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CAN YOUNG SEEDS GROW?

*Exploring the Potential of enhancing Agricultural Productivity in the
Yungas through Agricultural Youth Entrepreneurship*

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ABSTRACT

Without increasing small-scale agricultural productivity, the prospects of decreasing poverty and encouraging rural development in Bolivia will remain dim. There is very little scientific literature about the role entrepreneurship can play for enhancing agricultural productivity. Exploring this link in the Bolivian context is highly relevant due to the generally high occurrence of self employment, persistently low productivity among small-scale producers, and high youth migration to urban areas. The purpose of the study was to explore if young agronomists have the potential to impact agricultural productivity in the Yungas through entrepreneurship. I employed a qualitative research design (case study) with the unit of analysis being agronomy students enrolled at the Unidad Académica Campesina-Carmen Pampa (UAC-CP) in the Yungas region. The analysis focused on the agent-level while taking into consideration institutions that impact the agent's potentials. The study showed that the Yungas has a group of highly prepared young agronomists who not only have entrepreneurial capacities to create growth-oriented businesses, but who also have the technical capacities necessary to overcome current productivity constraints in the Yungas. However, this potential is unlikely to be realized unless access to finance improves, and the business- and agricultural environment become more conducive to agricultural entrepreneurs.

Key words: Agriculture, Small-scale Agriculture, Agronomy, Agricultural Productivity, Rural Development, Youth, Entrepreneurship

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TABLE OF CONTENTS

ABSTRACT	2
ACKNOWLEDGMENTS	3
1. INTRODUCTION	6
1.1. RESEARCH PROBLEM.....	6
1.2. PURPOSE AND RESEARCH QUESTIONS	9
1.3. DISPOSITION.....	10
2. BACKGROUND	11
2.1. INTRODUCING BOLIVIA	11
2.2. THE AGRICULTURAL SECTOR	12
3. THEORETICAL FRAMEWORK	13
3.1. PRODUCTIVITY ON THE SMALL FARM	13
3.2. AGRICULTURAL PRODUCTIVITY	15
3.3. LINKING ENTREPRENEURSHIP WITH ECONOMIC GROWTH AND AGRICULTURE	17
4. ANALYTICAL MODEL	21
5. METHODOLOGY	22
5.1. RESEARCH PARADIGM	22
5.2. RESEARCH DESIGN.....	23
5.3. DESCRIPTION OF CASE.....	23
5.4. DATA COLLECTION, METHODS, AND SAMPLING.....	25
5.5. DATA ANALYSIS.....	27
5.6. QUALITY OF RESEARCH	27
5.7. ETHICAL CONSIDERATIONS.....	28
5.7.1. <i>Positionality</i>	28
5.8. LIMITATIONS	29
6. ANALYSIS	29
6.1. THE AGENT	30
6.1.1. <i>Entrepreneurial Capacities</i>	30
6.1.1.1. <i>Preliminary conclusions: Entrepreneurial capacities</i>	37
6.1.2. <i>Technical Capacities</i>	38
6.1.2.1. <i>Preliminary conclusions: Technical capacities</i>	44
6.2. THE INSTITUTIONS	44
6.2.1. <i>Access to Finance</i>	45
6.2.2. <i>The Business Environment</i>	47
6.2.3. <i>The Agricultural Environment</i>	50
7. FINAL CONCLUSIONS	52
REFERENCES	55
APPENDICES	63
APPENDIX I – MUNICIPALITY OVERVIEW - YUNGAS	63

APPENDIX II – THE ILO FRAMEWORK: YOUTH ENTREPRENEURSHIP	64
APPENDIX III – STANDARDIZED ENTREPRENEURSHIP TEST	66
APPENDIX IV – INTERVIEW GUIDES	69
APPENDIX V – DESCRIPTION OF FINANCIAL INSTITUTIONS	74
APPENDIX VI – BUSINESS IDEAS, STANDARDIZED ENTREPRENEURSHIP TEST	75

LIST OF FIGURES, TABLES, AND PICTURES

Figure 1. Map: The Department of La Paz	11
Figure 2. Analytical Model	22
Figure 3. Map: municipalities in the Yungas.....	63
Table 1. Overview of Respondents.....	26
Table 2. Data Presentation 1: What is an Entrepreneur	30
Table 3. Data Presentation 2: Reaction to Failure	31
Table 4. Data Presentation 3: Perceived explanations for income poverty among farmers.....	32
Table 5. Data Presentation 4: Overview of the Students' Business Plans	34
Table 6. Data Presentation 5: Where to market my products	35
Table 7. Data Presentation 6: Technology.....	40
Table 8. Data Presentation 7: Requirements to access Credit	46
Table 9. Business Assistance and Support Services	47
Table 10. Bolivia - Ease of Doing Business	48
Table 11. Data Presentation 8: Formality of Business.....	49
Table 12. All Business Ideas from the Entrepreneurship Test	75
Picture 1. Slash-and-Burn Agriculture, San Juan de la Miel.....	43

ABBREVIATIONS

BDP	Banco de Desarrollo Productivo
Bs.	Bolivianos (the Bolivian currency. Current exchange rate 1 bs = 0.14368 \$US)
CO.FE.CA.Y	El Consejo de las Federaciones Campesinas de los Yungas de La Paz (<i>The Council of the Peasant Federations of the Yungas of La Paz</i>)
GEM	The Global Entrepreneurship Monitor Report (GEM)
IICA	Instituto Inter-Americano de Cooperación para la Agricultura (<i>Inter-american Institute for Cooperation on Agriculture</i>)
SAF	Sistemas Agroforestales (<i>Agro-forestry Systems</i>)
UAC-CP	Unidad Académica Campesina-Carmen Pampa

1. INTRODUCTION

1.1. Research Problem

Despite decades of efforts to foster development and decrease poverty, Bolivia remains one of the poorest countries in South America (DANIDA 2005). The World Bank (2008:4) categorizes Bolivia as an ‘urbanized country’ implying that agriculture is comparatively less important for national GDP than services and industry, and that poverty is not primarily a rural phenomenon. While industry and services have indeed grown and contribute with a larger share to national GDP (38.3% and 52.1%, respectively) than agriculture (9.6%), agriculture still accounts for 32% of the labor force¹ (CIA 2012). Moreover, poverty remains much more widespread in rural areas (66.43%) than in urban areas (43.55%) (INE 2012).

In the Yungas the agricultural labor force far surpasses 32%; 79% of the population is engaged in agricultural activities (CIES 2003:67). The Yungas is located in the Department of La Paz and it encompasses the provinces Sud Yungas, Nor Yungas and Caranavi. Agricultural production in the Yungas is characterized by subsistence and small-scale agriculture destined for family consumption and sales on local markets (CIES 2003). The Yungas is confronted with problems of deforestation, soil degradation, elevated soil acidity, topographical constraints, soil erosion, crop losses due to pests and diseases, inadequate physical infrastructure and an ageing population of farmers, of whom many do not have formal training. Moreover, many farmers do not have sufficient knowledge or funds to apply new technology (CIES 2003; Vera 2006:8; CO.FE.CA.Y 2007). Despite these circumstances, with proper soil and crop management, products such as high quality coffee, cocoa, citrus fruits, fruits, vegetables, poultry, and honey can all be successfully produced in the Yungas (VCDI-FONADAL 2010:12-21; UNODC 2010:46).

The function of agriculture in the process of development² has been greatly debated throughout time. In the 50s, led by Arthur Lewis (1954), agriculture was primarily seen as a precursor to industrialization. In the 60s, scholars such as Johnston and Mellor (1961:590) argued that the agricultural sector in itself could be a major driver of growth, one that should be developed in parallel with industry. More recently, agriculture has been praised for its

¹ While industry for 20% and services for 48% (CIA 2012)

² Development can be seen as a process of change; a process during with socioeconomic structures change and lead to a general structural societal transformation and GDP per capita increases (Sumner and Tribe 2008:11).

(possible) strong linkages with the nonfarm economy, its multiplier effects, and its importance for poverty reduction (Johnston and Kilby 1975; Mellor 1998; Haggblade et al. 2007). Several studies have shown that growth stemming from agriculture can be much more efficient to increase the incomes of the poorest compared to growth stemming from other sectors (Ligon and Sadoulet 2007; Kay 2009; Timmer 2009). Timmer (2009:3-4) argued that without increasing agricultural productivity countries are unlikely “[...] to sustain a rapid transition out of poverty [...]”, and Kay (2009:106) noted that without increasing agricultural productivity and investing in the agricultural sector, poverty in rural Bolivia is unlikely to decrease. While the exact role of agriculture in economic development is a debatable issue, the empirical literature seems to agree that to reduce poverty we have to increase agricultural productivity.

Yet, increasing agricultural productivity is just one factor in the process of fostering development and reducing poverty. Not only do we need policies aimed at strengthening the agricultural sector, but we also need to focus on the service- and industry sectors to encourage forward and backward linkages with the agricultural sector³. Moreover, once the agricultural sector becomes more efficient and the demand for labor decreases, excess labor from the agricultural sector has to be absorbed in other productive areas (Haggblade et al. 2007; Byerlee et al. 2009:6). While realizing the importance of adequate investments in the other sectors as well, this thesis focuses solely on ways to increase agricultural productivity.

Thirtle et al. (2003:1973) showed that while agricultural growth had been poverty reducing in Asia and Africa, this had not been the case in Latin America due to high levels of income- and land inequality. In concordance with this finding, Bolivia’s agricultural sector has undergone periods of growth; however growth has primarily originated from productivity increases on large and capital-intensive farms. In addition, productivity gains on these farms generally stemmed from a greater degree of mechanization which has resulted in a reduced demand for labor (Jemio and Choque 2006:1-3). Furthermore, the lack of government policies aimed at increasing the efficiency of small-scale agriculture has resulted in very low levels of productivity among small-scale farmers (Prosalus n.d.). However, these realities could also

³ Forward linkages can provide new sources of nonfarm employment in processing and distribution and backward linkages can stimulate agricultural production inputs such as seeds, fertilizers and equipment (Haggblade et al. 2007)

suggest that with the right policies and investments, directed towards small-scale farming, Bolivia has great room for gains in agricultural productivity and poverty reduction.

Currently, there is very little scientific literature about the role entrepreneurship can play for agricultural productivity and development. Knudson et al. (2004) have argued that entrepreneurship has been neglected by agricultural economists and the authors have called for increased research to “enhance the agricultural sector’s ability to move away from a traditional, commodity-oriented agriculture to an innovative, consumer-oriented agriculture” (Knudson et al. 2004:1330). Agricultural production in the Yungas is currently characterized by traditional commodity-oriented agriculture, and productivity gains are challenged by the aforementioned problems. Most small-scale farmers in the Yungas are self-employed who run their farms with family labor or hired laborers (CIES 2003). With this in mind, it seems necessary to take a closer look at the nature of self-employment in Bolivia.

According to the recent Global Entrepreneurship Monitor Report (GEM) (Fernandez 2010), 51.3% of the Bolivian population aged 18 to 64 are engaged in some kind of entrepreneurial activity (Fernandez 2010:3-5). Yet, we should interpret the number of “real” entrepreneurs (a concept that is defined in the theoretical framework) in Bolivia with certain caution since the GEM report presents self-employed as entrepreneurs⁴. The GEM report finds that 65.5% of the new businesses have very low prospects to generate employment; 84% do not offer innovative solutions; just 0.9% incorporate technology; 70% have little potential to expand their markets, and 79.9% do not export (Fernandez 2010:4-54). These findings are in line with studies carried out by the Foundation INASET⁵ that characterize Bolivian “entrepreneurs” as people who mobilize resources, but who apply these resources primarily in subsistence activities (in Arrázola n.d.). Since innovation, the incorporation of technology as well as access to markets (national or international) are factors that are all essential to increasing agricultural productivity, one could suspect that the type of “entrepreneurship” which is widespread in Bolivia does not have the potential to impact agricultural productivity.

⁴ The GEM report (Fernandez 2010) divides entrepreneurs into necessity-driven and opportunity-driven. Necessity-driven entrepreneurs are driven by the lack of other opportunities to sustain a living (ILO 2006:12). Opportunity-driven entrepreneurs have chosen to pursue a perceived opportunity to create economic or social value even though the individual had other income-generating opportunities (ILO 2006:12). Most classic contributors to entrepreneurship literature would hardly label those driven by necessity as entrepreneurs and they would also add more traits or behaviors to the opportunity-driven than what the GEM does (see theoretical framework)

⁵ INASET (Centro de Fomento a la Pequeña y Mediana Empresa) is a Bolivian foundation that works to promote small- and medium scale companies

Nevertheless, the Yungas has some of the most fertile land in Bolivia (Vera 2005:8), and it is rich in entrepreneurial opportunities to explore a more consumer-oriented approach to agricultural production. In addition, the Yungas benefits from the presence of the university, *Unidad Académica Campesina-Carmen Pampa (UAC-CP)*. The university is located in Nor Yungas, but students from all over the Yungas are enrolled. The UAC-CP prepares the youth to become professionals within the fields of Veterinary science, Educational Sciences, Public Health, Eco-Tourism, and Agronomy – degrees that are all highly relevant to rural development.

Considering the contribution of self-employment to national employment (51.3%) – and that the average entrepreneur in Bolivia is between 25 to 34 years old (Fernandez 2010:3-5) – it is possible that many of the students from the UAC-CP will create their own employment upon graduation. With this in mind, the agronomy students in particular could hold promise for becoming agricultural entrepreneurs. By applying the agronomic knowledge they have acquired at the UAC-CP - either directly in own production or through other entrepreneurial activities⁶ - they could help transform the agricultural sector in the Yungas from a commodity-oriented into a consumer-oriented agriculture.

1.2. Purpose and Research questions

The purpose of this study is to bring forth the capacities of the rural and educated youth⁷. The thesis explores the potential of young agronomists to become agricultural entrepreneurs, capable of increasing agricultural productivity in the Yungas. The research design is qualitative and I have applied a case-study approach with the unit of analysis being a group of agronomy students from the UAC-CP.

Whether the students will be able to differ from the average ‘subsistence self-employed’ and create employment, offer innovative solutions, incorporate technology, expand their markets, and perhaps eventually export, will depend on the students’ entrepreneurial capacities, their technical capacities, and the socio-economic context. The analysis focuses primarily on the

⁶ Such activities could be in commerce or services; where they could facilitate market access for other small-scale producers through their companies, thus giving incentives to increase yields. They could also establish experimental centers where other farmers could learn from their technical knowledge.

⁷ Capacity is understood as “the ability of individuals, organizations and societies to perform functions, solve problems, and set and achieve goals” (UNDP definition in SIDA 2005:6)

capacities of the agent⁸ - the agronomy students - while the institutions impacting the agent are assessed in a less detailed manner and primarily serve to put into perspective the potential of the agent.

Therefore, this thesis seeks to explore;

Do young agronomists have the potential to positively impact agricultural productivity in the Yungas through entrepreneurship?

To answer this question, the thesis analyzes;

- a. To what extent the agronomy students have entrepreneurial capacities
- b. To what extent the agronomy students have the technical capacities necessary to increase agricultural productivity in the Yungas (and overcome current productivity constraints)

1.3. Disposition

The structure of the rest of the paper is as follows: Chapter 2 serves as a background section that expands upon Bolivia and the agricultural sector. Chapter 3 outlines the theoretical framework; it presents empirical literature about productivity on the small farm, technical factors to increase agricultural productivity, and the role played by entrepreneurship in economic growth and how it can be linked with agricultural productivity. Chapter 4 presents my analytical model. Chapter 5 presents methodological decisions. Chapter 6 contains the analysis of the empirical data, both primary and secondary (the latter when appropriate or necessary). Chapter 7 contains the conclusion and provides suggestions for further research.

