

The baseline concept used in this report is the following: “Green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sector such as renewable energy and energy efficiency” (ILO, 2016).

Figure 1. Differentiation between employment in green economic sectors and job functions in all sectors from an environmentally-friendly perspective.



Source: ILO, 2016.

¹ The first report is found at http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_142485.pdf

Green jobs help to:

- Improve energy and raw materials efficiency;
- Limit greenhouse gas emissions;
- Minimize waste and pollution;
- Protect and restore ecosystems;
- Support adaptation to the effects of climate change.

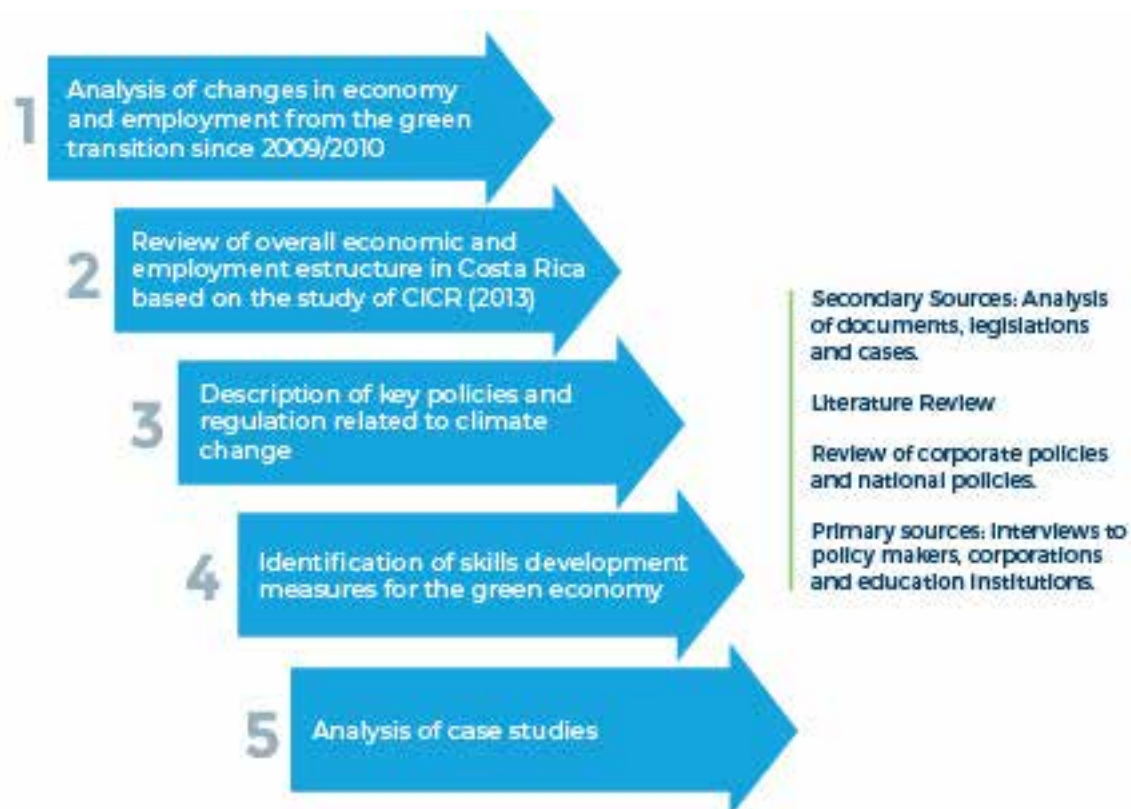
Green jobs are those represented by dashed area in Figure 1.

There is also a working definition which includes green jobs as decent jobs in any economic

sector (agriculture, industry, service) which improve energy and raw materials efficiency, limit greenhouse gas emissions, minimize waste and pollution, protect and restore ecosystems, and support adaptation to the effects of climate change (ILO, 2008).

To conduct research INCAE/CLACDS developed a methodology framework for gathering qualitative and quantitative data from several organizations including different actors at national level. A summary of the research method is presented in Figure 2.

Figure 2. Skills update methodology



2. Major changes in the economy and employment shifts in the green transition since 2009/10

The Costa Rican economy has experienced few changes since the recession period. The trends in its economy, industry and business performance (ultimately, it is up to businesses to adapt to shifts towards green transitions and perform adequately) suggest a relative stability.

In turn any priorities for ensuring a green transition remain unchanged. The main economic challenges in the country are not productivity or economic growth but rather reducing the size of its fiscal deficit - a problem associated with growing government expenditure - tackling growing corruption, and combating growing crime networks.

Costa Rica is a small but emerging economy, with a national income of more than US\$50,000 million. Since the 2009 economic recession Costa Rica has experienced annual growth of 3.5 per cent with a slowdown during

2013 and 2014.² Overall the economy has remained relatively stable with upward shifts in productivity in certain industry sectors.

At industry level, there are five sectors that are growing faster than ten per cent per annum, namely the energy sector, financial services, mining and other services (Table 1). These sectors are largely responsible for the four per cent growth of the economy. In many respects these growth sectors such as energy and water overlap with some of the country's environmental priorities.

At the centre of its economic and industry performance is a business sector that is responsible for the country's economic growth and, as it pertains to green skills and jobs, is essentially responsible for adapting its factors of production to any changes in its labour and occupational structure.

Table 1. Industry growth in Costa Rica's economy.

ECONOMIC SECTOR/OCCUPATION	MALE	FEMALE	TOTAL
Agriculture, forestry and fishing	66.2	76.5	71.4
Trade	9.0	10.1	9.6
Manufacturing	5.6	3.5	4.5
Education	2.9	2.3	2.6
Transport and storage	4.3	0.2	2.2
Construction	4.2	0.1	2.1
Other service activities	2.4	1.7	2.0
Accommodation and food	0.6	2.4	1.5
Others	4.7	3.1	3.9
Total	100	100	100
Number (Persons '000)	6,890	7,108	13,999

Source: Macro Economic Programme of BCCR, 2017.

Table 2. Type of business in Costa Rica (%)

	SME	LARGE	OTHER
Business	78	7	15
Employees	25	69	6

Source: <http://reventazon.meic.go.cr/informacion/pyme/2017/informe.pdf>

Overall there are officially 40,000 registered businesses scattered across various economic sectors.³ Alongside these businesses is an informal sector which is believed to account for over 40 per cent of the labour force⁴ and consists mostly of unipersonal businesses which may contribute less than 15 per cent of GDP.

These 40,000 businesses are partly responsible for changes in the economy and employment, and are the key players responding to a green jobs and skills attainment transition. However, it is also important to consider the size of the informal economy, which does not follow regulations or may not be aware of environmental policy and change.

Among some of the characteristics of the formal business sector we find that seven per cent are large corporations that hire nearly 70 per cent of the labour force in the formal economy. In other words, fewer than 3,000 companies employ a total of 1,006,014 people, or 43 per cent of the country's labour force.

Small and medium-sized businesses comprising almost the entire private sector hire only 25 per cent of the formal labour force or just over 300,000 people (part of the reason being that the majority of businesses are enterprises employing fewer than 10 employees).

Among large companies over 65 per cent are concentrated predominantly in managerial services, the hospitality industry, commerce, and manufacturing. Moreover, large businesses account for over 20 per cent in terms of management, education and transportation,

while construction, information, and energy account for more than ten per cent.⁵

Microenterprises are mostly operating in professional services and trade and compete with the informal sector.

2.1 Adapting green jobs to economy sectors

The economic performance of these sectors and businesses has remained relatively stable and unchanged over the past ten years or at least since 2010. Thus, to adapt green jobs operationally to the leading sectors of the economy and make the industry sector greener will require not only the introduction of new occupations and skills but also skills and occupations that make the industry sector compliant with environment-related frameworks.

According to the National Climate Change Strategy there are eight economic sectors prioritized as areas for intervention, namely *energy, transport, agriculture, manufacturing, solid waste, tourism, water, and land-use*. Transportation alone is responsible for one-third of CO₂ emissions.⁶

Table 3 shows some of the sectors and occupations in which, according to experts interviewed at the MINAE, INA and other academic institutions, greener jobs will play a role in the country's economy and the green transition.

