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**Poverty-environment dividends of rural community enterprises:
insights from a cross-sectoral study in Latin America and the Caribbean**

by

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Abstract

Over the past years, the development of rural community enterprises (RCE) has been advocated as a means to achieve the dual goal of poverty reduction and environmental conservation. However, there is little scientific evidence that RCE are living up to their expectations. Based on 11 case studies from Bolivia, Dominican Republic, Guatemala, and Mexico, including 5 cases each from the agricultural and forest sectors and one case from the tourism sector, we gained insight into: 1) the economic, social and environmental performance of RCE; 2) the factors that foster or impede their sustainable development; and 3) the changes needed in political-legal frameworks and service provision to provide an enabling environment for RCE development.

Our methodological approach included a questionnaire survey with open-ended and closed questions among RCE stakeholders (general, production and sales managers). Data were triangulated with information obtained from RCE staff other than management, service providers, and downstream enterprises, as well as secondary information.

Our main findings are: 1) land tenure is important but not a *sine qua non* for the initial stages of RCE development; 2) legal forms of RCE typically do not address their realities and needs; 3) some RCE have accumulated considerable physical capital but exhibit low levels of productivity and quality due to limited processing and management skills; 4) participation of women in RCE management and decision making is limited, in particular in the forest sector; 5) RCE tend to be highly undercapitalized irrespective of size and scale; 6) RCE usually take 20 to 40 years to become mature; 7) in many countries, political, legal, and regulatory frameworks are disabling rather than enabling RCE development; 8) long-term accompaniment by public sector agencies and civil society organizations is critical to RCE development, as is a better articulation between technical, business development and financial services; 9) despite overall limitations, most RCE have demonstrated their capacity to generate increased income for their members and, to varying degrees, have had spill-over effects on community development; 10) RCE membership increases the resilience of livelihood strategies of the rural poor, though related asset building may be collective rather than individual in nature; 11) RCE operations tend to be more environmentally benign than those of single-ownership companies; 12) RCE development is not inherently compatible with "triple bottom line" performance; 13) when measuring poverty reduction in mere terms of impact on income, RCE development does not necessarily have an advantage over alternative approaches focusing on agricultural productivity, base-of-the pyramid, or rural-urban migration; and 14) when adopting a broader perspective of poverty reduction, however, RCE development is a competitive approach of ensuring household and community level asset building on the mid and long run.

We conclude with recommendations for improving the political-legal framework, in particular as regards the legal forms of RCE, related tax regimes, and green/local purchasing policies; and the overall service environment for RCE development, with emphasis on gender promotion, sustainability of service delivery, trust development, and multi-stakeholder learning.

INTRODUCTION

Rural community enterprises (RCE) encompass a wide range of typically small and medium enterprises (SME) in the agricultural, forest, and tourism sectors. They are characterized by collective ownership, with membership ranging from a few dozen to several thousands, and annual turnovers varying from a few thousand to several million dollars. In the agricultural sector, they include cooperatives and producer associations dedicated to production and commercialization of annual crops (e.g., basic grains, sugarcane, or horticultural products), perennial crops (e.g., coffee, cacao), or products that can be harvested year-round (e.g., honey, banana, tubers). Over the past years, a significant number of agricultural RCE have obtained organic, fair trade or other certifications to underscore their environmental and social responsibility and capitalize on it as a distinguishing feature in the market. Though exact figures are not available, it can be safely assumed that RCE membership in the agricultural sector of Latin America and the Caribbean (LAC) is over a million, with a total number of direct beneficiaries between five and ten million.

In the forest sector, extraction, processing, and commercialization of forest products are crucial elements of household livelihood strategies across a variety of settings. In the LAC region, more than 10 million people living in or close to tropical forests earn part, if not most, of their livelihoods through the use of timber and non-timber forest products (NTFPs). Forest-dependent people typically sell both timber and NTFPs through local intermediaries, with little value added at household and community level.

The tourism sector in Latin America and the Caribbean tends to be dominated by large hotel chains, individual small and medium-size hotels, and related tour-operators. Only recently, rural community tourism has been emerging as a new market segment, allowing rural families and communities to benefit from the long-term growth in the tourism sector. In many cases, though, they are ill-prepared to cater to the specific needs of a diverse clientele and exhibit an unfavorable price-quality relationship (Nel-Lo Andreu 2008).

Many of these RCE direct their business to niche markets for organic and fair trade certified products, sustainable timber and wood products, or eco-tourism, underscoring their commitment to environmental and social responsibility. For example, Latin America and the Caribbean are leading producers of organic and fair trade certified products in the developing world – the vast majority of it produced by RCE (Stoian 2006). Similarly, the region has considerably advanced towards community-based sustainable forest management and related enterprise development, in particular in Mexico and Guatemala (Bray & Merino-Pérez 2002, Antinori & Bray 2005, Nittler & Tschinkel 2005, Stoian & Donovan 2008). Finally, the emergence of ecotourism as a global tourism concept is closely linked to related service offers in the region, with countries like Costa Rica, Mexico, Peru, and Brazil figuring prominently in this respect.

In addition to their often environmentally benign forms of operation, RCE are important generators of employment and income. This makes them excellent candidates for businesses that contribute to the dual goal of poverty reduction and environmental conservation. At the same time it needs to be borne in mind that many RCE are highly constrained in human and financial capital. Given the increased awareness of the potential and needs related to RCE development, national and local governments, research organizations, donor agencies, and development

practitioners have started to look into opportunities for strengthening the technical, management and financial capacities of RCE to ensure higher value adding and successful integration in global and local value chains. However, there is still a poor understanding of the duration and potential pitfalls of related processes and the long-term commitments required for securing RCE viability.

This paper aims at improving our understanding of the RCE potential and at identifying shortcuts to their development by analyzing 1) the importance of land tenure, legal forms of RCE, and their asset endowments in terms of natural, physical, financial, human and social capital; 2) the duration of RCE development processes; 3) the service environment available and required for RCE development; 4) the participation of women in RCE management and decision making; 5) the generation of employment and income among RCE members and its relevance for poverty reduction; 6) potential spill-over effects on community development; and 7) the "triple bottom line" performance of RCE.

METHODOLOGY AND METHODS

Primary data collection was carried out in four countries in Latin America and the Caribbean (Bolivia, Dominican Republic, Guatemala, and Mexico). Country selection allowed for wide variation in terms of gross national income per capita, human development index, and GDP contribution of the agricultural sector, as well as differences in the political-legal and institutional frameworks (Table 1).

