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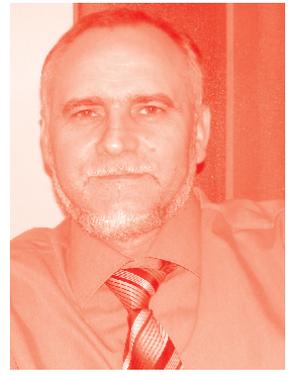
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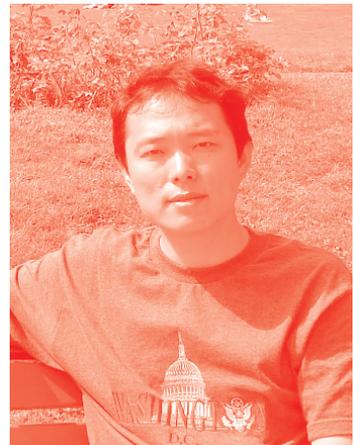
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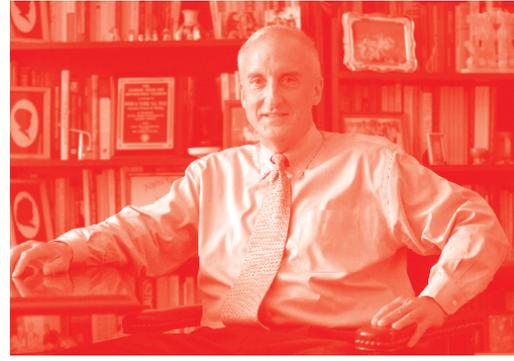
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Edited by Ryan Merlin Yonk

Contributors

Karina Caballero Gallardo, Jenny Palomares-Bolaños, Neda Alvarez-Ortega, Maria Alcala Orozco, Jesus Olivero-Verbel, Maria Rita Marques De Oliveira, Alister Chitetele Soy Pinto, Ana Pinto De Moura, Augusto Mário Miquitaio, Cristina Isabel Vitória Pereira Amaro Da Costa, Gabriel Cunha Beato, Gaspar Afonso Da Graça, Daniela Queiroz Zuliani, Imaculada C. F. Henriques Matias, Jaqueline Sgarbi Santos, Leodinilde Pinto Caetano, Lilian Fernanda Galesi Pacheco, Maitu Abibo Bunango, Miclay Carvalho, Pedro Acosta Leyva, Pedro Fernando Chimela Chume, Vladimir Ferreira, Bas'llele Malomalo, Delfin Domingues Da Costa, Rodreck Mupedziswa, Tumani Malinga, Poloko Nuggert Ntshwarang, Gordon G. Bechtel, Timothy Bechtel, Sónia Guadalupe, Henrique Testa Vicente, Monica Violeta Achim, Sorin Nicolae Borlea, Viorela Ligia Vaidean, Decebal Remus Florescu, Ramona Mara, Ionut Constantin Cuceu, Bounmy Inthakesone, Piya Wongpit, Keuangkham Sisengnam, Alay Phonvisay, Fatema Alaali, Rufaro Garidzirai, Prashanti Rao

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Meet the editor



Ryan M. Yonk is a senior faculty fellow at the American Institute for Economic Research, Massachusetts. He holds a Ph.D. from Georgia State University and an MS and BS from Utah State University. He has held academic positions at North Dakota State University, Utah State University, and Southern Utah University, and was one of the founders of the Strata Policy. He is the author or editor of numerous books including *Politics and Quality of Life: The Role of Well-Being in Political Outcomes*, *Green V. Green*, and *Nature Unbound: Bureaucracy vs. the Environment*. He has also (co) authored numerous articles in academic journals including *Public Choice*, *Applied Research in Quality of Life*, and the *Journal of Private Enterprise*. His research explores how policy can be better crafted to achieve greater individual autonomy and prosperity.

Contents

Preface	XIII
Section 1	
Improving Quality of Life Generally	1
Chapter 1	3
Intergenerational Support Networks and Wellbeing in Old Age <i>by Sónia Guadalupe and Henrique Testa Vicente</i>	
Chapter 2	21
GDP <i>Almost Perfectly</i> Predicts Survival <i>by Gordon G. Bechtel and Timothy Bechtel</i>	
Chapter 3	25
Economic and Financial Crimes and the Development of Society <i>by Monica Violeta Achim, Sorin Nicolae Borlea, Viorela Ligia Văidean, Decebal Remus Florescu, Eugenia Ramona Mara and Ionut Constantin Cuceu</i>	
Chapter 4	43
Role of Green Spaces for Maintaining Well-Being in Residential Community Development <i>by Prashanti Rao</i>	
Section 2	
Studies in Quality of Life Improvement	63
Chapter 5	65
Standard of Living, Well-Being and Community Development: The Case of Botswana <i>by Rodreck Mupedziswa, Tumani Malinga and Poloko Nuggert Ntshwarang</i>	
Chapter 6	81
The Reform in Government Expenditure and the Standard of Living in Bahrain <i>by Fatema Alaali</i>	
Chapter 7	93
Assessing the Sustainability of Community-Driven Development Projects in Lao PDR <i>by Piya Wongpit, Alay Phonvisay, Keuangkham Sisengnam and Boummy Inthakesone</i>	

Chapter 8**107**

Networking and Participatory Research Promoting Quality of Life and Well-Being in Portuguese-Speaking African Countries

by Alister Chitetele Soy Pinto, Ana Pinto de Moura, Augusto Mário Miquitaio, Bas'llele Malomalo, Cristina Amaro da Costa, Daniela Queiroz Zuliani, Delfim Domingos da Costa, Gabriel Cunha Beato, Gaspar Afonso da Graça, Imaculada C.F. Henriques Matias, Jaqueline Sgarbi Santos, Leodinilde Pinto Caetano, Lilian Fernanda Galesi Pacheco, Maitu Abibo Buanango, Miclay Carvalho, Pedro Fernando Chimela Chume, Pedro Acosta Leyva, Vladimir Silves Ferreira and Maria Rita Marques de Oliveira

Chapter 9**127**

Socio-Economic and Environmental Implications of Gold Mining in Afro-Descendant Communities from Colombia

by Maria Alcalá-Orozco, Jenny Palomares-Bolaños, Neda Alvarez-Ortega, Jesus Olivero-Verbel and Karina Caballero-Gallardo

Chapter 10**151**

An Analysis of Economic Determinants and Crime in Selected Gauteng Local Municipalities

by Rufaro Garidzirai

Preface

The themes of this volume are particularly important to me as my own academic work has focused on how to both conceptualize quality of life theoretically and how to measure it empirically. This examination of life quality in the United States conducted over the last decade has left me with two distinct impressions. First, that questions of life quality are important, and exploring how to improve it should be studied. Second, despite that importance it remains understudied in its complex form and our understanding remains somewhat limited. The authors of the chapters in this volume represent a collection of professionals interested in these questions and each is working to advance both our theoretical as well our practical understanding of what improves life quality.

Questions of how to improve life quality, wellbeing, and standard of living have been and remain among the most important questions addressed by social scientists, policymakers, and innovators. These questions, which are core to the human experience, have been studied, discussed, and debated for hundreds of years. The results of these studies and debates have had mixed results in improving the human condition. Throughout this volume a diverse and eclectic set of authors explore these same debates and identify a variety of mechanisms, theoretical approaches, and policy interventions relevant to this larger question of how to improve the human condition.

Despite the varying results that can be observed, the overall trend, especially in the last 75 years, has been toward improved life quality, greater wellbeing, and increased standards of living across most of the world. The evidence of this trend is clear. In 1950, the life expectancy for the worldwide population stood at around 45 years old. As of 2019, the life expectancy gradually increased to 72 years old. Over these 70 years, life expectancy grew by a whopping 27 years. As time passes, life expectancy generally increases, but time alone is not responsible for this development in human longevity. Numerous scientific, economic, technological, social, policy, and environmental factors played into this 27-year increase and contributed to an overall improvement in wellbeing (OurWorldInData.org).

Life in the 1950s was drastically different from life today as pivotal advancements and innovations transpired in the following years. In the United States at that time, various medical advances, such as the introduction of the amoxicillin antibiotic, had not yet occurred; vehicles emitted a large amount of significant pollutants in the air, including lead with little concern to the problems they might create; and the civil rights of minority groups were often not recognized. Now, amoxicillin and numerous successor drugs treat bacterial infections and medical advances in other areas have improved life expectancy and life quality substantially [1]. Car manufacturers have dramatically reduced emissions and are launching hybrid and electric cars that pollute even less. Human rights of individuals are better protected than at any other time in human history and continue to improve. These improvements and a myriad of others have dramatically and substantially improved life quality, standard of living, and wellbeing worldwide. Throughout this volume the authors provide details on how this occurred and under what circumstances this improvement is most likely.

The questions they and other economists and public policy experts continuously ask are how did we get here? What factors influence the progress of humankind? How do we measure the relative levels of the quality of life?

Taken as a whole, this volume provides a window into what influences the quality of life, why people live longer and are relatively better off compared to decades ago. Improvements in life quality are shown by looking at the gross domestic product (GDP) per capita, housing and food accessibility, level of happiness, suicide rates, political stability, income inequality measurements, literacy rates, fertility rates, economic freedom indexes, and much more. While the potential ways of measuring life quality are abundant, understanding what causes improvement requires careful study and consideration.

This volume provides useful insight into these challenges and helps to highlight a clear and important separation between wellbeing and standard of living, both relevant to assessing the quality of life. The standard of living refers to the material welfare of a group, including income, access to housing, food, and services. These factors tend to be measured empirically and have been shown to clearly enhance the condition of individuals regardless of personal preferences. Wellbeing, on the other hand, encapsulates harder-to-measure subjective preferences, such as social relationships, overall happiness, emotional health, and capacity to achieve goals. Combined, both components help us to understand the quality of life of certain groups at specific times, and in specific communities.

The chapters included in this volume further reveal that while wellbeing and standard of living are different, they inevitably interact with each other. This symbiotic relationship reveals that we cannot have one without the other. For instance, access to education is important for individuals to achieve their goals. Without the knowledge to read, write, or understand mathematics, people are severely limited in their future plans and careers. At the same time an individual's level of happiness or emotional health can impact their ability to work and in turn, alter the local economy. These factors rely on each other to collectively improve a group's quality of life.

Throughout this volume, our authors place the consideration of cultural and local idiosyncrasies at the front of their discussion, which ultimately provides a holistic understanding of the quality of life and its relation to the standard of living and human wellbeing. Community development captures the role that local coordination and focused government investment play in the betterment of life for these communities. One chapter discusses hunger and food inaccessibility in the Community of Portuguese Speaking Countries. The community collaborated on local arrangements, ancestral knowledge, and the use of natural resources to address the food plight. Through their local and communal knowledge, they were able to consider these factors and discover meaningful improvements. This could not have been done without the existing social relationships within the communities.

This chapter, as well as the others in this volume, demonstrate that community development involves two concepts necessary to improving quality of life: local knowledge and exchange. F.A. Hayek demonstrates that knowledge, spread throughout a group of people, can be more useful than the knowledge of a single expert. He asserts,

But a little reflection will show that there is beyond question a body of very important but unorganized knowledge which cannot possibly be called scientific in the sense of knowledge of general rules: the knowledge of the particular circumstances of time and place. It is with respect to this that practically every individual has some advantage over all others because he possesses unique information of which beneficial use might be made, but of which use can be made only if the decisions depending on it are left to him or are made with his active cooperation [2].

People within a certain location, time, or community are accustomed to the social relationships and cultural makeup of a community. They know how to achieve success for the community.

While unique and decentralized information is an essential attribute of community development, this information must be exchanged and shared for economic progress. If individuals in the car industry did not meet and exchange ideas, we might not have arrived at the results we enjoy today. In *The Rational Optimist*, Matt Ridley explained the importance of exchange:

“...there was a point in human pre-history when big-brained, cultural, learning people for the first time began to exchange things with each other, and that once they started doing so, culture suddenly became cumulative, and the great headlong experiment of human economic ‘progress’ began [3].”

That exchange is essential is made clear throughout the chapters of this volume, as one individual alone cannot harbor all relevant knowledge for the human enterprise. However, if the information is spread across several people, sharing their ideas becomes the impetus for new developments. Participants within the exchange can mutually gain from each other as they can obtain new knowledge or products from other specialized individuals. Moreover, as their knowledge becomes more specialized, they delve deeper into the economic and social problems and thereby can find better solutions. This specialization, collaboration, and exchange are crucial for bringing together meaningful innovations and advancements.

The ideas of local knowledge and exchange should shape how we see human progress. These concepts provide the framework for how wellbeing, the standard of living, and quality of life flourish. Without unique knowledge and exchange, we would not be able to enjoy all the luxuries of life today.

As one explores these chapters, I suggest the reader consider how local knowledge and exchange are essential to improved wellbeing, higher standards of living, and burgeoning community development, especially within the scope of developing countries. The book’s focus on these countries provides a unique insight into how such different communities can grow. It is easy for experts from developed countries to intervene and assert their expert opinions, but knowing the culture, institutions, and behaviors of these communities is a colossal obstacle. Nobel Prize winner Elinor Ostrom observed, “It is ordinary persons and citizens who craft and sustain the workability of the institutions of everyday life” [4]. The local people have a vested interest in seeing their lives improve. Without fully understanding the true essence of these countries or having personal incentives, the experts’ insights can be worthless.

Ultimately, human cooperation is a fundamental part of human flourishing, and the authors included in this volume provide powerful examples of that reality. Through their examination of different places, circumstances, and political and economic realities, they broaden both our theoretical and practical understanding of how life quality improves, and provide a framework for future work addressing these same and continually important questions.

Ryan Merlin Yonk
American Institute for Economic Research,
Great Barrington, USA

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Section 1

Improving Quality
of Life Generally

Intergenerational Support Networks and Wellbeing in Old Age

Sónia Guadalupe and Henrique Testa Vicente

Abstract

Family is the main informal support system for the older population. Focusing on social network types, the chapter discusses the relevance of family-centered networks, restricted and diverse networks for wellbeing, and psychosocial risk in the aging process. Social network types and social support effectiveness are also pointed out as good predictors of health, mental health, and social or community participation. Familistic cultures represent different demands on informal support and social care, bringing enormous importance to the heireses generations. Interpersonal relationships between generations are fueled by reciprocity in support throughout the life cycle. Intergenerationality closes its cycle when the offspring support their parents in older ages. Normativity in this cycle is broken with childlessness, which is less and less exceptional today. The emphasis on family ties in social care and the childless population's increase transform future support expectations, challenging societies.

Keywords: social networks, social support, family, wellbeing, old age

1. Introduction

Despite each biography's heterogeneity and the diverse trajectories in the life course, social networks are central in life experience. This is particularly reflected in the characteristics of social support in the last stages of the life cycle.

In later life, family relationships emerge as the core of social networks [1, 2]. The relevance of family in social networks' structure is evident, in general, but more relevant when addressing old ages. The family ties frequently determine the network type, either by its dominance, by the proportion in the network size, or by its absence.

The older population's social networks' typologies aggregate key commonality features, such as network size, network composition (proportion and type of family ties), marital status, frequency of contacts, and community participation or engagement [3]. These typologies allow organizing knowledge about social support, intergenerational relationships, psychosocial needs, social risk, and wellbeing, providing guidelines that allow anticipating the diversity of aging trajectories.

Beyond the relevance of family-centered networks, they also emerge as important for wellbeing in old age, the restricted and the diverse social, personal networks. These last two network types are associated with antagonistic social support

and wellbeing effectiveness features [2, 3]. Restricted and diverse networks are also predictors of health, mental health, and social participation, as key promoters of wellbeing.

Family intergenerational relationships constitute social support sources pointed out as primordial informal resources when evaluating old-age support systems [4]. However, changes in contemporary societies' family structures have complex and multidimensional implications in our lives and provision systems. Families' availability as a primary support source depends on family structure, lifestyle, gender, individual or familial choices, work-life balance, or care burden.

Nowadays, childlessness is statically less exceptional [5] and constitutes an emerging challenge for informal and formal support systems. Familistic or non-familistic cultures represent different demands and expectations on informal support and social care, challenging generations' relations. In old age, from a pessimistic perspective, childlessness interrupts the normative commitment to reciprocity expected between generations, leaving a void difficult to fulfill. In an optimistic perspective, having a life path marked by not having children allows people to explore relational dimensions differently.

The present chapter focus on the social network types and features in old age. Family-centered networks, restricted, and diverse are analyzed and discussed concerning wellbeing and the psychosocial risks associated with the aging process. The emphasis on family ties and interpersonal relationships between generations are approached, focusing on social networks' dominant characteristics and the challenges concerning informal and formal social support within contemporary societies.

2. Family-centered networks

Networks' composition and the kind of ties linking those who are part of support systems to the focal person are central to approach the role of the family within social networks. When the network type is based on the kinship topography, the reference to the family bonds happens either by their dominant position and proportion in the network size, when compared to other relationship' ties, on the one hand, or by their absence or weakness position, by another hand (**Table 1**).

Studies with the general population present kin-dominant and nonkin-dominant networks [24] or minimal family and family networks [18] within typologies. The family reference in interpersonal relations is so strong that *as-family* relationships are also mentioned in the literature [25]. Studies with older populations tend to defend this familial reference in social networks. Besides composition or other structural network properties, community participation, and social activities, especially of a religious nature, also emerged as a defining feature of several network types in research with older adults [3]. However, these are not the subject of this chapter.

Although not all typologies use nomenclatures that obviously express the central role of family ties in their definition, description, or presentation of the followed methodology, the family's role appears almost always as an essential reference. This happens in the cases of typologies presented by Mugford and Kendig [26] or Auslander [27]. The first typology highlights the family and the marital status, crossing the network size with the ties' multiplexity level, grouping attenuated, intense, diffuse, complex, and balanced networks [26]. The second one is based on supportiveness and the loss of support members, aggregating supportive, replacement, and traditional networks [27], corresponding the last type to a network where family ties and parenting are dominant features.

Network type		
Family-centered networks	Coabitant's networks	Nonfamily networks
<ul style="list-style-type: none"> • Family network [2, 6–9], • Kin network [10, 11], • Family focused network [12–14], • Traditional extended family network [15], • Family-intensive network [16], • Close-family networks [17], • Family dependent support network [18, 19], • Distant family network [14], • Small/Big predominantly family networks [20], • Multigenerational households: older integrated networks/younger family networks [21] 	<ul style="list-style-type: none"> • Private restricted support networks [19, 22], • Family intensive network [10, 11], • Narrow family-focused network [15], • Couple-focused network [23], • Married/coresidence networks [12] 	<ul style="list-style-type: none"> • Nonfamily network [8], • Restricted–nonfamily–unsupported network [13], • Nonfamily-restricted network [23], • Small/Big predominantly nonfamily networks [20], • Non-kin restricted networks [21]

Table 1.
 Social network' types regarding the family system.

Other typologies highlight specific family subsystems, household composition, parenting, conjugality, and marital status. Some examples are the marital networks [28], unmarried and married or coresidence networks [12], couple-focused type [28], child-focused [29]. Multigenerational households' networks [21], and widowhood networks [23].