3 <http://reventazon.meic.go.cr/informacion/pyme/2017/informe.pdf>, p.31.

4 http://www.nacion.com/economia/consumidor/Empleo-informal-Costa-Rica-alcanza_0_1489251088.html.

5 P.43, p44.

6 http://www.nacion.com/vivir/ambiente/Costa-Rica-aspira-emisiones-carbono_0_1519248062.html.

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Table 3. Green jobs and economic sectors

SECTOR	MARKET SIZE: JOBS	OCCUPATIONS FOR A GREENER INDUSTRY	TECHNICAL SKILLS REQUIRED FOR BETTER COMPLIANCE	SHARE OF SMES
Energy (renewables) and transportation	101 008	Engineers, mechanics, operators of water systems	Technology design, data analysis, software management, equipment design and selection	87% (44% microentr.)
Agriculture	244 031	Agriculture/forestry/ Environmental engineers, biotechnologists, biologists, statistician, operator of water treatment plants	Data analysis (statistics), technology transfer knowledge, drone management, precision agriculture knowledge, GPS management, software management, regulation/legislation knowledge, thinking design for innovation, living systems evaluation, quality control analysis	
Livestock		Veterinaries, agriculture engineers, environmental engineers, biotechnologists, biologists, operator of water treatment plants	Technology transfer knowledge, data analysis, living systems evaluation	
Construction	12 2513	Environmental engineers, environmental managers, expert compliance for building certifications like Leadership in Energy and Environmental Design (LEED), Excellence in Design for Greater Efficiencies (EDGE) and Requirements for Sustainable Buildings in the Tropics (Reset).	Operation and monitoring, technology design, quality control analysis	84% (microentr. 39%)
Financial services	44 994	Software developers, green financial analysts	Data analysis, environmental/strategic analysis, environmental evaluation and monitoring	NA
Manufacturing	203 447	Competencies in automation of processes is high, especially with knowledge of robotics, electronics and computing, all strongly related to energy efficiency and environment protection technologies.		94% (73%)
Tourism	135 911			95% (60% microentr.)
Electricity and Water	23 359 and 8 317	water resource management		96% (59% microentr.)
Transport	102 421			80% (44% microentr.)

Source: Interviews with government agencies in MINAET and INA, as well as other institutions.

<http://indicadoreseconomicos.bccr.fi.cr/indicadoreseconomicos/Cuadros/frmVerCatCuadro.aspx?idioma=1&CodCuadro=%201912>

Given the presence of many small businesses in Costa Rica, their infrastructures will need proper adaptation to practices relating to a goal of carbon neutrality or reduced greenhouse emissions. In turn those adaptations will require skills, practices and jobs that will in their turn require adaptation or creation.

Those practices are so far found in the Nationally Appropriate Mitigation Actions (for coffee) and the certification programmes on carbon emission.

3. Key policies and regulations

(green, climate change, and related employment / green jobs / skills, policy coherence and coordination, role of social dialogue)

The core of these issues associated with a green economy is informed by the involvement of Costa Rica in fulfilling its environmental commitments to the international community. Costa Rica has approved laws and conventions on the environment and implemented policies and regulations pertaining to these agreements.

In turn, MINAE and other entities should pair these policies with guidance to the industry on how to align existing practices, including employment in green jobs and climatefriendly industries.

These sections lay out trends and practices relating to conventions and agreements on the environment.

In December 2012 Costa Rica became part of the Asociación Independiente de Latinoamérica y el Caribe (AILAC), a negotiating group formed by Colombia, Chile, Panamá, Perú and Guatemala within the Parties Conference held in Doha, Qatar. The objective is to work on issues relating to the international UN Convention on Climate Change. Two countries were later added to the group, namely Paraguay and Honduras, while two other became cooperative countries, namely Mexico and the Dominican Republic.

On 30 September 2015 Costa Rica presented its Intended Nationally Determined Contributions (INDC) under the United Nations Convention framework for Climate Change and stated its commitment to climate-related measures (MINAE, 2015).

In December 2015 in Paris, France, in the twentieth first Conference of Parties (COP21) countries agreed a multilateral set of goals relating to countering the effects of Climate Change. The Paris agreement sets out tasks for reducing greenhouse emissions through mitigation, adaptation and ecosystem resilience to global warming; its full application must start by 2020, when The Kyoto protocol ends.

3.1 International Conventions

Between 2010 and 2016 Costa Rica has committed itself to adopting various international agreements, which in turn led to the implementation of several policies. The table below summarizes these agreements.

Table 4. International Agreements

DATE	ACTIVITY	PURPOSE
December 2012	Member of AILAC	Negotiating group
30 September 2015	Intended Nationally Determined Contributions (INDC)	Commitment to climate-related activities
December 2015	Conference of Parties (COP21)	Countries agreed a multilateral set of goals to face the effects of Climate Change.
13 October 2016.	Costa Rica ratified the Paris Agreement	Agreement to fundamental climate change commitments, including a National Adaptation Plan covering 10 economic sectors, and a Green and Inclusive Development Strategy
2016 Marrakesh	COP22	Development of the action plan on gender from the United Nations' Framework Convention for Climate Change CMNUCC

Costa Rica ratified the Paris Agreement on 13 October 2016.

In this agreement Costa Rica's main commitments are to the following:

- Develop a National Adaptation Plan by 2018, covering 10 economic sectors;
- Launch a Green and Inclusive Development Strategy;
- Increase forestry coverage to 60 per cent of the country's total surface;
- Consolidate a payment mechanism for environmental services and forestry certification;
- Consolidate the National System for biological corridors and the National System of Protected Wild Areas;
- Create and implement a National Policy of Disaster Risk Management 2016-2030 with the National Emergency Commission;
- Support the creation of territorial ordering plans from all the coastal "cantones"⁷ by 2020; these plans must include a ranking of vulnerability to climate change, adaptation and mitigation plans;
- Create ways of identifying and improving the public infrastructure and human settings and create a monitoring system by 2020;
- Increase coverage, maintenance and sustainability of sanitary and pluvial sewage up to 90 per cent by 2030;
- Create a health monitoring system relating to pathologies/illnesses associated with climate change by 2018;
- Consolidate a National Information System on Climate Change.

Other agreements approved in the COP22 2016 in Marrakesh, Marruecos, include the renewal of the Programme on Gender in Lima, and the creation of the mandate for the development of the action plan on gender from the United Nations' Framework Convention for Climate Change CMNUCC. This Convention recognizes women as the members of the population who are most

vulnerable to climate change and also the most important group facing the challenges.

According to its INDC, submitted to the UN Framework Convention on Climate Change on 30 September 2016, Costa Rica is working on a mission of becoming a global example in the greening process. Many actors have been working to accomplish this goal: civil society, private sector, academia, NGOs, and so forth. The country has positioned itself in the international community for its innovation in the hydroelectric sector, biodiversity, conservancy and other climate-change-related areas (MINAE, 2015). For example, the introduction of its inter-city electric train has been an important contribution to reducing carbon emissions.

This document states Costa Rica's commitment to the United Nations' Framework Convention for Climate Change (CMNUCC) to avoid dangerous anthropogenic interference in the climate system and the goal of "keeping the average temperature increase leveled at 2° and consider reducing this limit to 1.5°".

3.2 Country policy frameworks

In terms of mitigations,⁸ the country would like to (1) reaffirm its aspiration of becoming carbon-neutral from year 2021; (2) produce a maximum of net emissions of 9,374,000 tonnes of CO₂ equivalent by 2030, with emissions *per capita* of 1,73 net tonnes by 2030, 1,19 net tonnes per capita by 2050 and -0,27 net tonnes per capita by 2100 (MINAE, 2015).

The country also has an Adaptation to Climate Change component in its National Contributions, with clear commitments for 2030.

Its National Adaptation Plan is currently in preparation and will be finished before 2018.

⁷ A political territorial division smaller than a province. It includes a local government.