Table 1 – Characteristics of selected countries for RCE case studies

Country	Per capita GNI at PPP (US\$)	Human development index (HDI)	Agriculture as % of GDP	Salient features of political-legal and institutional framework related to RCE development
Bolivia	2,450	.69	15	Tenure rights for indigenous communities; strong donor & NGO presence for non-traditional agriculture & community forestry
Dominican Republic	6,210	.75	11	Long-standing government & donor commitment to organic agriculture
Guatemala	4,060	.67	22	Community forestry concessions (Petén) & government/donor support for specialty coffee production
Mexico	8,950	.82	4	<i>Ejido</i> common property regimes, extensive support for community forest enterprises

SouRCE: World Bank (2005), Human Development Report (2006), CIA World Factbook (2006)

In Latin America and the Caribbean, Bolivia and Mexico represent the lower and higher end, respectively, of gross national income per capita and human development index. At the same time, the agricultural sector's contribution to GDP is rather insignificant in Mexico, as opposed to Guatemala where it makes up almost one quarter of total GDP. Mexico and Bolivia offer formal land grants to indigenous and/or peasant communities, along with the right to commercialize

forest and other products. In the Petén region of Guatemala, communities have been granted the right to obtain renewable 25-year concessions for the harvesting and commercialization of timber and non-timber forest products. In all countries donors and NGOs have played a leading role in promoting RCE development, in particular in Bolivia and Guatemala, while in Mexico and the Dominican Republic government agencies have also been instrumental. Within these countries, case selection aimed at capturing variation across sectors, with five case studies each from the agricultural and forest sectors and one from the tourism sector (Table 2).

Table 2 – Salient features of RCE case studies, by country

Country	RCE	Legal form	Products / services offered	Certifications	Major Market (% of total sales)
Bolivia	El Ceibo	Cooperative	Cocoa beans, butter & powder (international); chocolate products (national)	Organic, fair trade	International (75%)
Bolivia	Cooperativa Agrícola Integral 'El Campesino' (CAIC)	Cooperative	Brazil nut	Organic, fair trade	International (100%)
Dominican Republic	Bananos Ecológicos de la Línea Noroeste (BANELINO)	Association	Fresh banana	Organic	International (100%)
Dominican Republic	Confederación Nacional de Cacaocultores Dominicanos (CONACADO)	Association	Cocoa beans, cocoa butter, cocoa liquor	Organic	International (100%)
Guatemala	La Voz que Clama en el Desierto (La Voz)	Cooperative	Green coffee	- - -	International (100%)
Guatemala	Federación de Pueblos Mayas (FEDEPMA)	Association	Green coffee	- - -	International (100%)
Guatemala	Empresa Comunitaria de Servicios del Bosque (FORESCOM)	Incorporated company	Precious and semi-precious tropical sawn wood	Sustainable forest management, chain of custody	International (85%)
Mexico	Chichan Há	Association	Logs, rough sawnwood, furniture	- - -	National (100%)
Mexico	Consorcio Corporativo de Productores y Exportadores en Forestería (Consorcio Chiclero)	Cooperative	<i>Chicle</i> gum	- - -	International (100%)
Mexico	Productos de Bosques Tropicales Certificados de Noh-Bec (Noh-Bec)	Cooperative	Rough sawnwood, dimensioned sawnwood, posts and poles	Sustainable forest management	International (85%)
Mexico	Prestadora de Servicios X-Yaat (X-Yaat)	Cooperative	Cultural tours, food service, eco-tourism	- - -	National (90%)

The 11 RCE case studies were selected with the aim of ensuring broad variation regarding their stage of development; organizational structures; and product and market orientation. Data at the RCE level were collected by employing a questionnaire with the following sections: 1) general information; 2) internal structure and governance; 3) political-legal framework; 4) economics and technology; 5) chain integration; 6) outcome and benefits; 7) service needs and finance; and 8) future projections. The questionnaire was employed to 1-4 stakeholders per RCE, depending on enterprise size and complexity as well as availability of respondents. Interviewees typically comprised general, production and sales managers. Data were triangulated with information obtained from RCE staff other than management, service providers and other enterprises, as well as secondary information.

RESULTS AND DISCUSSION

Objectives and service offer

RCE typically pursue multiple goals, with profit making and employment generation being only two of them. Other important goals include community development, improved local safety nets, environmental conservation, increased influence over political processes, and member education (Table 3).

Table 3 – Ranking of RCE objectives

RCE	Profit & employment	Community development	Capitalization	Environmental conservation	Political advocacy & cultural identity
El Ceibo	1	3	4	2	5
CAIC	1	5	4	3	2
BANELINO	1	2	4	3	5
CONACADO	1	2	4	3	5
La Voz	1	3	5	2	4
FEDEPMA	1	2	4	3	5
FORESCOM	1	5	3	2	4
Chichan Há	1	4	2	3	5
Consorcio Chiclero	1	4	3	2	5
Noh-Bec	1	4	3	2	5
X-Yaat	1	5	3	4	2

Note: Ranking on a scale from 1 (highest) to 5 (lowest)

Table 3 shows that profits and employment rank highest as RCE objectives, followed by environmental conservation, community development and capitalization, and political advocacy. It needs to be borne in mind, though, that the prioritization of objectives varies according to the type of respondent: RCE managers tend to emphasize the economic goals of an enterprise, while RCE members may assign higher importance to social, environmental and political goals. The diverse nature of RCE objectives is reflected in multiple services offered to their members (Table 4).

Table 4 – Services offered by RCE to their members

RCE	Marketing	Technical assistance & training	Credit	Storage & transport	Certification	Social services	Resource management
El Ceibo	X	X	X	X	X	X	
CAIC	X		X	X	X	X	
BANELINO	X	X	X	X	X		
CONACADO	X	X	X	X	X	X	
La Voz	X	X	X		X	X	
FEDEPMA	X	X	X		X		
FORESCOM	X	X		X	X		
Chichan Há	X			X	X		X
Consortio Chiclero	X	X	X	X	X	X	
Noh-Bec	X					X	X
X-Yaat	X						

As Table 4 reveals, with the exception of one Mexican RCE (X-Yaat), all RCE sampled offer at least three types of services to their members, in particular marketing, followed by technical assistance and training, certification, credit, storage and transport, social services, and resource management. These services are complemented by technical, business development and financial services sourced from outside the RCE (see external service offer below).