⁸ 'Agent' is understood as "[...] someone who acts and brings about change, and whose achievements can be judged in terms of her own values and objectives, whether or not we assess them in terms of some external criteria as well" (Sen 1999:19). 'Institutions' is understood as "the humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights)" (North 1991:97).

2. BACKGROUND

2.1. Introducing Bolivia

Bolivia is a landlocked country located in South America, inhabited by approximately 10.088.000 people of whom 66.4% live in urban and 33.6% in rural areas (CIA 2012). Out of 9 departments, La Paz has the second largest population and the third highest concentration of poor (Vargas 2004:8). Within the Department of La Paz, the Yungas region comprises three provinces: Nor Yungas, Sud Yungas and Caranavi (see Figure 1), and is home to approximately 151.077 people (Wikipedia 2013⁹).



Figure 1. Map: The Department of La Paz (The Yungas is emphasized with red) Source: WIKIPEDIA (2013)

Bolivia has a young population. The majority of people are younger than 25 (59%) with adolescents accounting for 31.26% (OPS 2001). Although rural areas have been subject to youth emigration (El Mundo 2007, Correo del Sur 2011), 30% of young people aged between 15 and 26 still live in rural areas (Alarcón 2012). The youth migration to urban areas has raised concerns about an ever aging rural population (El Mundo 2007, Correo del Sur 2011), and consequently, greater difficulties to enhance agricultural productivity (Patzi 2012). In 2008, it was found that nearly all rural youth were involved in the agricultural and livestock sector - either as their main economic activity (60%) or as part of economic¹⁰ and study activities (40%) (Alarcón 2012). This noteworthy participation of youth in the agricultural sector and the sheer size of the young population elucidate the important role that youth play in shaping, forming, and altering the (agricultural) future of Bolivia.

⁹ Please note that I cannot guarantee complete accuracy of this number since Wikipedia was the only source I could find that outlined population size in the Yungas.

¹⁰ Besides from agriculture, some were involved in trade, transport and others (Alarcón 2012)

2.2. The Agricultural Sector

Small-scale farming serves as a livelihood strategy for many rural families in Bolivia, but it is also important for national food supply with the production of potatoes, yucca, maize, rice, cocoa, quinoa, peanuts, bananas, citric fruits, coffee, tea, beef, sheep, poultry, and fish. The medium- and large-scale farmers are primarily working with agro-industrial crops destined for exportation such as soya, sugar, fats, and eatable oils (Prosalus n.d.).

As noted, 79% of the population in the Yungas is employed in agriculture, and a major share (56.5%¹¹) of household incomes stem from agriculture (CIES 2003). The average land size in the Yungas is 1.8 hectares indicating that small-scale farming dominates, however, land plots do vary significantly in size (CIES 2003:67). Despite the historically unequal access to land in Bolivia (Kay 2008:109), 99.2% of the population in the Yungas are owners of their land. However, only 40.5 % are also in possession of legal papers to demonstrate land ownership¹² (CIES 2003:32,69). On average, 22.3% of a family's agricultural output is destined for family consumption, 12.1% is lost, and 59.9% is sold (CIES 2003:69). The only crops from the Yungas that are currently sold on international markets are coffee and cocoa (VCDI-FONADAL 2010:4).

The Yungas is one of the cloudiest, most humid, and rainiest areas of Bolivia, and has some of the most fertile land in Bolivia. However, attempts to improve agricultural production have yet to deliver significant results (Vera 2006:8). While much of Yungas soil is acid, thus compromising its fertility, proper soil management could reduce acidity levels and thus improve soil quality (UNODC 2010:46). Instead, years of intensive and unsustainable agricultural practices with heavy use of chemicals have significantly deteriorated soil quality. Deforestation has been a major concern and could become even worse due to increasing coca production in the area (Vera 2006; VCDI-FONADAL 2010:4). Moreover, the topography (tilted areas, high altitude) complicates sowing and harvesting and the use of machinery. During heavy rains, soil nutrients are often washed away (NCC 2012, interview). In addition, concerns have been voiced that many producers lag behind with regards to education and technical training, and have insufficient knowledge or funds to apply new technology

¹¹ Of household income stemming from agricultural activities (56.5%), only 13.3% come from income gained outside one's own farm, e.g. as laborers on other farmers' parcels (CIES 2003:49)

¹² The remaining households rent land or have otherwise ceded the rights of their land (CIES 2003:32)

(CO.FE.CA.Y¹³ 2007). Finally, in some areas inadequate physical infrastructure, especially with regards to irrigation and road systems, curbs agricultural development (CIES 2003; Vera 2006:8).

Irrigated land is found to be twice as productive as rain-fed land (World Bank 2008:9) and fertilizers have a proven impact on yields (Fertilizer 2012). However, the use of fertilizers in Bolivia is much lower than in its neighboring countries¹⁴ (WDI 2013), and 97.7% of the agricultural families in the Yungas cultivate without the use of irrigation systems (CIES 2003:67). Although water scarcity is an increasing problem in many parts of the world, Latin America “[...] has large untapped water resources for agriculture” (World Bank 2008:64). Therefore, by increasing fertilizer use and investing in irrigation systems, there could be great room for productivity gains in the Yungas.

3. THEORETICAL FRAMEWORK

The agricultural sector has often been neglected due to urban bias reflected in the prioritization of the interests of urban areas and the manufacturing sector (Lipton 1977; Cypher and Dietz 2009:344). When agriculture has been prioritized, the necessities and interests of small-scale farmers have often been neglected due to landlord bias which happens when agricultural policies favor large-scale farms (Griffin et al. 2002:284). In areas where small-scale farming dominates, agricultural policies that marginalize this type of farming and focus on increasing productivity on large farms is logically less likely to have the desired effects on poverty reduction. Thus, for agricultural development to be pro-poor it is not only a precondition to increase agricultural productivity in general, it is just as important to ensure that small farms are able to increase their productivity.

3.1. Productivity on the Small Farm

The relationship between farm size and productivity is a widely debated issue, especially in relation to structural change. Some scholars argue that bigger farms are better performers (Yee et al. 2004; Rios and Shively 2006; Carroll et al. 2009), while others argue that small

¹³ Spanish name; El Consejo de las Federaciones Campesinas de los Yungas de La Paz (CO.FE.CA.Y)

¹⁴ Bolivia applies just 6.1 kg (per unit of arable land) while Chile 452.2kg, Peru 105.5kg, Paraguay 66.4kg, and Brazil 125.0kg (WDI 2013).

farms are more efficient producers (Munroe 2001; Huffman and Evenson 2001; O'Neill and Matthews 2001; Griffin et al. 2002).

According to Griffin et al. (2002), whether the large or the small farm is the most efficient performer depends on the country's factor endowments. In countries with abundant labor, labor has a low opportunity cost. In countries with limited land and capital, land and capital have a high opportunity costs (*ibid*). Therefore, in countries where labor is abundant and land and capital are scarce, increasing land productivity takes precedence over increasing labor productivity since it translates into a more efficient use of resources¹⁵.

Large farms are often better performers with regards to increasing labor productivity since they are more likely to invest in mechanizing their production to cut labor costs, whilst small farms are often better performers when it comes to increasing land productivity (here: value added per unit of land) since they are more likely to use all their land for cultivation, they can have crop mixes favoring high value added crops, and they will have higher physical yields for their crops (Griffin et al. 2002:286).

Those who believe small-scale farming is less efficient often argue; 1) small farms are unable to exploit economies of scale; 2) small-scale producers are tradition- and subsistence minded, and therefore less likely to act on economic opportunities, and 3) small-scale producers are exceptionally risk-averse (Griffin et al. 2002). Griffin et al. (2002) have provided counter-arguments to all three statements. Firstly, exploiting economies of scale is less important in primary production (as long as labor is abundant¹⁶). Secondly, small-scale farmers are not inherently tradition- and subsistence minded; they will respond to price changes, and they will use technologies in production to raise their incomes. The problem is not due to tradition, but due to their inability to access credit to purchase technology or insufficient knowledge to apply such technology. Thirdly, small-scale farmers can introduce risk management measures¹⁷ into production which reduce the risks associated with producing for the market (Griffin et al. 2002:318-319).

¹⁵ Land productivity measures output per unit of land (or yield per unit of land) and labor productivity measures the relationship between the output (goods and services) that our input (total hours worked by our labor force) is able to produce. The more output we are able to produce with the same amount of input indicates higher productivity (OECD 2011:9-21)

¹⁶ However, once structural changes do lead to a decline in the available labor force, it may become necessary to consolidate farms (Griffin et al. 318).

¹⁷ Such measures include sophisticated agricultural insurances, on-farm crop diversification, separation of holdings into various parcels, social networks, as well as informal credit system (Griffin et al. 2002:319).

This thesis is guided by the assumption that small farms can be very productive. In countries where labor is abundant, but capital and land are scarce (as in Bolivia), small farms may even be the most appropriate choice. However, for small-scale farming to be productive, certain conditions, which can be impacted positively and deliberately promoted, have to be in place. Such conditions include; the eradication of urban- and landlord bias, facilitation of business associations or cooperatives (to ease market access), access to and knowledge about technologies, access to credit, knowledge about risk management, and good social networks (Griffin et al. 2002).

3.2. Agricultural Productivity

The following section presents technical aspects of how to increase agricultural productivity. Firstly, the overall role of technology is explained and then a number of factors that impact productivity are presented, comprising; human capital, physical infrastructure, soil and crop management, and topography.

Technology

To improve agricultural productivity – whether stemming from increases in land or labor productivity, the application of new technology is often a precondition. However, the use of mechanical technology is not always the most appropriate solution. As exemplified by the findings of Hayami and Ruttan (1970) who explored agricultural development in the US and Japan in the period 1880 to 1960; a determining factor of the countries' rapid agricultural growth “[...] was the ability to generate continuous sequence of induced innovations in agricultural technology biased toward saving the limiting factors” (*ibid*:1115). In Japan, agricultural development was driven by biological and chemical technology which increased land productivity, whereas productivity growth in the US was primarily mechanical and increased labor productivity. The different factor endowments in the two countries, called for different types of technology to lead productivity.

However, Hayami and Ruttan (1970) also stressed that the two countries' ability to continuously adapt to changing factor endowments was key to their successful agricultural

growth¹⁸. Hence, the use of technology is not static, but should be modified and applied according to factor endowments (see Akubue 2000:7). With this in mind, investments in Research and Development (R&D) are crucial since R&D is “the main source of new technologies and agricultural productivity growth in the long run” (OECD 2011:10).

*Human Capital*¹⁹

Human capital positively impacts technical efficiency and productivity (OECD 2011:65). The OECD (2011) examined how factors such as age, years of experience, education and gender impacted agricultural productivity. With regards to age; some studies show that older farmers are less willing to adopt innovations in production; other studies find that older farmers are more experienced which helps them to become technically more efficient (*ibid*). Gender is usually not found to influence efficiency, yet excluding women from inputs can significantly harm overall agricultural productivity (OECD 2011; FAO 2011). Finally, education is generally found to positively impact technical efficiency since more education will provide the producers with a broader array of skills that they can use to run their farms more efficiently (OECD 2011:66).

*Physical Infrastructure*²⁰

Several studies demonstrate the importance of physical infrastructure for agricultural development (see Antle 1984; Fan, Hazell, and Thorat 2000; Mundlak, Larson and Butzer 2002, In Andersen and Shimokawa 2006). Inadequate investments on roads and irrigation systems can impair efforts to enhance productivity while increased investments can contribute significantly to agricultural growth (see Fan and Zhang 2004; Nadeem et al. 2011:156). Moreover, as noted previously, productivity on irrigated land is twice as high as on rain-fed land (World Bank 2008:9). Roads systems are also essential to stimulate rural areas by

¹⁸ Once it became necessary, the US began to apply more biological technology and Japan began to incorporate more mechanical technology (Hayami and Ruttan 1970:1116).

¹⁹ Scoones (1998:7) defines human capital as: “the skills, knowledge, ability to labor and good health and physical capability important for the successful pursuit of different livelihood strategies”.

²⁰ While physical infrastructure also includes e.g. communications and electrification, I have chosen to focus on irrigation and road systems due to the scope of this paper.

facilitating access to input- and output markets, and it is important for market development and supply response by farmers (Chhibber 1988, in Andersen and Shimokawa 2006)²¹.

Soil and Crop Management

Soil degradation has a negative impact on yields and is thus a barrier to productivity gains (Scherr and Yadav 1996:5). Hence, the ability to improve soil quality is essential to increase yields. Fertilizers (both natural and chemical) can be used to improve soil quality (Fertilizer 2012)²². Pest and disease attacks negatively impact yields implying that proper disease and pest management is also essential for agricultural productivity. The use of resistant varieties is one such method; resistant varieties are created either through classic breeding or genetic modification²³, the latter has been subject to debate regarding its long term impacts on the environment and human health (Sleper and Poehlman 2006:4). Regardless, for improved varieties to have a significant impact on yields they have to be combined with the use of fertilizers and proper water management (Hayami and Ruttan 1970:1133).

Topography

Last, but not least, topography can highly impact agricultural productivity since different topographies imply different climate conditions, differing soil quality, and altitude or slope impacts (Chen et al. 2007). While one cannot change the climate, it is possible to adjust to it; for instance, by searching for appropriate crops and by creating terrace systems for production in tilted areas.

3.3. Linking Entrepreneurship with Economic growth and Agriculture

As noted by Knudson et al. (2004), there is very little scientific literature about the role entrepreneurship can play for agricultural development which implies that I have created my

²¹Chhibber (1988, in Andersen and Shimokawa 2006) demonstrated that supply response in areas with good infrastructure were significantly better than in areas with poor infrastructure.

²² Fertilizers are natural or artificial substances that are used to improve the fertility of the plants and thereby improving their growth potential. Fertilizers are used to provide the soil with the necessary nutrients (Fertilizer 2012).

²³ Crop genetic improvement has accounted for app. 50% of yield gains from 1978 to 1998 in Brazil (Avila et al. 2003:423)

own model to analyze its potentials. The following section presents the logic that has guided my focus on entrepreneurship for agricultural development.

Although the term ‘entrepreneurship’ predates the formulation of both the neoclassical- and the endogenous growth theory, its exact role for economic growth has not been formulated in either of the theories. The neoclassical growth theory centers around two factors of production; physical capital and labor. The relation between the two was the key to economic growth (see Solow 1956). The endogenous growth theory added the factor of ‘knowledge capital’ to growth theory. The knowledge production function stressed that knowledge creation was necessary to create innovative solutions enabling countries to remain competitive in the long run (see Arrow 1962; Romer 1986). Common for both theories was the assumption that small firms were less efficient, less capable of creating jobs, and less capable of enhancing productivity since they were less able to make large investments in physical capital or knowledge creation (Audretsch 2008:246-249).

However, disappointing growth in Europe despite some of the world’s highest levels of human capital has led a group of scholars to argue that while knowledge remains crucial for economic growth, entrepreneurship is essential to ensure that the knowledge is used to create new ideas, products or companies (Audretsch and Keilbach 2007; Agarwal et al. 2010; Acs et al. 2011). The *Knowledge Spillover Theory of Entrepreneurship* was introduced by Audretsch and Keilbach (2007) and they stress that knowledge created in a firm or research institute, but which has not been commercialized, will be available for other firms to explore. By introducing the spillover effect, one is able to explain why small firms, unable to invest large sums in R&D, are able to identify opportunities and act on them (Audretsch et al. 2006; Audretsch 2008).