⁸ <http://www4.unfccc.int/ndcregistry/PublishedDocuments/Costa%20Rica%20First/INDC%20Costa%20Rica%20Version%202%200%20final%20ENG.pdf>

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MINAE (2015) emphasizes that the National Contribution will be implemented by the following:

- 1) An Inter-Ministerial Council for Climate Change, which will allow discussion, definition, and following-up of climate change policies.
- 2) *Ad hoc* Operational Coordination Mechanisms, for example Joint Commissions (agriculture and forestry, transportation and energy) which will coordinate the inter-sectoral implementation agendas under the National Climate Change Strategy.
- 3) MINAE's Climate Change Department, in charge of coordinating the implementation of the National Climate Change Strategy and supervising the definition of technical standards, closely coordinated with other sectoral institutions related to MINAE (Energy Department, National Meteorological Institute, National Forestry Finance Fund, National Conservation Areas System, National Forestry Administration, among others).
- 4) The Climate Change Scientific Council, which will be created to advise the Environmental Sector Council, particularly its lead Ministry (MINAE). This Council will include international and national experts and academics, as well as members of the National Meteorological Institute (IMN), the National Agricultural Technology Institute (INTA), the National Council of Universities (CONARE), and the

National Geo-Environmental Information Centre (CENIGA).

- 5) The Climate Change Citizen Consultation Council, which will create a permanent citizen participation forum on climate change, with wide participation by the private sector, organized civil society and academia to provide continuity to subjects and workgroups emerging from the sectoral climate change fora.

Since 2010 several policies have been launched to accomplish the neutral emissions goals by 2021. The efforts started with a decree from the Climate Change Directive in 2010. This office opened the Programme for Neutral Carbon in 2012.

Currently the Directorate of Climate Change (DCC) has the support of several cooperation programmes and multilateral organizations such as the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ, German International Cooperation), the United Nations Development Programme (UNDP), the United Nations Environmental Programme (UNEP), the World Bank (WB) through the Partnership for Market Readiness (PMR), the Inter-American Development Bank (IADB), and the United States Agency for International Development (USAID), among others.

Table 5. Public policies framework for climate change

Framework policies	National Strategy for Climate Change 2009 Action Plan for the National Strategy for Climate Change
Other relevant instruments	National Energy Plan 2015-2030 Risk Management National Plan 2016-2020 National Plan for Public Investment National Plan for Forestry Investment 2011-2020 Health National Plan 2010-2021 National Plan for Development 2015-2018 Institutional Environmental Management Programme (PGAI) Strategy and Action Plan for the adaptation of the bio-diverse sector of the country to climate change 2015-2025 (ENASB-CC)

Source: LEDS LAC (2016).

In 2012 the Climate Action Programme was finally created. It is executed by the GIZ along with the Directorate of Climate Change (DCC) and the Environmental and Energy Ministry (MINAE).

In general the country is directing its mitigation efforts in energy including transportation, agriculture, industry, waste management, tourism, water, and land-use change (LEDS LAC, 2016). In terms of policy adaptation the country is giving priority to the following sectors: agriculture, fisheries, infrastructure, tourism, water resources and biodiversity (LEDS LAC, 2016).

3.3 Occupation, employment and skills-related Initiatives aimed at complying with environmental regulations

As the section above showed, one of the most important public policy commitments has consisted of a focus on activities geared to improving the environment (as in complying with carbon-neutral emissions) and to achievement of a green economy.

These commitments in turn require education, employment and skills to be environment-rules-compliant with the objective of reducing greenhouse emissions.

For the most part, however, the government lacks comprehensive and systematic policies or guidance oriented to skills development for green jobs, or mechanisms for adapting jobs to a greener economy. Three core areas in which efforts exist are the C-Neutral certification programme, ecotourism policies, and the NAMA for coffee.

Overall the country is addressing general rules relating to compliance with the entire regulatory framework on the environment. For example, in 2014 the National Development Plan, which Alberto Cañas presented for the period 2015-2025, determined the strategic pillars for the government and incorporated climate change

as part of risk management. It aimed to link institutions in sectors such as energy, health, and agriculture, as well as local government bodies. **However, these rules do not include efforts or guidance on employment and skills.** At most the country is introducing and cooperating with segments of the private sector in the integration and training of experts on greenhouse gas emissions. In practical terms institutions may make minor steps to adapt to changing policies which in turn may modify skills or job demands.

There are some important examples of programmes promoting skills adaptation.

One is the Nationally Appropriate Mitigation Action (NAMA) for coffee. Costa Rica became the first country to establish a NAMA for coffee in 2013 with support from the agriculture ministry and the German Development Agency, GIZ. The relevance to green skills is that the programme provides technical assistance to farmers in changing production methods in the coffee industry.

In Costa Rica nearly 40 per cent of greenhouse emissions come from agriculture alone (even though it contributes only ten per cent of GDP). More importantly, coffee is responsible for ten per cent of all greenhouse emissions in the country.⁹ Therefore addressing alternative ways of growing and processing coffee substantially contributes to reducing these emissions.

Another example is the carbon neutrality certification programme promoted by the State. The programme has become an important gateway that aligns climate protection with green jobs and skills. Along the same lines, some academic effort has been undertaken to maintain compliance with certification.

Certifications

The country has been pushing for a number of initiatives that could have a multiplier effect throughout the industry. Specifically the most practical initiatives are the certifications in carbon neutrality, country brand, and tourism and construction.

9 <http://www.namacafe.org/en/nama-cafe-de-costa-rica>

Table 6. NAMA's areas of implementation in coffee production

	SKILLS AND GREEN JOBS NEEDED
1. Reducing the use of fertilizers;	Training in the use of alternative fertilizing material;
2. Using water and energy in coffee processing more efficiently;	Hiring experts and companies that sell organic fertilizers;
3. Promoting financial mechanisms to support new agroforestry systems in coffee production;	Training farmers in water maintenance and distribution;
4. Undertaking audits at mills determining the carbon footprint;	Hiring agronomists with skills and experience in green farming of coffee.
5. Developing strategies to promote differentiated coffee;	
6. Undertaking feasibility and project design studies for the implementation of low-emission technologies;	

Source: NAMA Café.

Carbon Neutrality Certification



Through the Carbon Neutrality programme organizations can participate through reporting of greenhouse gas emissions (GHG) and the Carbon Neutrality declaration under which the National Carbon Neutrality Standard, INTE 12.01.06, is applied.

Source: NAMA. *Carbon Neutrality Certificate awarded by the Costa Rican government to businesses that reach carbon neutrality.*

The National Carbon Neutrality Standard is voluntary, but is aligned with international regulations in the verification process by an ISO 14065 accredited body. The National Technical Standards Institute (INTECO) and the EARTH University have corresponding accreditation to the programme. In 2013 the Domestic Carbon Market was created in which the organizations participating in the Carbon Neutrality Country Programme can market carbon credits established under INTE Norm 12.01.06, known as Costa Rican Compensation Units (UCC). The initiative aims to help achieve the 2021 carbon-neutral goal.

Other initiatives have also been implemented, such as the Guide to designing a manual that enables SMEs to carry out Carbon Neutrality Statements under the International Standard 12.01.06, which are led by the DCC and help promote the entry of more organizations into the Carbon Neutrality Programme.

So far 84 companies have been awarded the certification and four organizations are declaring their inventories.

Country brand certification

In 2013 the Country Brand programme was introduced, aiming to position Costa Rica with a brand that represents five fundamental values of competitiveness. The use of the Country Brand is open to companies or products aiming to certify implementation of the values that the brand “Esencial Costa Rica” represents, highlighting sustainability as part of environmental, social and financial management.

Sustainable tourism certification

Since 1997 there has been a programme of Certification in Tourism Sustainability (CST) awarded by the Costa Rican Tourism Institute (ICT), which arose from recognition of the importance of sustainable development in the early 1990s. In 2010 an update of the regulation for sustainable tourism certification was created and the national sustainable tourism plan was

created with the objective of encouraging more companies to certify and redirect sustainability and climate change efforts, as well as to update the certification in line with the current needs of society.