Asset endowments

This section examines the asset endowments among the selected RCE, based on five key livelihood assets (natural, human, social, physical, and financial capital).

Natural capital

Access to the natural resource base varied among the RCE sampled, with forest-based enterprises exhibiting the highest natural capital endowments. For example, Noh-Bec owns 18,000 ha of tropical forest, with the largest concentration of mahogany in Mexico. Other RCE (e.g., Noh-Bec, Chichan Há, and FORESCOM) are similarly dependent on the sale of a limited number of high-value timber products (mahogany and tropical cedar), whose long-term availability may be in decline (SmartWood 2005). Some of these RCE have emerged as traders and processors, though often with limited backward linkages to members and low levels of natural capital endowments. These RCE (CAIC, Consortio Chiclero, and FORESCOM) increase their viability independent from direct access to the natural resource base in accordance with their ability to create sense of ownership among their members. FORESCOM, for example, competes with local intermediaries for raw material from its first-tier members (community concessions that are independently managed, some of which with own processing facilities). While some first-tiers are strongly committed to FORESCOM, others perceive it as "just another intermediary" and exhibit high levels of side selling. NTFP-based RCE, such as CAIC and Consortio Chiclero, maintain relatively loose affiliations with their members. As barriers to entry are low, there is high fluctuation among their members and, hence, little stability as regards natural capital.

Where collective property of the resource base prevails, access regimes range from substantive ownership rights (e.g., *ejidos* in Mexico), via long-term usufruct rights (community concessions in Guatemala), to customary rights (NTFP collection in northern Bolivia). With the exception of CAIC, community ownership or usufruct rights have been obtained only within the past 20 years. In Mexico, agrarian law provides communities (*ejidos*) with secure land tenure, including the right to harvest and sell trees. In Guatemala, successful lobbying of NGOs supported by development projects and donor agencies led to the granting of community forest concessions. Access to the resource base implies usufruct rights for 25 years (renewal possible) under the condition that the management units become certified under the scheme of the Forest Stewardship Council within three years after being granted the concession (Carrera *et al.* 2006).

Agricultural RCE base their operations on customary rights held by individual RCE members or households rather than on land titles. For example, only 20% and 10% of the members of BANELINO and CONACADO, respectively, have land titles. In the case of agriculture-based RCE in Guatemala, all members have land titles which were granted as part of the Peace Accords of 1996; however, these titles have yet to be formally issued by the government, implying additional costs in terms of legal and administrative fees. This suggests that the overall risks as perceived by RCE members are relatively low. In most cases where individual access regimes prevail, only a small percentage (10–30%) of members have legally registered land titles.

In several cases, high endowments of natural capital among agriculture-based RCE have played a key role in their development. For example, both RCE in the Dominican Republic (CONACADO and BANELINO) benefit from favorable growing conditions for organic production relative to other countries. Unlike most of Central and South America, crop diseases such as *Black Sigatoka* (banana) and *Moniliasis* (cocoa) have yet to take hold in the Dominican Republic – resulting in lower production costs and higher productivity in organic production. In contrast, FEDEPMA and La Voz members have only access to relatively small areas (68 ha and 144 ha, respectively), though production takes places on highly suitable land (e.g., coffee on high-altitude, volcanic soils). At the level of RCE members, natural capital tends to be limited, with the average farm size varying between 0.5 and 3.5 ha (e.g., CONACADO, BANELINO, La Voz, and FEDEPMA).

Human capital

Human capital endowments were assessed at two levels: board of directors (BoD) and administration. In general, we found a shortage of formally trained personnel from within RCE (Table 5). BoD members and administrators often acquire their skills through learning by doing, based on trial and error. In some cases mandatory rotation of BoD members, and at times, administrators, every two to four years implies irregular or 'zig-zag' learning curves, hampering RCE performance and strategic orientation. Despite these limitations, there is evidence that over the course of time, BoD members and administrators become progressively capable of administering RCE operations and, consequently, less dependent on outside support in terms of funding and business administration. For example, BANELINO and El Ceibo stand out as having acquired relatively high levels of human capital among elected board members and administrative staff. In some cases, high levels of human capital exist for business administration based on externally-sourced managers or extensive support from NGOs. For example, FORESCOM, with less than 10 years existence, has good business administration capacity but depends heavily on NGO and project support to maintain professional staff.

Table 5 – Human capital endowment among RCE management

RCE	Business administration and special skills
<i>RCE with relatively high levels of human capital</i>	
BANELINO (Dominican Republic)	<ul style="list-style-type: none"> - General manager with 10 years' experience (MS degree) + 5-member staff - Selection of personal based only on professional qualifications - 70% of producers able to comply with organic and EurepGap certification - Management of certification schemes: organic (2000) + fair trade (1996)
El Ceibo (Bolivia)	<ul style="list-style-type: none"> - Until recently, managers (General, production, sales) from community, but no professional background; rotation system (on a 4-year basis) - Long-term sales manager and production manager in the processing plant with autodidactic skills acquired over many years
FORESCOM (Guatemala)	<ul style="list-style-type: none"> - Professional manager, with marketing staff provided by international NGO - Experienced technical staff for forest management and timber marketing - 3+ years experience in production and processing of complex timber operations
Consortio Chiclero (Mexico)	<ul style="list-style-type: none"> - Advanced communication and coordination skills for maintaining business contacts in Japan forged over many years of trial and error - Builds on lessons from previous government-led <i>chicle</i> sector initiatives, efforts made to provide transparency and demand-oriented services
CAIC (Bolivia)	<ul style="list-style-type: none"> - Full-time, (semi-) professional, non-member staff for business administration and accounting, legal assessment, general medicine, and chemical engineering
CONACADO (Dominican Republic)	<ul style="list-style-type: none"> - General manager with 12 years' experience (BS degree) + 3-member staff - 100% of producers comply with organic certification requirements - International certification schemes: organic (1992) and fair trade (1995)
Noh-Bec (Mexico)	<ul style="list-style-type: none"> - No professional manager - key decisions taken by BoD and general assembly - Highly experienced technical staff for forest management and timber marketing - 15+ years experience in production and processing of timber operations - FSC certified since 1994, on-site specialist in wood kiln drying
<i>RCE with intermediate-low levels of human capital</i>	
FEDEPMA (Guatemala)	<ul style="list-style-type: none"> - NGO managed and operated highly trained in organic production techniques - Management of certification schemes: organic (2002), C.A.F.E. practices (2005)
La Voz (Guatemala)	<ul style="list-style-type: none"> - No professional management or technical staff - 25+ years of training in organic production techniques –1st cooperative in Guatemala to obtain organic cert.) - Sophisticated understanding of quality issues from long-term exposure to tourists
Chichan Há (Mexico)	<ul style="list-style-type: none"> - 15+ years' experience in production and processing of complex timber operations - Management of FSC certification scheme since 1991 - Limited business administration and marketing ability, with high staff turnover
X-Yaat (Mexico)	<ul style="list-style-type: none"> - Volunteer, part-time manager with 4 years' experience, takes operational and strategic decisions, coordinates with clients, and organizes RCE members