The term ‘entrepreneurship’ dates as far back as the 17th century when the economist Richard Cantillon introduced the entrepreneur as an important agent to adjust market demands in the economic system. Since then, there has been created a vast amount of definitions and as a result, various studies have been created based on sometimes even contrasting understandings of the entrepreneur (Praag 1999:313). Some of the classic contributors to entrepreneurship research include; Cantillon, Say, Marshall, Schumpeter, Knight, and Kirzner, yet none of them coincide completely in their account of the entrepreneur. All of them attribute economic

progress and some degree of innovation to the entrepreneur and they stress profit or wealth generation as inherent to the successful entrepreneur. All, except for Schumpeter, relate some degree of risk-bearing and acceptance of uncertainty to the entrepreneur, and all of them stress the importance of access to capital. Say, Marshal, and Knight also stress the importance of intelligence, knowledge about one's occupation, and about trade and business (Praag 1999:327-329). Knudson et al. (2004:1333) challenged the assumption that entrepreneurs must be innovators²⁴; they argue that while entrepreneurship is based on the desire to *commercialize* something, innovation is the desire to *create* something new. The authors argue that both innovators and entrepreneurs are essential for agricultural development.

The many contrasting definitions of entrepreneurship complicate the process of creating a coherent model to analyze the impact that entrepreneurship can have on agricultural productivity. **For the purpose of this thesis**, I have therefore created an understanding of entrepreneurship that integrates entrepreneurship theory with the profile of a productive small-scale producer. Inspired by the classic contributors, I consider the entrepreneur to be driven by the opportunity to create value (be that social or economic), and to be willing to accept and manage risks (and failure) in the process. Also, guided by Marshal, Say, and Knight, I consider the entrepreneur to be someone knowledgeable about her field of occupation and about trade and business. Moreover, I adhere to the statement by Knudson et al. (2004) that the entrepreneur is not defined by her level of innovation. In areas where already invented technology has yet to be adopted, implementing such technology may be very much effective in increasing productivity and creating value. In a sense, the entrepreneur creates innovation *to the area* although the product may not be "new to the world" (see Knudson et al. 2004:1333). Many of the skills Griffin et al. (2002) argued were critical for small-scale farmers to be productive and economically viable can be creatively paralleled with those abilities that are enabling for entrepreneurship. That is; the small-scale producer must not be tradition-minded; she must be willing to act on market opportunities; she must be able to apply new technology, and she must be able to manage the risks associated with producing for the market.

²⁴ In addition, the authors argue that there are different degrees of innovation, when something is new to the world it the most innovate, and when something is new to the individual it is the least innovative (Knudson et al. 2004:1333)

Finally, since I wish to provide insights not only on the agent-level, but also assess how institutions impact the agent's potential, I have incorporated a framework developed by the International Labor Organization (ILO 2006) which outlines five factors that can serve to either encourage or discourage youth entrepreneurship. The five factors are explained briefly below²⁵.

Social and cultural attitudes towards youth entrepreneurship: An enabling cultural environment is one in which entrepreneurship is viewed as a respected and valued employment path. Moreover, business failure is considered a learning experience “rather than a source of stigma” (ILO 2006:4). *Entrepreneurship education:* should provide students with skills (such as problem-solving, creativity, planning, and negotiations), and attributes (such as self-confidence and dynamism). Entrepreneurship education can help to prepare youth to manage the uncertainties that entrepreneurship brings (ILO 2006:36). *Access to start-up finance:* is a precondition for young people to create their own businesses (ILO 2006:41). *Business assistance and support;* when entrepreneurs receive informed guidance during the process of implementing their plans, their chances of becoming successful and economically viable improve (ILO 2006:57). *Administrative and regulatory framework:* Government regulations and bureaucratic formalities can serve to encourage or discourage entrepreneurship, but the administrative and regulatory framework primarily impacts the formality of new businesses (ILO 2006:52; Stel et al. 2007:183).

²⁵ Consult appendix II, for a more comprehensive explanation of each factor

4. ANALYTICAL MODEL

Please note that the thesis assumes that actions at the micro-level can have an impact at the macro-level (see Coleman 1990). This assumption is further supported by the Knowledge Spillover Theory of Entrepreneurship (Audretsch and Keilbach 2007). The students' ability to increase agricultural productivity at the micro-level is expected to positively impact general productivity in the area, and such desirable impacts are assumed during the analysis. Further academic research might be needed to examine this theoretical assumption in the Bolivian context.

To explore *if young agronomists have the potential to positively impact agricultural productivity in the Yungas through entrepreneurship*, I created an analytical model that integrates agricultural development research with entrepreneurship research in order to create a more thorough account of the students' potential (see Figure 2). The red column shown in the model integrates the theory from the former four columns into the analytical categories that structure the analysis.

To assess *to what extent the agronomy students have entrepreneurial capacities*, I explored if the students matched the description of an entrepreneur (as outlined in section 3.3.). To assess *to what extent the agronomy students have the technical capacities necessary to increase agricultural productivity in the Yungas (and overcome current productivity constraints²⁶)*, I used various specialized studies about agriculture to explore if their planned actions would in fact be conducive to land/labor productivity. Secondly, I used Griffin et al. (2002) in both sections to control if the conditions to make small-scale farming productive and economically viable were in place. Finally, to put into perspective the findings on agent-level, I created a section that explores (some of) the institutions that impact the agent's potential.

²⁶ Such constraints were outlined in the background section and include: Environmental and soil conditions (soil degraded, high acidity, deforestation, erosion, topography) - Technological constraints (fertilizers, improved seeds, pest/disease control, irrigation). Knowledge constraints (about soil management, about technology, about market opportunities) - Physical infrastructure constraints (irrigation, roads)

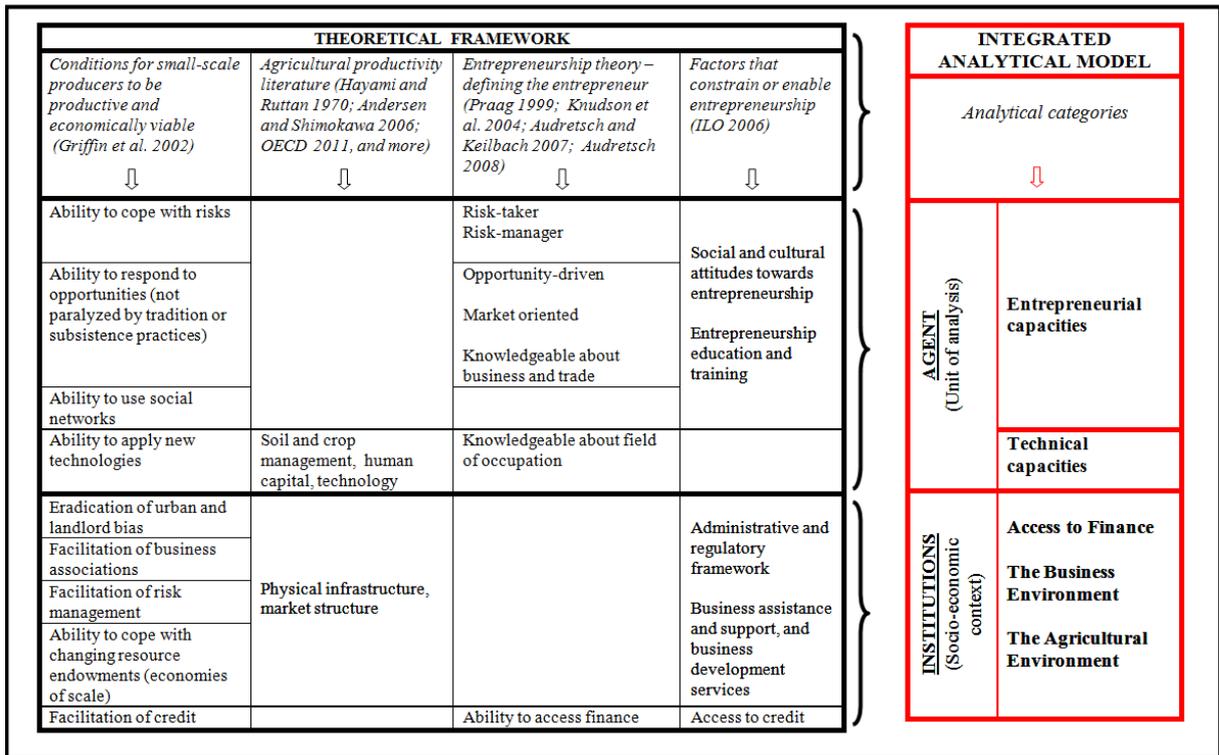


Figure 2. Analytical Model. Source: own elaboration

5. METHODOLOGY

5.1. Research Paradigm

The production of this thesis has been shaped by critical realism. Critical realism operates with an intransitive dimension (ontology) and a transitive dimension (epistemology). Critical realists are epistemologically relativist but ontologically realist. This implies an epistemological assumption that knowledge is relative; knowledge is a fallible product. However, the ontological position is realist since it is believed that an external reality do exist, a reality that is independent of our knowledge, but also a reality that we can never know with complete certainty. The belief in rational judgment is essential to critical realism, as it is through rational judgment that we make inferences about the social world (Buch-Hansen and Nielsen 2012:278-284; Bhattacharjee 2012:17-18).

Critical realists believe human behavior is influenced both by agency and structural factors (Clark 2008). This assumption can be seen in my analytical approach which involves agent-

level (entrepreneurial- and technical capacities) as well as structural factors (the institutions). While the students are agents who act on their own they are impacted by the institutions that shape their socio-economic context.

5.2. Research Design

For the purpose of this study, a qualitative research design seemed most appropriate since it generates richer and more detailed data, it allowed me to ask why and how questions (Mack et al. 2005:2), and to ask the students to elaborate when I was unfamiliar with the agronomic concepts they used.

Qualitative research is often criticized with regards to generalization (Bryman 2008:391); however, the purpose of this study is not to generalize. Bolivia is a very complex country both geographically and socio-economically, and what may work in the Yungas is not necessarily the right path in for instance Santa Cruz²⁷.

The thesis has thus been designed as a non-experimental single-case case study that has applied multiple methods to allow for triangulation of data (Bryman 2008:700). The case-study approach seemed like the most appropriate method to create a thorough account of young agronomists' potential to impact agricultural productivity in the Yungas through entrepreneurship.

5.3. Description of Case

The large majority of my primary data was collected at the rural university *Unidad Académica Campesina-Carmen Pampa* (UAC-CP) which is located in the small village of Carmen Pampa, just 12km outside the city of Coroico (the capital of Nor Yungas) (see Appendix 1). The remaining data was collected in Coroico and through email correspondence. The case-group consisted of 10 students (6 boys and 4 girls) who are currently enrolled at the agronomy degree program at the UAC-CP. The students come from different rural communities from the Department of La Paz, primarily from Nor Yungas, Sur Yungas and

²⁷ Santa Cruz is located in the eastern part of Bolivia; it is the most populated area, and it is home to most of Bolivia's large-scale farms. It is characterized by a more commercial and mechanized agricultural system (Vera 2006:10-11).

Caranavi. To assist in interpreting the findings from the students and to provide additional insights, a number of key informants were also interviewed (see Table 1)²⁸.

The UAC-CP is a Catholic university which was founded in 1993. Many young people are excluded from access to university-level education due to high tuition- and housing fees in the larger cities of Bolivia. The university's mission is to provide rural youth with the opportunity to achieve a university-level education. The university supports every single student with a grant of US\$1100 which enables the students to access the university at a lower tuition fee. In addition, scholarships are offered to students who have shown academic excellence and to students who come from families with particularly limited financial resources (UAC-CP 2012a)²⁹.

The university offers degree programs in Veterinary science, Educational Sciences, Public Health, Eco-Tourism, and Agronomy. The university is based on Catholic principals and the students are encouraged to return to their home communities upon graduation to use their newly acquired skills to support the continuous development in rural Bolivia. When the data collection was carried out 608 students were enrolled (281 boys and 327 girls). The agronomy program (5 years) is the most popular degree with a total of 205 students (RDG 2013, informant).

The agronomy program is tailored to prepare the students to become professionals within the field of agronomy, be that as researchers, producers, agro-industrial managers or elsewhere. They encourage the students to create employment for themselves and others. The program has an approach to agriculture that is sustainable (environmentally, socially, and economically). The program favors biological technologies, but the students also have classes about mechanical technology. There is an explicit focus on organic production techniques, and all experimental parcels at the UAC-CP apply organic techniques. The program covers the different regions of Bolivia, and introduces the students to the production potentials and limitations of each region. Finally, the program focuses on social interaction with local

²⁸ Please consult Appendix V for a short description of the two banks

²⁹ The Carmen Pampa Fund is a non-profit US-based organization that is responsible for generating funds for the university through monthly payments. The university has an agreement with the organization *Cross International* who supports the university's food cooperative with a 60% subsidy. In addition, the university receives private donations from individuals and other institutions (RDG 2013, informant).

farmers, and prepares the students to manage in multicultural and multiethnic ambiances (UAC-CP 2012b)³⁰.

5.4. Data Collection, Methods, and Sampling

I personally collected all primary data during the period from August to December 2012. I have a high level proficiency in Spanish and all interviews were conducted in Spanish. All interviews were digitally recorded, with prior permission from the respondents. Afterwards, all interviews were transcribed in Spanish³¹. Interview guides are found in Appendix IV.

Methods

Participant observation was an ideal method to collect data “on naturally occurring behaviors in their usual contexts” (Mack et al. 2005:2). I worked and lived in the facilities of the UAC-CP which allowed me to observe the students and participate in their daily lives. This also helped me build rapport which is essential when interviewing young people (Scheyvens and Storey 2003:176). Informal conversations and observations guided and shaped the interview guides and the interpretation of the formal interviews. Moreover, I used experiences that I gained during a project evaluation in a nearby community (San Juan de la Miel) to provide additional perspectives to the analysis.

In-depth interviews were conducted to gather a rich and detailed account of the students’ aspirations and potentials. In-depth interviews are favorable when the objective is to collect data about individuals’ “personal histories, perspectives, and experiences” (Mack et al. 2005:2).

The literature review (based on secondary sources) provided me with the necessary background knowledge to adjust interview guides, to support the analytical processes, and to fill out those gaps that were not covered in the interviews (Creswell 2009:22). Secondary sources were also essential to put into perspective the capacities of the students (see section 6.3).

³⁰ The agronomy curricula includes such courses as; organic and inorganic chemistry, microbiology, biochemistry, soil science, genetics, topography, soil fertility, phytopathology (plant diseases), irrigation and drainage, and management of agrochemicals (UAC-CP 2012b)

³¹ When interview quotes are used during the thesis, these have been translated directly by me.

Table 1. Overview of Respondents

TABLE OF RESPONDENTS				
STUDENT CASE GROUP (s = no of students)				
Age	Gender	Semester	Average family income level (<i>Bolivianos</i>)	Test score (0 to plus 76)
24 = 3s 23 = 2s 22 = 3s 21 = 2s	M = 6s F = 4s	Thesis = 1s 10 = 2s 8 = 3s 6 = 2s 4 = 2s	Less than 1000 = 2s 1000-1500 = 3s 1500-2500 = 2s 2500-3500 = 2s More than 3500 = 1s	Moderate potential (51-75) = 5s* High potential (plus 76) = 5s*
KEY INFORMANTS				
<i>Former students – now engaged in entrepreneurship</i>				
Name	Title/profession		Rationale for interview	
René Villca Huanaco	Entrepreneur – honey production		Insights into the life after UAC-CP as an agronomist doing entrepreneurship	
Misael Beltrán Quenaya	Entrepreneur – honey production		Insights into the life after UAC-CP as an agronomist doing entrepreneurship	
José Luís Chipana Mollehuanca	Entrepreneur – chicken production in an integrated management with vegetables		Insights into the life after UAC-CP as an agronomist doing entrepreneurship	
<i>Bank representatives</i>				
Gladys Esther Mamani Mamani de Ramírez	Credit Officer at the bank <i>Banco Fie.</i> In Coroico		Expert knowledge about credit systems	
Freddy Mauricio Guitierrez Paredes	Agency Manager at the bank <i>PRODEM.</i> In Coroico		Expert knowledge about credit systems	
<i>UAC-CP special informants</i>				
Nicanor Cuba Cuevas (NCC 2012)	Director of Studies of the agronomy program		Expert knowledge about the agronomy degree program, about agronomy students, about agricultural productivity in the Yungas	
Rubén Darío Gómez (RDG 2012)	Director of the Research Institute		Expert knowledge about the UAC-CP, familiarity with the students, methodological inputs	
* Exact score (mod. pot.) 65,25 – 64,25 – 65,5 – 75,5 – 67,75				
* Exact score (high pot.) 87,5 – 86,75 – 82,5 – 79,75 – 80,5				

Sampling

I used non-randomized sampling (quota and snowball sampling) to identify the respondents.