Construction

In 2016 the Chamber of Industries of Costa Rica (CICR) introduced guidance for the construction sector in its Guide for Sustainable Construction and its Guide to the Efficient Management of Building Materials 2016. The guidance was produced in partnership with the Costa Rican Technological Institute and GIZ, among others.

The guide also serves as support for the follow-up of at least three evaluation systems (LEED, EDGE and RESET) associated with conservation matters (such as efficiency in the use of water, energy, materials and resources, and in the quality of the interior environment, innovation and design). However the degree of implementation of these metrics by SMEs or large corporations is uncertain or unknown.

Education

With respect to educational policies, in 2011 the Ministry of Education presented the National Waste Plan which includes guidelines for educators from the educational centre, including curricular management and specific measures that involve the modification of student habits by incorporating environmental issues in educational programmes. Overall, the document does not make reference to the need for green skills or jobs. Neither does the National Plan for State Education 2016-2020 make reference to developments for green jobs; while it emphasizes the need for improving the quality of higher education, including coverage, outreach in peripheral regions, integration of State universities, strengthening of research, and contributions to innovation, a focus on alignment of its curricula on a green economy is missing.

Other policies were also developed in 2015, such as the National Biodiversity Policy, the Policy for the agricultural sector and the development of rural territories 2015-2018, and the National Health Policy, which also prioritize the issue of climate change through risk management and adaptation.

4. Skills development measures for the green economy

4.1 Skills needs identification/anticipation: Which technical and core (generic) skills are needed and how are they identified

(is it a systematic process or not, are there data issues, who are the main partners, what is the role of social dialogue and the institutional set-up)?

Although Costa Rica has committed itself to becoming a carbon-neutral country, and the industries with highest growth are those connected with carbon emissions, identification of the skills needed to operate in a green economy is absent. A lack of statistics, combined with limited guidance and awareness, makes it difficult to establish measures for skills development for green jobs or activities.

In the first place there is a lack of reliable statistics, metrics and classifications for these types of skills. As shown in section 2.1.1, the information provided is based on a general inventory of observed jobs that would require green skills adaptation or job creation. In general, as a matter of public policy of adopting green jobs and skills to promote green or greener economies, a step in the right direction would be working with businesses and households as units of intervention.

As regards businesses, the first point of attention is determining the skills needs of the 40,000 corporations registered with the Ministry of Economy. Changes in new green economies translates into workers needing to be trained with the right set of sector-specific and generic skills that support a green economy.

Data from the Industry Chamber shows that most small businesses are not aware of existing legislation to make the economy greener.

Therefore, there is an urgency to create awareness and encourage enterprises to shift into greener practices as a necessity for contributing to the current development changes.

This section reviews three institutions in particular, the Cámara de Industrias de Costa Rica, the National Learning Institute (INA), and a specialized University (EARTH). These three institutions shed light on the extent to which skills have systematically been identified. The work of the CICR is pivotal as a way of understanding or assessing how the private sector is integrating green business practices into its business activities. The INA is the entity entrusted by law with providing workforce development for the country's labour force. And EARTH University is among the leading institutions training professionals in environmental management.

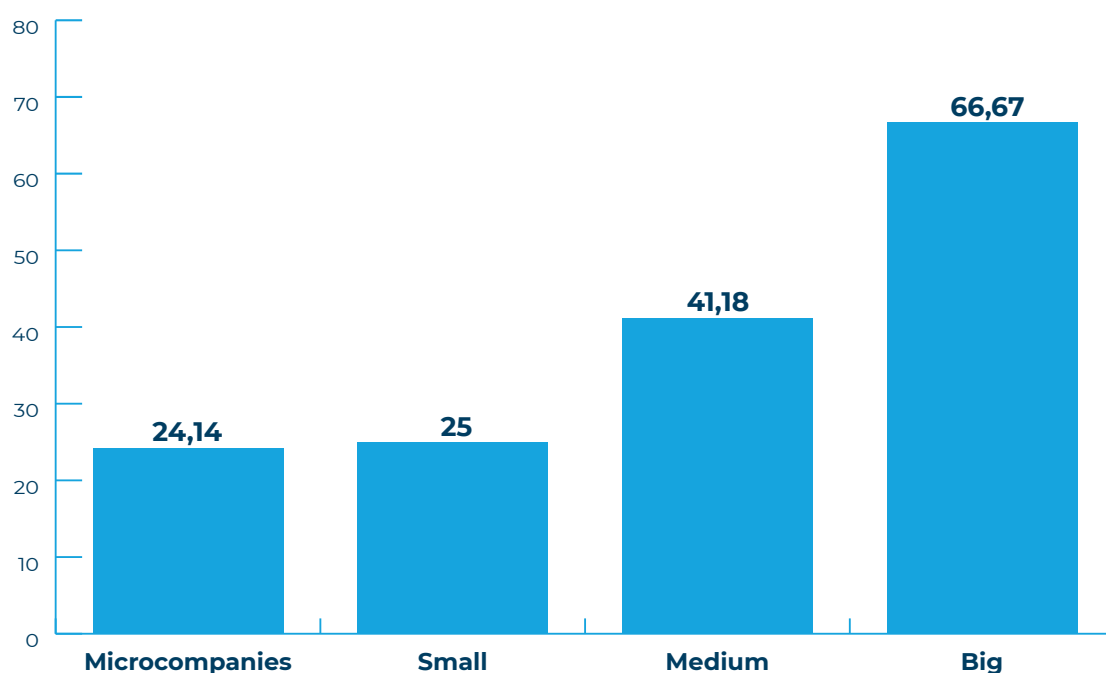
About the Cámara de Industrias de Costa Rica

In 2013 the Cámara de Industrias de Costa Rica (CICR) carried out a study to identify the skills needs for green jobs. The study included a sample of 100 out of 800 members. The skills were assessed by sector, giving this study a clear focus on trends in the shift towards a carbon-neutral economy.

The results show that an overwhelming majority (over 75 per cent) of micro and small businesses did not know about the government's environmental commitments. Medium and large companies were however more aware (40-70 per cent) of government initiatives.

These figures provide a very important baseline insofar as 75 per cent of the businesses are classified as SMEs.¹⁰ Therefore the fact that

¹⁰ <http://reventazon.meic.go.cr/informacion/pyme/2017/informe.pdf>

Graph 1. SMEs knowledge about Government initiatives related to climate change

Source: CICR, 2013.

the level of awareness is low is an indicator of the lack of knowledge of and compliance with the minimum information available such as the Certification programme and existing regulations. Their adaptation to a minimum of carbon-free standards will require contracting of experts that evaluate these companies and help them adapt.

In practical terms this entails ensuring that a critical mass of SMEs implement the voluntary Certifications. This is a challenge because their workforces are not equipped with the proper skills needed to work in a compliant manner (Graph 1).

The businesses surveyed identified that green jobs demand in the future will be in careers with technical, secondary and tertiary education. Table 7 displays the occupations and skills these businesses believe they would be required to obtain to be compliant. The selection of occupations and skills is somewhat similar to those priorities identified by the Costa Rican government (MINAET).

However, the table should be considered with the caveat that if business awareness is already low, their informed opinion as to what is needed

will be inadequate. Therefore public policy is essential for ensuring that all businesses understand what the country needs in order for there to be environmental compliance in the private sector.

Instituto Nacional de Aprendizaje (INA)

The Instituto Nacional de Aprendizaje (INA) identifies substantial needs for meeting the requirements of the different economic sectors.

INA's main attributions are the design and execution of training programmes in accordance with other public and private institutions; establishing of didactic enterprises and other training centres; and offering of technical assistance to institutions and companies for the creation and functioning of professional training, among other things (Article 3, INA's Organic Law, No. 6868, 6 May 1983) (Daley et al., 2010).