Social capital

A proximate indicator of social capital formation between members and RCE administration is change in membership levels. Several RCE exhibited strong membership growth over the past

five years, reaching as much as 200% in the case of BANELINO. All of these RCE are positioned in higher value markets, have professional business administration, and receive high levels of support from donors and governments. Other growing RCE include:

- *CONACADO*: 15% increase in membership over past 5 years
- *Consortio Chiclero*: 30% growth in membership between 2004 and 2006
- *La Voz*: Slight increase in membership level over past 5 years (<5%)

In certain cases, membership levels have remained unchanged or declined. In the case of El Ceibo and two forest-based RCE (Noh Bec, Chichan Há) high barriers to membership restrict growth. Moderate decline in membership was observed with *FEDEPMA* (-20% over past 5 years), partially due to inability to generate price premiums for organic coffee. Among RCE with the lowest level of social capital is X-Yaat, which in addition to declining membership, reports friction regarding internal operations. This RCE is administered by volunteer staff with little or no member involvement, and is characterized by restricted access to services.

Another indicator of social capital is the quality of relations with downstream buyers and processors. Several RCE have been successful in establishing long-term trust relationships with their buyers. This has led to secure market outlets, also in times of high market volatility, and access to embedded services (e.g., financing, loan guarantees, and technology transfer). Examples include: *CONACADO* with 10+ year relationships with four international buyers, *La Voz* with a 10+ year relationship with a U.S.-based coffee importer, and *Consortio Chiclero* with several 5+ year relationships with importers in Japan, Europe and the United States. While some friction has been reported – in most cases related to prices, quality, and communication – the long duration of these relationships implies mutual benefits for RCE and their business partners. Long-term relationships with NGOs and, to a lesser extent, government agencies have been reported by *CAIC* (with *SNV*) and *El Ceibo* (with *DED*). Such partnerships have been instrumental in assisting RCE in overcoming the principal problems faced in the initial stages of RCE development, often related to lack of liquidity and strategic orientation. In general, our sample suggests that social capital is key for innovation in production or marketing as, at least in the early states of RCE development, it is often induced by NGOs and buyers. For example, *La Voz* became the first cooperative in Guatemala certified organic with help from a U.S.-based buyer.

Physical capital

Several RCE have accumulated physical capital worth several hundred thousand dollars (e.g., *BANELINO*, *CAIC*, *Chichan Há*, *Consortio Chiclero*, *FORESCOM*, and *Noh-Bec*), if not more than a million dollars (*El Ceibo*). In many cases, related investments were realized through external donor funding and/or credits. Under favorable conditions, physical capital accumulation can be achieved in a relatively short period of time, for example in the case of *BANELINO* (banana packing shed, storage facilities, banana transport infrastructure, vehicles, fertilizer production facility, and intern-equipped offices). Despite their investments, most RCE are not well equipped with state-of-the-art technology or facilities. Typically, equipment and machinery were purchased second-hand, lowering initial investments but resulting in higher maintenance and operating costs. In most cases, regular maintenance has been deferred due to unavailability of spare parts, limited willingness (or ability) of RCE to invest, and limited technical capacities of

RCE or external support staff. For example, both Chichan Há and Noh-Bec report major inefficiencies in milling operations due to lack of maintenance.

A low endowment of physical capital is common among agriculture-based RCE oriented towards domestic markets with little or no support from government agencies or NGOs. In many cases, physical capital consisted of little more than an administrative office, basic storage facilities, and rudimentary post-harvest and/or processing machinery and equipment.

Among the sampled RCE, access to public infrastructure varied widely, but in general it represented a constraint to RCE development. Less than 20% of the sampled RCE have year round road access, 24/7 electricity, and secure telephone and internet connection. For the majority of the RCE, one or several of these factors constrain RCE operations. Impassable roads during parts of the year cause delays in delivery of raw materials and finished products (e.g., CAIC). Regular and irregular power cuts and limited capacity to generate own electricity increase production cost, while limited number of telephone lines (only 1–2 lines at RCE level and highly limited number of lines among RCE members) and low speed and intermittent internet connection, increase transaction costs and undermine coordination and internal and external communication. Even when a telephone connection is available at the RCE level, many members do not have telephone access, thus increasing the cost of internal RCE communication.

Financial capital

Most sampled RCE are highly undercapitalized irrespective of their size and scale of operations. However, the extent to which the lack of financial resources restricts RCE development varies:

- *Severe, but able to cover operating costs while dependent on out-side assistance for investments* (BANELINO, CAIC, CONOCADO, La Voz, FEDEMPA, and X-Yaat): these RCE finance their activities via deductions in payments to RCE members proportional to their usage of RCE marketing services.
- *Sufficient for covering operating costs and stimulation of long-term growth*: Only in the case of El Ceibo were significant financial assets reported.

Access to financial services is highly variable. For RCE with long-term relationships with buyers, relatively stable production volumes, and niche market orientation, formal credit from international not-for-profit lending organizations (e.g., Shared Interest, EcoLogic Finance/ Root Capital, Oikocredit) is a viable option. In the case of several RCE oriented towards niche markets, grants were made available from NGOs, government agencies and foundations (e.g., X-Yaat from Expedia). Nearly all the financial services received by Noh-Bec, Consorcio Chiclero, and Chichan Há for infrastructure development and processing facilities were provided by government-backed projects at partially subsidized or zero interest rates. Significant amounts of credit and donations were received by BANELINO (US\$ 1.5 million for infrastructure investments) and El Ceibo (US\$ 1+ million for investments in office facilities and processing equipment). The Guatemalan government donated about US\$ 250,000 to FORESCOM to establish a processing plant. A few RCE have significant levels of working capital (e.g., Consorcio Chiclero, CAIC, FORESCOM), often based on short-term credit with the harvest or finished products as collateral.