The reviewed studies that propose network typologies were developed in different parts of the world and different cultures [3]. Although some cultures value the family more than others, as is the case in the southern European countries (e.g., [30]) concerning the rest of the continent, in the personal social networks of older people, the family seems to be a reference in the definition and characterization of networks regardless of culture. Alongside the family, friendship relations are also fundamental in defining the types of network, as are neighbors and other community relations [3], but these relational fields are not as strongly addressed and emphasized as family relations.

Family network, *family-focused network*, and *kin network* emerge as a social network type in eight studies with the older population conducted in diverse contexts and populations, such as the United States of America, China, Germany, and Israel.

Howard Litwin [6, 10, 11, 15] has proposed several typologies of older people's personal social networks, studying Israeli elders and older Soviet Jews who emigrated to Israel, highlighting the family role in social support and social relations. A more recent study with older European demonstrates that a greater family closeness brings beneficial changes to the social network in old age [17].

Family networks are addressed in the Litwin [6] typology developed based on a sample consisting of 2.079 older Jews in Israel, alongside *diverse network*, *friends network*, *neighbors network*, and *restricted network*. *Family networks* are defined as having frequent contacts with children living nearby and minimal contacts with neighbors and friends, being the diverse networks (composed of relatives, friends, and neighbors) the most frequent in the sample. The same type emerges in another study with older Americans [7], confirming the typologies and each type's main features. In Litwin's early studies [10, 11], of which proposals for typologies have

been presented, the kin network was the most frequent and tended to be larger than the average network size. The network included members of the extended family, with affective proximity and long-lasting ties. Another type was the *family intensive network*, which was, in turn, focused on the nuclear family and cohabitants, being the smallest type, dense and intimate, with long-lasting ties and frequent contacts. Although the *family intensive network* presented the highest social support levels in the mentioned research [10, 11], another study [14] that pointed out that the typology (*composed of kin, family intensive, friend focused and diffuse ties networks*) proved to be a good predictor of social support, the *kin network* was associated with a higher level of support and the *family intensive network* with the lowest level.

The *narrow family-focused network* and the traditional extended family network, along with other four network types (*diversified support network, friends-and-neighbors-based support network, attenuated network, and religious family-focused network*), emerged in an investigation with the participation of Israeli elders [15]. The diversified support network was associated with marriage and parenting and was the most common type. The *narrow family-focused network* had frequent contacts with children and siblings living nearby, with support from close relatives, but limited community participation, being frequent among married individuals. Also associated with married people with a large offspring, the traditional extended family network comprises supportive children and other relatives living nearby [15]. Closeness and nearness are crucial in both network types.

In a different cultural context, such as China, the same closeness trait typifies the social networks of the older people in two studies [9, 14]. Cheng et al. [14] identified *family-focused* and *distant family networks*, as well as *diverse, friend-focused, and restricted networks*, highlighting the relevance of extended family support among an older Chinese population, especially in the absence of children and close relatives. The research undertaken by Li and Zhang [9] asserts that family networks are centered on kinship with close children.

Emphasizing the important role of spouse and adult children in Asian cultures, Park et al. [12] also found a *family-focused network* type, following their study with older Korean immigrants in the United States of America. However, the conjugality or marital status defined three of the six types of networks that the authors agglomerated: *married/coresidence network; unmarried/diverse network; unmarried/restricted network*. The study also presents *diverse* and *restricted networks* that will be discussed below. The *married/coresidence network* was one of the most frequent types in the sample. The unmarried types included those who were not married and likely to live alone. Another typology resulting from a study with South Korean seniors [28] also presents a *couple-focused network* type comprising young and educated married individuals with children and a distant large family, presenting low community participation. This study shows the prevalence of *restricted* and *couple-focused networks* representing limited social relations and the lack of a conventional *family-centered network* type [28].

Another research with the migrant population highlights intergenerational cohabitation, addressing the cultural and ethnic diversity in the social networks, carried out by Burholt and Dobbs [21]. Two types of *multigenerational households* emerge, mainly composed of relatives and centered in family relationships, involving married or widowed individuals: one with older integrated networks, another with younger family networks. The other types are the *family and friends integrated networks* and the *non-kin restricted networks*. The last type integrates non-relatives that are more isolated, typical of childless older persons living alone or only with their spouses, with formal support. Multigenerational living arrangements are common in certain familistic cultures, impacting the network types [21].

The contrast between *family* and *nonfamily* networks emerge in the study of Fiori, Antonucci, and Cortina [8] developed with older North American, although they were less frequent types than others such as the *diverse networks*. The family network was focused on relations with children, and the *nonfamily network* belongs to unmarried or childless individuals, presenting the most limited social ties in the typology.

The family also emerges as central in elderly network typologies in studies developed in European countries. The precursor studies on types of senior networks from Clare Wenger [19, 22] in the United Kingdom establish a classification where family ties, social support, and community integration are relevant. The *family dependent support network* is centered on close family ties, having a small size, is usually held by older widows, with low community involvement.

A study with older adults in Germany [13] reported six different network types, in which the *family-focused network* represents those that belong to married people with frequent contact with family ties. In opposition, a *nonfamily restricted network* is characterized by infrequent family contact. As previously emphasized, the relationship between parents and children also plays a central role, defining the *family-intensive network* found in a study developed in Finland [16]. It pointed out the role of extra-family interaction for defining other network types. The *family network* type was found as the most frequent in a study with older adults in Portugal [2] with a very high proportion of family ties in the networks' size, attesting to the older persons' familistic nature networks in that context.

Confidant networks among older adults, composed of trust and especially meaningful persons with whom we share important issues, decisions or problems, also present the same trends found in network typologies in a broader sense, regarding the relevance of family ties in their definition. In a study with a large sample of several European countries, Litwin [31] defined a typology, thus distinguishes between *proximal family-based confidant networks* and *distal family-based confidant networks*. Closeness, proximity, and intimacy were the features that define the network types. The majority of participants were embedded in *family-based networks*, all very close emotionally and some with high proximity and frequent contact (including spouse and children, children, spouse, and other family members), in contrast with *nonfamily-oriented network* types (friend network and "the other" network). Another study on confidant or trust-relations networks in Portugal [20] addresses familial and nonfamily networks, based on size and composition (*small/big predominantly familial networks*; *small/big predominantly nonfamily networks*). *Small familial networks* are the most frequent. Proximity is also defining for the predominantly familial networks.

Particularly in later life, the family is considered the core of social networks [1]. For this reason, all typologies mention network types composed of family ties, dominated by family relations, or that recognize the importance of this kind of ties by underlining their absence or their scarce presence in the older persons' lives, as mention before. However, it is mainly in familistic cultural contexts that stronger kinship ties are emphasized [32].

Beyond closeness, nearness, and intimacy, other features like cohesiveness, accessibility, and stability are significant to understand family relations within social networks.

Stability over time refers to relational durability and the projection of the relational commitment in the future regarding intergenerationally. Longer relationships are associated with predominantly familial networks [2, 11]. A recent study evidenced that older Europeans [17] experienced diverse network transition, although, over time, close-family-based networks tended to prevail. Those in close-family networks had better life satisfaction and fewer depressive symptoms

than the elderly with other network types, which points to greater family closeness as beneficial.

High cohesion or density levels between members are also expected in networks dominated by kinship [2, 20, 33]. This feature has positive and negative sides. Positively, it increases the ability to recognize the support needs and mobilize support quickly and effectively. This is a relevant trait since accessible family ties are strongly correlated with wellbeing in the older population [31]. Negatively, high-density levels are also associated with centripetal functioning and control [33], inward oriented through cohesion forces, which can promote closure and isolation around family relationships, making possible changes difficult.

The family is seen as an intergenerational exchange system, where the family norm of reciprocity is established. When there is autonomy in old age, older people tend to have high social participation levels, having a strong helping paper in family life caring for younger generations [34]. Intergenerational solidarity becomes especially relevant when there are losses in independence and autonomy in the elderly. Generally, a dependence trajectory requires a care trajectory, being very relevant the informal care with a clear family anchorage [35]. Both sides of intergenerational care and exchange are important in network relations, promoting horizontal reciprocity.

Family relationships have become more complex and less dependent on marriage, blood ties, or cultural bonds, with the diversification of bonds beyond the household, linked by friendship, vicinity, dissolved marriages, step-parenting, or other ties [25, 36]. A new pattern of close relational commitments emerges, as well as care arrangements, involving close kin, extended kin, non-kin, and ex-kin, bringing enormous diversification to relational patterns [25, 36].

The levels and the ways of interaction between the older persons and their families, friends, neighbors, and community groups set the ties binding individuals to each other. Diversification is pointed as key to wellbeing, as we will discuss further.

3. Diverse and restricted networks, wellbeing and psychosocial risk

Diverse and restricted social, personal networks are two frequent types that emerge in typologies when studying structural and functional dimensions of social relationships in old age (Table 2). The interaction of these types of networks with wellbeing and psychosocial risk tends to function in opposite directions.

The diverse networks underline the relational diversity in the network's composition, integrating family, friendship, neighborhood, and community bonds. However, they also highlight their broad distribution, not focusing specifically on one of the available relational fields and the associated functional diversity or their broad size. In the opposite sense, the restricted networks are associated with a confined composition, with few members and scarce social participation.

Several studies clearly point out the opposition between the diverse and restricted networks in the typologies they present based on samples with an older population [6, 7, 9, 12, 14, 28].

Litwin [6] found that *diverse networks* were the most frequent type in a study in Israel, composed of relatives, friends, and neighbors, with a high contact rate. Usually, this type was associated with married men, younger and with adult children living nearby. *Friends networks* had similar features of *diverse networks*, but with minimal contact with neighbors. Restricted networks were more frequent among widowed older persons, having the most limited social ties, narrow contacts with adult children, and no contact with friends or neighbors. In another research with older Americans [7], the authors confirmed those features, reporting that

Network type	
Diverse Networks	Restricted networks
<ul style="list-style-type: none"> • diverse network [6–9, 12, 14, 28, 34, 37], • diversified support network [15], • diverse-supported [13], • diverse with/without community participation [23] 	<ul style="list-style-type: none"> • restricted network [6, 7, 9, 12, 14, 28, 37], • private restricted support network [19, 22], • defective network [16], • small: friendship-poor and socially isolated [29], • attenuated network [15], • restricted-nonfriends-unsatisfied [13], • restricted-nonfamily-unsupported [13], • nonfriends-restricted [23], • nonfamily-restricted [23], • non-kin restricted networks [21]

Table 2.
Diverse and restricted network' types.

restricted network was associated with lower social capital and greater social risk, while the diverse networks were associated with higher social capital and wellbeing.

Diverse networks were also the most frequent type in the study by Cheng et al. [14], focusing on social networks and older adults' subjective wellbeing in China. The least frequent were *family-focused* and *restricted networks*. *Diverse networks* tend to be those with a higher number of members and a frequency of contacts. The conclusions report the same direction of the above-mentioned study, that *diverse* and *friend focused networks* are associated with higher levels of wellbeing and the best indicators of support, while restricted networks are associated with lower levels [14]. Also, with the Chinese population, Li and Zhang [9] asserts that the most balanced social resources were found in the *diverse network*, which is associated with marriage, social engagement, and urban settings. *Restricted networks* were the most common in the sample and were associated with older individuals and rural contexts. The *diverse networks* yield the most beneficial health results, and the *restricted* had the most negative outcomes in subjective health and psychological wellbeing. The authors consider it essential to facilitate older people's social participation with physical limitations and poor psychological conditions, enhancing their interaction with diversified groups [9].

Confirming the same trend in findings, with some specifications, Park, Smith, and Dunkle [28] identified *restricted* and *diverse networks* within the typology that resulted from the study with South Korean older adults. The *restricted* type is characterized by closeness to adult children and limited contact with friends, comprising older urban men with social participation. The *diverse* type presents the greatest extent and diversity of ties, being held by healthy and active women. *Restricted networks* were prevalent in the sample and reported lower wellbeing and higher depressive symptomatology than other types. The *diverse networks* presented low levels of social support, despite its most favorable characteristics.

The last reviewed study that presents *diverse* and *restricted network* types [12] indicates the *diverse* type as one of the most frequent types. Individuals with *diverse networks* were married and lived with others, having frequent contact with close family and friends. They also maintained community participation, including religious activities. The *restricted* were less represented in the sample, referring to individuals with limited contacts with family and friends and minimal involvement in religion. The study also proposes another restrictive type of network: the *unmarried/restricted* type, which included unmarried people and likely to live alone, with

closer relationships with friends than family and minimal religious participation. Similar to previous studies, the *diverse network* is associated with better health and lower depressive symptoms, whereas the *unmarried/restricted* had the opposite outcomes [12].

Focusing on community participation, a study in Mexico [23] points to two *diverse* and two *restricted* networks: *diverse* with and without community participation and *nonfamily-restricted*. The *diverse* type includes family and friends, with frequent contacts. Having or not community participation is the dimension that differentiates them. *Diverse networks* without community participation were the most frequent in the sample. The less frequent was the *nonfamily-restricted network*, common among childless older persons, with a reduced number of relatives and a low frequency of contacts, centered in friendship relations. The nonfriends-restricted networks were held by older people with children and an extended family, with whom they have frequent contacts, not including friends, and having limited community participation. *Restricted* types and *widowed networks* were associated with negative self-rated health, dependency, and depression [23].

Some regularities should be underlined. Several characteristics of the restricted networks are associated with the older persons' personal, relational, and social vulnerability, being less supporting and less effective. Restricted networks with the designations represented in **Table 2** are other examples. Private restricted support networks [19, 22] are small, centered in cohabitants, and characterized by the absence of relatives and friends nearby, minimal contact with neighbors and limited community engagement, and being associated with couples or isolated individuals. Older persons without spouses have attenuated networks [15], focused on the interaction with close adult children, that is their only support source, having very low contact with other ties and low community participation. *Restricted-nonfriends-unsatisfied* [13] and *restricted-nonfamily-unsupported* [13] have similar profiles: the first one held by unmarried elderly with small networks, low social activity, and low support; the second adds infrequent family contact. Stone and Rosenthal [29] found two fragile network structures regarding vulnerable groups with fewer interpersonal resources: *small - friendship-poor and socially isolated* and *small - extended-family and friend-focused*, both with small network size and lack of contact with the few available network members. The *small extended-family and friend focused networks* are small and dominated by siblings and friends, belonging to lifelong single and childless women [29].

Defective networks [16] are small, with fewer friends and no neighbors, presenting higher levels of isolation, also related to childless elderly. *Nonfriends-restricted networks* [23] belong to older people with adult children and extended family, with frequent contacts, but exclude friends, and they have low community engagement. *Nonfamily-restricted networks* [23] are associated with childless older persons, with fewer relatives and a low frequency of contacts, centered in friendship relations. Also, the *non-kin restricted networks* [21] are typical of childless older persons living alone or only with their spouses, being more isolated. They integrate non-relatives and tend to have formal care, being the most vulnerable regarding loneliness and isolation identified by the study [21].

Although socially restricted, the *couple-focused* type among South Korean elderly presents high levels of life satisfaction and low levels of depressive symptomatology [28], but it is an exception that has cultural peculiarities.

Focusing on mental health among older adults, a study with North American [8] found diverse, family, and friends' networks, as well as two types of restricted networks (nonfamily network and nonfriends network). Depressive symptomatology was lowest for individuals in the diverse network and highest for those in the nonfriends network [8]. The nonfamily network had the most limited social ties

and are associated with unmarried or childless elders, and the nonfriends network had few contacts with friends and low social engagement. The absence of family in friends is considered less detrimental for mental health than the absence of friends in the family [8]. Reinforcing these conclusions, a recent study in rural China [37] found that social network types (diverse, family, friends, restricted, and family-restricted networks) were significantly associated with depressive symptoms and health in older adults, following the same trend. Older people with diverse or friend networks presented lower depressive symptoms, whereas those with restricted and family-restricted networks had reported higher levels of depressive symptoms and lower self-rated health levels.

As stated by Fiori, Smith, and Antonucci [13], we can affirm that individuals with *diverse-supported networks* present high levels of wellbeing, realizing the opposite when the individuals have *restricted networks*. However, the relations between network types and health or wellbeing outcomes are very complex. Emotional closeness and having more than one type of relationship within networks, such as family and friends, positively affect older persons' wellbeing [38]. Compared with family-centered networks, those composed of friends have a greater impact on wellbeing and quality of life [38].

Another literature review point that having more friends than family in their social network, its diversity, size, the frequency of contacts, having co-residency with own child, and social capital was protective regarding late-life depression; low diversity strongly contributed to explaining network structures that were predictive of depression in old age [39]. Quality of support is refereed as a key mechanism by which network types affect mental health [8].

The diversity of social ties and broad network size are consistently associated with positive social support, wellbeing, and health, indicating, on the other hand, an association between restricted networks and less effective characteristics and psychosocial risks.

4. Intergenerationality and childlessness

Childlessness hinders the normative vertical intergenerationally. Little is known about the population without intergenerational bonds [40], despite being a fast-growing population segment because it is an emerging research issue in contemporary societies [41]. This situation can be voluntary (childfree) or involuntary (childless), either lifetime childlessness or permanent or definitive childlessness [5, 41], but with similar repercussions in terms of intergenerationally in advanced ages.

The demographic and social trends observed in families, gender, and aging patterns combine into a demographic transition that produces diversification in models, structures, and roles in intergenerational relations [42]. The shrinking size of families, the fall of fertility and birth rate, and the number of children, as well as the changes in marriage and the family formation, the increase in divorces or union dissolution, the increase of single-parent families or in the elderly living alone and the life expectancy at birth increasing, are some examples that are reported as macro-level factors (e.g., [41]).

Childlessness among both men and women has increased throughout the European countries at ages 30–34 and 40–44 years old, mostly involuntary [41]. The same increase happens in the age group 40–44 in most OECD countries [5]. Childlessness in Europe is positively associated with a higher mean age at marriage and with more delayed motherhood. On the other hand, childlessness is negatively associated with ever married proportions and with fertility rates. European men with little education and women with either very high or very low education are

more common childless people. Higher childlessness rates are found in widespread individualist values countries [41].

The rapidly increasing proportions of childless people pose diverse challenges because of its potential impact on wellbeing, when involuntary, and “in the long run, the growing proportions of childless persons will also bring extra challenges for future aging generations through the older people who will have no adult children or grandchildren to assist and take care of them” ([41], p. 42).

Even when there is offspring, the contemporary demographic context leads to a potentially greater number of people to care for in advanced ages and a smaller number of potential family caregivers [43].

This is enhanced by the verticalization of family relations, thanks to the decrease in children’s number, originating the so-called “beanpole-family”, with fewer elements in each generation and less or inexistent lateral branches [44]. In familistic cultures, kinship ties are especially valued, alongside the spouse bond, emphasizing adult children’s role in informal social support and care for their older parents (e.g., [45–48]).

Life trajectories with or without parenthood are associated with normative and non-normative social expectations and are necessarily different [49], shaping the meaning and the experience of childlessness [46], as well as sociability and social participation patterns [49]. Those who are childless or childfree have potentially fewer family responsibilities, more free time, and greater flexibility for extra-family and social engagement lifelong [50]. Parenthood and motherhood imply other socialization contexts not explored when there are no children, namely with other parents and childcare and education services.

Life courses and intimate relational history help understand individuals’ trajectories with and without children [51, 52]. Older persons’ lives result from very heterogeneous choices and features, varying according to gender, civil status, financial status, education, as well as the prior relationship with close family ties and extrafamilial ties, or either family circumstances [52–55].