In quota sampling the number of participants is decided when the study is designed³². Quota sampling in connection with a case-study is ideal as it allowed me to select the cases that were most likely to shed light upon my research questions (Yin 2003:ch2). For the purpose of

³² Initially, I planned to interview app. 20% of the 77 students, but after having conducted 10 interviews I realized I had enough material to shed light upon my research questions.

selecting the respondents, a standardized entrepreneurship test developed by the Center for Rural Entrepreneurship (see Appendix III) was handed out during a meeting with the agronomy students³³. The test was handed out to 87 students and 77 were completed and returned. Based partly on the score of the test and the entrepreneurial idea of the student³⁴ and partly on the following criteria; gender, age, income level, and semester (to resemble the agronomy student population), I created a list of names, and begun conducting interviews. After 10 interviews I also realized that I had gathered sufficient information to shed light upon my research questions.

Snowball-sampling was used to identify key informants (see Bryman 2008:184). My key informant at the UAC-CP (RDG) facilitated my contact with the two bank representatives and with three former students who are now engaged in agricultural entrepreneurial activities.

5.5. Data Analysis

Transcribed data was processed using a 5 steps process recommended by Powell and Renner (2003:2-5); step 1: get to know the data by reading and re-reading it several times; step 2: focus the analysis by listing topics and sub-questions that emerge; step 3: categorize the information by identifying themes; step 4: identify patterns and connections within and between the different categories; step 5: interpret the information and list key findings. In addition, secondary literature was used in the analysis to provide additional insights, back up or question findings in primary data.

5.6. Quality of Research

To ensure the quality, or trustworthiness, of the study, I used recommendations by Guba and Lincoln (1994). To ensure credibility I triangulated my data by using multiple methods. Moreover, I tried to ask the respondents similar questions at different times, and I asked them to elaborate when their answers were vague. To ensure transferability I created a detailed description of the context and the case (section 2 and 5.3). To ensure dependability, I created

³³ The meeting was arranged by the Director of Studies, the teacher in charge, and me. Not all the agronomy students enrolled at the UAC-CP were present during the meeting.

³⁴ I added an open-ended question to the test where the students were asked what they would like to work with/in. This allowed me to exclude unserious responses and it also provided me with a general overview of the students' aspirations. Please consult Appendix VI for a complete overview of the business ideas proposed by the students who participated in the entrepreneurship, but who were not interviewed later.

a fieldwork folder with notes from all phases of the research process. To ensure confirmability, I wrote a short personal reflection on my position as a researcher (see 5.7.1) to control for subjective biases (Guba and Lincoln 1994, in Bryman 2008:377-379).

5.7. Ethical considerations

Prior to all interviews written informed consent was secured. All respondents were informed about the purpose of the research, the expected time necessary for the interview, and that participation was voluntary. I had the approval of the UAC-CP to conduct the interviews.

The research topic is not particularly sensitive, however, when interviewing youth, Scheyvens and Storey (2003:176) recommend that sufficient time is dedicated to build rapport in order to develop their confidence and achieve a greater level of participation. I worked at the school and I socialized with the students through work- and spare time activities which allowed me to build rapport. I also tried to adapt to the students' busy schedules and to conduct the interviews at the least intrusive moments (Devereux & Hoddinott 1993: 28-35).

5.7.1. Positionality

My role at the UAC-CP was to assist in the formulation of project plans and to search for funds³⁵. Earlier concerns that my age, gender and the fact that I mingled with the students might compromise my acceptance by the students, proved to be groundless. The recording device and interview guide seemed to contribute to a professional atmosphere in which I was taken seriously as a young researcher.

I am born and raised in Denmark, a completely urbanized country with a highly productive and mechanized agricultural sector. I had to remind myself that Denmark's factor endowments differ significantly from those of Bolivia, so as not to make erroneous inferences and comparisons.

³⁵ My internship was with the Inter-American Institute for Cooperation on Agriculture (IICA). The IICA has been working in close collaboration with the UAC-CP since 2008 to develop project- and development strategies benefitting the university and the areas surrounding the university (RDG 2012, informant)

5.8. Limitations

I have chosen to focus on technical productivity, not on monetary productivity. This implies that the economic gains from increased productivity will not be analyzed even though such gains have an impact on the poverty-reducing effects of increasing productivity.

By focusing solely on educated youth, I neglect the potential of young people who do not have access to tertiary education. While uneducated youth may also have the potential to increase agricultural productivity through entrepreneurship, the barriers and incentives that impact them are likely to differ from educated youth. Thus, for the purpose of creating a more detailed account, I focused solely on educated youth.

The students' efforts constitute just one piece in the puzzle towards enhancing productivity on a broader region-based level. Other farmers would still need training and support. Likewise, the service and industry sectors need to develop in parallel with the agricultural sector to create positive linkages; producing a more dynamic and integrated process of rural and agricultural development.

6. ANALYSIS

This section is divided into the analytical categories outlined in Figure 2. Firstly, the students' entrepreneurial and technical capacities are assessed. The preliminary conclusions are presented at the end of each section. Secondly, those institutions that are most likely to impact the student's potential are addressed, including; access to finance³⁶, the business environment, and the agricultural environment³⁷

³⁶ Therefore, when analyzing the entrepreneurial and technical capacities of the students, the factor of financial capital is not taken into consideration although it is highly important in both areas.

³⁷ The agricultural environment should be understood as factors that impact the functioning of the agricultural sector.

6.1. The Agent

6.1.1. Entrepreneurial Capacities

Social and Cultural Attitudes towards youth entrepreneurship

Prior to designing the final fieldwork plan, I expected that many of the students would want to search for job opportunities in urban areas instead of the rural sphere, since sources had noted this was a trend (Correo del Sur 2011; Patzi 2012). However, I quickly came to the impression that this was not the case for many of the students at UAC-CP³⁸. Many students believe the rural areas need their assistance and they wish to contribute to developing and helping their communities. On top of the 10 case-group students, plenty of other agronomy students, who participated in the entrepreneurship test, plan to engage in some kind of entrepreneurial (or self-employment) activities within the rural sphere (see Appendix VI).

Moreover, when the students were asked to define what an entrepreneur is and what traits they believe characterize an entrepreneur, all of them spoke in very positive terms. In fact, not one of them used negatively laden words to describe an entrepreneur. They found an entrepreneur to be (Table 2):

Table 2. Data Presentation 1: What is an Entrepreneur

Someone who shows solidarity, with good ideas, who constantly searches for opportunities, who is goal-oriented, who fights, who is growth-oriented, who creates jobs, who is responsible, who is honest, who confronts problems, who is a leader, who is positive, and who is respected.
--

It is likely that the UAC-CP influences the students' desire to stay in the rural sphere, help their communities, and also that many of them dream about creating their own employment. Regardless, I sensed that entrepreneurship is considered a respected and valued employment path, and not a path chosen due to necessity or obligation – since there are other employment opportunities as well. Although it may not be surprising that individuals who themselves would like to become entrepreneurs speak in positive terms, their choice of words may also characterize the kind of businessmen they would like to become; one that is guided by social responsibility and the desire to spur local development.

³⁸ This includes not only the case group, but also other students at the university from whom I acquired information through observations and conversations during the time I was working at the university.

Ability to Manage Risks and Cope with Failure

The ability to view failure in a constructive manner is another social or cultural factor that is enabling for entrepreneurship to development (ILO 2006:24). When I asked the case-group and the 3 former students how they would react to a sudden failure in their business, their answers were (table 3);

Table 3. Data Presentation 2: Reaction to Failure

<p><i>Well, in this case, I would not look at it as an obstacle; instead it would encourage me to take action to gain distinction (Ernesto, 24)</i></p> <p><i>At first it would upset me, when I imagine it now and seeing my mother by my side, it would frustrate me, and I would get angry with myself, but I know there is a solution. So because of this error, I will be more careful next time (Emma 22)</i></p> <p><i>When you fall, you need to know how to get up (Darío, 23)</i></p> <p><i>An entrepreneur is someone who is capable of solving problems, right. So in this case, I don't think I would get mad, instead I would try to find this weakness and turn it into a strength or an opportunity (Diego 21)</i></p> <p><i>My father has always told me that you need to have experiences. If you fall, you need to get up again (Jesus, 23)</i></p>
--

In fact, seven out of eight case-group students³⁹ and all 3 former students showed a general acceptance of failure in business. While a failure would naturally be up-setting, the students were very clear about transforming the experience into a useful learning lesson which they could use to improve themselves. Moreover, when the students were asked to evaluate their tolerance of and ability to manage risks on a scale from 1 to 10 (ten equaled total ability)⁴⁰, four of them ranked themselves a 5 while the rest of them ranked themselves either an 8 or 9. Their statements suggest a great ability to turn failure into something constructive, and also that they perceive themselves to be quite capable of managing risks – two defining abilities of an entrepreneur.

It should also be noted that all of the students (who plan to produce) intend to have a diversified production with their crops separated into different parcels. Their primary reason

³⁹ Unfortunately, two of the female participants were never asked this question; one of them because we only managed to finish half of the interview.

⁴⁰ The question sounded: "Risk Tolerant - I am risk tolerant and I am able to successfully manage risk associated with creating and growing a business" (See the standardized entrepreneurship test, Appendix III).

for diversifying was to ensure that they could harvest during the entire year and thus have a constant and stable income. Nevertheless, while they did not use the term ‘risk management’ to describe this decision; to diversify crops and separate holdings into different parcels are in fact measures that reduce the risks related to being a small-scale producer (Griffin et al. 2002:319). One can hardly consider this group of (potential) future small-scale producers⁴¹ to be exceptionally risk-averse.

Opportunity-driven and Market-oriented

While agronomists can naturally work in urban areas, agronomic knowledge is applied in agriculture and hence there will often be a connection with the agricultural sector and the rural sphere. The sheer popularity of the agronomy program could imply that the students believe the agricultural sector offers good opportunities (be that as researchers, producers, or others). Moreover, all 10 case group students believed the agricultural sector offers good opportunities to have a high income; as long as your production is well-managed and focuses on specific crops with good market prices. The food security agenda of the government and urban market development were also mentioned as factors that would offer new opportunities within the agricultural sector. Income poverty among agricultural producers is perceived by the students to be due to primarily technical and resource factors (see Table 4);

Table 4. Data Presentation 3: Perceived explanations for income poverty among farmers

Lack of training and technical knowledge
Incorrect use of chemicals
Monoculture
Inability to fight plagues and diseases
Lack of crop rotation and integrated management to ensure income all year round
Lack of money to invest in production inputs and labor
Lack of market information about other crops than coca
Lack of basic services like water and good roads
Lack of stable markets in the area

The students were not paralyzed by tradition to produce a specific kind of crop; instead their business plans were guided by perceived opportunities. Although none of their chosen products can be considered particularly untraditional, they have chosen these products

⁴¹ While the students may not all be typical small-scale producers since some will have access to quite large land plots, they are still confronted with the financial constraints that are typical for small-scale producers. Moreover, the financial constraints as well as the topography prevent many of them from using all their land for cultivation.

because they believe there is a clear demand, suggesting a market-oriented approach to product selection (see Table 5 for a summary of the business ideas⁴²). For instance, Elena identified the lack of access to seeds and wishes to contribute to this. Diego is aware of the high rates of deforestation and identified it as a profitable opportunity to provide seedlings for reforestation. Ruben was convinced that quality vegetables are increasingly appreciated in the market, and saw this as an opportunity. Manuel explained that he did not want to “[...] *just produce and then go around offering it, because then people will try to bargain the price down, and you may have to sell at a lower price because you have nowhere else to sell*”. Instead, he planned to engage in contract farming⁴³, a clearly consumer-oriented approach to production.

Whether or not there is a market demand for these products goes beyond the scope of the paper, but the fact that cocoa, coffee, fruits and vegetables were all encouraged for their market and production potentials in the national plan for productive economic development in the Yungas (VCDI-FONADAL 2010) suggests the existence of demand. Moreover, contract farming is gaining momentum within the agricultural sector and it has been argued that these types of managed supply chains can “[...] result in potential income enhancement in rural areas” (Da Silva 2005:25).

Finally, although the selected products per se are rather traditional, the educational attainment and technical curiosity of many of the students, is likely to allow them to create innovative solutions to producing them. Since they have yet to actually implement their plans, it is too soon to stipulate if the students are innovative or not; however, in the standardized entrepreneurship test, the students did perceive themselves to be highly innovative and resourceful⁴⁴.

⁴² Please note; all, except Elizabeth, plan to have some kind of agricultural production as part of their business plan. Therefore, when I write e.g. “the students plan to produce/incorporate in production/etc”, I refer only to the group of students who wishes to produce.

⁴³ Contract farming is “an agricultural production system carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products” (FAO 2012:1). Depending on the specific contract, the buyer may provide production inputs and assistance in preparing the land while the producer is obligated to supply the desired quantity (and quality) (FAO 2012:1)

⁴⁴ Innovative: 9 students ranked themselves from 7 and above, while only 1 ranked himself a 4. Resourceful: 7 students ranked themselves a 9 or 10, and the remaining three ranked themselves 3, 6, 7 [the scale was from 1 to 10, 10 equaled total ability]

Table 5. Data Presentation 4: Overview of the Students' Business Plans

Name, age	Business plan (summary)
Manuel, 24	He wants to have a diversified primary production of coffee and vegetables combined with a SAF system ¹ . He identifies coffee as a long-term investment with interesting potential on international markets. The vegetable production is a way to ensure a regular flow of income and he plans to do contract farming ² . He wants to introduce timber because he believes prices will increase in the future making it a good investment.
Ruben, 24	He plans to open a family company that produces vegetables. He believes some vegetables (e.g. tomatoes and lettuce) offer good prices in the market. His cousins and he have not decided on a product yet, but they want to diversify production.
Jesus, 23	He plans to focus on livestock production – chicken and pigs – he says the demand is high in his home region. He has also had success with organic pineapple production using the method of induced resistance which he therefore considers to continue to produce as well since the market price for pineapples is very good.
Elena, 22	She wants to open a seed store to facilitate access for Yungas farmers. She explains that prior to getting enrolled at the university, she worked a lot with farmers, and the producers often complained about the lack of easy access to seeds. She explains you have to go to the city of La Paz to buy seeds. She also plans to produce and sell quinoa with her boyfriend to be able to save up money to open the seed store. She says the government supports quinoa production and that it pays well.
Ernesto, 24	He wants to produce cocoa under a SAF system. His primary crop will be cocoa, but he wants an integrated management with citrus fruits, bananas, and papaya. He plans to sell his cocoa to a big local cooperative <i>El Ceibo</i> because he says the demand for quality cocoa beans is high there.
Emma, 22	She wants to focus on livestock production; chicken. She wants to establish a family company that produces high quality chicken, and later also pigs. She has seen that the demand for quality “Yungeño” chicken is high in the city of La Paz and she explains that people will line up for hours to get a hold on quality produce. She wants an integrated system with timber and vegetable/fruit production.
Elizabeth, 24	She plans to work with different projects to gain experience. Afterwards her dream is to associate with some friends and implement an experimental station with capacity training. She believes the Yungas needs more specialized research about agriculture in the area in order to improve the situation.
Diego, 21	He wants to engage in forestry. He is very concerned about deforestation and he believes the focus on reforestation is gaining momentum and the demand is there. He plans to implement a greenhouse with local timber seedlings to supply deforested areas with trees.
Darío, 23	He is very interested in coffee production, and he would like to study more about resistant varieties first, and then implement it in his own coffee production. He believes the introduction of improved varieties through breeding would enable the Yungas area to significantly increase yields.
Maria, 21	Her family produces and processes high-quality special coffee which is currently sold to intermediaries. Her dream is to expand the family production so that they can create their own brand and to ensure more coffee producers can benefit by supplying her business.
<p>¹ SAF is the abbreviation for the Spanish term <i>Sistemas de Agroforesteria</i>, which translates into ‘agro-forestry systems’ which is an integrated system where forest management is combined with agricultural production (See Beer et al. 2003).</p> <p>² Contract farming is “an agricultural production system carried out according to an agreement between a buyer and farmers, which establishes conditions for the production and marketing of a farm product or products” (FAO 2012:1).</p>	

Knowledge about Business and Trade

Many of the students may have a market-oriented approach to product selection, but the ability to go from producing to actually supplying a market is highly important if the students are to become successful and able to sustain their livelihoods through entrepreneurship. The students' knowledge about how to register a company, how to pay taxes, and how to register property rights was very limited, and none of them have had any experience with running their own businesses (although some mentioned that experiences from working elsewhere would help them manage). If the students are serious about creating their own businesses, gaining a knowledge base about these aspects is highly relevant to avoid potential fines, tax shocks, or that someone claims ownership of their businesses.