Several RCE report highly limited access to credit for financing growth or offering short-term credit services to members. In such cases, members must rely on informal lending options that typically imply high interest rates in view of the real or perceived risks. Access to crop insurance was not reported by any of the selected RCE.

Asset endowments at aggregate level

Aggregate asset endowments of natural, human, social, physical and financial capital vary widely among the sampled RCE, ranging from very low (X-Yaat, FEDEPMA) to high (Consortio Chiclero) (Table 6).

Table 6 – Asset endowments among the RCE sampled

RCE	Assets / Capitals					Mean
	Natural	Human	Social	Physical	Financial	
Consortio Chiclero	4	4	3	3.5	3.5	3.6
BANELINO	3	3.5	3	4	1	2.9
El Ceibo	3	2.5	3	4	2	2.9
Noh-Bec	4.5	2	3	3.5	1	2.8
CONACADO	3	4	3	2	1	2.6
FORESCOM	3.5	3.5	2	2.5	1.5	2.6
CAIC	4	2.5	1	2	1	2.1
Chichan Há	3	2	1	3.5	1	2.1
La Voz	2.5	1.5	2.5	2	1	1.9
FEDEPMA	2.5	1	1	1.5	1	1.4
X-Yaat	1.5	1	1	1	0.5	1.0
TOTAL MEAN	3.1	2.5	2.1	2.7	1.3	2.4

Note: Ranking on a scale from 1 (very low) to 5 (very high)

Table 6 illustrates that asset endowments among RCE are highest as regards natural capital, followed by physical, human, and social capital. Financial capital is clearly most constrained and only Consortio Chiclero has reached an intermediate level in this respect. Many other RCE, in particular CAIC and X-Yaat, are barely able to cover operating costs and continue to depend on external support for investments. On average, asset endowments are low to intermediate (mean value 2.4). Good access to natural resources is a necessary but not sufficient condition for viable RCE development. Only when paired with human and social capital, business administration and positioning in the market reach decent levels. Physical and financial capital condition each other and, again, require sufficient natural, human, and social capital to reach their fullest effect.

Environmental performance

As indicated earlier, environmental conservation figures prominently among the RCE objectives, often second (or third) only to economic (and social) objectives (Table 3). The majority of the sampled RCE is certified according to internationally recognized organic agriculture or sustainable forestry standards (e.g., IFOAM, FSC), attesting environmentally friendly natural resource management. Though our sample is far from being representative, there is clear evidence that RCE have a smaller ecological footprint as compared to single-ownership or corporate enterprises operating in the rural sector. In the agricultural sector, for example, RCE members tend to use less synthetic fertilizers, pesticides, and herbicides, in particular in the coffee, cacao, banana, and dairy sub-sectors. The prevalence of mixed cropping systems, such as agroforestry systems (e.g., coffee, cacao or banana with timber and fruit trees) and silvopastoral systems (e.g., cattle ranching with strip plantations, fodder banks, or dispersed trees), is far more common among RCE than among traditional enterprises. These systems help conserve soil organic matter and increase aboveground biomass and, hence, have a positive impact on greenhouse gas emissions. In addition, these systems are more resilient to negative impacts of climate change.

In the forest sector, community forestry has gained a lot of momentum in Latin America over the past two decades, as reflected in the emergence of new legal figures that ensure communal access to forest resources; examples include *ejidos* (Mexico), community concessions (Guatemala), extractive reserves (Brazil), and territories for indigenous people (Bolivia and Peru). In many of these cases, as also shown by some of the sampled RCE, community forest enterprises (CFEs) have emerged as a special form of RCE, adding value to the communally managed forest resources and thus providing economic incentives to their conservation. In the Petén region of Guatemala, for example, close to half a million hectare of forests have been certified in the Multiple Use Zone of the Maya Biosphere Reserve over the past 15 years, being sustainably managed by local communities. About 15 first-tier CFEs ensure that precious woods, such as mahogany and tropical cedar, obtain higher added value, and one second-tier CFE (FORESCOM S.A.) adds value to lesser known species through primary and secondary wood transformation. According to satellite images, the certified community concessions have strongly improved forest conservation in the Peten as compared to both the former situation when private companies – often illegally – logged the forest, and to the current situation in the adjacent national park where forest protection is compromised through higher occurrence of forest fires and encroachment. This is a clear example of how RCE in the forest sector can help raise the economic value of forests through sustainable forest management and improve their conservation through social fencing spurred by a strong sense of ownership.

The State can play an important role in fostering the environmental performance of RCE through specific legislation. Examples include: 1) improvements in terms of individual land titles and collective access to natural resources, as shown above; 2) promotion of SME development including the rural sector (e.g., Costa Rica, Guatemala, and Bolivia); 3) promotion of organic agriculture (e.g., Dominican Republic, Costa Rica, Bolivia, Ecuador, and Peru) and sustainable forest management (e.g., Mexico, Guatemala, Bolivia, and Brazil); 4) financial assistance and tax incentives; 5) science and technology; and 6) public-private partnerships.

Legal forms and management models

Six out of the total of eleven RCE sampled are legally constituted as cooperatives, four as associations and one as incorporated company model. The former legal figures imply specific advantages, such as tax exemption, ease of establishment, access to government and donor support (including donations), and member ownership with internal decision control through the board of directors (BoD) and the general assembly. Incorporated companies, on the other hand, imply more flexibility in financial and management operations, more professional management and technically skilled staff, and allow for increased capitalization and often better relations with buyers. When carefully pondering the pros and cons of the different legal forms, it becomes evident that none of them adequately addresses the needs and realities of RCE at different stages of the enterprise development process. It could be argued that in view of given political-legal conditions and the current support environment, the not-for-profit forms (cooperatives, associations) may be more suitable in the initial stages of RCE development, while a for-profit orientation (incorporated company) seems to be indispensable as the enterprises evolve and strive for long-term viability.

In addition to the diverse legal forms of RCE, there are marked differences in their management models. More advanced RCE (CAIC, FORESCOM, and Consorcio Chiclero) rely on externally sourced managers, whereas less advanced RCE tend to be managed by administrators recruited from within the community (Chichan Há, Noh Bec, and X-Yaat). The former model signals a clear step towards professionalization, while the latter increases local empowerment and member buy-in. In none of the RCE cases, women were figuring prominently at the management or BoD level. This reflects a general bias towards male community members, in particular as regards the timber-based RCE.