INA plays the role of providing technical training based on current needs emanating mainly from:

- 1) **Organizations or companies with environmental management as an operative principle:** Such companies are involved

Table 7. Occupations and skills by sector identify by Costa Rican managers in 2013

SECTOR	OCCUPATION	REQUIRED SKILLS
Agroindustry	Environmental Engineers	Knowledge of legislation, regulations and trade.
Food	Food scientists and technologists	Knowledge of legislation, regulations and trade.
Construction	Environmental civil engineers	Knowledge of buildings and construction, production and material processing.
Lithographic	Environmental designers and nanotechnologists	Computer and electronics knowledge.
Wood	Sustainability specialists	Knowledge of engineering and technology.
Metalworking	Electromechanical technicians	Knowledge of computers and electronics.
Plastic	Environmental engineers	Knowledge of computers and electronics.
Chemical	Nanotechnologists in industrial engineering	Knowledge of engineering and technology
Services	Software developer	Knowledge of engineering and technology
Textile	Commercial and industrial designers, Industrial engineering technicians.	Knowledge of computers and electronics.

Source: CICR, 2013.

in voluntary internal or external measures to improve environmental performance. Normally this type of enterprise is regarded as taking steps forward into a green economy. Some of their practices include carbon footprint measurement and use of biodegradable packaging;

- 2) **Organizations or companies adopting measures to comply with environmental legislation:** These companies show a reactive response to trends in the green economy.

INA has maintained direct contact with companies in the country with a view to identifying occupations in all productive sectors in the shift into a greener economy. The following list includes the main occupations across sectors:

- Operators of sewage water treatment plants;
- Operators of centres for the collection of usable materials;
- Operators of community aqueducts or water purification systems;
- Operators of swimming pools;
- Implementers of environmental management systems;

- Other: Environmental management, including GHG inventory performers, waste managers, energy efficiency analysts, organic products growers, etc.

Skills requirements differ according to the sector but mainly include waste management; water and energy efficiency; carbon or other footprint estimation; environmental labelling; environmental legislation knowledge; emergency system management; and sustainable and green Fair Trade purchases. Desirable soft skills among employees in the new economy will be respect for the environment, teamwork, motivation, leadership, analytical thinking, perseverance, and assertive communication. These skills are considered priorities in performing and maintaining higher environmental and social standards. It is important to highlight that the level of training may vary according to the sector. Such variation depends on the level of awareness and the degree of skills needed to provide for each sector.

In INA's case the process for identifying the skills needed is based on:

- 1) Direct requests from companies or workers;

- 2) Studies of demand conducted regularly by the institution;
- 3) Agreements or similar mechanisms with Chambers of Commerce, Associations or Government entities such as Acueductos y Alcantarillados (AYA), Instituto Costarricense de Electricidad (ICE), Ministerio de Ambiente y Energía (MINAE), Cámara de la Construcción, Cámara del Plástico, and Cámara de la Industria Alimentaria. A constant flow of information and feedback ensures an anticipated response to labour market trends.

Technical departments at INA have incorporated the environmental component to ensure that technicians will graduate with green skills focused on waste management or cleaner production. In the internal structure other areas in which work on green jobs is taking place are:

VEHICLE MECHANICS CORE	HYBRID CARS
Electric Core	Photovoltaic energy and energy rational use
Agriculture Core	Organic agriculture and bio-digesters
Health, Culture and Craft Cores	Health, Culture and Craft Cores
Construction	Sustainable buildings

For INA, greening of existing jobs is relevant in all sectors, particularly in construction and agroindustry. Moreover occupations related to environmental management, such as GHG inventory performers, waste managers, energy efficiency analysts, organic products growers, and so forth, require particular attention. The main technical skills in current occupations include waste management, resource use efficiency in water and energy, estimation of carbon and potentially other footprints, environmental labelling, knowledge of environmental legislation, emergency systems management including environmentally cleaner production, Fair Trade, and sustainable and green purchases.

Besides the technical training for employees provided by INA, companies are investing in internal programmes for training their personnel

in green jobs. Several institutions such as MINAE, ICE and AyA are providing support for sectoral training in green topics.

In summary, from INA's perspective the following are the main occupations that have been identified as priorities for technical training:

- Operators of sewage water treatment plants;
- Operators of centres for the collection of useable materials;
- Operators of community aqueducts/water purification systems;
- Operators of swimming pools;
- Implementers of environmental management systems.

EARTH University

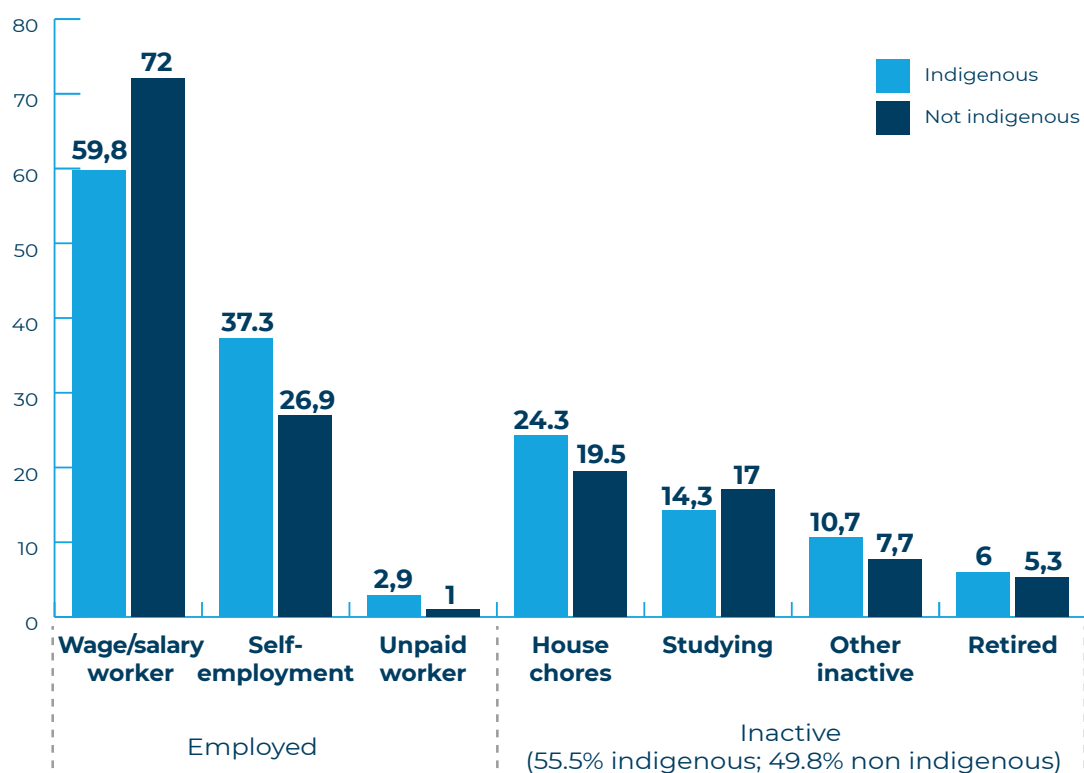
The EARTH University is the leading entity generating C-Neutral certifications and preparing employees to perform tasks related to green jobs. EARTH University graduates professionals and technicians from several countries, including México, Honduras, Guatemala, Ecuador and Costa Rica.

According to EARTH Professor and Carbon-Neutral Unit Director Edmundo Castro, the demand for professionals with knowledge of environmental topics has been high and urgent due to the inadequate supply of professionals within this field. As part of their commitment to provide training programmes for several sectors, EARTH has identified relevant occupations in the following sectors:

- Agroindustry: agronomists, biotechnologists, biologists, forest engineers, veterinaries;
- Food: food technologists;
- Plastics: industrial engineers.

Technical skills transfer in the programmes includes the following: development and maintenance of management systems especially those for GHG, data analysis, statistics, quality control, software management, GPS management, and instrument (distance meters) and drone use.

As in the case of INA's response, the EARTH Carbon Unit has identified a medium level of

Graph 2. Indigenous people are more likely to work in self-employment or be inactive

Source: Elaboration based on 2011 census and Programa Estado de la Nación (2014).

training as a prerequisite for green jobs. There are also some over-qualified professionals, mainly with MSc. or Ph.D. qualifications, working in green jobs. Most employees with bachelor-level degrees are interested in learning skills for a C-neutral economy.