The students did have some basic ideas about how and where they would like to sell, but none of them, except for Manuel (contract farming) gave a confident impression that they knew how to connect with competitive markets. Table 6 below summarizes how some of the students plan to sell or market their products;

Table 6. Data Presentation 5: Where to market my products

Emma planned to spread the word to neighbors and family first because then sooner or later the word would spread. Manuel said he wanted to do contract farming. Diego planned to use radio to advertise for the timber seedlings and he would also present his product to the local municipalities and farmer organizations in the area. Ernesto thought about associating with an already well established cooperative El Ceibo to sell his high quality cocoa. Elena knew from experience that the demand for seeds is very high in the area and she expects people will come to her once the word is out. Maria and Ruben talked about certifying their products which would give them access to other markets.

When I asked the students how they planned to stay competitive, most of them expressed that they planned to market their product on 'quality'. Their almost unanimous desire to focus on 'quality' may be a reflection of their lack of knowledge about other marketing strategies (e.g. focusing on quantity and cost reduction or even niche markets) rather than an informed marketing decision on their behalf. Some of those who wanted to produce organic products mentioned that it was a sought-after product. Although domestic high-value markets, such as the organic market, are increasing rapidly in many developing countries (World Bank 2008:12), organic products are still often not identifiable in Bolivia, even in some of the big

supermarkets⁴⁵. Hence, the students could benefit from more training about commercialization to make them more aware that producing organic or high-quality products does not automatically lead to a higher income or greater success if such sophisticated markets do not exist in the first place (or at least not where they plan to sell).

Moreover, to access supermarkets or even international markets, a certain quantity is often requested which may be difficult for a small-scale producer to deliver on her own (TrioFrugt 2012, email correspondence⁴⁶). Hence, for many small and medium-sized companies, the only alternative for survival is to associate with others (Liendo and Martínez 2001; Camacho et al. 2007). The idea of associating may be gaining some momentum at the university; while I was working there, a workshop focused on ‘associations’ was held where many students participated. Yet, only three of the students planned to associate themselves with established businesses or institutions to gain market access, while the others only mentioned associating with family members. Also, none of the three former students have associated themselves with companies to facilitate market access. Many of the students who participated in the entrepreneurship test, but who were not interviewed, actually share similar ideas with the case-group (see Appendix VI). I would argue that the students could benefit from being introduced to one another in ‘entrepreneurship forums’ to create social networks or even to form business associations which could help them gain access to markets despite their small size.

Entrepreneurship Education and Training

Having received entrepreneurship education is by no means a precondition for becoming a successful entrepreneur; however, such training can provide budding entrepreneurs with tools and practical experiences that can help them become successful businessmen or women.

The UAC-CP does not integrate explicit entrepreneurship education into the curricula, but the students explained that the courses ‘rural administration’ and ‘economics’ to some extent

⁴⁵ Out of curiosity, I visited two large supermarkets in La Paz (Hipermaxi and Ketal) and asked where I could find organic vegetables or fruits; and in both places the employee was unable to show me such products (This was done in December 2012).

⁴⁶ TrioFrugt.dk is a Danish company that supplies supermarkets and wholesalers with quality fruits and vegetables, <http://triofrugt.dk/>

were useful for establishing a business. During these courses, the students have a creative and practical exercise during which they establish a small business and sell their product at the school. This exercise is similar to what the ILO (2006) argues should be incorporated into school curricula. The ILO (2006:36-39) also states the importance of having lectures about specific fields of business with examples from real life entrepreneurs. While I was working at the university, a workshop about the commercialization of coffee was held. Yet, the presentation was not by an entrepreneur and it was primarily focused on marketing strategies; which you need more than one workshop to master.

There has never been a visit from a (young) entrepreneur to inform the students how she or he managed to get that far. Considering that other entrepreneurs can serve as role models for promoting entrepreneurship and give the entrepreneurial students encouragement and inspiration to continue (see ILO 2006:31), such visits could clearly benefit the students. Moreover, business-education linkages are deemed important for developing entrepreneurs (ILO 2006), and although the UAC-CP does connect the students with industries through internships, these internships are focused on the technical aspects of the students' degrees and not on how to open and manage a business.

6.1.1.1. Preliminary conclusions: Entrepreneurial capacities

The above analysis has shown that the agronomy students have strong entrepreneurial capacities. The students view entrepreneurship as a valued and respected path of employment; they have the ability to turn failure into a constructive learning lesson; they are prepared to manage risks; and they have a market- and opportunity-oriented approach to product selection. Due to their educational attainment they also know how to incorporate technology, and they perceive themselves to be innovative and resourceful. The students do not know exactly how to register a company, protect property rights, and pay taxes, nor are they marketing wizards who know exactly how to strategically introduce their products into markets. However, this type of knowledge is transferrable to a much greater degree than entrepreneurial capacities which the students quite clearly have. By introducing business and commercialization courses into the agronomy curricula (or otherwise made available at the university), the students could back up their entrepreneurial capacities with tangible business and trade education.

6.1.2. Technical Capacities

As noted, this thesis chose to focus on agronomy students assuming they would be more likely to possess the skills necessary to impact agricultural productivity through entrepreneurship. As outlined in the analytical model (Figure 2), factors such as human capital, knowledge about field of occupation, soil and crop management, the ability to apply technologies, and the ability to handle topographic barriers are all part of defining the agent's technical capacities to impact agricultural productivity. The following section analyzes to what extent the students' technical capacities are enough to overcome current production barriers in the Yungas.

Access to Land

Considering that 9 out of 10 students plan to become producers⁴⁷, they need access to land. Of the 9 students, all but one have access to land, ranging from very small plots of just ¼ of a hectare to 50 hectares⁴⁸. The student who does not have access to land expected that he would eventually manage to save up enough to buy a plot. Well-functioning land markets are essential in this regard (Griffin et al. 2002:299). Land markets can hardly be considered well-functioning in Bolivia in general (see Muñoz 1999), but according to students and the Director of Studies, it is possible to buy land in the Yungas, although sizes and prices vary within the different municipalities. According to Muñoz (1999:27), the price for unprepared and uncultivated land in the Yungas range from US\$600 to US\$3000 per hectare. In other words, accessing land in the Yungas is possible, but the price may prevent landless young agronomists to impact productivity through own production.

Topography

Increasing productivity in tilted areas is more complicated than in areas with a plane surface where access would be easier during all phases of production; soil nutrients would not easily be washed away; and machinery could be used to facilitate labor when necessary and appropriate. However, considering that 79% of the population in the Yungas work in

⁴⁷ Some of them plan to combine production with other activities as well, e.g. Elena whose main goal is to open a seed store.

⁴⁸ While the students may not all be typical small-scale producers since some will have access to quite large land plots, they are still confronted with the financial constraints typical for small-scale producers. Moreover, the financial constraints as well as the topography prevent many of them from using all their land for cultivation.

agriculture (CIES 2003) there has to be created solutions to increasing productivity under these circumstances.

The students do have some ideas about how to manage the topographical constraints. One mentioned the importance of improving drainage systems to help discharge excess water; another said it would be helpful if a NGO provided access to appropriate machinery; and a couple of other students considered creating terraces. Despite the obstacles of producing in tilted areas or in altitudes, the students seemed comfortable working under these circumstances, and none of them believed topography was a seriously limiting factor for increasing productivity.

Knowledge about Field of Occupation and Human Capital

Beings future agronomists, the students have broad knowledge about their (future) fields of occupation. This acquired knowledge increases their human capital which impacts their ability to increase agricultural productivity. The CO.FE.CA.Y (2007) argued that many Yungas producers lag behind with regards to education and technical training and that many of them have little knowledge about new technology. The lack of technical knowledge or financial capacity to do a proper management may explain why 36% of crop losses is due to diseases and plagues (CIES 2003). By applying their knowledge about technology and disease management, the students should be able to decrease crop losses.

The students seemed quite confident that the knowledge they have acquired at the university enables them to improve productivity compared to someone who has never been formally trained. As Elena explains; *“When I graduated high school I went to work with farmers and I saw what they did and I did what the farmer told me to, but by coming here [at the university], I have learned new practices, new techniques to improve”*⁴⁹.

Education is important to increase productivity, but experience is an invaluable factor that many of the students have yet to acquire. For instance, Ernesto emphasized that although his degree has given him great knowledge, the producers’ lifelong experience in the field should

⁴⁹ Other perceived advantages included that the students were; more quality concerned; more capable of choosing the best grains; able to improve soil quality; do disease management; make soil and crop analyses; knowledge of new production techniques; Coordination and organization of production to prevent soil degradation and to ensure incomes all year round.

never be underestimated and that older producers are very much capable of improving yields as long as they receive technical training and support. To create knowledge spillovers from the students to other farmers in the area, there has to be forums to exchange knowledge and information. Through these forums the students could also learn from the farmers' experience. The UAC-CP manages an extension project where agronomy students train and work with local farmers; this could be one such forum for knowledge exchange. Moreover, Elizabeth would like to create an experimental station and training center in the Yungas where scientific research would be combined with the local farmers' experience. While the logistics (both financial and location-wise) of her plan are not clear at the moment, such an idea could also facilitate knowledge spillovers and information exchange.

Technology and Soil and Crop Management

Some students have quite ambitious plans with regards to biological or chemical technology, see Table 7 below;

Table 7. Data Presentation 6: Technology

Dario wishes to specialize himself in breeding to create and use resistant varieties. Jesus has implemented a successful experiment with induced resistance in pineapples to improve their resistance to pest and diseases. Emma would like to study biology to improve her skills in the laboratory because she wants to create inputs in her own laboratory to be used directly in her land.
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The fact that at least three students aspire to using advanced biological methods in their production confirms their technical skill level, but also indicates that if they are successful yields can be increased significantly (Sleper and Poehlman 2006:4).

With regards to the use of mechanical technology (machinery), a few students might use smaller equipments to remove weeds and prepare the soil; some mentioned that the topography prevented the use of machines, and others said they would probably not be able to afford it. Either way, using machines was not a priority for any of the students. This should not be translated into a constraining factor to increase productivity since facilitating labor with machines is less important when labor is abundant (see theoretical framework). Gains in productivity may as well come from the application of biological technologies, leading to land

productivity improvements (Hayami and Ruttan 1970). Regardless, as Akubue (2000) noted, the use of technology is not static implying that if the students at some point realize they need to facilitate labor, they would have to search for appropriate machinery, and financial constraints would have to be overcome (for instance through rental systems).

Concerning soil quality, the ideal pH range for agricultural production is between 5 to 8 pH (Acid Soil Action 2000), but in many parts of the Yungas it is around 4.5 to 5 (NCC 2012, interview). Generally, the students were quite confident about their ability to improve soil quality. Some planned to carry out soil analyses to identify suitable crops and potential soil enhancements measures to be taken; some stressed the use of fertilizers and pointed to successful experiments from the university; techniques such as crop rotation to create a natural nutrient balance in the soil, and crop associations (such as SAF) to ensure vegetative coverage and keep nutrients in the soil, were also mentioned. Despite the yield increasing impacts of applying fertilizers, Bolivian agriculture is currently done with very limited use of fertilizers (WDI 2013). The students would diverge from this pattern as they plan to actively keep their soil fertile, - this should enable them to increase yields.

With regards to the use of fertilizers, all the students (who plan to produce) wanted to produce organically. The students' arguments for producing organic were first and foremost to protect the environment and give back nutrients to the soil. Some of them expressed awareness that producing organically requires extra labor and that controlling for pest and diseases is more complicated, but they argued that it would be a better investment in the long run since extensive use of chemicals could deteriorate soil quality. While it is often argued that organic production is inferior to inorganic production with regards to yields, recent studies have shown that organic production can be very productive (see Halweil 2006). Hence, producing organically would not necessarily translate into inferior yields; in fact, the application of organic manure to degraded soil would increase its fertility and serve to increase yields. Also, the extra labor required in organic production would be beneficial for local employment creation.

Nevertheless, for fertilizers (organic or inorganic) and resistant varieties to deliver to their potentials, proper irrigation is a must (see Hayami and Ruttan 1970:1133). All the students

noted that irrigation is crucial to increasing yields. A couple of them mentioned that they wanted to implement a “drip irrigation system⁵⁰” to save water and another one talked about installing water reservoirs to collect water during rains. Nevertheless, most of them planned to access water manually from nearby rivers and one of them even planned to count on the rain. Although the students know how to apply technology and how to manage crops and soil, their ability to actually implement this knowledge will be impacted strongly by the institutions delivering such inputs or services (see section 6.2).

Deforestation

The production practice known as “slash-and-burn agriculture⁵¹” (see Picture 1) is widespread in the Yungas (Vera 2006:13). Not only does slash-and-burn agriculture lead to deforestation, but it also directly contributes to soil degradation, and is hence a barrier to productivity gains (Scherr and Yadav 1996:5; Klanderud et al. 2010). The students’ awareness about environmental problems in the Yungas, such as deforestation, soil erosion, and soil degradation, is quite clear. This awareness is reflected in some of the students’ aspirations; three students plan to implement agro-forestry systems (SAF)⁵² and another student plan to produce timber seedlings to help speed up the process of reforestation. By implementing an agro-forestry system it becomes possible to combine agricultural production with environmental protection. It has been noted that agro-forestry systems are more labor-intensive and that they complicate the use of machinery during harvest season (Lopez and Molina 2007), however, since labor is abundant in the area and the topography already complicates the use of machines to harvest, such concerns hardly outweigh the positive benefits SAF systems have on long-term productivity.

⁵⁰ A drip irrigation system is a technical solution to save water; in a drip system the water is delivered directly to the root of the plant instead of being applied to the surface through for instance a sprinkler (Smart 2013).

⁵¹ The practice of slash and burn revolve around cutting down forest which is consequently burned. These areas are then normally used for cultivation for a shorter period of time before they are abandoned when the soil is no longer providing satisfactory yields for the producer (see Klanderud et al. 2010:188).