Beyond gender, barriers to entry vary across RCE, with the timber-based among them being most restrictive in terms of membership. NTFP and agriculture-based RCE, on the other hand, impose fewer restrictions to potential new members, while tourism-based RCE do not show a clear-cut picture in this respect.

Value adding and external service offer

Timber-based RCE and certain agriculture-based RCE are among the most advanced in terms of processing capacity. While technical skills for forest management and agriculture are relatively well developed, quality issues tend to arise at the level of processing (milling and drying) and grading. This differentiation is also reflected in the external service offer: technical services related to production and post-harvest management are rather readily available, while relatively little attention is paid to services that allow for value adding through processing.

In terms of financial services, government agencies rather than private banks or NGOs have been the key source of long-term loans or donations. RCE such as Noh-Bec, Consorcio Chiclero, FORESCOM, and Chichan Há all received relatively large grants or government-backed loans (US\$ 200,000–400,000) for the purchase of logging and milling equipment. Overall, RCE reported a high degree of reluctance on the part of private banks to provide financial services, due largely to the perceived risk, the lack of business consolidation in the absence of professional management, and the fact that in the absence of legally valid titles land cannot be used as

collateral. In these cases, some national and international buyers provide critical short-term finance for operations such as crop harvest or timber extraction.

Benefits

By their very nature, RCE tend to provide benefits to a larger proportion of community members, thereby increasing overall impact on the community. For example, Noh-Bec makes major contributions to community infrastructure (e.g., 80% of *ejido* funding from this RCE). In general terms, RCE benefits vary widely across RCE, both at member and community level (Table 7).

Table 7 – Household and community-level benefits of RCE

RCE	Member impacts	Community impacts
El Ceibo (Bolivia)	<ul style="list-style-type: none"> - Price premium for certified cacao (about 30% or US\$400/member/yr) - Access to organic production technologies - Access to RCE provided credit 	<ul style="list-style-type: none"> - Production zone: 80 full-time employees (mainly local promoters) + processing plant: 40 full-time and 20 part-time employees - Leverage of project funds for community development
CAIC (Bolivia)	<ul style="list-style-type: none"> - Market outlet for 450 Brazil nut collectors - Availability of cheap foodstuffs to employees of processing plant, which are bought by the Cooperative from members, to the extent possible 	<ul style="list-style-type: none"> - Part-time employment (4-8 months) for 170 people - Full-time employment for 20 people - Strong role of women in processing plant (110 Brazil nut shelling posts absorbed by women)
BANELINO (Dominican Republic)	<ul style="list-style-type: none"> - 2006 prices for organic and conventional banana averaged 10% & 5%, respectively, above prices offered by local exporters, translating into avg. US\$ 2,100 increased income for RCE members - Skills development in post harvest management, certification, and organic production - Relatively low-risk investment/market environment - Access to affordable credit through RCE (12% APR) 	<ul style="list-style-type: none"> - Strong female participation in management, marketing, and tech. assistance (>50% labor) - Low barriers to RCE membership, with rapidly expanding membership levels - 25% net income reinvested in community development (educational infrastructure, health services, youth sports) and certification - 70% production certified organic (est. 700 ha) - 50 full-time, year-round positions - One of only 28 fair trade certified banana providers in the world
CONACADO (Dominican Republic)	<ul style="list-style-type: none"> - Avg. annual income received by RCE members ~US\$ 2,000, with price premiums averaging 50% above prices offered for conventional cocoa (average US\$ 1,000/year of additional income/member) - Skills development in organic production, fermentation, and certification - Funeral costs covered for members - Low-risk investment/market environment - Secure access to interest free credit 	<ul style="list-style-type: none"> - Low barriers to RCE membership, with moderately expanding membership levels - US\$ 330,000 invested in churches, home repair, bridge construction since 2004 - 100% cocoa production certified organic (est. 24,000 ha.) - Sound resource management through use of diversified cocoa-based agroforestry systems - 12 full-time, year-round positions
La Voz (Guatemala)	<ul style="list-style-type: none"> - Avg. annual income received by RCE members: US\$ 2,300, price received averaging 25% above prices offered for conventional coffee, translating into average increased income of US\$ 525/year/member - Relatively low-risk investment/market environment - Development of skills and capacities for production and certification of organic coffee 	<ul style="list-style-type: none"> - Low barriers to RCE membership, with slightly expanding membership levels - Social premiums from fair trade invested in didactic materials for 4 local schools and construction of library (US\$ 1,300) - 3 full-time, year-round positions - 100% of coffee production is certified as organic, produced using traditional techniques and plant varieties (est. 144 ha)

RCE	Member impacts	Community impacts
FEDEPMA (Guatemala)	<ul style="list-style-type: none"> - Avg. annual income received by RCE members ~US\$ 230, with price premiums nearly 5-10% above conventional coffee - Development of capacities for production & certification of organic coffee and manufacture of handicrafts 	<ul style="list-style-type: none"> - Low barriers to RCE membership - Facilitated the donation of US\$ 13,000 for the upgrading of local school infrastructure (security wall, water purifiers, latrines, etc.) - 6 full-time, seasonal positions (6 months) - 100% of coffee production is certified as organic, shade canopy is maintained (est. 68 ha)
Chichan Há (Mexico)	<ul style="list-style-type: none"> - Annual dividend ~US\$ 150/member (expected to increase once recent loans for processing equipment are repaid) - Dividends have increased nearly 100% since formation of RCE (work group) 	<ul style="list-style-type: none"> - 40 temporary jobs per year in forest management and timber processing - Financial support for members' funeral costs, schools and sporting events - 32,500 ha (50% total land area) declared permanent forest reserve
Consortio Chiclero (Mexico)	<ul style="list-style-type: none"> - 100% increase in chicle-derived income, translating into additional annual income of US\$ 1,500/member - Pension benefits for members - Skills development in quality control and international marketing of chicle products - Relatively low-risk investment/market environment 	<ul style="list-style-type: none"> - Chicle extraction provides seasonal employment for up to 1,500 forest dwellers in Yucatan (many of whom among most vulnerable members of forest communities) - Provides economic incentives for sustainable management of 18,000 ha of forest - RCE critical for preserving 100+ year tradition of chicle extraction in Yucatan
Noh-Bec (Mexico)	<ul style="list-style-type: none"> - Annual dividend US\$ 2,200/RCE member - Price of timber in 1982 US\$ 800 in 1994, increased to US\$ 19,000 after <i>ejido</i> took control over resource base and RCE was established - Development of skills related to sustainable forest management, timber extraction and processing, marketing, and certification 	<ul style="list-style-type: none"> - 80% of community income comes from RCE, providing support for pensions, funeral costs, health and social services, and co-financing of potable water service & cable TV service - 70 temporary and 116 full-time jobs - Sustainable management of 18,000 ha of tropical dry forest, agricultural frontier checked, fire control
X-Yaat (Mexico)	<ul style="list-style-type: none"> - 7 RCE members receive on average US\$ 13/visit (average total US\$ 850/year/member) - 39 participating community members receiving avg. US\$ 7.5/visit (total US\$ 500/year/member) - Development of skills related to food preparation, group tourism management, and business admin. 	<ul style="list-style-type: none"> - Low barriers to RCE membership, with 3 out of 7 members being women who assume between 50-75% of activities related to provision of services (food, cultural shows) - Loan vehicle to <i>ejido</i> members for emergencies - Loan computer to <i>ejido</i> primary school - Preservation of culture through productive activities, food, and dancing (average 65 visits per year, majority from regional schools)