The approaches appear to be divided between those who point to childlessness as an advantage or a disadvantage. However, this polarization can be reductionist to address complex and diverse relational paths [55].

However, in advanced ages, childless people tend to be perceived as disadvantaged, particularly due to the inexistence of adult children as a potential source of informal support and care [50, 54, 56, 57]. In this regard, childlessness in adulthood is pointed to as a future support deficit [58].

The childless seniors’ social networks tend to be smaller compared to those who have adult children [49, 50, 59]. Other relevant demographic and social variables are associated with better or worse conditions in the social networks in old age, such as age, marital status, income, education, living alone or not, being in disadvantage those who are oldest, unmarried, and who live alone [60].

The perceived independence is valued as an advantage by childless seniors since the expectations of not having children are adapted to the situation in advanced ages [54]. Their community participation tends to be potentially more active than parents, either in religious activities [54] or volunteering [58].

There are some specificities in childless people’s social networks in old age. Studies highlight the extended family, friends, and neighbors as social support sources [61], especially in an emergency or in short term care [54]. When autonomy shifts to dependence, the support needs become more demanding and continuing in the long term. To deal with the dependency, community services become a relevant source of social and healthcare support, particularly for those who live alone [54, 61]. Facing health deterioration, the childless elderly are more likely to be supported by extrafamilial relations or social services [58], which is the preferred

source of supporting the extrafamilial relationships (friends and neighbors) [62]. Different models of social support are defined for old age, integrating informal and formal systems. Children are generally identified as the preferential support system, then the absence of offspring tends to create a compensatory hierarchical model [62]. Thus, the compensation for childlessness can be done through other ties, following a preference hierarchy: first, the significant others (other relatives, friends and neighbors) and then formal social services [62] although, the availability of social support seems to be more determinant than preference in this process [63]. Nevertheless, the idea of compensating support bonds underlies a normative and conventional family perspective, not corresponding to contemporary family changes and diversity [45].

The family-centered networks and the diverse networks tend to mirror the condition facing parenthood, as we observed earlier in the present chapter. Non-kin relationships assume special importance in the childless elders' networks, being distinguished by the role of friends and neighbors [62]. The extended family is also referred to, particularly the role of brotherhood in the case of single childless persons [64] and the role of the nephews, especially when there are no siblings capable of acting as a support system [54, 57].

Psychological wellbeing of childless older persons has been addressed through a perspective that underlines the pernicious impacts of the lack of offspring and another perspective that emphasizes the lack of differences in wellbeing between those with and without children. On the one hand, there is no clear association between childlessness or parenthood and wellbeing [46, 56, 65]. Loneliness, depression, and childlessness interactions in advanced ages are addressed as having significant associations [66], but either for the lack of association between these dimensions [65], which indicates the need for further studies. Despite these disparities, there is evidence of weaker social support among the childless [56], which can be attributed to the negative impacts of lack of offspring on wellbeing throughout life trajectories.

Childless older persons are commonly associated with restricted social network types such as *nonfamily-restricted networks* [23], *small extended-family and friend-focused networks* [29], *defective networks* [16], or *non-kin restricted networks* [21]. These networks are reported as being more vulnerable to social isolation and loneliness [16, 21] and associated with negative perceived health, dependency, and depression [23], which should bring particular attention to childlessness in adulthood old age trajectories.

5. Conclusions

The structure and functionality of social networks in later life say a lot about individuals' life trajectories. How we relate to others, how we participate in community life, our choices or our lifestyle is reflected in the characteristics that social networks assume, and these become central to the achievement of wellbeing.

Family, friends, workplace-friends, school friends, neighbors, and community relations are part of social networks. Intergenerational bonds and family ties are core relations within social networks' typologies in old age, even when this type of relational ties is not part of the networks. Kinship is key to determine the network type, either by its dominant position (e.g., [1, 2, 6–14]) or by its absence [8, 13, 20, 21, 23], being highlighted the roles of the spouses and adult children. Despite the wellbeing and perceived high levels of support associated with family ties [2, 10, 11], large offspring, intense kinship interaction, and high network density tend to reduce extrafamilial relationships and diversity [2, 29, 33], often leading to relational restriction.

It must be underlined that the “identification of network types permits analysis as to how relationships and emotional interconnectedness can interplay with health and emotional well-being in late life” ([31], p. 762–763). Closeness, nearness, intimacy, cohesiveness, accessibility, and stability over time are the most relevant features to approach family ties within social networks and to approach the association with variables related to wellbeing or psychosocial risk.

The changes and the complexification of relationships in families bring enormous diversification to relational patterns [25, 36] and hinders reciprocity and intergenerational support. The increasing childlessness, particularly in old age, is frequently associated with restricted social networks [16, 21, 23, 29], vulnerability to social isolation and psychosocial risks [16, 21, 23], and with disadvantage regarding social support and care [50, 55–57], especially in situations of loss of autonomy. This justifies focusing the chapter on this increasingly relevant population, that should have more attention from research and social intervention.

Restrictiveness and diversification are essential for addressing social networks at an advanced age, appearing in typologies with opposite characteristics [6, 7, 9, 12, 14, 28]. The restricted networks’ main characteristics are associated with frailty, vulnerability, less supportiveness, and low effectiveness [13, 15, 16, 19, 22, 23, 29, 37], presenting limited ties, contacts, and social engagement. The diverse networks’ types present extent and diversity of ties composition, tend to be large, having a high frequency of interaction and community participation. Diverse networks are associated with high social capital, wellbeing, and quality of support [7, 14, 28], showing more protective features regarding psychosocial risks in old age [8, 12, 38, 39].

In general, there are consistent characteristics in the personal social networks of older people that clearly point to a positive association of social support, wellbeing, and health with the diversity of ties and broad size in the networks, as well as for an association with psychosocial risks and less effective characteristics in the networks with the relational restrictions found in the networks. However, we must avoid linear interpretations and homogeneous approaches, requiring a complex aggregation of variables to have an approximate reading of networks as determinants of wellbeing.

Author details

Sónia Guadalupe^{1*} and Henrique Testa Vicente²

1 Miguel Torga Institute of Higher Education, Centre for Health Studies and Research of the University of Coimbra, Coimbra, Portugal

2 Miguel Torga Institute of Higher Education, Research Centre for the Study of Population, Economy and Society, Coimbra, Portugal

*Address all correspondence to: guadalupe@ismt.pt

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GDP *Almost Perfectly* Predicts Survival

Gordon G. Bechtel and Timothy Bechtel

Abstract

This article extends results reported by Bechtel, G. and Bechtel, T. (2021). These previous findings induce the hypothesis confirmed here; namely, that gross domestic product GDP *nearly perfectly* predicts survival in the world's entire population. The fractional polynomial regressions here are run over the pre-pandemic period 1991–2016. During the subsequent pandemic, the American Center for Disease Control reported that life expectancy at birth in the USA dropped one year during the first six months of 2020, the largest drop since World War 11. The drops in African and Hispanic life expectancy at birth during this period were 2.7 and 1.9 years (Aljazeera; Democracy Now, February 18, 2021). The USA is the worst covid-19-affected population. It is now imperative to confirm that life expectancy at birth is well predicted from GDP in all nations over 1991–2018. This pre-pandemic control for each nation will accurately calibrate its subsequent yearly survival drops due to Covid-19. This is especially important in light of the trade war between the United States and China, which has increased the need for accurate measurement of the human effects of this war.

Keywords: A Theory of Imperatives, Life Expectancy at Birth, Fractional-Polynomial Transformation of GDP, Pandemic Threats to Lives and Economies, R^2 Invariance with Respect to GDP and Survival Calibration

1. Introduction

Among the plethora of economic variables that might be invoked to measure Covid-19's negative effect on economic recovery, GDP remains paramount. This economic imperative is exceeded only by the human imperative of survival itself [1].

Section 2 shows that world GDP can almost perfectly predict the life expectancy of the entire world population. In arriving at this finding, this work relies on only three data definitions and one fractional-polynomial command. It will be interesting to see if the World Bank or IMF can verify that these definitions and their processing command will predict the survival rate of the world's rich as well as poor nations.

2. Dual data imperatives

2.1 Keynesian GDP (K) and survival (S)

The dollar denomination of variables counted in different units (automobiles, cereal boxes, etc.) allows the ratio scaling of GDP up to a multiplier calibrating GDP in single, thousands, millions, billions, or trillions of current US dollars.

This ratio scaling also allows daily exchange-rates to multiply one nation's currency into another's (e.g. dollars into yen). Likewise, the ratio scaling of life expectancy at birth allows survival to be scaled in days, months, years, or decades.

The goal of this paper is to relate GDP to survival by posing survival as a fractional-polynomial function of GDP. It is shown that this function predicts survival of the world population.

Definition 1. \mathbf{K} denotes frequency-weighted Keynesian GDP. Vector \mathbf{K} replicates $\mathbf{K}t$ N_t times and contains $\Sigma_t N_t$ values, where N_t is world population size in year $t = 1990 \dots 2018$.

Definition 2. \mathbf{St} is survival time, denoted by life expectancy at birth in year $t = 1990 \dots 2018$.

Definition 3. Vector \mathbf{S} replicates \mathbf{St} N_t times and contains $\Sigma_t N_t$ values, where N_t is world population size in year $t = 1990 \dots 2018$. \mathbf{S} is a ratio scale unique up to multiplication by a positive constant that calibrates \mathbf{S} in days, weeks, months, or years.

2.2 Fractional polynomial regression of \mathbf{S} on \mathbf{K}

The following Stata command returns an importance-weighted fractional polynomial regression [2, 3]:

$$\text{fracpoly regress } \mathbf{SK} [\text{iweight} = \text{POPmillions}], \text{degree}(9) \text{ noscaling.} \quad (1)$$

$R^2 = .9751$ for this time-series regression of \mathbf{S} on \mathbf{K} over $t = 1991 \dots 2018$ for the entire world population. It is also important to note that this R^2 is invariant with respect to the units in which \mathbf{S} and \mathbf{K} are calibrated; i.e. days, weeks, months, or years for survival and single, thousands, millions, billions, or trillions of current US\$ for GDP.

Acknowledgements

This chapter is dedicated to the memory of the author's best critic, Maria Cohn Bechtel. The author thanks Dr. Bethany Bechtel for the book *The Great Invention: The Story of GDP and the Making and Unmaking of the Modern World* [4]. We have also benefited from Dr. Bechtel's insistence on monitoring a population's economic indicators over time, coupled with a gradual approach to resolving societal conflicts and loosening entrenched beliefs. This paper generalizes previous work reported in [5, 6] and [1, 7, 8]. The author thanks the reviewers of all five of these open access articles for their stringent reviews, which have strengthened *this* article's content and clarity.

Conflicts of interest

The authors declare no conflicts of interest.

Data availability

The data files used in this study are available on request from the corresponding author. These files are not publicly available due to their extraction and reduction from the World Bank. This extraction and reduction by the author renders these files understandable and usable by a reader of this article.

Author details

Gordon G. Bechtel^{1*} and Timothy Bechtel²

1 Warrington College of Business, University of Florida Gainesville, USA

2 Aviation Power, Frankfurt, Germany

*Address all correspondence to: bechtel@ufl.edu

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Economic and Financial Crimes and the Development of Society

*Monica Violeta Achim, Sorin Nicolae Borlea,
Viorela Ligia Văidean, Decebal Remus Florescu,
Eugenia Ramona Mara and Ionut Constantin Cuceu*

Abstract

The purpose of this chapter is to study the detailed dynamics of economic and financial crimes within the European Union member states, namely corruption, shadow economy, tax evasion, money laundering, cybercrime and financial frauds. Our econometric modelling focuses on the impact of the vector of financial and economic crime proxies upon economic prosperity and human development. In accordance to the reviewed literature, for our sample of European Union countries, corruption and shadow economy have a negative effect upon the vector of development proxies while money laundering and cybercrimes belonging to “white collars” are positively correlated with the vector of development proxies that we analyze. All the data are interpreted and discussed, and then conclusions are drawn. Governmental policies on economic prosperity and societal wellbeing should focus on reducing corruption and shadow economy, in order to favour benefits in the field of economic and human development.

Keywords: corruption, cybercrime, gross domestic product, human development index, money laundering, shadow economy

1. Introduction

At the international level, there is not any common definition valid for all the states regarding the economic and financial crime phenomena but in practice, this concept is associated with various deeds such as corruption, tax evasion, money laundering, theft cheating, embezzlement, data distortion, counterfeiting, data and document cover up and destruction, tax evasion, crimes regarding the accounting books and many others.

The growing digital economy together with the period of crisis create challenges for the criminals to find new channels to engage in crimes. For instance, the current crisis determined by the COVID-19 pandemic led to the deterioration of working conditions, disruptions of financial markets, accentuating the need for liquidity in companies. Cyber scams, fraud, disinformation and other cyber-enabled crimes will become a growth industry, as people under lockdown kill time online [1]. On March 2020 the number of cybercrime events increased about 1.5 times compared to the similar month of 2018 [2]. Under these conditions, the theft of banking data, followed by the compromise of savings accounts, frauds on some institutions and

companies or blocking access to information systems, increased the pressure on society. Cybercrime represent an important channel for money laundering [3]. Thus the development of new financial technologies (virtual currency, e-commerce activities, mobile payments, prepaid cards) facilitates the high movements of money, it sometimes facilitates anonymity and secrecy and these are the best channels for cyber to be explored in order to get higher benefits under the form of fraud, also including money laundering. An important role in the fight against money laundering is played by international money laundering regulations which have known important adjustments year by year especially starting with the fifth EU Directive (EU) 2018/843 [4] which brings many important adjustments including addressing the risks associated with prepaid cards and virtual currencies.

All these crimes bring along many negative effects upon people on many channels: the decrease of the revenues collected by the national budgets [5, 6]; the diminishing of the level of economic and sustainable development [7–11]; the reduction of the level of investments ([12], p. 438; [13]); or the increase of social inequalities and poverty [14, 15].

The remainder of this chapter is structured as follows: section 2 presents various statistics of crime deeds (frauds, corruption, shadow economy, tax evasion, money laundering, and cybercrime) within the European Union member states with reference to Romania; section 3 is dedicated to the analysis of the relationship between economic and financial crimes and economic development. The paper ends with the formulation of the final conclusions, limits and future studies.

2. Statistics on economic and financial crimes

2.1 Top of frauds

According to the study of PwC [16] conducted on 5,000 respondents around the world, the first category of frauds by types is represented by customer frauds (fraud to the clients), followed very closely by cybercrime, asset misappropriation, corruption and financial statement frauds. When it comes to the frequency of frauds by domains, according to a study conducted by ACFE [17] conducted on 2,504 cases of occupational frauds that were investigated between January 2018 and September 2019, the highest number of frauds occurs in banks and financial services (386 cases, losses' average 100.000\$), followed by government/public administration (195 cases, losses' average 100.000\$) and manufacturing (185 cases, losses' average 198.000\$). However, when it comes to the analysis of the value of losses caused by frauds, the same study establishes that the highest prejudices are found in mining (losses' average of 475.000\$ for a total of 26 cases), followed by real estate (losses' average of 254.000\$ for a total of 52 cases) and telecommunications (losses' average of 257.000\$ for a total of 67 cases) [17].

According to our own calculations, based on the data for crimes investigated by the Romanian Police for the 2011–2019 period, the highest losses by domains are found in banks and financial institutions, in real estate and the food industry (**Figure 1**).

Related to the frequency of frauds by types of entities, the most fraudulent companies are the private companies (44%) followed by public companies (26%) [17].

2.2 Corruption

Corruption, as another component of crimes, goes hand in hand with many types of frauds. To calculate corruption levels, we will use the data offered by Transparency International regarding the *Corruption Perception Index (CPI)*

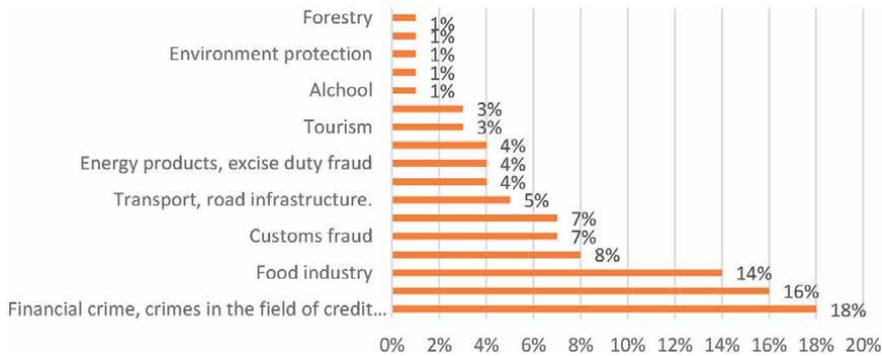


Figure 1.
 Top frauds by total losses (% in total losses), by domains in Romania. Source: Own calculations based on the data from the Romanian police for the 2011–2019 period.

referring to perceived corruption. In our study, the level of corruption is calculated as the order position occupied by a certain country out of the total 180 countries taken into account within the sample: the higher the ranking, the higher the level of corruption, and the lower the ranking, the lower the level of corruption, respectively ([18], p.41). According to our calculations conducted over the 2005–2019 period (**Figure 2**), the Northern countries (Denmark, Finland, Sweden, the Netherlands) are the least corrupt countries among European countries, while Central and Eastern European countries face the highest levels of corruption (Bulgaria, Romania, Greece and Croatia).

Regarding the evolution of the level of corruption within European countries over the 2005–2019 period, we may note very small changes during this period (**Figure 3**). Thus, despite the efforts made by the organisations, corruption still remains a long standing problem among European countries.

2.3 Shadow economy

Shadow economy represents another component of economic and financial crime. The level of the shadow economy is expressed in percentages as the weight of the shadow economy within the GDP, as provided by the database calculated by Medina and Schneider [20]. According to our calculations conducted over the 2005–2017 time period, the average percentage of GDP lost in shadow, for the European Union countries, is 17% (**Figure 4**). However, there are high discrepancies among European Union member states. The highest values for the shadow economy are found in Central and Eastern European countries such as Croatia,

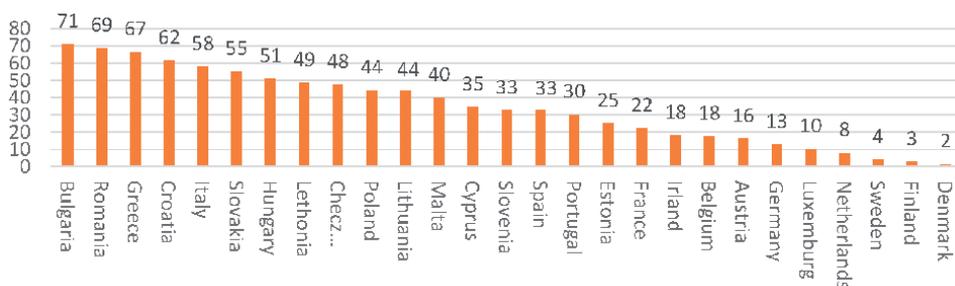


Figure 2.
 Corruption within European Union countries, in average for the period 2005–2019. Source: Own calculations based on the data of corruption perception index provided by transparency international [19].