⁵² An agro-forestry system maintains soil fertility, it reduces soil erosion by providing organic material to the soil, it helps fixate nitrogen and recycle nutrients, it serves to conserve water, capture carbon, and it contributes to the conservation of biodiversity (Lopez and Molina 2007)



Picture 1. Slash-and-Burn Agriculture, San Juan de la Miel Oct. 2012
Source: author's

Diversification or Specialization

None of the students will implement a monoculture system; everybody wanted to diversify their production to ensure incomes all year round and to prevent the degrading effects of monoculture. The OECD (2011:65) noted that farm specialization is beneficial “to technical efficiency since it enables farmers to concentrate their attention on a few tasks and their capital on specific technology, and thereby improve management practices”. However, according to Picasso et al. (2011) mixed crop systems are better to sustain productivity over time. Therefore, by creating integrated and complementary crop systems, the students will have income all year round, they will protect soil fertility, and they create insurance in case of crop failure.

The students themselves were quite optimistic about young agronomists' ability to help improve productivity in the area, but they also pointed to various factors that had to complement their efforts. Such factors included; continuous focus on capacitating other farmers, implementation of irrigation systems, increased research focused on Yungas crops, improved coordination to strengthen the coherence of efforts to overcome problems,

government support to experimental stations, and financial support to ease access to production inputs.

6.1.2.1. *Preliminary conclusions: Technical capacities*

The technical skill level of the students enables them to overcome many of the current productivity constraints in the Yungas. Crops and soil would be analyzed and measures taken to increase fertility and yield potentials. At least three students wish to introduce advanced biological technology into their production, and everybody wanted to produce organically. Three students plan to integrate agricultural production with forest management to promote reforestation and create vegetative coverage. Diversification is the preferred choice of production to ensure steady incomes, protect soil quality, and it will also function as a risk management strategy. Topographical constraints are tackled with creativity, such as constructing terraces. Moreover, the focus on biological- rather than mechanical technology is likely to have a positive effect on local employment creation. Even if they constitute just a small part of the producers in the Yungas, the students do have the capacities required to increase yields, be that on their own farms or by guiding other farmers. To encourage knowledge spillovers in the area, it would be beneficial to facilitate more interaction between the agronomy students and local farmers which would also allow the students to learn from the lifelong experiences of the farmers. Nevertheless, the technical capacities of the students are impaired by different contextual constraints which will be addressed in section 6.2.

6.2. The Institutions

Considering the first two sections, it appears that the students are not only technically equipped, but also possess entrepreneurial capacities that should enable them to increase agricultural productivity through entrepreneurship. However, a number of contextual factors should be assessed to provide a more realistic account of the students' potential. These factors are divided into; access to finance, the business environment, and the agricultural environment.

6.2.1. Access to Finance

Access to financial capital is crucial if young people are to impact agricultural productivity through entrepreneurship. Without access to capital, implementing a project, registering a company, purchasing technological aids and other production inputs, become unfeasible. The large majority of students enrolled at the UAC-CP come from families with limited economic resources⁵³. This means that most students cannot depend on family fortunes to implement their business plans and they will need to apply for credit. In fact, nine case-group students identified the financial aspect as the main obstacle for them to start up their business⁵⁴.

While the Director of Studies was very optimistic about the students' technical capacities to increase productivity, he believed the economic factor would constrain many agronomy students from becoming agricultural entrepreneurs. He noted that many students did not have funds to implement a company, and that many students preferred a stable job, such as in a bank. He also explained that there was not enough government support to make production attractive to technically equipped individuals, who may just as well find salaried employment outside agricultural production. In fact, many former agronomy students have been absorbed by financial institutions where they work as credit officers – hardly the most efficient use of 5 years of agronomic knowledge.

According to the GEM report for Bolivia (Fernandez 2010), the availability of start-up or venture capital is not sufficient to encourage entrepreneurial activities; but it also notes that the public and private sector have attempted to facilitate more credit for new and growing companies. In June 2011, the Morales government adopted the *Ley de la Revolución Productiva Comunitaria Agropecuaria*⁵⁵, obligating financial institutions to provide more loans to agricultural and livestock activities (BDP loans⁵⁶). The requirements for accessing credit from Banco FIE, PRODEM or BDP-loans are summarized in table 8.

⁵³ This is exemplified by the average family household income of the students, noted in table 1.

⁵⁴ The 10th student identified 'time' as the most constraining factor: finding time to implement his plan. This student is also the only student from a home where average household income surpass 3500bs

⁵⁵ In English: law of the Productive Communitarian Agricultural and Livestock Revolution

⁵⁶ The so-called BDP-loans are a type of state-sponsored loans earmarked for productive activities; the credit ranges from 8000bs to 80.000bs and comes with the lowest interest rates in Bolivia at 6% (Key informant 2012).

Table 8. Data Presentation 7: Requirements to access Credit

You must demonstrate between 6 months to 1 year of experience running your business; you must have at least 1 guarantor (either personal or collateral securities); you need personal ID; you need to demonstrate that you own your land if the credit is for agricultural activities; and you also need to pass a 'personal assessment'. I was informed that bank officials may visit the place of your business and converse with other community members about your sense of responsibility, your business, and your general conduct to decide whether you will be a good candidate for credit. If you are young you may also be judged based on the behavior of your family members as it is assumed that if the parents are responsible or irresponsible, so is the child (Key Informants 2012).

Youth are basically confronted with the same requirements as adults, yet it may be harder for them to provide collateral due to their age. On the one hand, educated youth would be a good candidate to receive credit since their educational attainment supports their ability to return the money. Moreover, having former UAC-CP students working as credit officers may also help students who apply for credit. Yet, on the other hand, the (non-negotiable) requirement of business experience (6 to 12 months) is obviously constraining budding entrepreneurs to implement their plans if they do not have sufficient funds to actually get started in the first place.

While the Morales government may have obligated banks to lend more to agricultural producers in general, there has been no special attention given to youth. For instance, instead of requesting 6 to 12 months experience, budding entrepreneurs could be required to demonstrate a complete business plan with financial projections. The students' proven knowledge about new technologies and crop and soil management is very valuable, but without access to credit, their ability to actually implement this knowledge in their production becomes much less certain. Hence, for young agronomists to realize their potentials as agricultural entrepreneurs there simply has to be developed credit solutions tailored to this group of individuals.

Finally, having access to credit is not the only factor; the time consumed to gain access is important as well. According to both bank representatives, the process from applying to receiving the money is fast (from 2 to 30 days); however, one of the former students informed me that it took a year from the moment his company applied until they finally received credit. Such a time lag could potentially spoil the ability to act on a perceived opportunity, as this opportunity may be explored by someone else during the wait.

6.2.2. The Business Environment

Business Assistance and Support and Business Development Services

Business assistance to budding entrepreneurs is considered important to their chances of becoming successful and economically viable (ILO 2006:57). Ortman (2010) stated that there are actually quite a few institutions assisting Bolivia's micro-entrepreneurs with financial and technical services. However, I did not encounter many initiatives for budding entrepreneurs, and those I found were very expensive. Table 9 summarizes some of the existing institutions;

Table 9. Business Assistance and Support Services

<p>There is supposed to be a network called "Red Bolivia Emprendedora" (Network for Entrepreneurial Bolivia) which Ortman (2010) also refers to. However, their webpage no longer functions and they do not respond to my requests through email. <i>Fundación IDEA</i> and <i>CEMLA</i> both offer plenty of interesting courses relevant for running a business; however, the admission costs are very high and hence out of reach for many rural youth who come from families with limited economic resources. Other options include <i>Nueva Economía</i> which is a weekly magazine focused on the economy, finance, and business, and <i>Nuevo Norte</i> which is a nonprofit organization that links small scale producers with markets.</p>

The students' knowledge about business assistance and support services was generally very limited. While two of the former students were familiar with business forums, only two case-group students even knew such services existed. All the students were interested in learning more about such services and many of them commented that it would be very useful as a way of informing themselves about opportunities and to connect with other entrepreneurs. Encouraging greater awareness about and access to business assistance and support services, might increase the students' chances of becoming successful and economically viable.

Market Structure - Farm and non-farm Linkages

Bolivia has a very little integrated economy and trade is the only sector considered a 'pull sector' (one that generates dynamism in the rest of the economic activities) although this is due more to its indirect effects on transportation than to its direct demand on inputs (Anaya 2011). Anaya (2011) argues that there is a clear lack of integration between the productive sectors compared to other countries and stresses that manufacturing and the food-processing industry could be better integrated with agricultural- and primary production activities to create a more dynamic economy.

If agro-processing industries were connected with small-scale farming, it could create more dynamism and greater incentives to increase yields. For instance, citrus fruits could be used in juices, and pineapples could be canned. None of the case-group students' aspirations revolved around the processing industry, yet at least 7 students who participated in the standardized entrepreneurship test wished to implement some sort of processing company (see Appendix VI). Hence, the student potential may even go beyond the capacity to increase agricultural productivity to creating dynamic farm-nonfarm linkages. However, such efforts would again be impaired by the lack of financial capital, and nascent industries might also need some degree of protectionist measures in the initial stages to be able to compete with foreign processed food.

Administrative and Regulatory Framework

Table 10. Bolivia - Ease of Doing Business

Bolivia – Ease of Doing Business (Rank 1 to 183: 1 indicates the best possible score)					
AREAS	TIME	COSTS	PROCEDURES	RANK	Regional Average
To start a business	50 days	90.4% of income per capita + paid-in minimum capital at 2.3% of income per capita	15	169	97
To register property	92 days	4.8 % of the property's value	7	138	111
To pay taxes	1080 hours per year	The total tax rate (% of profit) is 80.0 compared to the Latin American average of 47.7	42 payments per year	179	113
To trade across borders	Export: 19 days Import: 23 days	Export 1 container = US\$ 1425 Import 1 container = US\$ 1747	Export: 8 documents Import: 7 documents	126	87
To enforce contracts	591 days	33.2% of the claim	40 procedures	135	113
To access credit	-	-	-	126	84
Source: own elaboration based on IBRD (2012).					

According to IBRD (2012:7)⁵⁷, the business environment in Bolivia, together with Venezuela and Surinam, is the worst in Latin America. The IBRD ranks the ease of doing business on a scale from 1 to 183 (1 equals the best score); Bolivia ranks 153. The IBRD analyzes the ease of starting a business, registering property, paying taxes, trading across borders, and enforcing

⁵⁷ The IBRD report uses a 'standardized company' for their calculations. The 'standardized' company is much bigger than what the students' companies would be, and hence, the numbers should be approached with some caution

contracts⁵⁸. As illustrated in table 10 above, Bolivia scores poorly in all areas. Moreover, the interventionist policies of the Morales government have been criticized for impairing foreign and private investments in Bolivian companies (EIU 2010). The lack of reforms in the areas that impact the creation and functioning of businesses may limit the ability of the students' companies to flourish and deliver according to their potentials.

Administrative and regulatory burdens particularly impact the formality of new businesses (Stel et al. 2007:183). Only one of the three former students is formally registered; he explained that it was not benefitting him economically to be formal. He explained that the Bolivian tax system was very problematic when trading with informal small-scale producers. When he purchases products from informal producers they do not give him an invoice, but when he sells the transformed product, he has to provide the buyer with an invoice⁵⁹. Therefore, he is paying a higher price for being formal since he does not receive a tax deduction based on the material he bought from the informal producer. Nevertheless, out of seven students who were asked about formality, six of them wanted to work in the formal economy. Table 11 presents some of their arguments in the matter.

Table 11. Data Presentation 8: Formality of Business

<p>Ruben: <i>"having a formal business is more stable. If not, they can force the closure of your business"</i>.</p> <p>Diego: <i>"I prefer to be in the formal sector [...] because then you are more trustworthy, you show more security, and you know you have the right permits, and then you are not robbing the state either"</i>.</p> <p>Manuel: <i>"[...] an advantage [of being formal] could be that you are in the system [...] sooner or later this will have benefits, for instance, that they offer you contracts"</i>.</p>

Considering the difficult business environment in Bolivia, it may hardly come as a surprise that Bolivia's informal sector is the largest in Latin America; approximately 68% of the national GDP stem from informal activities (World Bank 2007:11). One of the most apparent problems with a large informal sector is the loss of tax revenue; revenues which could be used to improve public services and to invest in physical infrastructure (World Bank (2007:11-14):

- Both of which impact the students' ability to increase agricultural productivity and run successful businesses.

⁵⁸ As well as; getting electricity (124), dealing with construction permits (107), getting credit (126), protecting investors (133), resolving insolvency (65) (IBRD 2012)

⁵⁹ A central aspect of the Bolivian tax system revolves around invoices; when you purchase a good, you are supposed to receive an invoice which you then return to tax services in order to get a tax deduction.

6.2.3. *The Agricultural Environment*

Landlord and Urban Bias

Landlord and urban bias cannot be overcome without a government that is determined to incorporate the rural sphere and small-scale producers into national plans. The rhetoric of Evo Morales suggests that his government is increasing efforts to include rural communities in decision-making processes, to support land distribution (and the provision of legal entitlements of land), and expand investments to spur rural development. (Urioste 2009:117). Moreover, the law of the Productive Communitarian Agricultural and Livestock Revolution, formulated in 2011, intends to create better conditions for small-scale producers (Patzi 2012).

Nevertheless, the law does not clearly identify the different actors that are supposed to implement the agricultural transformation nor does it sufficiently include the role of departmental and municipal governments in the plan (Patzi 2012:21). This is problematic since the lack of coordination between the national administration and the departments and municipalities have historically prevented integrated efforts to spur development in Bolivia (Kay 2009:107-108).

Patzi (2012) also voiced concern that the ‘production unit’ under the law is considered the community⁶⁰ rather than the individual families who produce. The focus on community farming neglects the presence and necessities of other individual actors in the area. Hence, while the government’s increased focus on supporting small-scale farming could reduce urban and landlord bias, a political environment that favors collective farming over individual farming is hardly the right solution either.

The GEM report (Fernandez 2010:102) noted that only 25% of the consulted experts believe individuals who accomplish success through individual efforts are supported and valued by the social and cultural norms in Bolivia. The government’s focus on ‘community’ over ‘individual’ seems to support this claim. Most of the students would fall into the category of individual farmers rather than collective farmers and their benefits from the government’s initiatives to support small-scale farming are thus unclear.

⁶⁰ The community economy is a concept used to explain the functioning of farming communities who have collective property rights over land and who farm collectively (community farming) (Fundación Milenio 2011).

Physical Infrastructure, Production Inputs, and Technology

Access to seeds in the municipality of Coroico is not easy which is exemplified by the perceived opportunity of Elena to open a seed store. While I was evaluating a project in San Juan de La Miel, the UAC-CP's extension team tried to implement a crop rotation, but they had to give up since they could not access seeds, even from the city of La Paz. I suspect the situation is the same – or worse – in other municipalities in the Yungas since Coroico is probably the easiest community to reach from the city of La Paz. The unstable access to seeds is harmful for the producers' ability to respond rapidly to changing consumer demand. Elena's store could be helpful to farmers in Coroico, but it would not resolve the problem elsewhere.

With regards to fertilizers, most of the students planned to produce their own manure or to purchase droppings from local farms. In some areas of the Yungas, the farmers give away droppings for free while they charge expensively in other areas. Again, during the project evaluation in San Juan de la Miel, I learned that the producers were particularly concerned about their ability to purchase fertilizers (and seeds) without the project's financial support. As part of the aforementioned law (of 2011), two national companies have been established to facilitate access to inputs; one to create seeds and the other fertilizers. However, it is not clear how the national production of such inputs will benefit the producers and none of the companies have begun producing yet (Patzi 2012:22).

As explained previously, the students do not have access to sophisticated irrigation systems and are likely to collect water manually from rivers: a process that is more time-consuming and hence less efficient. Moreover, the costs of constructing irrigation and drainage systems are likely to surpass what a small company is able to invest itself. Therefore, if the government is committed to supporting small-scale agriculture facilitating the construction of irrigation and drainage systems is essential. In the long run such investments would contribute to national GDP as yields could increase and fewer crops lost during heavy rains.