Table 7 reveals that RCE benefits vary widely, both at member and community level. Principal benefits include generation of income as well as part-time and full employment. Development of skills and capacities, in particular as regards production technologies and practices, also figure prominently among the benefits perceived by RCE members. At community level, spill-over effects include investments in local infrastructure (e.g., schools, potable water, latrines) and improvement of basic services. In general, RCE membership alone is no guarantee for escaping poverty. But in many cases, it is a precondition for more secure livelihood strategies based on reduced vulnerability. The environmental impact of many RCE is rarely negative and, in several cases, rather positive, for example by providing incentives to sustainable agricultural or forestry practices through organic and forest certification, respectively.

Poverty reduction potential

In terms of the actual and potential impact of RCE on poverty reduction a distinction has to be made in terms of poverty definitions. When focusing on poverty reduction measured as impact on the income of its members, RCE are not necessarily the best option. As indicated earlier, many RCE are administered by community members rather than professional managers. While this increases local sense of ownership, it also implies inefficiencies in business administration that, after all, compromise members' income. There are several examples where RCE membership has helped obtain higher prices for given products, in particular in international markets, but the administrative cost related to RCE marketing services may well consume most of these gains. If the income of poor rural producers is to be increased significantly, alternative approaches such as technical assistance to increase productivity, involvement of the poor in base-of-the-pyramid initiatives, and the like, may yield more rapid results.

On the other hand, if poverty reduction is seen as a more complex phenomenon that stretches beyond income, RCE development becomes a much more promising option as it focuses on overall asset building. In this case, the building of financial capital is but one way of building assets and one which may be achieved through the combination of other assets. For example, in RCE development processes asset building often takes place first in terms of human and social capital. This, in turn, helps improve natural capital and, based on a combination of these three capitals, financial capital can eventually be built in a more significant way. Thus, investments in physical capital (e.g., storage centers, transport means, machinery and equipment for processing) are facilitated which, again, will increase financial returns. These positive feedback loops in asset building are characteristic of RCE, with spillover effects to local communities. However, related asset building takes decades rather than years. In terms of poverty-environment dividends, environmental returns from RCE development can often be expected on the short to mid run, whereas poverty dividends are likely to be achieved only on the mid to long run. Nonetheless, given their integrated nature as 'social enterprises' and related asset building processes, RCE have an inherent advantage over most single-ownership or corporate enterprises when considering their potential for sustainable development.

CONCLUSIONS

Poverty-environment dividends are a reality for a variety of rural community enterprises and a viable option for many others. Proliferation of voluntary standard systems, including certification of organic agriculture, fair trade, sustainable forest management, and ecotourism, allow RCE to differentiate their products and services in the market and, in many cases, to obtain a price premium and/or better market access. In the developing world, Latin America and the Caribbean is by far the most important region in the production of organic foodstuffs, fair trade certified products, certified timber and wood products, and environmentally friendly and socially beneficial tourism. A coordinated service offer will enable these RCE to generate significant poverty-environment dividends on a broad scale in the future. It needs to be borne in mind, though, that RCE development produces environmental dividends fairly quickly, while poverty dividends rather materialize over the long term. When compared with single-ownership or corporate enterprises, RCE often show better environmental performance. In terms of poverty reduction, however, approaches involving the former (e.g. base-of-the-pyramid initiatives) or technical assistance to boost productivity may yield tangible results more rapidly.

Land tenure is important but not a *sine qua non* for the initial stages of RCE development. While most RCE depend directly on natural capital for their business operations, endowment levels vary. Though land tenure is a prerequisite for using land as collateral for credit, its absence does not imply an imminent threat to the flow of natural resources from the forest to the RCE. There is evidence that investments at household and enterprise level also take place in the absence of *de jure* access to the resource base.

Significant physical capital accumulation by RCE is possible, but limited processing capacity and poor rural infrastructure remain key constraints. Several RCE have made significant investments in physical capital worth hundreds of thousands of dollars, often with support from donors and governments. Nonetheless, most RCE are not equipped with state of the art technology or facilities (e.g. for eco-tourism). Only a few RCE produce finished products (e.g., furniture, chocolate products), while the majority offers semi-finished or unfinished products. RCE without basic processing capacity are among the least consolidated sample RCE. In terms of external physical capital, few RCE have year round road access, 24/7 electricity, or secure telephone and internet connection.

Most sampled RCE are highly undercapitalized, irrespective of size and scale. This situation results, in large part, from the inherent constraints of the legal form of the RCE (e.g., cooperatives or associations), weak management, and limited willingness of members to invest in the RCE. Chronic undercapitalization implies constrained working capital and, at times, suspended business operations. Access to credit is highly variable and usually increases with the existence of long-term buyer relationships and relatively stable production volumes.

RCE can accumulate high endowments of social capital among members and with buyers and development agencies. In several cases, social cohesion is high among members, reflected in membership growth, strong corporate identity, and commitment to RCE development. In other cases, social capital is limited with members' conception of the RCE as just another intermediary. Several RCE have been successful in establishing long-term trust relationships with a few buyers. Similarly, several RCE have forged strategic alliances with development agencies or NGOs. In most cases, donor and government support (in this order) have been critical for RCE establishment and development. There is little evidence, however, that RCE have had a major impact on political decision-making processes at local or national level.