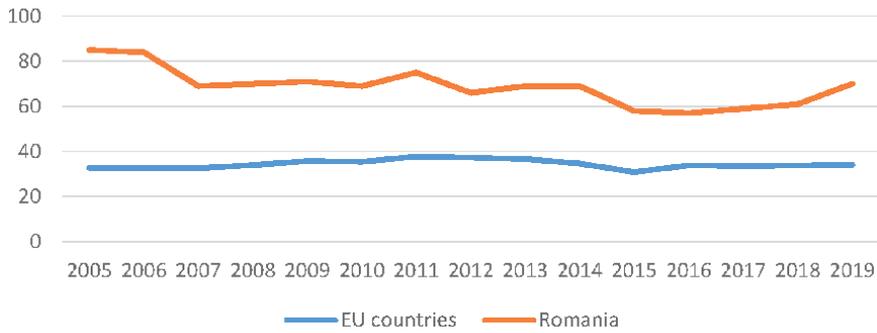


Figure 3. Evolution of corruption throughout the European Union countries, 2005–2019. Source: Own calculations based on the data of corruption perception index provided by transparency international [19].

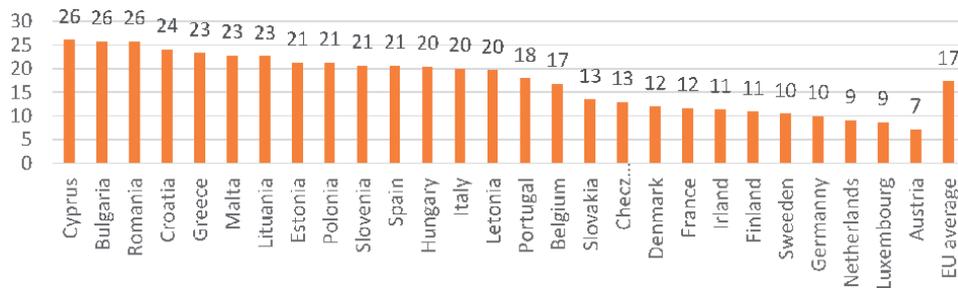


Figure 4. Shadow economy (% of GDP) in European Union countries, in average for the period 2005–2017. Source: Own calculations based on the data from Medina and Schneider [20].

Romania and Bulgaria while the lowest levels of shadow economy are found in Austria, Luxembourg, the Netherlands and Germany.

However, when we analyse the evolution of the shadow economy in European Union countries, we may note a decreasing trend year by year. For Romania also, the level of shadow economy has significantly decreased during the last 12 years. Thus, in 2005 the level of shadow economy was 31% while in 2017 it is 23%, thus it has reduced by about 8 percentage points (Figure 5).

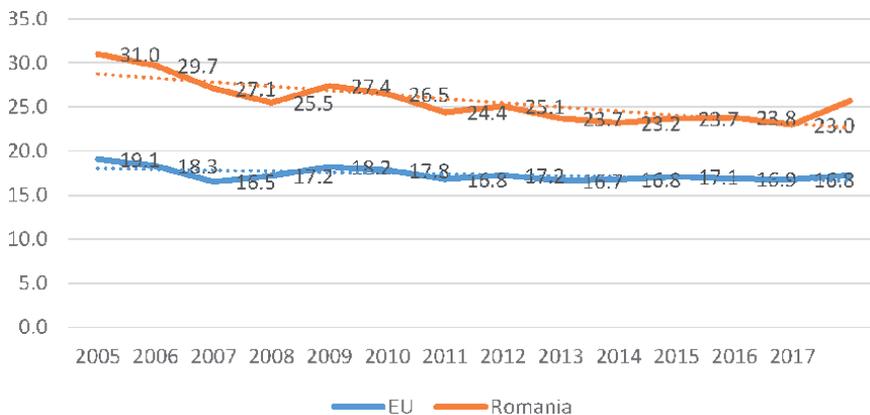


Figure 5. Evolution of shadow economy (% of GDP) in European Union countries, 2005–2017. Source: Own calculations based on the data of Medina and Schneider [20].

2.4 Tax evasion

According to the European Commission [21], the percentage of value added tax (VAT) revenues lost in the European Union in 2018, highly varies among the member states (**Figure 6**). The highest lost VAT revenues are found in Romania (34.3%), followed by Greece (30.1%) and Lithuania (25.9%). The lowest lost VAT revenues are found in Sweden with only 0.7%.

From **Figure 6** we may note that Romania registers the highest level of lost VAT revenues among the European Union member states. However, when it comes to the whole level of tax evasion, it registers a significant decrease in Romania throughout the 2009–2017 period, from 2.84% in GDP (2009) to 1.68% GDP (2017), according to the data provided by the National Institute of Statistics in Romania (**Figure 7**).

2.5 Money laundering

In order to find data on worldwide money laundering, we measure the money laundering deeds using the Basel AML (Basel Anti-Money Laundering) index

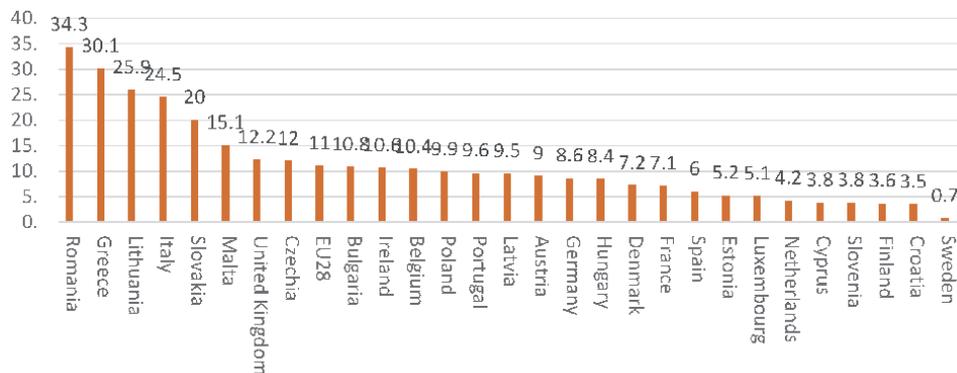


Figure 6. Percentage of value added tax (VAT) revenue lost in the European Union countries, in 2018. Source: European Commission [21].

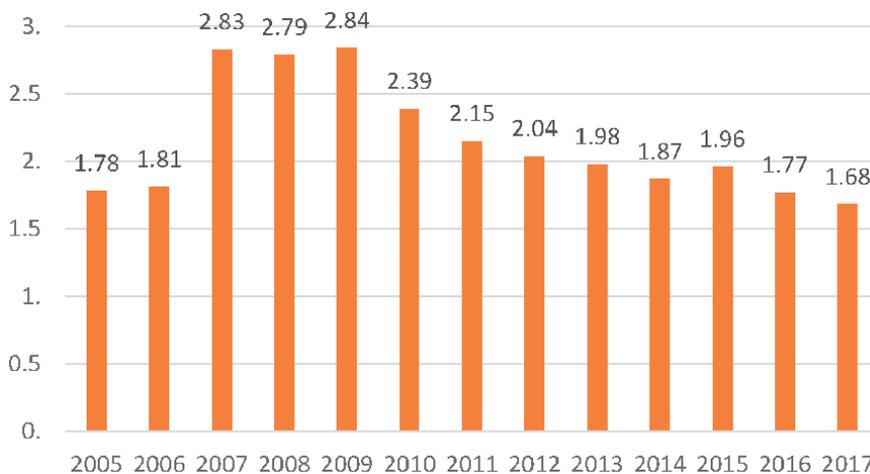


Figure 7. Tax evasion (% in GDP) in Romania, 2005–2017. Source: Own calculations based on data provided by the National Institute of statistics in Romania [22].

which evaluates the risk of money laundering and terrorism funding. This score ranges between 0 meaning the lowest risk, to 7 meaning the highest risk of money laundering. From our calculations (**Figure 8**) we find that the average risk of money laundering in EU countries in the last eight years is of about 4. The money laundering crimes somehow differ to other types of crimes (such as corruption, shadow economy or tax evasion) because money launderings are more spread in rich countries where big transactions are conducted by rich and highly position situated entities, the so called “white collars”, while corruption and shadow economy highly characterize poor countries [9]. Thus, we may see from the graph that the highest risk of money laundering is found in developed countries (Luxembourg, Greece, Italy, Germany, Austria) while the lowest risk of money laundering is found in Central and Eastern European countries such as Estonia, Slovenia, Lithuania. Although the general average values of AML risk scores are high, we may see a reduction of them in the last eight years, because of the efficiency of anti-money laundering regulations. However, in Romania, the risk of money laundering has started to increase since 2016 (**Figure 9**). Similar results at EU level are found by Cotoc (Bodescu) et al. [24] in their study conducted for several EU countries. They find that the number of suspicious transactions reports (STR) received by anti-money laundering national bodies and the volume of amount suspended, frozen or seized increased in the last period of time, as an effect of European Union measures and transposition of these within national laws.

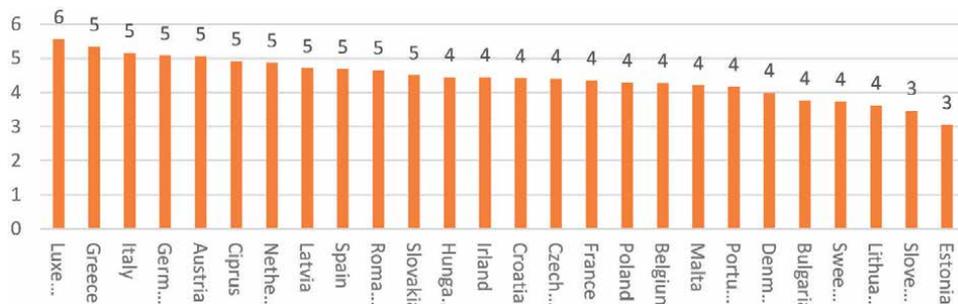


Figure 8. The risk of money laundering in European Union countries, in average for the period 2012–2020. Source: Own calculations based on Basel AML index [23].

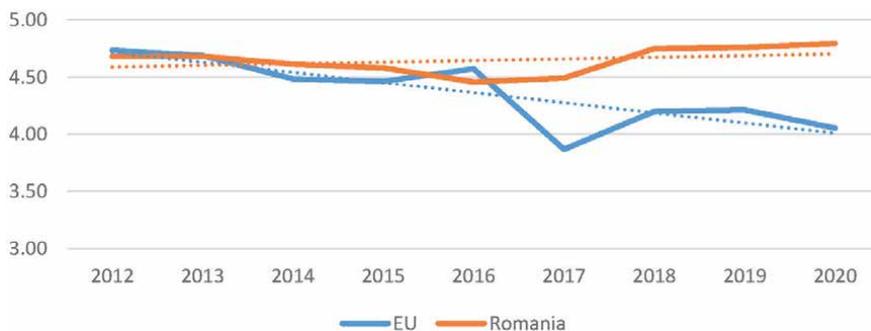


Figure 9. The evolution of the money laundering risk in the European Union countries, 2012–2020. Source: Own calculations based on Basel AML index [23].

2.6 Cybercrime

Within the digital economy the economic and financial crimes face new dimensions under the form of cybercrime. According to the Digital Economy Society Index determined by European Commission [25], all the five components of digital economy have increased on average among the EU countries. We refer to connectivity, human capital, use of internet, integration of internet technologies and digital public services. Over the past years, all the EU countries have improved their digital performances. However, many gaps are still found between the two blocks: Central and Eastern European economies and Western economies. According to the data from the Digital Economy Society Index provided by European Commission [25], Finland, Sweden, Denmark and the Netherlands have the most advanced digital economies in the European Union while Bulgaria, Greece, Romania and Italy have the lowest level of digitization.

Despite the well-known benefits of digitalization there also are negative consequences for facing the abusive use of technology to generate financial benefits - in the form of **cybercrime**. According to the Global Cybersecurity Index (GCI), an initiative of the International Telecommunication Union [26], Malta, Greece, Romania, the Czech Republic and Cyprus are the most vulnerable countries in terms of cyber attacks. The lowest risk of cyber attacks is found in France, Lithuania, Estonia and Spain (**Figure 10**).

Related to cyber attacks, the number of malware applications developed in the last 10 years has highly increased (according with the data of [27]).

Cybercrime has been counteracted over time by investments in IT equipment in order to be protected against these risks. This statistic shows the global spending on cybersecurity during the last 4 years. In 2019, the spending in the cybersecurity industry reached about 40.8 billion U.S. dollars, with forecasts suggesting that the market will reach 43 billion by 2020 as the best-case scenario, taking into account the coronavirus' (COVID-19) impact.

Concerning the perceptions about the development of cybercrime risks in the European Union, according to a recent study conducted by the European Commission [28], 76 percent of respondents stated that they agree with the following statement: "Do you believe the risk of becoming a victim of cybercrime is increasing?"

Similarly, according to a big study conducted by the European Union Agency for Fundamental Rights [29], more than one in two people in the EU (55%) are

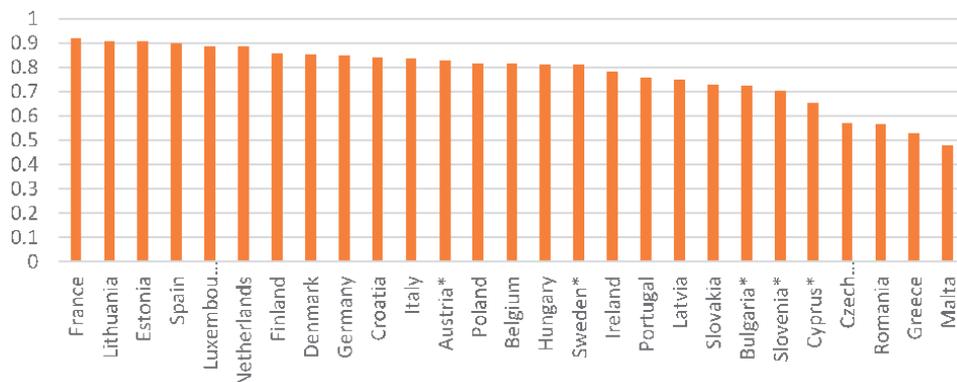


Figure 10. Global cybersecurity index in European Union countries, 2018. Source: Own calculations based on global cybersecurity index provided by international telecommunication union [26].

concerned about their online data – the information they share on the internet/social media – being accessed by criminals and fraudsters. According to the same study, one in four people in the EU (24%) are very worried about the unauthorised use of their online bank account or credit/debit card details in the following 12 months. In addition to that, 6 of 10 persons are very to somewhat worried about these risks.

Regarding experiencing cyberharassment and in-person harassment, the same previous study shows that 1 in 7 people in the EU (14%) have experienced cyberharassment in the five years before the survey. Nevertheless, experiencing in-person harassment remains more common than cyberharassment. However, the highest percentages of online harassment are registered in France, the Netherlands and Austria (58%, 55% and 53% respectively). At the opposite pole, registering lower levels of cyberharassment and in-person harassment, Hungary, Cyprus, Italy, Poland, Malta, Romania and Bulgaria are found. We may note that within the developed countries where human rights are more valuable, the levels of cyberharassment and in-person harassment are significantly higher than within the developing countries where the human rights are less valuable. According to ACFE [17], in the context of the COVID-19 pandemic, the cybercrime risk registers a significant increase. In May 2020, 45 percent of respondents reported a significant increase in cyber fraud risk. Additionally, 60 percent of respondents expected a significant increase in cyber fraud risk over the next 12 months.

When we analyse the average cost of cybercrime by domains in 2020, we find that the highest value of cybercrime cost is registered in healthcare (about 7.13 mil \$), followed by the energy, financial and pharmaceutical fields, while the global average cost of a data breach is 3.86 million U.S. dollars [27].

What motivates hackers? According to the 2020 Hacker Report provided by Hackerone [30] more than a half of cyber-attacks (about 53%) are financially motivated while only 13% have an interest to the national state. However, when we talk about the average cost of cybercrime, the cyber attacks towards the national state face the highest cost (4.43 mil \$), followed by the other reasons.

2.7 Financial frauds

In the view of the aforementioned, one of the main reasons of the hackers is related to getting financial benefits which could be in the form of thefts from

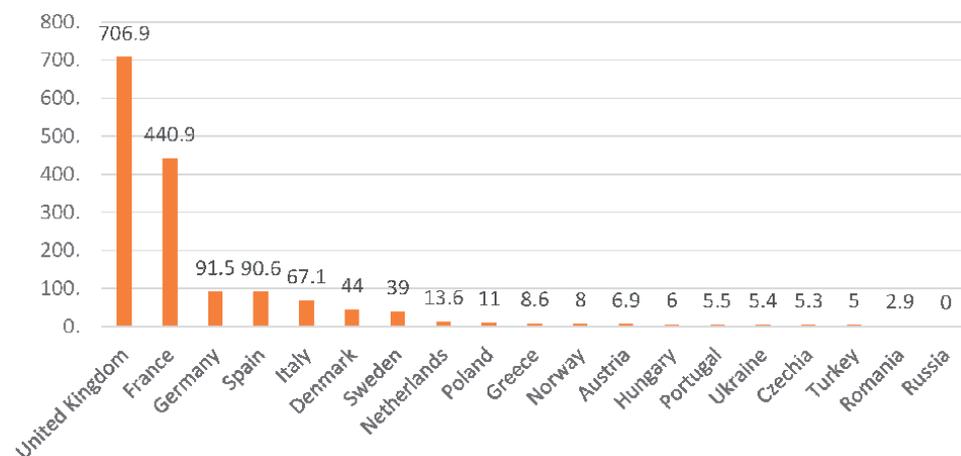


Figure 11. Card fraud losses in Europe in 2019, by country (total values, in million euros). Source: Own calculations based on data provided by fair Isaac Corporation [31] <https://www.fico.com/europeanfraud/regional-shifts>

customers' bank accounts. Regarding the total value of card fraud losses in Europe, the United Kingdom holds the first position (with 706.9 million euros) followed at a fairly long distance by France (440.9 million euros) and then Germany and Spain (with about 91 million euros) (**Figure 11**).

Romania has a very small level of card fraud losses compared to the other EU countries. However, when we check for the evolution of the value of card fraud losses there is a significant increase year after year. Actually, the value of card fraud losses has doubled in the last 5 years and achieved the value of 2.85 millions euros [27].

All in all, the general rate of economic crimes in Romania is 42% in 2018, meaning that 42% of the companies have been victims of at least one fraud in the past period [32].

3. The relationship between economic and financial crime and economic development

3.1 Data and methodology

Our sample covers the European Union 27 member states (EU-27) at present. The *Gross Domestic Product per capita (GDP)* is used by this paper as an economic development proxy, following various research works [9, 33]. These prosperity levels, corresponding to per capita GDPs of EU-27 countries are provided by World Bank Group [34] for the 2005–2019 time period. According to the latest classification of countries and lending groups provided by World Bank Group [34], all EU-27 countries are classified as developed countries (high-income countries), the latest added to this privileged category being Romania and Bulgaria. Further on, the *Human Development Index (HDI)* comprises three key dimensions of human development: a long and healthy life, knowledge and having a decent standard of living, aggregated within a composite index through their geometric mean, according to UNDP [35]. It has been previously used as a proxy for sustainable development by Murshed and Mredula [36]. The most recent data on the HDI comprised by our study cover the 2005–2018 time interval.