Access to markets, both national and international, requires proper road systems. According to Vera (2006:8), difficult access to the Yungas has been a major hindrance to agricultural development. Transportation from the city of La Paz to Coroico has improved significantly since a new and safe highway was inaugurated in 2006, replacing the famous *Camino de la*

Muerte (The Death Road). Nevertheless, access to the surrounding areas is difficult and season-specific⁶¹. The complicated and time-consuming process of transporting goods negatively impacts the access to production inputs and it increases transaction costs to deliver one's output. Efficient access to inputs and low costs to deliver outputs are essential when running a business.

Finally, both the Director of Studies as well as various students mentioned that there is a lack of agricultural research focused on developing technological solutions fitting the necessities of the Yungas⁶². Although the UAC-CP works to fill this gap by encouraging agronomy students to develop their theses around the necessities and opportunities in the Yungas, conducting agricultural research is expensive and neither the students nor the UAC-CP have unlimited funds. Financial or technical support from the government (or private institutions) is necessary to speed up the process of developing biological or mechanical technology suitable to agricultural production in the Yungas. In addition, such technology has to be provided at a cost affordable to small-scale producers; otherwise the ability to incorporate technology and increase yields will continue to be reserved for large-scale farmers.

7. FINAL CONCLUSIONS

Without increasing small-scale agricultural productivity, the prospects of decreasing poverty and encouraging rural development in Bolivia will remain dim. The purpose of this thesis was to explore if young agronomists have the potential to impact agricultural productivity in the Yungas through entrepreneurship. To answer this question, the thesis explored if the students had the entrepreneurial capacities necessary to create successful businesses and if they had the technical capacities to overcome current productivity barriers in the Yungas (such as soil degradation, topographical constraints, and the inability to apply new technology).

The analysis focused on the capacities of the agent while taking into consideration how institutions impact the agent's potential. Also, the study was based on the theoretical assumption that micro-level action can impact macro level developments. More specifically,

⁶¹ Darío told me that although Irupana (municipality in Sud Yungas) is closer to Coroico than to La Paz, you have to travel all the way back to La Paz and then take a bus from La Paz since there are no direct roads from Coroico.

⁶² Public investments in agricultural research even decreased from US\$27 million to US\$5 million in Bolivia between the 1990s and 2001 (Anderson et al. 2001, In Marr and Chancellor 2005:326).

the theory of entrepreneurship knowledge spillover provided a basis for assuming that successful agricultural youth entrepreneurship can have a facilitative role for overall agricultural productivity. The fact that many of the students were guided by the desire to help their communities, and some even deliberately planned to facilitate other farmers' access to knowledge, supports the assumption of potential knowledge spillover. In addition, the students would be likely to create employment opportunities for others since they plan to apply primarily organic and biological technology (which is labor-demanding) rather than mechanical technology (which is labor-saving) in their production. If the students manage to establish successful businesses, they might also facilitate market access for others, strengthening the benefits of increasing yields.

With regards to the agent's potential, the analysis showed that the students not only had entrepreneurial capacities, but also possessed the technical capacities necessary to increase yields. While the students did not know exactly how to register a business, pay taxes, or strategically market their products, this type of knowledge is transferable to a much greater degree than the ability to manage risk, handle failure and perceive opportunities to create value; - abilities they seemed to have. Their technical skill level is mirrored in their ability to improve crop and soil management, to create creative solutions to topographical constraints, and to incorporate technology in production. The students would also have a strong potential to differ from the large amount of self-employed Bolivians (51.3% of the population) who are unable to create employment, be innovative, incorporate technology, and participate successfully in competitive markets.

However, the analysis also showed that the institutional context is constraining rather than facilitating agricultural entrepreneurship. The lack of access to credit and the unsupportive business- and agricultural environment are realities that are likely to prevent many (future) young agronomists from realizing their potential as agricultural entrepreneurs. Without access to credit it becomes an intricate task to start up a company, purchase necessary production inputs, apply technology and adjust rapidly to consumer demand. Especially when taking into consideration that none of the students come from particularly affluent families who might help them get started. Business assistance and support services are expensive, and thus out of reach for many young entrepreneurs. Moreover, the Bolivian economy is very little integrated which prevents dynamic production-consumption linkages and multiplier effects. The

interventionist policies of the Morales government reduce the incentives to invest in private businesses, and the ease of doing business is considered to be one of the worst in Latin America. The large informal economy decreases tax contributions which are essential for the much needed investments in physical infrastructure. While urban and landlord bias may be decreasing, favoring community farming over individual farming ignores the necessities of individual farmers; a group most of the agronomy students would belong to. The unstable access to production inputs constrains the ability to improve yields, and act rapidly when consumer demand change. Insufficient physical infrastructure (irrigation, roads, and drainage) can impair potential gains from fertilizers and resistant varieties; it increases transactions costs to deliver outputs; and crops will continue to be lost during heavy rains. Finally, limited R&D investments focused on the topographical, crop, and soil conditions in the Yungas weaken the creation of biological or mechanical technology suitable to the area.

To conclude, this study has shown that agent and institutional factors point in different directions. While the young agronomists seem quite well-equipped to become agricultural entrepreneurs capable of positively impacting agricultural productivity through knowledge spillover effects, the socio-economic context is likely to constrain the agent from realizing this potential. Therefore, to enable young individuals to unleash their potential, the institutional context has to be gradually improved. Such changes would not only benefit the educated and entrepreneurial youth, but also small-scale farmers and rural dwellers in general as it would help to stimulate the rural economy.

Finally, it is hoped that this thesis has provided incentives to conduct further research in the area of (youth) entrepreneurship and the agricultural sector.

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⁶³ VCDI stands for the “Vice Ministry for Coca and Integrated Development” and FONADAL is a public institution that promotes integrated development processes

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APPENDICES

Appendix I – Municipality Overview - Yungas

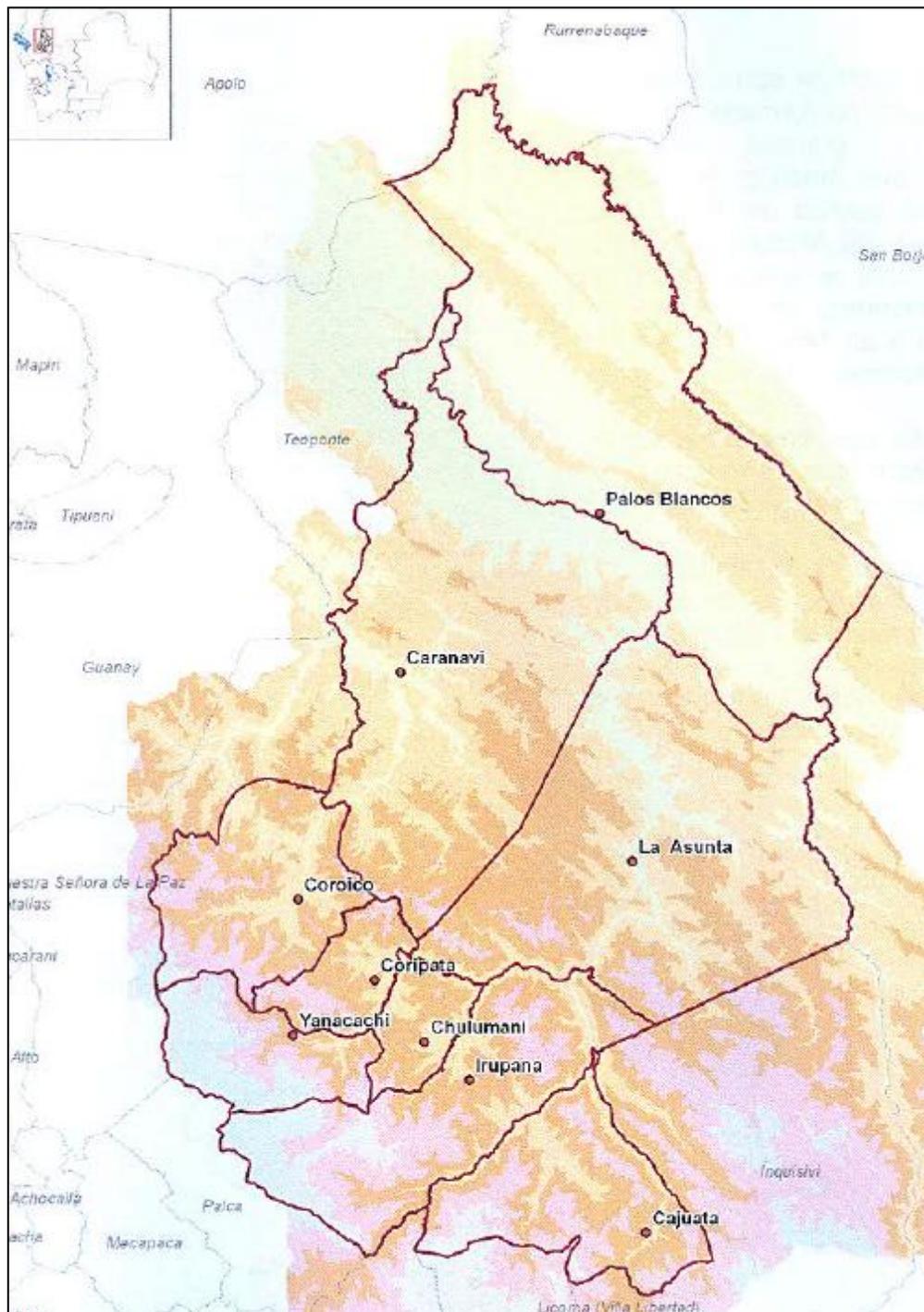


Figure 3. Map: municipalities in the Yungas. Source: UNODC (2010)

Appendix II – The ILO Framework: Youth Entrepreneurship

The International Labor Organization (ILO 2006) has created a framework for investigating the potential of youth entrepreneurship which outlines five factors that can serve to encourage or discourage youth entrepreneurship. These five factors will be briefly explained in the following.

1. Our **social and cultural background and attitudes** highly influence the way we approach life. These same factors are thus very likely to influence *whether* and *how* we engage in entrepreneurship. For instance; “A cultural environment in which entrepreneurship is respected and valued and in which business failure is treated as a useful learning experience rather than a source of stigma, will generally be more conducive to entrepreneurship” (ILO 2006:24). The general reputation, acceptance and credibility of entrepreneurs in society can highly influence youth’s desire to become entrepreneurs. While some people view entrepreneurs in positive terms such as honest, successful, courageous, independent and innovative individuals who create prosperity and progress in society, others view entrepreneurs in completely negative terms such as dishonest, ruthless, and selfish people who hurt other by their reckless risk-taking (ILO 2006:26-27).
2. **Entrepreneurship education** is another component that can influence the level of entrepreneurship in a country. Entrepreneurship education can help provide youth with skills and attitudes that will make it easier for them to adapt to uncertain and changing employment patterns (ILO 2006:36). The ILO (2006:36) argues that entrepreneurship education should provide students with skills in for instance problem-solving, creativity, planning, and negotiations, and attributes making the students self-confident, autonomous, versatile, and dynamic. The lack of practical experiences and skilled teachers who have had business experience themselves is also a constraining factor (ILO 2006:38). Finally, providing students with access and skills to successfully make use of the internet, can help them in their entrepreneurship venture as they can find information and connect with likeminded (ILO 2006:39).
3. **Access to finance** is another rather obvious possible obstacle to entrepreneurship. According to ILO (2006:41): “The lack of adequate start-up finance is one of the most prominent (at least most talked about) impediments to young people seeking to create their own business”. Young people are often unable to access credit due to for instance a lack of personal savings, lack of securities and credibility, lack of business experience and skills, and a lack of knowledge and understanding of credit opportunities (ILO 2006:42).
4. The **administrative and regulatory context** can also encourage or discourage entrepreneurship. Government regulations and bureaucratic formalities are often one of the reasons for the large informal sectors in developing countries (ILO 2006:52; World Bank 2007). In 2002, Djankov et al. (in Stel et al. 2007) claimed that high regulations for businesses correlated with higher levels of official corruption, undemocratic tendencies, and large informal economies. These findings therefore led to new policies to lower

regulations. However, in a more recent study, Stel et al. (2007:183) found that administrative burdens, such as time, costs, and number of procedures to start a business, did not impact business creation, but it did impact the formality of such businesses. When it is more expensive (or disproportionately difficult) to register in the formal sector, people are less likely to switch from the informal sector. This is of course a problem because the government will lose tax money and it is also a problem for those engaged in the informal sector because they are not secured by formal employment benefits and regulations (World Bank 2007). Complicated tax regimes, high costs and numerous procedures for registering a new business can also negatively impact youth's ability to start new ventures. An unstable regulatory framework, where regulations change frequently or are not transparent makes it much harder for the entrepreneur to plan in advance. Finally, when property rights, patent, and copyrights are not enforced, young people may be unable to protect their business or invention (ILO 2006:54). In 2002, Djankov et al. (in Stel et al. 2007) claimed that high regulations for businesses correlated with higher levels of official corruption, undemocratic tendencies, and large informal economies. These findings therefore led to new policies to lower regulations. However, in a more recent study, Stel et al. (2007:183) found that administrative burdens, such as time, costs, and number of procedures to start a business, did not impact business creation, but it did impact the formality of such businesses.

5. Finally, **business assistance and support, and business development services** impact entrepreneurship potential. According to the ILO (2006:57); “The more business assistance a young entrepreneur obtains in the start-up and new business phases the better his or her chance of creating a successful and sustainable business”. In this regard, support services (e.g. mentors and support networks) can be very important in transforming a one-person youth business into a small- or medium sized business. (ILO 2006:57)

Appendix III – Standardized Entrepreneurship Test

Please note that the test has been modified slightly by the author, however, none of the questions were altered. When translating the text into Spanish, a Bolivian student assisted in making the language more understandable and less technical to ensure that all students would understand the questions. The original test is available through:

http://www.energizingentrepreneurs.org/content/chapter_1/tools/1_000031.pdf

Entrepreneur Self Test

Don Macke, Co-Director

Deb Markley, Co-Director

Web: <http://www.ruraleship.org>– no 5. June 2003

<http://www.energizingentrepreneurs.org/site/>

The Entrepreneur Self-Test was developed by the Rural Entrepreneurship Initiative, the predecessor of the Center for Rural Entrepreneurship. This assessment was designed to help an individual identify and understand his/her entrepreneurial potential. The test can be used at the community level with residents engaged in or considering involvement with a business. Community or nonprofit service providers working with potential entrepreneurs might also use this test.

Not all questions carry the same value and weight. The following scoring approach is recommended:

- First Two Questions under Motivation:
2 questions x 10 pts. = 20 maximum pts. x factor of 1 = Score of 20
- Remaining Questions under Motivtion:
10 questions x 10 pts. = 100 maximum pts. x factor of .25 = Score of 25
- Capacity - Skill Questions:
9 questions x 10 pts. = 90 maximum pts. x factor of .25 = Score of 22.5
- Capacity - Networking/Partnering Questions:
6 questions x 10 pts. = 60 maximum pts. x factor of .25 = Score of 15
- Support Questions:
5 questions x 10 pts. = 50 maximum pts. x factor of .25 = Score of 12.5

- Low Potential 0 to 25 Score
- Some Potential 26 to 50 Score
- Moderate Potential 51 to 75 Score
- High Potential 76 plus Score

The *Entrepreneur Self-Test* consists of three sections: motivation, capacity, and support.

Motivation

() Evaluate your overall motivation to start and operate your own business
Score on a 1 to 10 scale, where 10 indicates strong agreement with the statement and 1 indicates little or no agreement with the statement.