Relatively little attention has been paid to human capital formation for RCE administration. Among board of directors and management there is an overall shortage of trained personnel from within the RCE. BoD members and managers often acquire their skills through learning-by-doing processes. Mandatory rotation of BoD members, and at times, managers, create zigzagged learning curves, hampering RCE performance and strategic orientation. Despite these limitations, there is evidence that, over the course of time, BoD members and managers become progressively capable of administering RCE operations, and less dependent on outside support in terms of funding and business administration.

There is no single legal form that adequately addresses the realities and needs of RCE. The choice of the legal form of RCE often implies trade-offs in terms of taxes vs. no taxes, capital accumulation vs. capital disbursement, internal vs. external decision control, member vs. non-member participation, among others. In many cases, not even the 'second best option' is chosen,

due to a lack of business vision, legal inexperience, and inappropriate advice by NGO and development agencies (e.g., priority for conservation, rather than business development). As a result, the legal form of RCE may impede their long-term development. A phased approach may be needed, whereby RCE could opt for not-for-profit legal forms in the early stages of enterprise development, and for for-profit forms as the enterprises evolve and seek maturity.

Weak RCE management capacities remain a major impediment for RCE development. In some cases, RCE management is carried out mainly by the board of directors which in turn is controlled by the general assembly. On the upside, participatory decision-making legitimizes major RCE decisions. On the downside, development of clear strategic perspectives can be hampered when such democratic processes are combined with weak skills and capacities of locally recruited RCE administrators. Though several RCE have received external support for business administration – usually in the form of externally funded managers or direct administration through NGO staff – this form of business administration is prone to be unsustainable, unless clear exit strategies exist.

The service environment for RCE development is rarely conducive. Services are often incomplete, insufficiently focused, rarely coordinated among different service providers, and usually without adequate entry and exit strategies. In addition, many RCE face difficulties in clearly expressing their needs for technical, business development and financial services. Many RCE have yet to receive effective services, at reasonable cost, and according to their specific needs. Technical services, for example, tend to focus on production and processing of low-value products for local or international markets. Financial services, on the other hand, are often provided without a clear business strategy orientation. Moreover, while technical and financial services for RCE development are rather readily available, there are hardly any specialized business development services available for the rural sector. To be more conducive, technical, business and financial services need to be better articulated and logically sequenced according to the respective needs in the different enterprise development stages.

Long-term accompaniment is critical to RCE development. Without long-term assistance from NGOs and development agencies, several sampled RCE would not be where they are. Related services are critical for linking with buyers, improving quality, obtaining certification, and developing effective administration and export procedures. In addition, accompaniment by buyers and processors (embedded services) can play a critical role in RCE development. Such services are critical for acquiring specialized production capacities, development of business vision, product placement, and resolving various issues related to export and import. Buyer-provided technical, business development or financial services (typically short-term) are usually offered in the context of long-term business relationships. However, these tend to be limited to RCE participating in niche markets (e.g., certified timber, organic products).

Many RCE exhibit low levels of productivity and processing capacity. Though technical skills for forest management and agriculture are relatively well developed, there is a general lack of quality control from the forest or farm to the processing plant. Quality segregation hardly takes place and incentives for quality production are largely absent.

With few exceptions, participation of women in RCE management and decision-making is very limited. In some RCE, women play a critical role in NTFP extraction and processing or

agricultural production, though they are largely excluded from the boards of directors. In the case of timber-based RCE, women even tend to be excluded from production related processes. In many cases, cultural factors and women's domestic tasks largely prevent them from playing a more prominent role in RCE decision-making. Even women beyond the age of child rearing responsibilities do not readily find their way into RCE decision-making boards, suggesting that strong barriers to entry exist. There is an urgent need to identify women who are interested in RCE administration and to strengthen their entrepreneurial skills and leadership capacities.

Despite limitations, several RCE have demonstrated capacity to generate income for their members. Employment generated by RCE typically ranges from 10 to 20 staff, though they may have several hundred members. Where processing plays a mayor role, the employment effect may be higher. Some timber-based RCE pay significant annual dividends, varying from a few hundred dollars up to 4,000 dollars per member. However, in none of the sampled RCE members live exclusively on RCE-derived income.

RCE enhance community development beyond their own membership, though the overall scale of impact varies widely. By their very nature, RCE tend to provide benefits to a larger portion of community members, thereby increasing overall impact on the community. One of the areas in which RCE clearly stand out is their capacity for sound natural resource management, often promoted by NGOs with a strong focus on the environmental performance of RCE. This underlines their actual and future potential of generating poverty-environment dividends.

The long duration for RCE to reach maturity (about 20-40 years) compromises the viability and impact of related processes. This will be even more critical in the future, given rapidly globalizing markets for agricultural and forest products and related services (e.g., eco-tourism) and the concomitant rise in competition among enterprises. This highlights the need for shortcuts to RCE development processes through comprehensive support policies and strategies.

RCE development is not inherently compatible with 'triple bottom line' performance. To become economically viable businesses, a focus on 'enterprise' is paramount. Compatibility of the economic goals of RCE development with environmental and social objectives is most feasible when sustainable production modes are in place, testified by organic or forest certification where appropriate. It needs to be borne in mind, though, that many RCE face trade-offs between their economic, social, and environmental goals. In situations where environmental management and broader community development are paramount, and where niche market orientation is not a viable option, approaches other than RCE development may be required.

If RCE are to become a viable alternative to other forms of rural enterprises, adjustments are needed in the political-legal frameworks to address their unique nature by allowing for specific legal forms that take into account their varying needs and realities in different stages of the enterprise development process. This may include a shift from not-for-profit forms to for-profit forms as RCE enter a stage of consolidation. In addition, technical, business and financial services need to be improved and better articulated, with a logical sequencing that seeks to strengthen the human, social, and natural capital of RCE, before promoting the creation of physical and financial capital. Enhancement and articulation of services needs to account for the specific conditions of given RCE and the value chains they are integrated in, with a careful differentiation between services that can best be provided from within the chain ('embedded

services') and those to be sourced externally. Finally, there is a need for multi-stakeholder learning alliances initiated, though preferably not led, by universities or research centers, with the aim to advance our understanding of factor combinations conducive to RCE development.

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