Our financial and economic crime proxies include *Corruption*, *Shadow Economy*, *Money Laundering* and *Cybercrime*. The perceived levels of *Corruption* in the public sector are taken from the latest report of the Corruption Perceptions Index (CPI) provided by Transparency International [19]. Our study particularly deals with countries' rankings, generally ranged from 1 (lowest level of corruption) to 180 (highest level of corruption), selecting the EU-27 member states only, for the 2005–2019 time period. Furthermore, *Shadow Economy* is considered from the data provided by Medina and Schneider [20] for the 2005–2017 time period, through-out which it is calculated as a percentage of the official GDP. *Money Laundering* statistics cover the 2012–2020 time period. *Cybercrime* data reflect its 2018 values, extrapolated to the entire time frame.

The summary statistics for our independent and dependent variables are presented within **Table 1**, for our entire sample of 27 European Union countries, for the 2005–2020 available data. The average GDP of the EU in current US dollars is 32355.59, with the largest values attained in Luxembourg and the lowest values attained in Bulgaria and Romania. Romania and Slovakia have the lowest HDIs in the last reported year, while Germany, Ireland and Sweden lead in sustainable development. From the point of view of the financial and economic crime analysed proxies, the countries with the least developed such undesirable phenomena are Denmark, Austria and Estonia, while the countries with the highest economic crime levels are Bulgaria, Greece and Lithuania.

Variable	Mean	Std. Dev.	Min	Max	Observations
GDP	32355.59	21790.3	3899.908	118823.6	N = 405
HDI	0.863824	0.041065	0.75	0.942	N = 392
Corruption	34.3284	22.00019	1	94	N = 405
Shadow Economy	17.26011	6.072792	6.4	31	N = 351
Money Laundering	4.36428	0.789174	1.78	6.78	N = 243
Cybercrime	0.775741	0.120259	0.479	0.918	N = 432

Source: Own calculations in Stata.

Table 1.
Summary statistics of dependent and independent variables.

The underlying relationships between the development proxies on the one hand and the financial and economic crime proxies on the other hand may be depicted from the graphical representations of one against each other from **Figure 12** that also contain the linear fit of data.

Table 2 projects the correlation matrix between our variables. In order to fulfil the basic assumptions of multivariate data analysis through regression modelling, most variables are used with their natural logarithmic transformation [37], except for the Money Laundering variable. One may easily notice the indirect relationship that exists between GDP and HDI on the one hand and Corruption and Shadow Economy respectively on the other (negative correlation coefficients) and then the direct relationship that exists between GDP and HDI on the one hand and Money Laundering and Cybercrime respectively on the other (positive correlation coefficients).

Our unbalanced panel data are modelled through simple regressions, using the Pooled OLS method, in order to estimate the impact of financial and economic crime proxies upon the economic and human development. The resulting log–log and log–linear models have the following baseline equation:

$$\text{Development}_{it} = \beta_0 + \beta_1 \text{Financial and economic crime}_{it} + \varepsilon_{it} \quad (1)$$

where: Development_{it} – proxy for the development dimensions of country i in year t ; it includes:

GDP_{it} – the per capita current USD gross domestic product of country i in year t and.

HDI_{it} – the human development index of country i in year t ;

β_0 - intercept;

β_1 - linear effect parameter;

Financial and economic crime $_{it}$ – proxy for the financial and economic crime dimensions of country i in year t (Corruption_{it} , $\text{Shadow Economy}_{it}$, $\text{Money Laundering}_{it}$, Cybercrime_{it});

ε_{it} - the prediction error.

3.2 Results and discussions

The results have been synthesised within **Table 3**. Basically **Table 3** contains the estimations of the GDP economic prosperity proxy as a function of financial and economic crime proxies: the independent variables are, on turn, Corruption in model (1a), Shadow Economy in model (2a), Money Laundering in model (3a) and

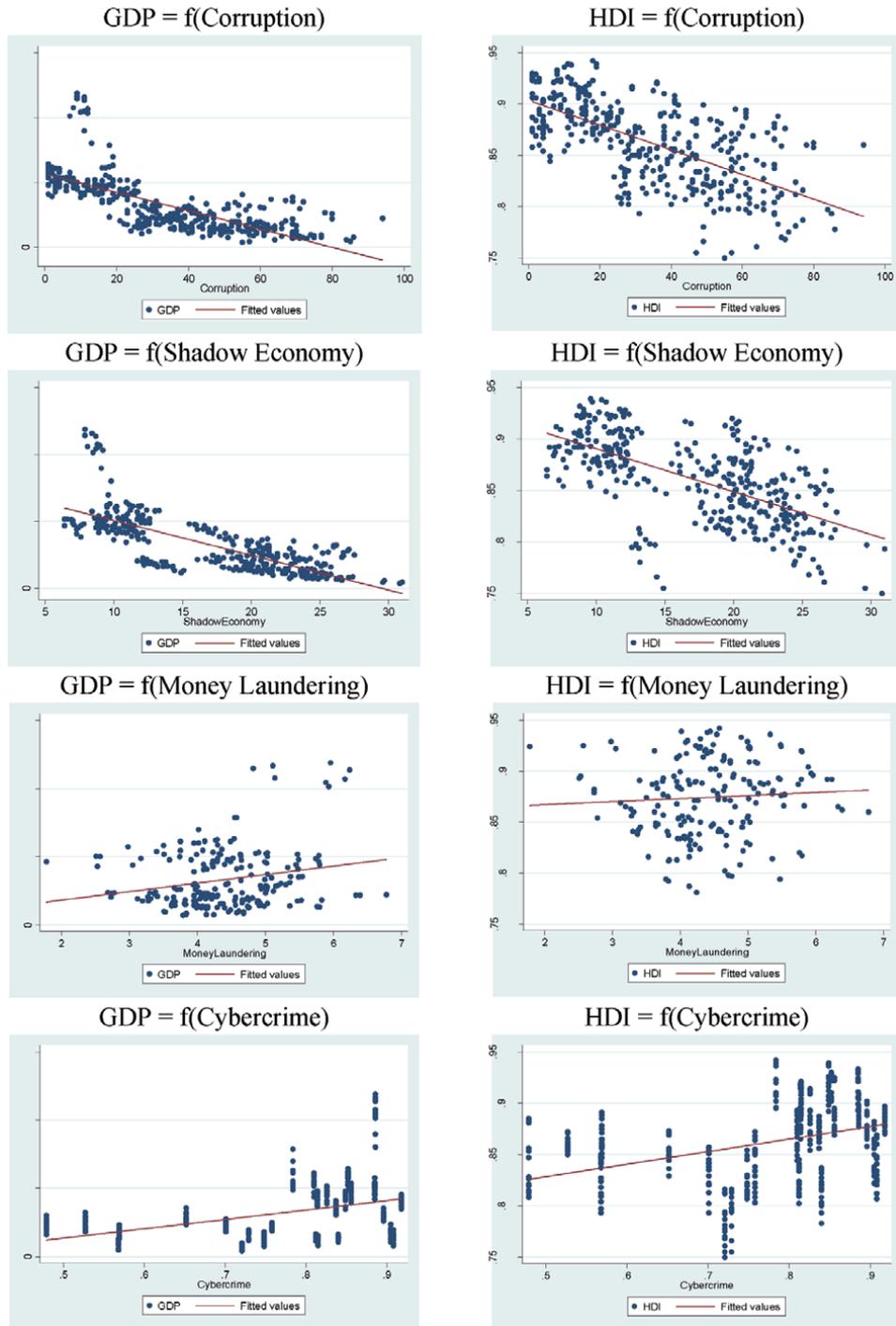


Figure 12. Economic and human development as a function of financial and economic crime proxies. Source: Authors' processings.

Cybercrime in model (4a). In the same manner, **Table 3** contains the estimations of the HDI as a function of financial and economic crime proxies (models (1b)-(4b)). Except for models (3a) and (3b) which are log-linear models, all the other models are log-log models. As such, models (1a), (2a), (4a), (1b), (2b) and (4b) are

	Log GDP	Log HDI	Log Corruption	Log Shadow Economy	Money Laundering	Log Cybercrime
LogGDP	1					
LogHDI	0.7465	1				
LogCorruption	-0.726	-0.6429	1			
LogShadow Economy	-0.7665	-0.5988	0.6425	1		
Money Laundering	0.1912	0.0745	0.2104	-0.1386	1	
Log Cybercrime	0.3704	0.3434	-0.4273	-0.3897	-0.092	1

Source: Authors' processings.

Table 2.
Correlation matrix.

commonly referred to as *elastic* and the coefficients of financial and economic crime proxies are referred to as *elasticities* [38]. Basically we want to estimate the impact held by various financial and economic crimes' proxies upon economic prosperity (Table 3) and human development (Table 3).

By simply comparing the estimated coefficients from Table 3, one may easily notice that the absolute values from Table 3 are larger than the ones from Table 3, thus we somehow expect a more pronounced impact of the vector of financial and economic crime proxies from Eq. 1 upon the economic development than upon human sustainable development.

For log-log models, the interpretations are considered as an expected percentage change in development when the financial and economic crime proxy increases by some percentage. For model (1a) in terms of effects of changes in Corruption on GDP (both unlogged) we have that multiplying Corruption by e will multiply the expected value of GDP by $e^{-0.4577}$. In other words, a 1% increase in Corruption multiplies GDP by $e^{-0.0045}$, so actually GDP is reduced by 4.6%, everything else unchanged. The effect of Corruption upon human development is estimated through the simple regression modelling from model (1b): a 1% increase in Corruption multiplies HDI by 0.9997, so actually HDI is reduced by 0.03%, everything else unchanged. So, corruption on the one hand and economic and human development on the other are indirectly related, the decrease in corruption having positive effects upon development.

The impact of shadow economy upon development proxies is estimated through models (2a) and (2b). As such, the -1.3301 elasticity from model (2a) (Table 3) gives that a 10% increase in Shadow Economy multiplies GDP by 0.8809, so actually we get an 11.91% reduction of economic prosperity. In a similar manner, a 10% increase in Shadow Economy reduces HDI by 7.01%, everything else unchanged, from model (2b) (Table 3). As expected, the more shadow economy evolves, the less developmental benefits it brings. All in all, the negative effect of corruption and shadow economy upon economic prosperity and human development is validated, with a stronger impact upon economic development.

Model (4a) estimates the effect of cybercrime upon development. Multiplying Cybercrime by $e \approx 2.72$ multiplies GDP by $e^{1.3342} = 3.7969$, i.e. increases the expected GDP by about 279.69%. Further on, model (4b) estimates the multiplicative changes in both Cybercrime and HDI: multiplying Cybercrime by e multiplies HDI by 1.0967, i.e. increases the expected HDI by about 9.67%. The graphical representations and the correlation coefficients depicted a direct relationship between the

Table 4a Results of Pooled OLS estimation of GDP as a function of Financial and Economic Crime
 Dependent variable: GDP per capita

Variables	Model (1a)	Model (2a)	Model (3a)	Model (4a)	Model (1b)	Model (2b)	Model (3b)	Model (4b)
Log Corruption	-0.4577 ***				-0.0268 ***			
Log Shadow Economy		-1.3301 ***				-0.0738 ***		
Money Laundering			0.1359 **				0.0034	
Log Cybercrime				1.3342 ***				0.0923 ***
Constant	11.6291 ***	13.8483 ***	9.6121 ***	10.5302 ***	-0.0639 ***	0.0536 ***	-0.1502 ***	-0.1247 ***
R squared	0.5133	0.5934	0.0294	0.1207	0.3410	0.3655	0.0042	0.1119
Adjusted R squared	0.5120	0.5922	0.0249	0.1185	0.3393	0.3637	0.0012	0.1096
N	405	351	216	405	378	351	189	378

Source: Authors' processing.
 Note: Within parentheses there are the p-values and *** designates the 1% significant coefficients, ** designates the 5% significant coefficients and * designates the 10% significant coefficients.

Table 3.
 Simple regression modelling.

evolution of cybercrime and that of development proxies. That direct correlation is validated by our tabled coefficients: cybercrime and both economic and human development move in tandem, like a hand in hand walk. It seems that the more developed the economic conditions are and the more evolved people have become, cybercrime is conferred a boost, especially in the last years.

Nonetheless, the interpretation of the log-linear model (3a) (**Table 3**) is the following: each one unit increase in Money Laundering increases LogGDP by 0.1359. For the untransformed GDP, each one unit increase of Money Laundering increases economic prosperity by a multiple of $e^{0.1359} = 1.1456$ or a 14.56% increase. Then, model (3b) provides the following estimation: each one unit increase of Money Laundering increases human development by a multiple of 1.0034, that is a 0.34% increase. Thus, there's a direct relationship between money laundering and development, just like between cybercrime and development. Somehow, money laundering has a positive effect on prosperity, both economic and human, influencing it directly. We have not tested for causality as this was not our research purpose, but money laundering moves just like development does.

4. Conclusions

This study brings a detailed insight on the evolution of the dimensions of the financial and economic crimes, with an explanatory approach of the top of frauds, corruption, shadow economy, money laundering, tax evasion with an emphasis on VAT lost revenues, cybercrimes as reflected by the Global Cybersecurity Index, malware and data breaches and card fraud losses, closely related to the specialised literature in this field. Our explanations and interpretations cover both the absolute values and the dynamics of these unwanted phenomena, for the particular situation of European countries, with a slight emphasis on Romania.

Our empirical analyses cover the EU member states and throughout the time frame of the last 15 years, the impact of the vector of financial and economic crime proxies upon the economic development measured as per capita GDP has proved to be stronger than their impact upon HDI as a proxy of sustainable human development. Nonetheless, in accordance to the reviewed literature, for our sample of European Union countries, corruption and shadow economy are indirectly related to their vector of development proxies while the money laundering and cybercrimes of the “white collars” are directly related to the vector of development proxies we study. All in all, reducing the shadow economy and corruption must be a top priority for governmental policies towards achieving economic development. According to our findings, their impact upon development is negative, so strict measures should be applied through various public policies in order to limit the flourish of corruption and shadow economy. Public private partnership agencies or private entities could also focus on diminishing corrupt behaviours and situations and reducing shadow economy phenomena, in order to obtain benefits in the fields of economic prosperity and societal wellbeing. Nonetheless, our estimations support a positive effect of cybercrime and money laundering upon development and the explanation resides in the boost registered by these undesired financial and economic crimes due to technological progresses and digitization. Also, highly skilled professionals might find it easy to engage in such activities. We consider that these actions and digital processes should be strictly monitored and regulated. The main policy implications of this research refer to the awareness of the level of economic and financial crime by the government authorities from the European countries in order to find the proper solutions to diminish it. These solutions should concern at least the following areas: improving the level of financial education of citizens in order to improve

fiscal morality; improving the efficiency of recovery of the proceeds of crime while this level is still low; and increasing the degree of digitalization in public institutions, including the tax administration.

One of the limits of our study is related to the lack of data for a longer period, especially regarding the variables associated with digitization and cybercrime while these phenomena are relatively recent. Our data are the most recently available ones but they are still somewhat limited, not always covering the entire 2005–2020 time interval. For the future we intend to surpass these limits through the use of exploratory factor analysis on the multiple interrelated facets of the financial and economic crime phenomena, in order to have the conceptually defined dimensions further aggregated as newly derived factors. Furthermore, for a larger dataset of analysed countries, once we are able to enlarge our cross-sectional dataset, cluster analysis would help us form similar groups, on certain algorithms and probably obtain some interesting conclusions.

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Author details

Monica Violeta Achim^{1*}, Sorin Nicolae Borlea^{2,3,4}, Viorela Ligia Văidean¹,
Decebal Remus Florescu⁵, Eugenia Ramona Mara¹ and Ionut Constantin Cuceu¹

1 Babes-Bolyai University, Faculty of Economics and Business Administration,
Finance Department, Cluj-Napoca, Romania

2 University of Oradea, Faculty of Economics, Doctoral School, Oradea, Romania

3 Western Vasile Goldis University of Arad, Faculty of Economics, Informatics and
Engineering, Department of Economics, Arad, Romania

4 Babeş-Bolyai University, European Research Institute, Cluj-Napoca, Romania

5 Babes-Bolyai University, Faculty of Political Science, Administration and
Communication, Journalism Department, Cluj-Napoca, Romania

*Address all correspondence to: monica.achim@econ.ubbcluj.ro

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Role of Green Spaces for Maintaining Well-Being in Residential Community Development

Prashanti Rao

Abstract

The planned green spaces are the most significant social spaces for people to interact on a daily basis and also considered as one of the sustainability indicators for maintaining the well-being in residential Communities. The benefits of green space for wellbeing are extensively recognized and progressively more documented. Due to increasing urbanization and housing demand, Residential communities are growing in suburbs and few in the urban core. Due to which depletion in per capita green space is recorded. This book chapter intends to look into the challenges of the residential communities and how Green Spaces (Passive and Active) within the communities helping in bringing back the quality of life and well-being. Further, it discusses the benefits of green spaces at the community level, through case studies. Conceptually this entire study propels the belief that the residential communities usually comprise of the varied age user group and all of them have the right to led a better quality of life. It can be possible only when they are accessible to green space and avail maximum perceived benefits like safety and security concerns, healthy environment, and social cohesion. Housing environments should enable residents to have positive experiences through the allocation of diverse green environments, which lead to physically and mentally happy, healthy living. Such positive experiences affect their happiness level, thus leading to sustainable lives.

Keywords: accessibility, green space, quality of life, residential communities, well-being

1. Introduction

The planned green spaces are the most significant social spaces for people to interact on a daily basis and also considered as one of the sustainability indicator for maintaining the well being in residential Communities. The benefits of green space for wellbeing are extensively recognized and progressively more documented. Much of this work focus on the potential of natural environments to provide opportunities to enhance wellbeing in different ways:

- Physical wellbeing through physical activity and fresh air.
- Mental wellbeing through stress reduction and attention restoration.

- Social wellbeing through social integration, engagement and participation.

These residential communities should enable residents to have positive experiences through the allocation of diverse green environments, which lead to physical, mental happiness and healthy living. Such positive experiences affect their happiness level, which is an important component of well being thus leading to sustainable lives. The immediate ecological benefits of green spaces are reduction in the urban heat island effect, cleaner air, and reduced noise pollution, which have been shown to improve health-related quality of life, and reduce both morbidity and mortality. However, most of the residential communities when designed have been excessively focused on their economic and iconic value, while the importance of residents' experiences has been ignored in the living environment. On the other hand, the standards and bye-laws reflect variation in the provision of Green Spaces based on criterion like area and accessibility. Accessibility to Green Spaces is a complex concept, as it depends upon the age group and pace of mobility of the user, i.e. low mobility and high mobility. In terms of psychological comfort, the definition of accessibility changes from physical accessibility to visual accessibility (safe place for use) for few user groups. Conceptually this entire study propels the belief that the residential communities usually comprise of varied age user group and all of them have right to led a better quality of life. It can be possible only when they are accessible to green space and avail maximum perceived benefits.