Indigenous people

The indigenous population of Costa Rica tend to be less educated and hold low-skill jobs. Based on the 2011 Census, the indigenous population does not represent more than three per cent of the national population, but hold a vast territory representing about seven per cent of the total area. They are more likely to be self-employed compared to the rest of the population and are three times more likely to become unpaid workers.¹¹ Based on a World Bank report, indigenous people study less, dedicate themselves more to household chores and are less likely to be salaried workers.

Some research results recognize the livelihoods of some members of the indigenous population as sustainable. Some of their practices promote conservation, a friendlier relation with the environment, sustainable agriculture and a reduction in emissions through less deforestation. On this basis some of their practices may be used to create adaptation measures in response to climate change.¹²

The REDD+ initiative: "Reducing Emissions from Reforestation and Forest Degradation in Developing countries, and the role of conservation sustainable management forests, and enhancement of forest carbon stocks in developing countries", has to include the indigenous territory based on the Indigenous and Tribal Peoples Convention, 1989 (No. 169).

A comparative study on REDD+ Recommendations for Action in 2012, including

¹¹ <https://openknowledge.worldbank.org/bitstream/handle/10986/22023/K8319.pdf?sequence=4> p.31 visited on Nov 16,2017

¹² http://www.ilo.org/wcmsp5/groups/public/---dgreports/---gender/documents/publication/wcms_551189.pdf p.29 visited on Nov 15,2017

Costa Rica, determined that the main capacity-building needs of the country were related to the development of forest inventory, since they represent the higher priority. As a medium priority there is capacity-building for GHG inventory development. Other capacities for the implementation of REDD+ might be required but there is no specific data to specify which.¹³

As part of REDD+ the indigenous population adopted a “PSA Indigenous” which is a set of environmental services provided by the group and sold to the government. In August 2017 the indigenous people signed PSA contracts to the value of about 7.2 million colones (or 12 million dollars) to protect forests. Currently the result of their services has been positive and the negotiation of PSA Indigenous is a global example of good practice, incorporating the indigenous population into REDD+. During the same year the Minister of Environment and Energy committed the country to strengthening indigenous capacity-building in forestry, wildlife and defence against hunters.¹⁴

4.2 TVET provision for new green occupation and for greening established jobs / occupations

The provision for new green occupations depends on the adaptation of practices and trades in the workplace associated with the industry sector’s compliance with environmental regulations. At the academic level INA has created curricula to enable training students to take on new occupations.

INA has trained population groups ranging from operators and managers to supervisors. Additionally, community groups such as ASADAs (Administrative Associations for Aqueducts and Sewers) and entrepreneurial projects favour centres for collecting recyclable materials.

Table 8 provides a summary of graduates from 2010 to 2016 in the Environmental Management Sub-sector. The list is not exhaustive owing to data limitations. However the graduation of 61 students in environmental management calls attention to the possible shortage of at least 40,000 SME in the business sector may find when determining how to adapt their premises and other business infrastructure.

INA stated that upgrading or creating new competency standards is a daily task since market and environment needs monitoring is conducted regularly. The country’s environmental “boom” is growing constantly, nowadays with special attention to C-Neutrality and ecological footprints.

INA includes the participation of Chambers of Commerce or Associations from the productive sector, performing analyses of the skills and new positions required in response to requests from the private sector. The design process responds to requested competencies, and to whatever is needed to achieve those competencies (technical and soft skills), and stipulates the evidence or results that students must deliver on completion of the programme.

New occupations and the design of standards for competencies in the curriculum address the need for qualified personnel for the productive sector.

4.3 ALMPs and retraining measures

(including the role of employment service providers; which target groups of the population need retraining most and which benefit most from retraining and ALMP measures?)

The study undertaken for this report had difficulty in finding initiatives on retraining.

¹³ <http://www.scope14.com/wp-content/uploads/2013/01/Comparative-REDD+-study-public-version-June-2012.pdf> p. 61 visited on Nov 15, 2017.

¹⁴ <http://presidencia.go.cr/comunicados/2017/02/minae-ayudara-a-poblaciones-indigenas-de-talamanca/>.

Table 8. Graduates from 2010 to 2016 in the Environmental Management Sub-sector*

PROGRAM		2010	2011	2012	2013	2014	2015	2016	SUBTOTAL	TOTAL
Operator of water supply systems for community aqueducts /	M	73	16	59	36	22	53	49	308	359
Assistant or operator for water purification plant	F	10	1	7	13	5	5	10	51	
Operator of centres for the collection of useable materials /	M	83	55	44	48	77	80	92	479	1565
Collector of solid waste	F	146	98	139	208	229	131	135	1086	
Operator of sewage water treatment for environmental management / Technician in operation of plants for sewage treatment	M	18	18	6	11	26	24	23	126	174
	F	8	5	7	6	7	7	8	48	
Operator of swimming pools	M		26	55	48	95	118	78	420	480
	F		2	5	6	12	15	20	60	
Assistant in environmental management systems implementation	M						8	13	21	48
	F						14	13	27	
Environmental management systems implementation	M							6	6	13
	F							7	7	

*Updated names, followed by former ones.

4.4 The role of the private sector in skills training

(sectoral approaches, apprenticeship training, on-the-job training by enterprises for current workforce, existing support measures and incentives)

Cámara de Industrias de Costa Rica

Since the 2013 SME survey, the level of knowledge in SMEs on policies and programmes on climate change has changed positively. This trend sets a call to action from the Government to improve green practices in operations. Government procurement now requires compliance with norms such as Cneutrality, ISO 14001 or recognition from Sistema de Reconocimientos Ambientales (SIREA) at MINAE. To apply and be elected companies need to comply with regulations, otherwise they will be bypassed by competitors. However there is no clarity on the degree of compliance with this

initiative since there are only 84 companies which comply with the C-Neutrality Norm.

Cleaning companies represent a clear example since they need to hire employees able to develop methodologies with specialization in environment or quality compliance since ISO 9001 certification is requested within this purchasing scheme.

Since the environmental component should be transversal within the organization, teamwork is a highly desirable soft skill. Currently CICR is responding to the demand for a course to train auditors in environmental management systems.

4.5 The role of institutional set-up

(e.g. sector/industry skills councils and other sectoral bodies, inter-ministerial coordination, HRD councils/committees. PPPs etc.)

In Costa Rica there are two types of university that work independently: public and private. In the case of the public universities there is strong State funding and it is in them that the greatest amount of research is produced, in addition to which they provide 32 per cent of all graduates.

In this State system, initiatives for a career change or the opening of a new career arise from the universities which make a request to the National Council for Deans (CONARE), which transfers the application to the Office of Planning of Higher Education (OPES); the OPES in turn refers the request to an academic unit in which all requirements are reviewed. Subsequently there is an interaction between the academic division and the OPES and the outcome is then sent on to the university to make the requested changes. Once finalized, the final opinion is sent to CONARE for final approval.

Despite the formal structure, there is a need for coordination between the private sector (employers) and training centres (State and private universities, technical schools, etc.) about equating the demand for and supply of labour. Overall, there is a lack of connection between the education provided by universities and the needs and requests of the private sector. Institutions such as earth are somewhat an exception because they were created with the purpose of training professionals to handle issues that are now relevant to addressing the reduction or mitigation of greenhouse emissions.

Within the Inter-Ministerial Council for Climate Change there is no direct representation of the main institutions working with green jobs skills. The agenda of the council still covers issues such as carbon emissions and has not approached green job skills as a public policy issue.

Sustainable Tourism Certification

The Costa Rican Institute of Tourism has a certification system designed to categorize and differentiate tourist companies according to the degree to which their operation approaches a model of sustainability in terms of the management of natural, cultural and social resources.

This award is granted by the National Accreditation Commission of Costa Rica, and is based on physical-biological environment, service plant (this area corresponds to accommodation establishments), service management (this area corresponds to tour operator agencies), customers, and the socioeconomic environment .

Country Brand

A country brand is a marketing tool used by countries around the world to facilitate excellence in international markets. Costa Rica's country brand is Esencial Costa Rica:¹⁵ which refers to "down to earth people" who proudly preserve their environment and happily enjoy a high quality of life, and to a modern world of technology, trade and commerce, all set in the world's premier ecotourism destination of rich biodiversity.