What type of business what you like to create? _____
 Where? _____
 How would you rank the probability that you manage to create this business? (from 1 to 5) _____

NOTE: The three questions within this table have been added by Emilie Faurholdt

- () Perceive Opportunities - I am constantly seeing business opportunities or ideas that have potential commercial value.
- () Growth Oriented - I like growing or building business, or taking ideas and make something of them.
- () Creative - I am creative and I am regularly coming up with new ideas on how to do things better or more efficiently.
- () Innovative - I am innovative and I am able to find solutions to challenges and problems.
- () Resourceful - I am resourceful and I am able to find solutions to challenges and problems.
- () Dynamic - I am a dymaic person providing vision, hope and energy to those I am working and partnering with.
- () Hard Working - I am a hard working person and I do what it takes to succeed.
- () Flexible - I am flexible and I am able to adapt to changes and surprises quickly and successfully.
- () Risk Tolerant - I am risk tolerant and I am able to successfully manage risk associated with creating and growing a business.
- () Open to Learning - I thrive on learning and I am constantly seeking out new information that can help me with my business.
- () Competitive - I am motivated by success and driven to do well.
- () Collaborative - I believe in working with others who can help me make my dream a reality.

Capacity

Evaluate your capacity related to the following business skills. Consider not only your own capacities, but also the capacities of the other members of your management team. Rate yourself on a scale of 1 to 10 with 1 being no capacity and 10 being high capacity.

- Ability to assess market opportunities.
- Ability to develop products or services.
- Ability to provide products or services.
- Marketing and communications capacity.
- Fiscal management.
- Ability to acquire financial capital.
- Personnel or team development and management.
- Ability to develop and sustain partnerships.
- Quality control.

Evaluate your ability to network and partner with other organizations and individuals. Score on a 1 to 10 scale where 10 indicates strong agreement with the statement and 1 indicates little or no agreement with the statement.

- I am comfortable seeking out information from others.
- I regularly network with others to gain information for my business.
- I have an extensive resource network that I am constantly building.
- I am comfortable with partnerships.
- I have two or more partnerships associated with my business.
- I have learned how to deal with the challenges of partnering with others.

Support

Evaluate the level of support you feel from your family and community as you pursue your business opportunities. Score on a 1 to 10 scale where 10 indicates strong agreement with the statement and 1 indicates little or no agreement with the statement.

- I am challenged and happy in my work building a business.
- I believe there is good balance between my work and my personal life.
- My family and friends are supportive of my work and encouraging to me.
- My community is supportive of me and my business undertakings.
- My community is actively helping me build my business.

Appendix IV – Interview Guides

Identities of Respondents

Case group ¹	Former students	Key informants
#Edmy Vianney Quispe Mamani #Elvis Cuagora Pariano #Luis Rodrigo S. Cayo #Erica Paula Sarmiento F #Maritza Sanabel Huanca Montaña #Marcos Ever Duran #Daniel Maldonado Coronol #David Raul Fernandez Huayta #ElizAngela Chavez Q. #Juan David Ticona Huanca	#René Villca Huanaco #Misael Beltrán Quenaya #José Luís Chipana Mollehuanca	#Nicanor Cuba Cuevas #Rubén Darío Gómez ² #Gladys Esther Mamani Mamani de Ramírez #Freddy Mauricio Guitierrez Paredes

¹All respondents have given permission for me to publish their names, but the names of the case group students have been altered completely in the thesis text since some of the students requested to be anonymous when I used direct quotes.

²Rubén Darío Gómez (RDG) was not interviewed formally, but provided inputs continuously during the fieldwork period.

Semi-structured Interview Guide for Case-group

1. PERSONAL CHARACTERISTICS

Name, age, gender, semester, community of origin, average family income category

2. PARENTS AND FAMILY

What do they do? Who are they? Access to land (rent or own?)

[the questions varied significantly depending on the answers they gave me]

3. AGRONOMY, AGRICULTURE AND POVERTY

Why did you choose to study agronomy?

Do you believe the agricultural sector in the Yungas offer good opportunities? (income-wise)

Why do you believe that poverty is widespread among farmers?

What do you believe are the main factors for low agricultural productivity in the Yungas?

Do you believe the youth can play an important role in transforming the agricultural sector?

4. IDEAS AND ASPIRATIONS

Once you finish your degree, what would you like to do?

Where would you like to do this?

Do you have access to land? (where, how, how much?)

Do you wish to focus on production, transformation or distribution?

What are the main obstacles for you to achieve your dream?

Have you thought of a goal for your business?

Have you thought about what product (products) you wish to produce? (why this product?)

Do you want to diversify or specialize production?

Have you thought about innovative solutions for your business?

Do you have any previous business experience? (explain)

Do you have family/friends who are entrepreneurs? (explain)

Do you have the support from your family/friends? (explain)

5. ACCESS TO CREDIT

Do you have sufficient financial resources to open your business (carry out your plans?)

If not, how do you plan to access credit?

Do you feel well-informed about the different ways to solicit credit?

Would you like the UAC-CP to inform about this?

6. ACCESS TO MARKETS

Do you know if the lack of access to markets is an obstacle for producers in this area?

Have you thought about how to overcome this possible obstacle?

Have you thought about how to ensure that your product is competitive in the market?

Where would you like to sell your product? (why?)

Have you thought about associations – associating yourself with someone? (why/why not)

7. ENTREPRENEURSHIP – KNOWLEDGE AND UNDERSTANDING

What is an entrepreneur in your opinion?

Can you describe an entrepreneur in five words?

If you suddenly experienced a big failure in your business, how would you react?

Do you think your degree prepares you to be an entrepreneur or a salaried worker?

Have you received training about how to open and run a business?

What do you know about – opening a business, paying taxes, registering property rights, the informal vs. formal sector?

Does your degree program focus on entrepreneurship and commercialization? (would you like it to?)

Do you know any forums or institutions that offer assistance or advice to entrepreneurs?
(expand)

Would you like to be informed of such forums/institutions?

8. LABOR PRODUCTIVITY

Do you believe your technical formation makes you capable of increasing your yields more than if you have not studied agronomy?

Have you thought about if you want to use machinery in your business/work?

9. LAND PRODUCTIVITY (fertility, irrigation, topography)

What do you know about the soil fertility in the Yungas region?

What do you know about irrigation systems in the Yungas region?

Do you know if low soil fertility will impact your business? (how would you improve soil quality?)

Would you have access to irrigation systems (how, where)

Have you thought about producing organic or inorganic? (why?)

Do you believe the topography of your plot will present any obstacles for your business plans?

Semi-structured interview guide for 3 former students

1. ENTREPRENEURSHIP

What do you do for a living? (Please provide with details)

Why did you decide to devote yourself to this? (*Necessity or opportunity?*)

Why this specific product/business?

Do you diversify or specialize your production?

How is the business managed/organized? (organization of the business)

How many employees do you have?

What is the main goal of the business?

What are the future goals of the business? (Do you dream of expanding?)

What are your current markets? (Do you dream of expanding to other markets?)

When did you begin to plan to engage in the above? (during or after university)

Why did you decide to study agronomy?

Do you believe there are good job opportunities for agronomists in the Yungas? (why?)

Do you feel your education prepared you to be an entrepreneur? (Why?)

2. SOCIAL/CULTURAL ATTITUDE

Do you have any family or friends who are entrepreneurs? (What do they do?)

When you told your family you wanted to open your own business, how did they react? (Support or lack of support)

When you told your friends that you wanted to open your own business, how did they react? (Support or lack of support)

According to you, what is an entrepreneur?

Do you consider yourself an entrepreneur?

In five words, what defines the personality of an entrepreneur?

How would you react to a sudden failure in your business?

Do you take risks in your business? (such as?)

Is it necessary to take risks to become successful?

3. ENTREPRENEURSHIP EDUCATION

Have you received education/training on how to open and run a business at some point during your studies (primary, secondary, university)?

Did you receive *practical* education on how to run a business?

a. Did you go visit businesses?

b. Did you participate in workshops/presentations by successful entrepreneurs?

c. Did you do an internship in a business?

Your current knowledge about business administration stem from training/education or own direct experiences?

Your current knowledge about creating and managing a budget stem from training/education or own direct experiences?

4. ACCESS TO CREDIT

Did you solicit credit to open your business?

Did you get it? (from where?)

Was it a difficult or easy process?

5. ADMINISTRATIVE AND REGULATORY FRAMEWORK

Does your business belong to the formal or informal sector? (Why?)

To register the business is: easy___ medium___ difficult___ (why?)

To register the business: cheap___ medium___ expensive___ (How much?)

To pay taxes: easy___ medium___ difficult___ (why?)

To register property rights is: easy___ medium___ difficult___ (why?)

5. BUSINESS ASSISTANCE

Are you member of any forum (social network) for (young) entrepreneurs?

Would you like to become a member?

Do you receive any type of business assistance/support for your business?

if the answer is no, is this something you would like to receive?

6. LAND AND LABOR PRODUCTIVITY

Who is the owner of the land where you have your business is?

Did you purchase/inherit/rent/other the land?

How big is the lot?

How is the quality of the soil?

Do you use fertilizers/pesticides in your production? (why)

Is the production organic or inorganic? (Why?)

Does topography impact your business?

Do you feel your formal education has impacted your decision to become an entrepreneur?
Do you believe your formal education has helped you to increase productivity? (*compared with, for example a family member with no such education*)?

What kind of technology do you use in your production?

Could you use other types of machinery/technology in the production? (would you like to? Why?)

Do you have any ideas for how to innovate the business, how to innovate the production in order to augment yields or reach new markets?

7. PERSONAL CHARACTERISTICS

Name, age, gender, level of education, occupation, city and / or community of origin, average family income category (Bol. / Month → less 1000 ____ 1000 to 1500 ____ 1500 to 2500 ____ 2500 to 3500 ____ más of 3500 __)

Has your business-venture allowed you to reach higher income levels?

Semi-structured interview with key informant *Nicanor Cuba Cuevas (NCC)*

1. PERSONAL INFO

Name

Gender

Title at the university

Education

2. PRODUCTIVITY IN THE YUNGAS?

Why is agricultural productivity low in the Yungas? (expand)

What do you believe are the main obstacles for increasing productivity in the Yungas?

What crops would be profitable as well as suited to produce in the Yungas?

How is the land market in the Yungas? (can you buy, size of plots, where)

3. THE STUDENTS

Where do the former agronomist students work?

Why do you believe that not more of them dedicate themselves to production?

Do you (the university) encourage the students to associate?

Do you know of former agronomy students who are now entrepreneurs? (expand)

Do you believe the young people can help transform the agricultural sector in the Yungas? (how, why)

Semi-structured interviews with key informants: Bank Representatives

1. PERSONAL INFO

Name?

Responsibility in the bank?

2. ACCESS TO CREDIT

Do you provide credit to young people?

If he/she says no,

Why not?

What would have to change in order for you to provide loans to young people?

If he/she say yes;

What types of loans do you offer to young people?

What are the conditions/requirements that young people have to meet to get credit?

a. Are the requirements/conditions different for the young and older? (*young = what age range?*)

b. Is it harder to get a loan being young?

Do you receive many applications from young people?

In general, what do they request money for?

Currently, approximately what percentage of the bank's customers are young people?

According to your experience, are young people well informed about the different ways to get credit (as well as about the requirements) when they apply for loans?

Currently, through what means can young people obtain credit in Bolivia?

I have been told that banks are currently providing more loans for activities in the agriculture and livestock sector – Is it true? (why, how?)

How many offices do you have in the Yungas?

In order to get a loan from this bank (Coroico office) is it mandatory that the applicant lives in Coroico?

How long does it take from applying for credit to actually receiving it (on average)?

Is it mandatory that the business is registered in the formal sector to obtain a loan?

Appendix V – Description of Financial Institutions

The following contains a very brief description of the banks where the two key informants with regards to credit facilitation work. These two banks were chosen due to their presence in rural areas, particularly in the Yungas, and due to their focus on extending credit to micro, small, and medium businesses. In addition, PRODEM was chosen because the bank also administrates the state-sponsored BDP loans.

The Bolivian bank “Banco Fie” has existed for more than 27 years; first in the form of an NGO and then as a Private Financial Fund, before it was finally established as a bank in 2010. According to the bank’s own description, the bank is focused on supporting small business ventures and to provide financial services with equity and transparency. The bank offers loans to micro-, small and medium-sized companies (BANCO FIE 2012). The bank has five offices in the Yungas area and is soon to open an additional office. The Private Financial Fund “PRODEM” has existed for more than 12 years and it is one of the financial institutions with the most extensive national coverage with offices spread across both rural and urban Bolivia. The fund has 6 branches in the Yungas area. The fund is focused on microfinance and it also administrates the state-sponsored BDP loans (Banco de Desarrollo Productivo) loans which are loans earmarked for productive activities (Key informant, 2012).

Appendix VI – Business ideas, standardized entrepreneurship test

The table below shows the business ideas of the students who participated in the standardized entrepreneurship test, but whom were not interviewed later. Their plans can be broadly divided into 5 categories: extension services, technology, livestock, vegetable/fruit production, and others. The majority of the students wishes to produce vegetable and fruits (including coffee and cocoa), but livestock production is also a very popular choice.

Table 12. All Business Ideas from the Entrepreneurship Test

BUSINESS IDEAS – ORGANIZED INTO CATEGORIES				
Extension services	Technology	Livestock	Vegetable/fruit production	Others
Male 19 – Create an association to be able to carry out agricultural projects, Caranavi,	Male 23 – Implement an irrigation project in my community, Camacho	Male 23 – livestock production and plantain production	Female 20 – A lettuce garden (greenhouse production) Oruro	Anonymous – a company built on my own ideas in La Paz
Female 20 – Open a training center where youth can come and learn about plants, La Pazo	Male 24 – Construct a seed bank or a germplasm bank and then generate a massive production of species	Female 22 – Poultry farm and pig farm as well as a vegetable garden	Male 21 – Advocado production first and then add other products later, Caranavi	Male 25 – SAF parcel
Female 20 – Supervise people, provide technical assistance, contribute to others	Female 19 – Create a large agro-chemicals company	Female 23 – Micro-company poultry, pigs and beef, Alto Beni	Female 20 – A fruit processing company, Caranavi	Male 23 – SAF parcels, Alto Beni
Male, capacity-training		Male 22 – Chicken and beef production, Laracaja	Male 24 – Vegetable production in greenhouse	Male 23 – Forestry

Male 19 – Capacity-training center	Male – lacteous products	Female 28 – Vegetable processing plant, La Paz	Female 25 – Agriculture and tourism combined, Sud Yungas
Female 18 – environmental work	Male 18 – Livestock production	Male 21 – Specialize myself in extensive crops and then form a society or company to produce in the tropic area	Female 26 – A processing company
	Male 24 – Livestock production	Male 22 – Fruit company, exports	Female 21 – create an agro-tourism company
	Female 19 – Livestock production	Male 19 – Organic production of seeds and vegetables	Male 23 – help poor people in my community
	Male 21 – Livestock production	Female 20 - Production of naranjillo fruits, Cochabamba	Male 22 – ecotourism
		Male 25 – Create a cooperative to recollect organic cocoa beans, Alto Beni	Male – my own company
		Male 20 – A coffee processing plant, Caranavi	Anonymous – my own company
		Male 21 – A processing plant for native crops, Tocaña	Female - own company
		Male 22 – Organic agriculture	Male 21 – businessman
		Male 21 – Honey products, various, and aloe vera, and other natural products, Vagantes	Male 20 – to be honest and sincere
		Anonymous – Exports processed mango fruit	Male 23 – To be a businessman with my own company, Coroico
		Male, work with hydroponic crops	Anonymous – Sell car batteries
		Female – produce organic food stuff	Male 20 – A micro-company
		Anonymous – dehydrated fruits	Male 23 - Open a company similar to McDonalds
		Anonymous – Sell vegetables	Anonymous - ? Anonymous - ? Anonymous - ? Female 21 - ? Anonymous - ?

Female - ?
Male 19 - ?

Anonymous –
Produce organic
coffee