1.1 Importance of green environments for residential communities

In many countries like England, Australia, Germany and Belgium the concept of the green environment is popular they explored healthy city planning and defined it as an effective tool for achieving sustainable health and well-being in humans. It had been observed in many empirical studies that the varied types of green environment influences and helps in improving the overall life satisfaction of residents, including their well-being, amenity, sociality, health, and comfort. It is important that these types of green environments are publicly accessible to provide spaces of social interaction for residents. The green spaces have diverse classifications, and each provides its own values and benefits. Thus, further exploration of green environments is critical to ensure higher accessibility, usability, and functionality of green environments for future residents. In many residential communities green spaces are buffers between Built and Exterior surroundings. In addition, Multi unit residential developments have focused on branding value and esthetic aspects and ignored the importance of natural spaces within the living environment. However, the importance of green spaces in residential communities has been recognized by residents and in some communities they are developed and protected voluntary. Hence it is essential to understand the importance of green spaces for sustenance of the well being of residential communities and their overall development.

2. Understanding terminologies

2.1 Green spaces

The presence of green spaces is considered as one of the important components for good quality of life in urban areas. For this reason, it is important to understand the scale, functions and benefits of green spaces ranging from regional to local scales/levels. In this context, a few definitions are discussed below. Green spaces is a broad terminology, which may be used for both macro level and micro level spatial

scales. This is the definition of urban green spaces in the European context, which is concurred with among a majority of ecologists economists, social scientists and planners.

Urban Green [s] are green space[s] located in urban areas mainly covered by vegetation, which are directly used for active or passive recreation, or indirectly used by virtue of their positive influence on the urban environment, accessible to citizens, serving the diverse needs of citizens and thus enhancing the quality of life in cities or urban regions [1].

Whereas, in context of the United Kingdom planning documents, Green spaces are an area of grass, trees, or other vegetation set apart for recreational or esthetic purposes in an otherwise urban environment. Green spaces are the 'green lungs' of our towns and cities which contribute to improving people's physical and mental health by providing places for informal recreation – walking, cycling, sitting, socializing and children's play – and 'breathing spaces' to take time out from the stresses of modern life. They include not only areas to which the public have physical access, but also visual access, for example, in the way green spaces provide setting for building, communities, and everyday activities.

Yet in the Indian context, green spaces of the residential areas are termed as planned open spaces, which come under the local open space system. Detailed layout of residential sectors will have to give due consideration to the provision of formal and organized second level open space corresponding to the local open spaces forming an integral part of the built form. Local open space system is envisaged to be linearly structured establishing continuity engulfing the recreational and community based social facilities, the third level of open space corresponds to system of open spaces provisions made within sectors and neighborhoods consisting of neighborhood consisting of neighborhood parks linearly inter-linked with an overall open space network.

The above green spaces definitions clearly state that in the European context, the green space definition includes the function, user category, accessibility and its impact on quality of life. Whereas the definition in context of the United Kingdom elaborates green spaces in terms of its physical characteristics, function performed, perceived benefits availed and about physical and visual accessibility. However, in the Indian context green space is considered for provision in the terms of accessibility and connectivity. According to above discussion the green space might be understood as.

Green spaces are those planned open spatial layouts with visual and physical.

Accessibility in a residential community, which are committed to guarantee services including passive and active recreation. As an impact interface they can enhance social cohesion, feelings of safety–security as also other perceived benefits to all users.

2.2 Well being

Well-being is the experience of health, happiness, and prosperity. It includes having good mental health, high life satisfaction, a sense of meaning or purpose, and ability to manage stress. More generally, well-being is just feeling well (Take this quiz to discover your level of well-being.) Well-being is a positive outcome that is meaningful for people and for many sectors of society, because it tells us that people perceive that their lives are going well. Good living conditions (e.g., housing, employment) are fundamental to well-being. Tracking these conditions is important for public policy.

Wellbeing is important because it effects both physically and mentally, and is the essence of living. Our perception and our ability to observe our thoughts and

feelings is what makes us human and separates us from other creatures. We owe it to ourselves to live our lives to the fullest while we have the chance.

There is no consensus around a single definition of well-being, but there is general agreement that at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning. In simple terms, well-being can be described as judging life positively and feeling good. For public health purposes, physical well-being (e.g., feeling very healthy and full of energy) is also viewed as critical to overall well-being. Researchers from different disciplines have examined different aspects of well-being that include the following

- Physical well-being.
- Economic well-being.
- Social well-being.
- Development and activity.
- Emotional well-being.
- Psychological well-being.
- Life satisfaction.
- Domain specific satisfaction.
- Engaging activities and work.

3. Green space functions and benefits

The Tangible and Intangible Benefits of Green Space functions and benefits are discussed below.

3.1 General benefits

The functions and benefits of green space are plenty in number. Green Space symbolize peace, minimal stress and a cleaner environment for many people, which are considered as important factors in making a city livable, pleasant and attractive for its citizens and guests. The primary functions performed by Urban Green Space are given in **Table 1** below.

The significant benefits obtained through urban green space, are categorized under two perspectives tangible and intangible. Tangible benefits include ecological benefits (absorbing pollutants, clean air, improve the urban climate, etc.), planning benefits (network linking, improving accessibility, noise barrier, visual screening and safe walking and recreational) and economic benefits (Comparing with other landscape elements, neighborhood parks induced the heaviest investment intention in the home buying behavior).

Likewise, the intangible benefits include social benefits (Opportunities for people of all age groups to interact, encourages volunteerism, promotes stewardship, help individuals with disabilities, enhance cultural life by providing venues for local

S No.	Type	Functions
1	Regulation functions	Regulates the chemical composition of atmosphere and purifying the local air Controls the runoff and flooding Regulates the hydrological cycles Supports biological diversity in the city Prevents the soil erosion and sediments Regulates the local and global climate
2	Carrier functions	Conserves the energy in the city through control of the micro climatic variations Help recreation and tourism Integrates urban man to nature.
3	Production function	Recharging the ground water table Providing medical resources Providing Raw material for some of the human activity
4	Information function/ dissemination	Esthetic information Spiritual and religious information Cultural and artistic inspiration Scientific and educational information sources

Source: Rao, P, 2017 from Ph.D thesis of SPA, Bhopal.

Table 1.
 Showing various functions of green spaces.

festivals, civic celebrations, and theatrical performances, reduces crime, strengthens community by reflecting the different communities they serve and meeting their varying needs) as shown in **Figure 1** were discussed by Grahn P and Stigsdotter U A, [2] P Jain, [3].

4. Understanding green space usability and user characteristics (residential community)

Both green space and housing research are broad fields of study. The paradigm shift observed understands the relationship between green space and its usability in the residential area. In green space research, there is an increasing number of studies that concern people’s experience and use, but it has been pointed out that more research is needed due to increasing urbanization issues like safety and security [4, 5]. Many previous models and theories substantiate that the usability of green space is directly associated with its accessibility. The usability of green space differs due to different spatial arrangements within the residential communities and variation in the provision of it with respect to quantity and quality. Physical accessibility and the connection is a major research area in the field of green space use in the residential area because people are associated with the green space usage. Hence, place accessibility and people accessibility represent different research foci in accessibility research [6]. While by ‘place accessibility’ researchers conceive geographical access as a location attribute, with people accessibility—researchers, on the other hand, focus on the ability of different groups of individuals to access the

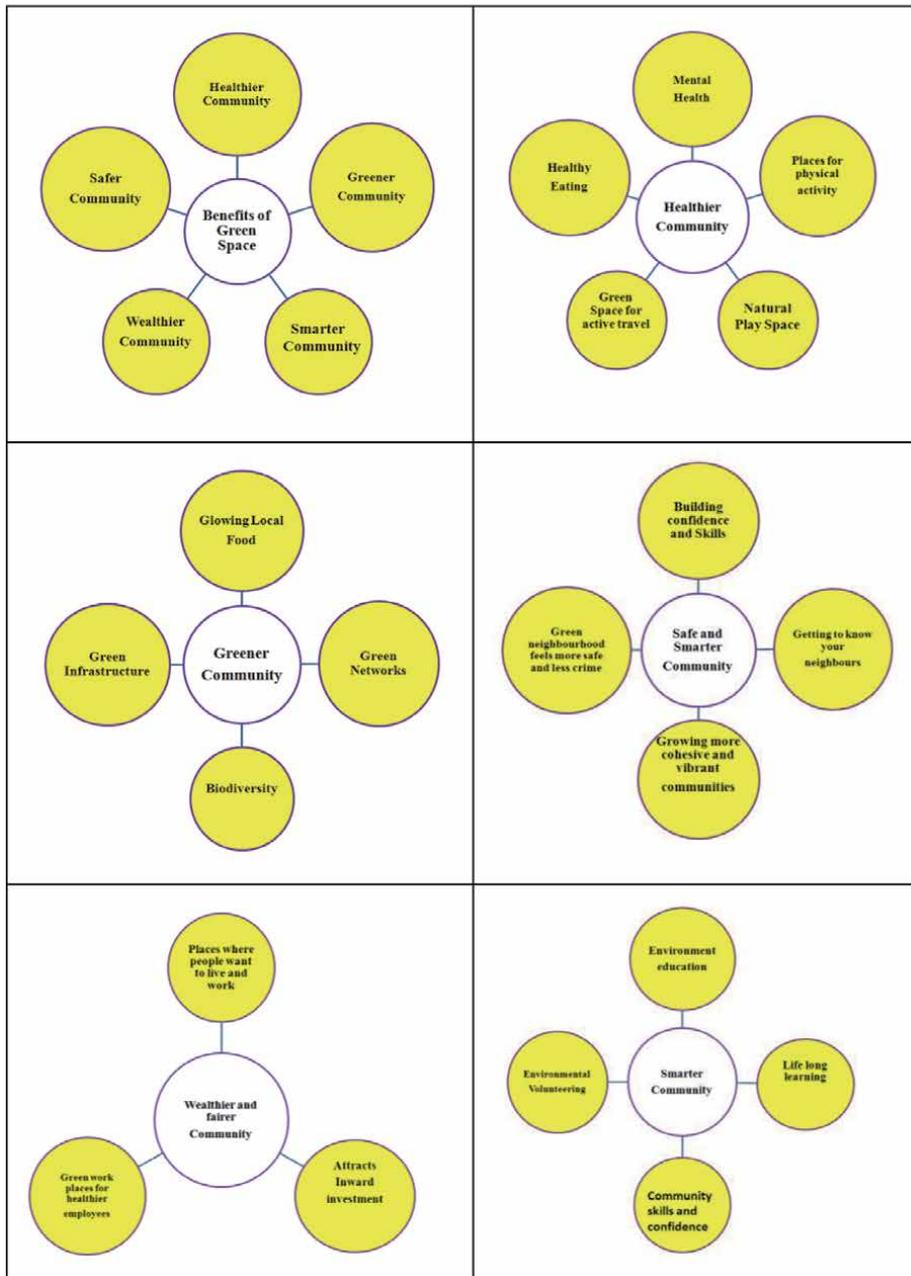


Figure 1. The benefits of green at community level. Source: Grahn P and Stigsdotter U A, 2003 [2].

open space [6]. This suggests, that place and people accessibility are different representational frameworks that provide different operational definitions for accessibility.

4.1 Impact of accessibility, connection and recreation in green space use and impact on well being

Many empirical studies have been attempted to understand the purview of green space with respect to accessibility and connection in residential and city level, in the

UK and European cities. A few of them as illustrated below attempt to understand the needs of users. Two empirical studies, one in the UK and the other in Canada had been conducted to explore the modern meaning of open spaces and for the quality of green space for walk-able community areas respectively. The study by Burgess, J, carried an empirical research in local and neighborhood level park in UK with a sample size of 406 to explore modern meaning and values for open spaces in the city. According to their findings, the major physical factors to impact park use were accessibility and connection while the rest are natural elements required for active and passive activities. In this study, apart from recreational needs and maintenance, other attributes also impact the use value of local and neighborhood level parks. These were the natural environment, sensitivity to the change of seasons, wild patches of land and woods., Varied topography and plants, were also addressed for creating an appealing environment – yet it strongly implied proximity to the residential area as significant. A similar study conducted was theory-based qualitative research conducted in the urban community of Canada. The study tried to explore a framework for understanding the quality of an urban community in the relationship between quality and physical form. The physical attributes strongly advocated by the researcher were outdoor amenities, adequate seating, barrier-free environment to achieve the quality for the walk able community. In other words, recreational facilities should be placed in the accessible distance and connected with other essential street furniture. Therefore, both these studies emphasize on outdoor amenities and physical characteristics of GS enhancing the sense of community. There are several studies, which indicate the high demand of GS at the spatial level. In this purview, conducted the survey in few European cities at neighborhood and city level and strongly advocated regarding the spatial needs for GS for all. The report produced by them stated an observation given below., Where one GS site cannot accommodate all users or serve a full range of purposes, the wider spread of GS provision in an area as a whole is required. Similarly, Sullivan et al. [7] found the relation between GS and involvement of individuals in social activity. Their study states that 83% more individuals engaged in social activity in GS as opposed to sparsely vegetated or concrete ones.

The recent model for the benefits of urban green space as shown in **Figure 2** suggested by Bedimo-rung et al. [8] describes the relationships between park benefits, park use, and physical activity, and the antecedents/correlates of park use. In this classification scheme, the discussion focuses on park environmental characteristics that could be related to physical activity, including park features, condition, access, esthetics, safety, and policies which is responsible for well being of residents. In another study by Giles-Corti et al. [9, 10] tested three models of accessibility: simple distance from respondent's home to all public open spaces in the study area, distance and attractiveness. Here the attractiveness of public open space scored over the distance and attractiveness or size of the POS. However, when the size of green space is considered, those with excellent access to large attractive public open space were more likely to use them, suggesting that after distance was taken into account, size was more important than attractiveness in encouraging use. The above discussion during this period strongly indicates that the most of the studies related to green space are exploring various other aspects apart from its importance of physical proximity. Later on, many studies suggested the relation between the accessibility and quality of green space are not different perspective when usability of green space is considered. Both these aspects impact equally upon green space usability.

The concept of *accessibility for all* was also tested in various studies which is responsible for developing the well being for the residents in which it was observed that to induce diversity in the usage of green space, diversity in amenities is also required. The study conducted by Croucher et al. [11] does not encourage

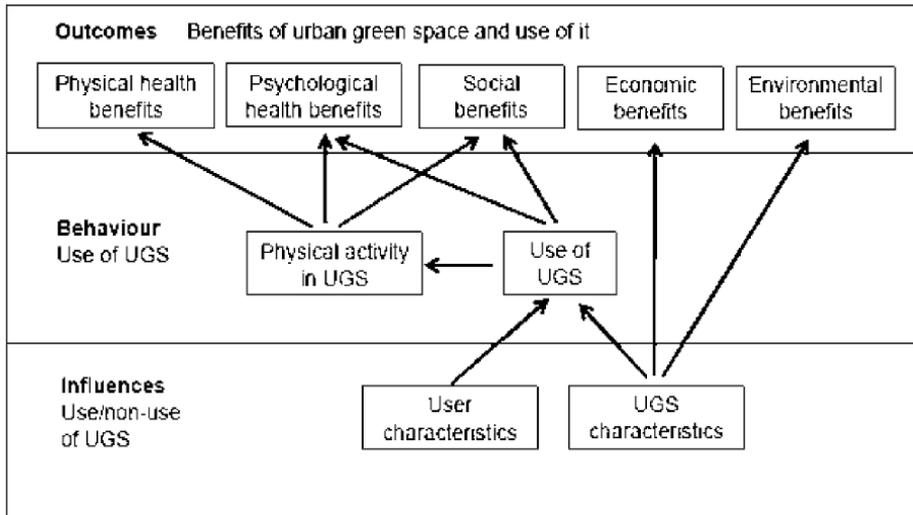


Figure 2.
A model for the benefits of urban green space (re modified by author) source: Bedimo-rung et al. [8].

undedicated use unless there is diversity in facilities. Further studies distinguished between the tangible and intangible benefits as an exploration of individual and neighborhood shows that the perceived benefits enhanced due to increased green space, recreation activities and accessibility to all persons. Thus, both studies emphasize the quantity, as well as the quality of green space. The study reveals that these are the two most important considerations for the diverse users across individuals to communities.

4.2 Impact of perceived psychological comforts (social cohesion, safety, perceived benefits) on green space usability

Some studies, as discussed below show the resident’s perception or urge for green space usability. In this the primary emphasis is on social interaction spaces along with accessibility, aesthetical design consideration, and maintenance factors. The theory of reasoned action states that of the two perspectives of individual psychological comfort for using the green space (as shown in **Figure 3**), one is personal in nature, and the other reflects social influences. One particular factor is the individual’s positive or negative evaluation of performing the behavior.

That’s why usage of green space depends on personal reasoning or following others aspiration. On the contrary, the socio-ecological model developed by Giles-Corti et al. [10] gives a comprehensive model, which explains in detail the various

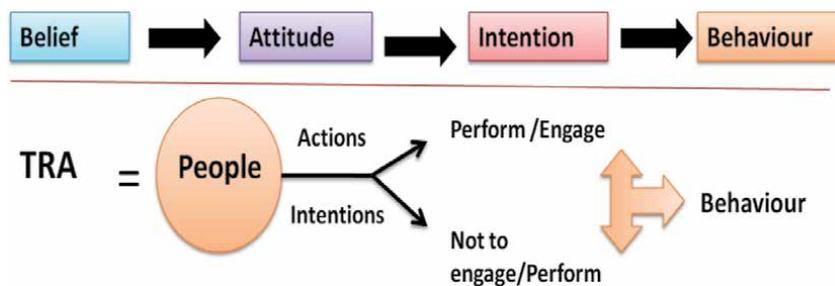


Figure 3.
Theory of reasoned action. Source: redrawn by author.

environments required for any green space usage including user characteristics as shown in **Figure 4**. The facilities available within green space also impacts on perceived environment like safety, accessibility and comfort. Green Space with a variety of attractive attributes such as landscaped features, ponds, trees, and lakes can encourage higher levels of use.

Similar views have been projected by Cohen et al. [12] in which primary emphasis is given to social cohesion and safety factors in a green space. The initial research was developed into a manual for addressing social and ecological concerns. It further emphasizes the positive association between neighborhood features and the ability of residents to interact positively. Another study investigate three parameters, i.e. human-nature interaction, human-human interaction and perceived benefits.

The result shows the major indicators under all the three parameters were; contact with nature, esthetic preference, recreational and play, social interaction, citizen participation, sense of community unity with nature, solidarity with myself and freedom. All the three studies above show the parallel approach as also validate the socio-economic model. Peeping into the evidence-based studies about accessibility to residential green space clearly state that only physical proximity is not sufficient for proper usage of it. Arguably, accessibility to urban green space, including parks, is said to contribute to community well-being and a healthier city lifestyle. Past studies reveal that accessibility variable is not much beneficial when measured with quantitative spatial measures.