The goal of the country brand is to generate competitiveness in Costa Rica and raise the sustainable standards of its companies, under which the organizations undergo an evaluation protocol that consists of five values appreciated by demanding consumers:

- **Value excellence:** refers to the superior quality or added value that makes a product, service or organization worthy of singular appreciation and estimation;
- **Innovation value:** systematized management of value generation for the organization and its clients, through the creative transformation of one or more dimensions of the business;
- **Origin value:** the link that exists between services and products in the country;

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- **Social progress value:** defined as the ability of organizations to meet the satisfaction of the basic needs of their collaborators, as well as to provide adequate platforms for well-being and development so that their human talent can improve their quality of life and reach their maximum potential, both professional and personal;
- **Sustainability value:** the commitment to satisfy the needs of present generations without compromising the possibilities for future generations to meet their own needs. In this case, sustainability is a living goal, the path to the future and the link between environmental management, social management and financial management.

5. Conclusions and recommendations

5.1 Conclusions

The findings of this report suggest that needs for skills and green jobs are yet to be fully measured and developed. Efforts to reduce CO₂ emissions have been positive. So far, the country possesses three tools related to skills adaptation: certification on carbon neutrality, NAMA for coffee, and sustainable tourism.

Efforts in carbon-neutral certification are very important mechanisms that serve as gateways to develop skills to comply with a green economy and green practices. However, with 84 companies out of 40,000 in the formal economy, none of which is classified as a large business, the country does not yet demonstrate its full compliance. Achievements in mitigation from new practices in coffee production are recent and data are not available. Sustainable tourism is also a practice of which the related skills have yet to be fully systematically extended to the entire tourism sector.

At country level, the public sector response to the rapid changes remains a major challenge. Technological advances require immediate measures that cannot be taken with out-of-phase mechanisms to generate incentives that will lead to a green economy with an increased need for green jobs.

Technical training conducted by INA and EARTH University has been key in the transition of companies to a green economy. SMEs and the private sector had highlighted the need for this type of training for their employees. Therefore it is important to emphasize short-term measures for addressing certification among businesses.

5.2 Recommendations

The growth of green jobs in Costa Rica will be linked to the development strategy of the country in which the environmental theme is central.

The strategy will relate to priority areas of the country in accordance with the commitments taken on by Costa Rica in the COP 21 and the implications they have for the productive sector and its transformation.

A second aspect to consider is the definition of a new industrial policy. In 2016 the Ministry of Economy started this process. The Chamber of Industries (2013) proposes that any new policy should consider aspects of sustainability and eco-efficiency as crosscutting axes. The new policy would identify “green” areas in which the country could have comparative advantage and create incentives that encourage development of the industry (Granoff et al., 2015).

The Ministry of Science, Technology, and Telecommunications (Micitt) established a policy that promotes the incorporation of science and innovation in the productive sector and can help support green industries.

When considering those elements that will positively influence demand for green jobs, the need for coordination is evident. A first step will, therefore, be to institutionalize a multi-stakeholder group that involves the participation of ministries (environmental, science and technology, economy, education, labour), the productive sector (employers’ organizations), academia (universities, vocational training organizations) and workers.

This group would have as its functions:

- 1) Identifying the skills and abilities required by workers at different levels (professionals, technicians, etc.) on a permanent basis;

- 2) Proposing follow-up mechanisms for the implementation of measures that allow the development of the competencies and skills required.

As regards implementation, it would be necessary to identify the areas of influence of each actor. In the case of the Micitt, its area of influence is especially through the formation of high-level human capital since it gives scholarships to students (doctoral or masters) that could address the identified areas of interest. For its part, the academy should review the curricula of some areas or develop new careers to fill the gaps detected.

The second level is the development of skills at vocational level, the main responsibility for which rests with the National Institute of Learning (INA). Although this institution periodically performs research on the needs of the productive sector, long implementation times are needed for the

recommendations made. Greater proximity to industry and civil society is required to facilitate curricula development through active participation beyond that of the institution's board of directors (OECD, 2017).

Projects that seek to establish dual education in Costa Rica should consider "green skills" that complement the needs of the business sector, for which the Ministry of Education should review its curricula in accordance with the results obtained through the efforts of the working group.

Finally, it is necessary to consider the working population with low educational levels. Implementing programmes that allow this population to complete their basic knowledge with vocational elements relating to green jobs can contribute to enhancing their inclusion in the labour market and obtaining formal jobs. This could also contribute to reducing poverty in the country.

6. Annexes

6.1 Analysis of case studies

Case study Holcim (The world leading supplier of cement and aggregates)

Holcim

Holcim is a construction company with a leading role in sustainability in Costa Rica and Latin America. As part of the Lafarge Holcim Group, it has internal environmental and social responsibility policies that influence their employees.

Holcim has experienced the need to contract consultants with expertise in impact measurement for the implementation of environmental measures requested by the headquarters in Switzerland. Also, in order to comply with better environmental management, the company has trained their concrete plant employees in areas such as climate change, environmental management and in techniques for addressing neighbours' concerns. Forestry engineering, biodiversity specialisms and topography have been some of the areas requiring training.

In surveying the need for training the company performs updates to job descriptions (for example, relations with neighbours and the external public) to improve environmental performance. Essential skills for employees in identified environmental positions within the company include environmental and social awareness, a sense of urgency to act against a risk to security or health, openness to audiences of interest, technical excellence in the management of emissions and actions plans, integrated management systems, database management, and teamwork. The company has improved through learning in situations which were inappropriately handled, causing issues with audiences of interest. Internally Holcim

trains employees in climate-change-related issues. Several training partnerships have been also established with several actors: Instituto Tecnológico, Veritas University, an alliance with Asociación para el Desarrollo Empresarial (AED) and RedEAmérica to access free training. These partnerships consist in building curricula together for current employees.

The programme “Holcim in my community” has been a successful case of being elevated as a Good Practice in Latin America. The content is designed to train collaborators living near the concrete facility in green skills, mainly environmental management and awareness related to the scope of company activities in the community. The training has been challenged by low attendance due to the productive process schedule. Pressure from the community to improve the company's environmental actions, and expectations from stakeholders and CEOs from headquarters to operate with excellence, have been some of the external leading forces in improving environmental and social performance.

Case study FLOREX¹⁶

FLOREX

The company's mission is to “Ensure that cleaning is a fundamental and recognized instrument in the search for solutions to the problems of environmental contamination, through the production, distribution and an integral cleaning service of the highest quality.” Furthermore, the company aims to be an agent of change in Latin American society through leadership and innovation in environmentally-friendly cleaning materials.

Florex's 53 commercial products were already popular in certain industries, but of growing interest to Araya and Chaves was the positioning

¹⁶ INCAE Business School, Florex case, 2012.

of their cleaning products on the retail market. By 2010 Florex had introduced five new products to supermarket shelves: laundry detergent, disinfectant, fabric softener, liquid dishwashing and a degreaser. Two new products, a dishwashing liquid and a substance to treat septic tanks and sewage were being developed for roll-out on to supermarket shelves.

Based on their own corporate principles, Florex developed green positions as part of their strategy to create a greener market. Florex seeks to influence purchases and consumer behaviour which values sustainability. The human resource strategy includes educating people in these values. Some internal reforms necessary to adapt to the new trend in green jobs have been the opening of positions such as environmental manager, biotechnology, and environmental expertise.

During 2017 the company has invested in 609 hours of training. More than 50 per cent of employees have been trained with an investment of approximately ten per cent of the monthly payroll.

To promote environmental practices Florex found valued partners - for example Universities with programmes supporting product development, sustainable business models, and life-cycle analysis. Other alliances are with government agencies such as the Competitiveness Council, Department of Labour and National Council for Innovation and Technology.

By training current employees in sustainability, talent retention and performance has increased and staff turnover has decreased. However, the future challenges are numerous, including for example the low supply of education in sustainability and also access to the few programmes offered, owing to cost or location. Another important challenge is the lack of knowledge and culture of metrics and financial indicators to evaluate the programmes better.