The theory of urban park indicates that both distance and green space size exert an impact on the diverse usability. Yet when empirically tested, the theory found a relatively weak relation between distance and park value. It indicated that accessibility is a much more complex construct. Similar studies also suggested the difference between geographical and subjective accessibility and its impact on green space usability. The geographical accessibility showed poor consistency with subjective-measured accessibility. It recommends that green space planning should

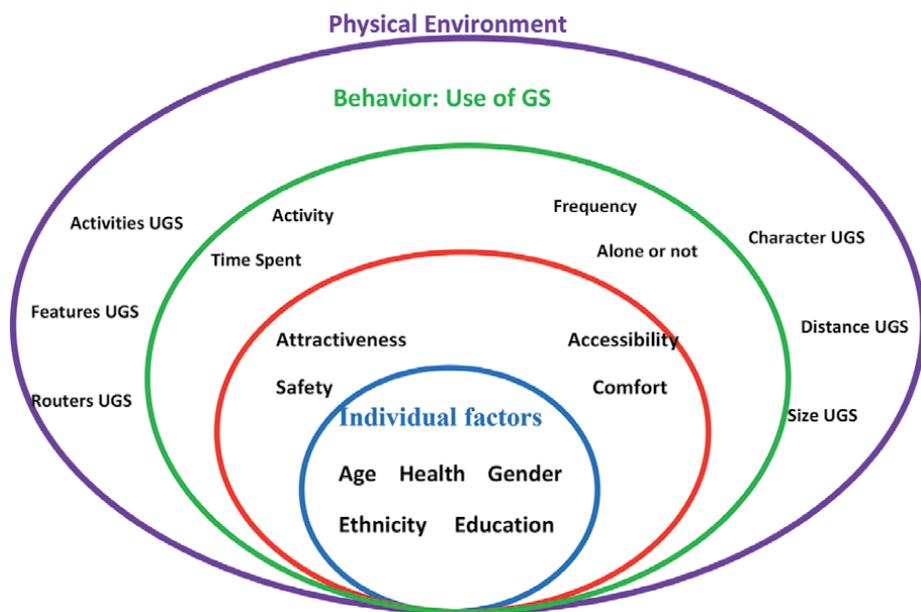


Figure 4. A socio-ecological model for the use of urban GS. Source: Giles-Corti et al. [10].

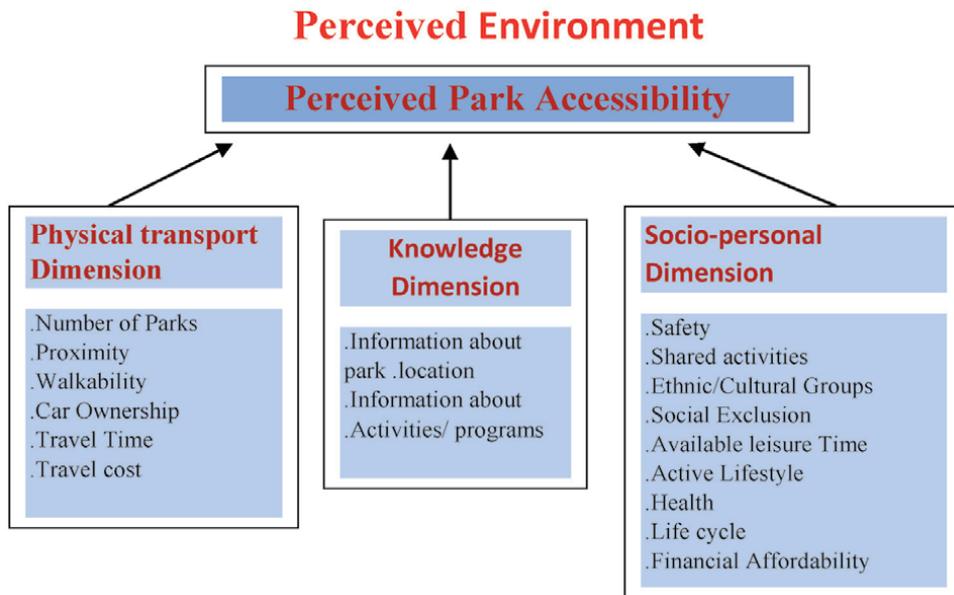


Figure 5. Conceptual model for perceived park accessibility extended planned behavior framework to explain open space use. Source: Dong Wang, 2013 [14] (redrawn by author).

go beyond physical indicators to gain more understanding about the diversity of users' preference [13].

A conceptual model for perceived park/green space accessibility as shown in **Figure 5** depicts that the socio-personal dimension, i.e. accessibility to for people's green space is one of the important factors. Out of which, factor of safety is the prime indicator. Increasing fear and crime in urban areas arouse the importance of security while accessing any green space by residential users. Hence a need is felt for spatial location criteria to be addressed as a serious concern, to offer green space under natural surveillance or visual access. A few past studies also substantiate the above said fact. Maas, J et al. [15] study investigated upon the fact that how green space in living environment associated with people's feeling of social safety in a closed and open green space and later discussed on Safety on parks and recreation. The recent studies by Xiaoping Li et al. [16], states that visibility of green vegetation also plays a major role in increasing perceived safety in urban areas. The above discussion shows that two parallel constructs for green space exists in theory, one emphasizing the physical accessibility and characteristics of green space for its use and the other emphasizing physical and VA along with green space characteristics for its use in general.

5. Paradigm shift in concept of accessibility

Accessibility, however, is a complex concept. It is difficult to define and more difficult to measure. While accessibility has now evolved into a multidimensional construct, current open space planning models still use physical proximity to an open space area as proxy variable to evaluate 'accessibility.' This approach, however, tends to overlook the complexity of the 'accessibility' concept [14].

The dependency on quantitative standards in planning practices for the provision of green space had developed a few limitations in its usability. This approach is unable to address the complexity of the accessibility concept. These quantitative

measures are relatively easy in operational and practice level, but inadequate to address the complex nature of people's perception regarding green space accessibility.

Almost all prevailing space standard models comprises of quantitative measures, which indicate relation between population sizes in the target area. And these quantitative measures provide the minimal amount of green space for the target population. This model is accepted worldwide due to its simplicity in operation, but later on has been criticized for its disregard of complex social systems. The park system model brought new approach, i.e. systems approach towards green space planning. The park system model holistically considers the interrelationship of parks and gardens that supports continuous movement within the system. Beyond quantitative standards, park system model emphasizes proximity to users and the variety of user experiences in different types of urban open spaces, from small community gardens to large metropolitan parks. On the contrary, contemporary green space models address the question of how much, what type of and where to provide green space should be given. (See **Table 2** for the comparative summary of the key criteria used by the three models). However, in present context, due to increasing crime and fear, there is an urge for safety, which these standards were unable to address. Hence, it reveals that quantitative measures like population size, spatial location, and distance are the most common parameters considered. But somehow in present context only these variables failed to address the people's perspective like social cohesion and perceived benefits etc. Thus it generates demand to analyze other factors which are responsible for enhancing people's need with respect to their green space. Hence need to examine qualitative aspects which needed to be incorporated in regulatory framework.

6. Empirical study to understand the impact of physical and visual access to green space in residential communities for obtaining benefits of physical, social and psychological well being by varied user age groups

The observational studies for green space were conducted for three selected colonies under each housing typology, Row housing-1, Group housing-2 and Multi unit residential housing-3 respectively. Observational data has been collected for morning and evening hours of weekends during the summer vacation (April to June month) to map the maximum usability of green space with respect to physical, social and psychological well being. And also to examine the impact of physical and visual accessibility to green spaces well being in residential communities. Data has been collected on the basis of physical verification of all activities happening during the selected time, i.e. morning 6:00 to 8:00 AM and evening 5:30 to 7:30 PM. Data has been collected to identify four major factors, i.e.

- What is the user age group and benefits they are availing?
- Issues of area and accessibility of green space impacting on wellbeing of residential community.

6.1 Case-1: row housing

Row Housing comprised of 80 number household was selected for observational study. These residential communities have two green spaces (P1 and P2). As depicted in **Figure 6** the P-1 is regular in size and had both visual and physical

S.no	Shape	Size in Meter	Area (sqm)	Accessibility
1.	Regular	30x24	720	Physically and visually
2	Irregular	—	225	Physically and Partially Visually

Source: Author.

Table 3.
 The physical characteristics of the green space – P1 and P2.

The results depict that users around the green space are more compared to those inside the green space. It is reflected in both the case of morning and evening hour’s observations for regular shape Green Space. The low mobility user group, mostly old age group are not using the inside space in spite of green space passive character. Dependent children along with the adults are more in numbers inside the green space because of availability of play equipments and benches inside the green space. These benches help them to sit and monitor their children while playing. On the contrary the irregular shape and partially visual green space benefits are availed by high mobility user. The types of benefits availed is depicted below in **Table 4**.

6.2 Group housing

Group Housing comprised of 200 number of household was selected for observational study. These residential communities have seven green spaces of regular size with different area and shape (P1, P2, P3, P4, and P5).

6.2.1 Physical characteristics

The physical characteristics of Regular shaped P3 has been observed and tabulated in observation **Table 5** below with physical and visual accessibility.

Benefits availed due to presence of Regular shape-physically and visually accessed green space-P1						
Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	yes	yes	yes	yes	yes	yes
High Mobility	yes	yes	yes	yes	yes	yes
Benefits Availed due to presence of Irregular shape -Physically and Partially Visually Accessed Green Space-P2						
Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	partially	partially	partially	partially	no	no
High Mobility	yes	yes	yes	yes	yes	yes

Source-Author.

Table 4.
 Benefits availed due to presence of green space – P1 and P2.

S.no	Shape	Size in Meter	Area (sqm)	Accessibility
1.	Regular	33x 40	1320	Physically and visually

Source: Author.

Table 5.
The physical characteristics of the green space.

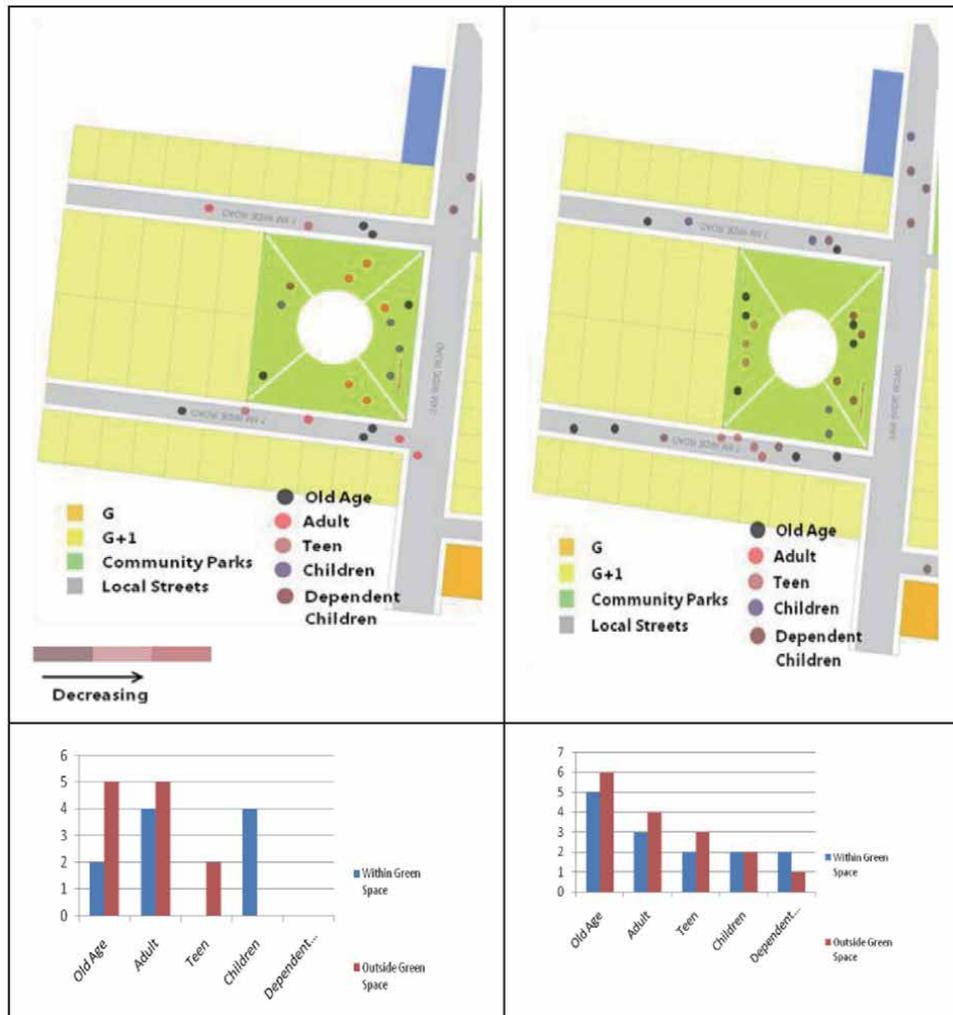


Figure 7.
The dot density mapping for graphical representation of number of users and category of users with in and around green space in row housing communities. Source: Author.

The dot density mapping technique for identification of category of users (Morning Hours 6:00 A.M to 8:00 A.M 2. Evening Hours 5:30 PM to 7:30 PM) (Figure 7).

The documented observation (as shown in Figure 8) is discussed below (Figures 9 and 10) (Table 6).

The users around the green space are more compared to those inside the green. It is reflecting in both the case of morning and evening hour's observation. The low mobility user group mostly old age group and children and high mobility user group

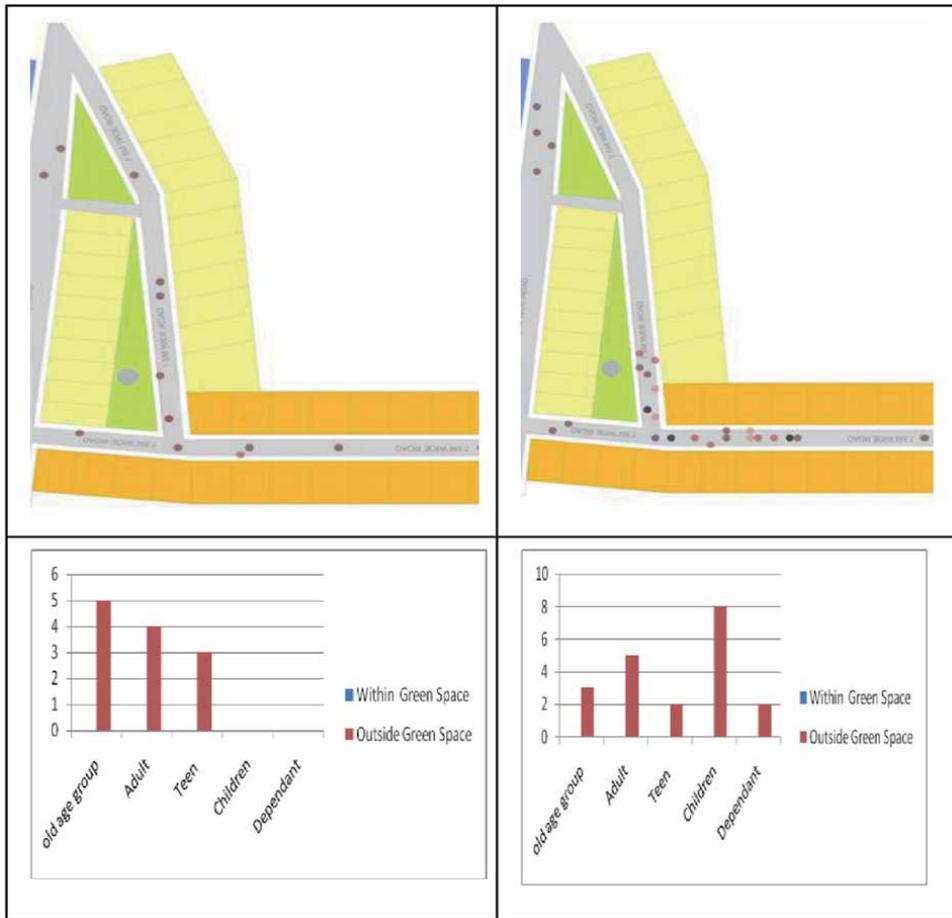


Figure 8. The dot density mapping for graphical representation of number of users and category of users with in and around green space in row housing communities. Source: Author.

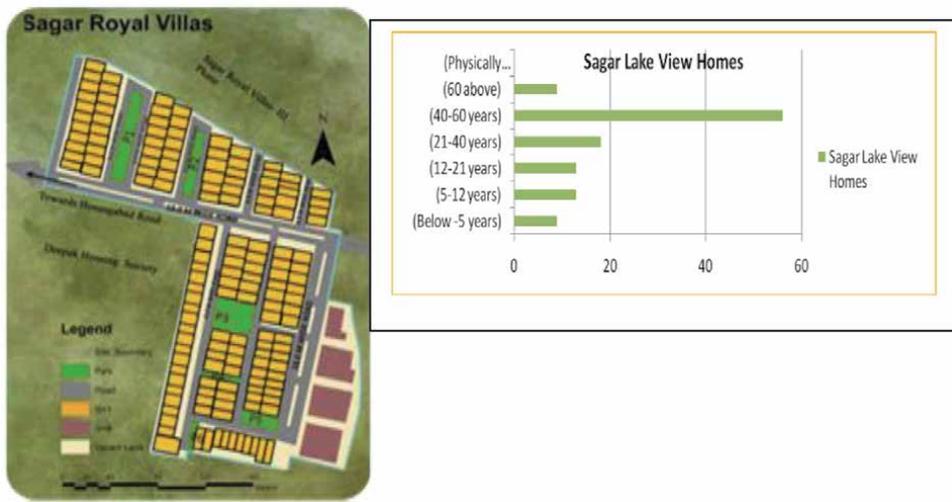


Figure 9. Group Housing typology and demographic profile. Source: Author.

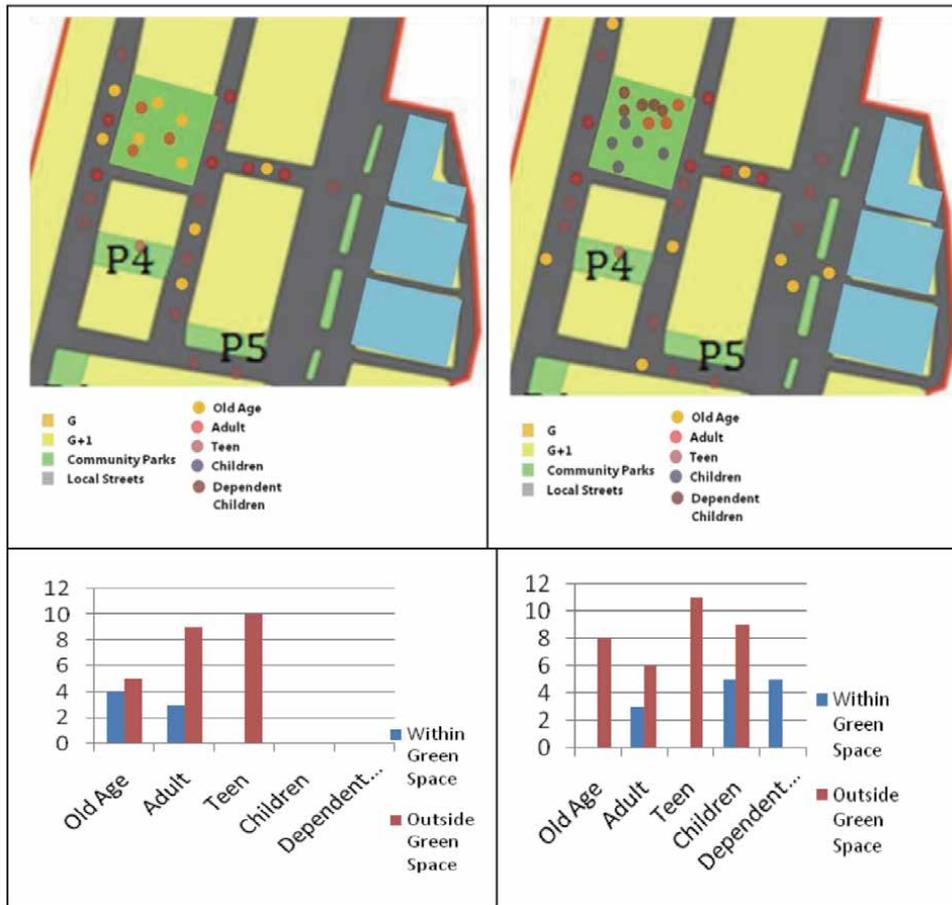


Figure 10. The dot density maps for graphical representation of number of users and category of users with in GS and around GS in group housing communities. Source: Author.