Case study NAMA Cafe¹⁷

The Costa Rican government collaborates with the private sector and international partners

to develop concrete Nationally Appropriate Mitigation Actions (NAMAs).

Coffee production in Costa Rica is closely linked to the country's national identity and provides employment for up to 150,000 people (during harvest). Coffee production gives rise to up to nine per cent of Costa Rica's national GHG emissions. To reduce the carbon footprint of the sector and maintain sustainable coffee production in the future, the government of Costa Rica plans to implement the NAMA in a participatory process between 2011 and 2021. Once successfully implemented, the initiative also seeks to lay the foundations for extending NAMAs to other agriculture systems.

The NAMA Café de Costa Rica is an innovative collaboration effort between the public, private, financial and academic sectors. There are six main actions to be implemented: first, reducing the use of fertilizers; second, using water and energy in the coffee processing more efficiently; third, promoting financial mechanisms to support new agroforestry systems in coffee production; fourth, undertaking audits at mills to determine the carbon footprint; fifth, developing strategies to promote differentiated coffee; and sixth, undertaking feasibility and project design studies for the implementation of low-emission technologies.

These actions will create the first certified low-emission coffee production worldwide and give Costa Rican coffee producers access to new markets. In 10 years the nationwide project aims to reach the entire coffee production area with a total investment of US\$30 million. It also seeks to lay the groundwork for extending the initiative nationally and internationally to different agricultural systems and other sectors.

The overarching goal of the NAMA Café is to produce and process coffee in Costa Rica in a low-emission, sustainable fashion. This objective will be reached by strengthening technical and institutional capacities at country level.

At the conclusion of the initiative, coffee growers and mill operators will possess the agronomic and technological knowledge to initiate change to low-carbon coffee production. Furthermore,

¹⁷ <http://www.namacafe.org>.

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they will have access to attractive financing options for long-term eco-efficient investments and will be connected to international buyers interested in sustainable, high-quality products. The concept is based on implementation of technologies in the coffee sector that will increase competitiveness, mitigate the emission of greenhouse gases, and simultaneously generate social, economic and environmental co-benefits, including those related to climate change adaptation.

Knowledge Transfer

From 29 November to 2 December participants from all over the world visited key players in the Costa Rican coffee sector. At the national coffee research institute ICAFE they saw its current work with somatic embryogenesis and centrifugal demuciligation. Additionally, participants visited the institute's varietal garden and biodigestor, which produces energy from coffee pulp. Other stops on the agenda were the coffee cooperative Coopedota, which anchors a Direct Trade programme with Intelligentsia Coffee in Costa Rica, and three of its coffee farms. Participants were presented with different farm management practices Coopedota promotes, such as renovation approaches, coffee leaf rust mitigation plans, varietal experiments and composting practices.

The ICAFE currently implements the Costa Rican Coffee NAMA in cooperation with the country's Ministries for Environment (MINAE) and Agriculture (MAG).

Costa Rican coffee farmers trained in Good Agricultural Practices

Coffee producers from all over Costa Rica received training in farm management, tree pruning, and sustainable soil management so as to increase productivity and minimize the impacts of climate change. In addition, they were introduced to NAMA Café and its NAMA Support Project. Over 500 people were trained directly in nine workshops organized and coordinated by the Ministry for Agriculture (MAG), the National Coffee Institute (ICAFE) and sponsored by GIZ. They were carried out locally by consultants from

Centro de Inteligencia de Mercados Sostenibles (CIMS). Over 700 producers were subsequently trained on the workshops' topics by their technicians.

Training materials to adapt to Climate Change for: Costa Rican coffee producers

The CASCADE project, implemented by the Centro Agronómico Tropical para Investigación y Enseñanza (CATIE) and Conservation International (CI), supports the development of Ecosystem-based Adaptation (EbA) for smallholder farmers in Costa Rica, Guatemala and Honduras. A set of training materials was developed within the framework of the project, providing basic information on Climate Change and its impacts on the agricultural sector, and presenting strategies for adaptation to Climate Change while maximizing the provision of ecosystem services on farms. The materials are freely accessible on line.

Each module offers practical information on the application of the concept of Ecosystem-based Adaptation (EbA) for technical personnel and farmers. **Module 1** provides an introduction to the basics of climate and Climate Change. **Module 2** focuses on the impacts of Climate Change on agriculture, possible strategies for Climate Change adaptation and mitigation of greenhouse gas (GHG) emissions. **Module 3** addresses the importance of ecosystems services for agriculture, and **Module 4** presents different and easily implemented EbA practices that help address Climate Change.

6.2 List of RELATED offered curricula

Universities

- Universidad Latina, has a technician in sustainable tourism management, which consists of seven modules;
- ECPA (Energy and Climate Alliance of the Americas), conducts courses related to sustainability, for example Sustainable Cities;

- UCI (University for International Cooperation) offers master's degrees in the protection of natural resources and management of the ecoregion.

INA Programmes

- General Guidelines For A System Of Environmental Management In The Company, according To ISO 14000 Standard;
- Guidelines for The Integral Management Of Solid Waste;
- Establishment of Forest Plantations;
- Manager (A) In Occupational Health and Environment;

- Forest Fires.

Programmes Chamber of Industries (not part of formal education system).

- Diploma in Sustainability Management;
- Training of Internal Auditors in Integrated Management Systems Quality, Environment, Energy, Health And Occupational Safety according to Standards ISO 19011: 2011; 9001: 2015; 14001: 2015; 50001: 2011 and the Ohsas 18001: 2009;
- Power Manager.

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8. List of key resources

ORGANIZATIONS	NAME	EMAIL
Private sector		
Florex	Silvia Chaves	schaves@florexcr.com, recepcion@florexcr.com
Holcim	Mónica Gutiérrez or Marcela Céspedes	Monica.gutierrezortiz@lafargeholcim.com, Marcela.cespedes@lafargeholcim.com
Academia/VET		
Universidad EARTH	Edmundo Castro	edcastro@earth.ac.cr
INA	Roy Alfaro Sharon Fernández Quesada	ralfarotrejos@ina.cr,
Chamber		
Cámara de Industrias de Costa Rica	Emil de la Rocha José Salas	erocha@cicr.com, jsalas@cicr.com, saraya@cicr.com
Government		
Ministerio de Ambiente y Energía	Andrea Meza, assistant Daniela Villalta	Andrea.mezamurillo@gmail.com

9. Annex

Florex: Internal training and professional development programmes

Florex Group develops an annual training plan to facilitate formal training and curriculum updating for collaborators. External consultants or selected employees conduct the training. This methodology opens up the possibility of professional growth. Florex Group believes in its collaborators and offers concrete opportunities for formal education for those interested in pursuing further studies. Internal training programmes are based on two core principles:

- 1) Professional growth of collaborators;
- 2) Personnel retention to build a strong commitment and identification with the company.

In order to update employees for green jobs and sustainability awareness Florex used training in:

Strategic planning in Florex includes continuous training in Green Jobs. There are two kinds:

- 1) Internal Programmes:
 - a) Induction in environmental management;
 - b) Ethics: environmental behaviour, including relations with clients;
 - c) Identifying deficiencies: environmental and economic impact.
2. Daily programme (daily feedback):
 - a) Waste management;
 - b) Energy efficiency;
 - c) Deficiencies;
 - d) Investment.

During 2017 the company has invested in 609 hours of training. More than 50 per cent of employees have been trained with an investment of approximately ten per cent of the monthly payroll.

External training and professional for general public

Florex Group developed projects to train stakeholders including visitors, students, customers, and the general public, among others. The objective is to encourage a break-away from schemes and paradigms related to products consumption in households, industries and institutions. In 2017 207 participants were trained under the “Environmental Education” programme.

HARD SKILLS

Plant operations	Impact analysis
Energy savings	Impact accountability
Occupational health	Lighten the processes and work on process coherence
Environmental impact	Environmental finance: cost of environmental system
Sales within others	Emission management
Waste management	Business savings
Plant engineering	Indicator writing
Biotechnology laboratories	Financial and managing impact accountability.

ISBN 978-92-2-132909-1