Benefits availed due to presence of regular shape-physically and visually accessed green space-P3						
Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	yes	yes	yes	yes	yes	yes
High Mobility	yes	yes	yes	yes	yes	yes

Source: Author.

Table 6. Benefits availed due to presence of green space – P3.

teenagers, adults are not using the inside space in spite of green space passive character. Dependent children, children along with the adults are more in numbers inside the GS because of availability of play equipments and canopy inside the green space.

6.3 Multiunit residential unit

The multi unit residential community comprises of 10 multi units of G + 6 structure having 8 flats on each floor in 4 units and 4 flats on each floor in remaining units. Having 4 patches of organized green spaces which is visually and physically connected (**Figure 11**).

6.3.1 Physical characteristics

The physical characteristics of Regular shaped P1, P2 and Irregular shaped P3, P4 has been observed and tabulated in observation **Table 7** below with physical and visual accessibility.

The dot density mapping for identification of category of users (Morning Hours 6:00 to 8:00 AM and Evening Hours 5:30 to 7:30 PM).

The documented observation is discussed as shown in **Figure 12**.

The users inside the green space are more compared to those inside the green space. This is reflected in both the cases of morning and evening hour's observation (**Table 8**).

- Both the low and high mobility groups use the inside space because the green space has a passive and active characterizes within it.

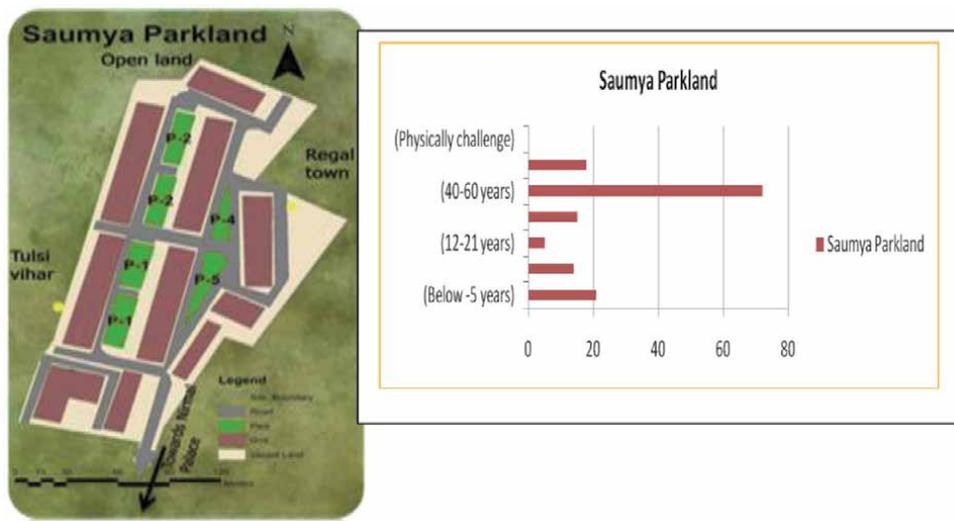


Figure 11. Multiunit housing typology and demographic profile. Source: Author.

S.no	Shape	Size in meter	Area (sqm)	Accessibility
1.	Regular –P1	18x60	1080	Physically and visually
2.	Regular –P2	18x60	1080	Physically and visually
3.	Irregular-P3		480	Physically and visually
4.	Irregular-P4		285	Physically and visually

Source: Author.

Table 7. Shows the physical characteristics of the green spaces.

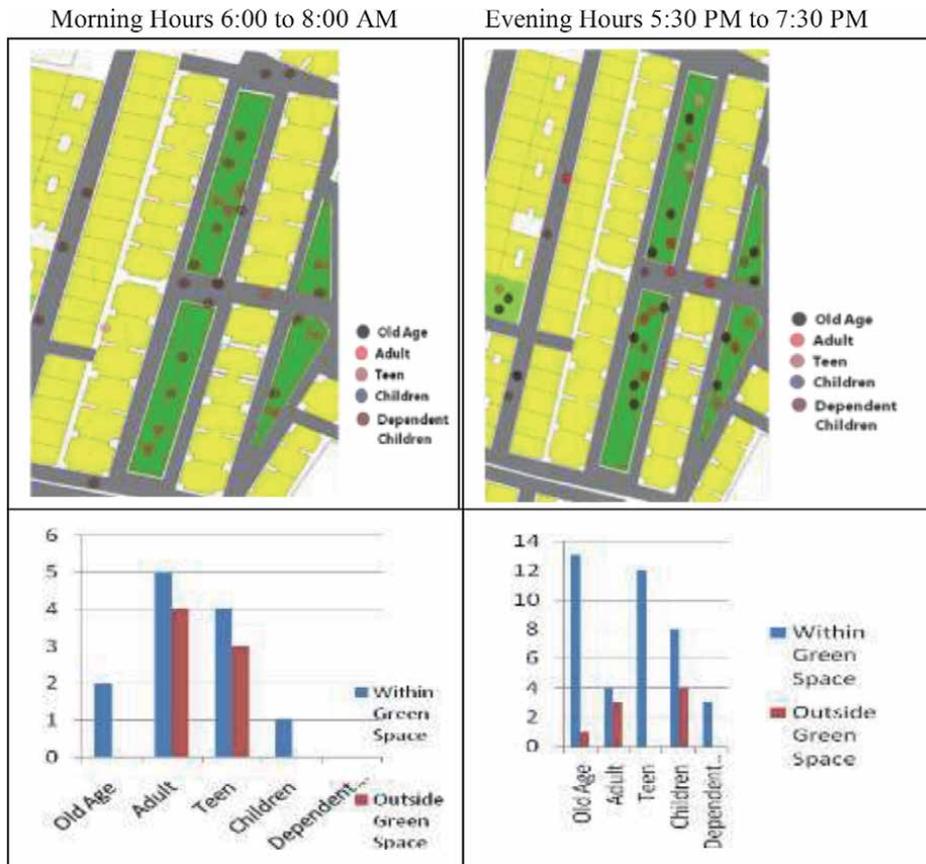


Figure 12. Maps of visual and physical accessibility of residents for their respective green space. Source: Author.

Benefits availed due to presence of regular and irregular shape-physically, visually and partially visual accessed green space-P1, P2, P3 and P4

Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	yes	yes	yes	yes	yes	yes
High Mobility	yes	yes	yes	yes	yes	yes

Source-Author.

Table 8. Benefits availed due to presence of green space – P1, P2,P3 and P4.

- Dependent children, children, teenagers along with the adults are more in numbers inside the green space because of availability of play equipments and canopy inside the green space.

All green spaces with Passive and Active amenities, providing the benefits of physical, social and psychological well being of varied user group.

7. Discussion and conclusion

Green Space is an umbrella term used to describe either maintained or unmaintained environmental areas, which can include nature reserves, wilderness environments and urban parks. It had been observed in all the three residential communities (Row, Group and Multi Unit) only presence of green spaces with physical, visual and partial visual access in spite of their irregular shape and size is responsible for bringing physical, social and psychological well being. Often, particularly in urban contexts, green spaces are purposefully designated for their recreational or esthetic merits. Global urbanization has reduced access to and engagement with green space, but there is good evidence of a positive relationship between levels of neighborhood green space and mental health and well-being. The experimental studies are carried out to examine and establish the link between the existing condition/status of the relation between identified components of wellbeing and green space for varied housing typology. Individuals have less mental distress, less anxiety and depression, greater wellbeing. A positive correlation between green space availability and physical activity level has been evidenced in systematic reviews. Indeed, physical activity at least partially mediates the positive relationship between neighborhood green space and well-being, Acute psychological outcomes of time spent in green spaces have also been reported; beyond green spaces functioning to promote pro-mental health behaviors, these environments have characteristics that can offer more positive experiences than equivalent time spent in other environments. Housing environments should enable residents to have positive experiences through the allocation of diverse green environments, which lead to physically and mentally happy, healthy living. Such positive experiences affect their happiness level, thus leading to sustainable lives.

Conflict of interest

The authors declare no conflict of interest.

Author details

Prashanti Rao
School of Planning and Architecture, Institute of National Importance, MoE,
Government of India, Vijayawada, Andhra Pradesh, India

*Address all correspondence to: prashanti_swe@spav.ac.in

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Section 2

Studies in Quality
of Life Improvement

Standard of Living, Well-Being and Community Development: The Case of Botswana

*Rodreck Mupedziswa, Tumani Malinga
and Poloko Nuggert Ntshwarang*

Abstract

There is considerable evidence in literature that suggests that the concept of standard of living has tended to be predicated on the notion of income alone. However, exploring this concept further, evidence suggests that the notion of standard of living goes beyond simply looking at income to include Gross Domestic Product (GDP), life expectancy, and economic opportunities available to individuals. This suggests that in a given country, when the above-mentioned 'components' are accessible to individuals, the expectation is that these will translate into realization of meaningful standards of living and wellbeing. This chapter seeks to explore how standard of living and well-being in Botswana have metamorphosed over time, from the pre-colonial period, through the early years of independence and the time of the discovery of diamonds, up to the present. Additionally, the article examines how community development initiatives across the country, have impacted standard of living and wellbeing of the population. The chapter concludes by suggesting strategies the government of Botswana could adopt in efforts to strengthen community development, with a view, ultimately, to further improve standard of living and wellbeing of the country's population.

Keywords: wellbeing, Botswana, standard of living, community development, poverty, social protection

1. Introduction

There are many ways in which the standard of living and wellbeing of a population can be measured in a particular country. In the context of most states shelved under the category of developing countries, Botswana included, the level of community development activities is considered key in measuring the standard of living and wellbeing of the people. Incontrovertibly, there is an obvious link between standard of living and wellbeing. Let us commence by briefly unpacking the meanings of the concepts of wellbeing and standard of living, before we explore the link with community development.

Many authors confess that the concept of wellbeing is difficult to define, comprehend and measure [1, 2]. This concept can however, be understood in varied ways [3]. According to Axford [4] the notion of wellbeing revolves around issues of

needs, rights, poverty, quality of life, and social exclusion. Stratham and Chase [5] add that this notion can be comprehended in two broad ways: first, through objective indicators such as household income, health status and educational resources, and secondly, through subjective indicators which include perceptions of one's quality of life, life satisfaction and happiness.

While the notion of wellbeing has traditionally tended to focus on the individual, some commentators take a broader perspective of this concept (wellbeing) and emphasize community rather than individual circumstances. Marshall et al. [6] observed that, "...wellbeing is a state of being where all members of a community have economic security; are respected, valued, and have personal worth; feel connected to those around them; are able to access necessary resources; and are able to participate in the decision-making process affecting them" (p. 1). Hence, viewed this way, wellbeing, as a concept, is envisioned to encompass economic, physical, social, emotional, environmental, spiritual and political factors. Deneulin and McGregor [7] corroborates this contention by the standpoint that wellbeing should be conceptualized and measured on the basis of psychological, political and social perspective within a specified socio-cultural context. The structural systems, especially the socio-economic and political spheres are important in assessing and defining wellbeing because there are varying levels of power embedded within them which is likely to empower or disempower people, and consequently exposing them to better or poor wellbeing respectively. In today's world, attainment of meaningful wellbeing is considered a goal that is immensely valued, especially in development circles. The essence of this concept is succinctly captured in Goal 3 of the UN's Sustainable Development Goals (SDG), which contends thus: 'Ensure healthy lives and promote wellbeing of all ages.'

The term standard of living (SL), on the other hand, basically refers to the amount and quality of material goods and services available to a given population [8]. Standard of living, as a concept, is apparently narrowly focused on the value of goods and services produced and consumed. Measurement of standard of living, therefore includes basic material factors such as income, gross domestic product (GDP), life expectancy, and economic opportunity [9]. The World Bank [10], put it more succinctly when it noted that standard of living is essentially measured by the Gross Domestic Product (GDP) per capita. Each individual in any given society has a right to an adequate standard of living. This is a fundamental human right as stipulated in the Universal Declaration of Human Rights crafted by the United Nations in 1948. Basing on the above observations, it can be surmised that attaining a certain standard of living, therefore, does impact an individual's wellbeing [11]. Thus the terms standard of living and wellbeing enjoy a symbiotic relationship. The current paper considers issues around standard of living, well-being and community development, with particular focus on Botswana's experience.

The Community development and wellbeing cannot be disassociated because they tend to coalesce [12]. Community development is critical because in most instances it uses participatory methods that help people to have a sense of improved wellbeing. Participatory methods are important in the achievement of wellbeing because they empower people. The use of participatory methods makes people to have a sense of ownership of the end results; local needs are accurately identified and met. Participatory methods also enhance team work and provide space to challenge certain ideas that do not benefit the community [13].

2. Wellbeing: concepts and theory

Sen's capabilities framework, as well as human needs, and adaptation theories have been used in efforts to understand the concept of wellbeing. Sen's capabilities

approach in particular emphasizes individual's capability and functioning to achieve a state of wellbeing [14], while the theory of human needs considers needs as universal and important for health and people's autonomy [15], Adaptation theory, on the other hand, shows that diverse components of wellbeing are dynamic and that people's adaptation to similar situations differs [16] hence similar factors cannot be used to define wellbeing.

Fisher [17] criticized current theories of wellbeing for their failure to capture the psychological status, hence making them irrelevant for social or public policy. Most literature points to two dominant ideologies, namely: (one) objective and (two) subjective conceptual frameworks to wellbeing. An objective perspective of wellbeing is consistent with Sen's capability model as it tends to focus on a variety of components or factors that have an impact on the quality of life such as physical health, emotional expressions, and one's ability to use educational achievement to attain life goals as well as dignified life that gives one the right to autonomy and participation in societal platforms that are meaningful to the individual. According to Kuklys and Robeyns [14], the capability model describes wellbeing as a personal achievement that is determined by a person's life choices and access to basic needs or rights. Sen's capability model has, however, been criticized for being narrowly constructed, with limited consideration of the contribution of structural systems on people's functioning or capabilities.

The subjective approach, on the other hand, tends to limit the conception of wellbeing to a few items that influence the quality of life such as income and employment status. According to Gasper [18], subjective wellbeing encompasses "feelings and/or judgements of the person whose wellbeing is estimated" (pp. 14). Western and Tomaszewski [19] argue that the definition of wellbeing should be inclusive of the socio-economic, political and environmental factors as they determine life satisfaction in one way or the other. The two authors further argue that measuring wellbeing from an objective perspective is not always fair because it often overlooks other important factors that interplays such as class, age and gender. In addition, wellbeing can be measured using social indicators, a framework which theorizes and measures wellbeing using social factors such as summative status of education, security, income and socio-political status. Theories of human need [15] consider wellbeing as the fulfillment of basic needs, health included. Gasper [18] argues that defining wellbeing from a need basis is normative and similar to the objective approach as emphasis is on external assessment and approval of subjective factors of a people's lives such as mobility and morbidity.

In the paper, the authors adopt Sen's theoretical (capabilities) approach to understanding wellbeing and standard of living as the paper focusses essentially on the government of Botswana's efforts to improve the quality of life of the people through various platforms of community development.

3. Botswana – socioeconomic and political profile

Before considering the nature of standard of living and wellbeing with particular focus on Botswana over the years, it is perhaps pertinent to commence by providing a brief account of the historical evolution of Botswana, with particular focus on the country's socio-political and economic factors. Botswana is a landlocked country situated in the southern part of Africa, covering 581,730 km² (see [20]). It is bordered by Zambia in the north, Zimbabwe in the northeast, Namibia to the northwest, and South Africa to the southeast. Botswana, which is a member of the 16 state economic block – the Southern African Development Community (SADC) – started off as a British Protectorate, before eventually gaining independence.

During the period 1895 to 1965 Botswana was administered by the British High Commission in Cape Town and Mafeking, South Africa. The country then attained Independence from Britain in 1966. As at 2014, the country's population was estimated at 2,024,904, having risen exponentially from 550,000 in 1966 [21]. The majority of the population is concentrated in the southeastern and eastern regions of the country given that much of the western part of the country is a desert [21]. At independence (in 1966) Botswana was considered one of the poorest countries in the world, but as will be seen later, the situation changed dramatically over time. Let us commence by looking at standard of living prior to the arrival of the colonial power, Britain.

4. Socioeconomic status in pre-colonial period

During the pre-colonial period, Tswana societies were self-sufficient as the people relied on subsistence farming [22]. Parsons [23] observed that during the precolonial era, the economy of Tswana societies was based on cattle rearing and food crop production, supplemented by hunting (and gathering). Strong traditional structures existed and these were based on the notion of the extended family network and the community which both played a pivotal role in addressing individual and family needs [24]. Community obligation was the backbone of the social and economic fabric of the people, and this helped meet their needs. As indicated by Schapera [25], members of Tswana societies during that period were socialized within the norm of collective participation in family and communal activities. The family and the community ensured that every person received essential services such as food and shelter [25]. The community was compelled to care for the needy out of moral obligation. All these endeavors, predicated on the notion of *botho* (Ubuntu), ensured that the community's standard of living was maintained at a reasonable level, with communal support helping to improve their wellbeing.

During the pre-colonial period, the institutionalized traditional frameworks and systems in place helped communities contain hunger and poverty. For example, there was the *mafisa* system whereby those with cattle would lend a number of beasts to the poor (without asking for payment in return), to allow them to use as draught power and to benefit from milk; the *majako* initiative whereby the poor would provide their labor to the rich during the plowing season in return for part of the harvest; *go tshwara teu* or *bodisa*, a system which allowed the rich to provide an opportunity to poor people to serve as cattle herders, and receiving as payment, a cow each year as a way of breaking the poverty cycle [26–28]. Furthermore, traditional ceremonies such as “*motshelo*” or “*molaletsa*” assisted the homeless to construct houses with assistance from the community [25]. Moreover, traditional leaders (*diKgosi*) collected levies from the community which would later be distributed during periods of drought and economic strife, to benefit the poor.

These traditional frameworks and systems benefited those who did not have such resources as land and cattle, as well as those living in poverty, hence the gesture helped improve their standard of living. The community in some instances, also relied to some extent, on the positive socio-cultural practice of volunteerism that enhanced solidarity and social protection [27, 29].

5. Socioeconomic environment during colonial era

As noted earlier, in 1885, the British government colonized Botswana (naming it Bechuanaland Protectorate) and adopted indirect rule as its governance policy. The

arrangement, as noted, involved the British controlling the country through *Bogosi* (chieftainship) [30]. During that time, the extended family network and the community ensured they continued to appreciate their obligation to care for their own. With time, the colonial government introduced taxes, which policy then radically transformed the traditional frameworks, which all along had relied on subsistence farming. The tax obligation meant a considerable segment of the population was obliged to go and work in the mines in South Africa [31, 32]. This therefore, unsettled family welfare arrangements as able-bodied young men in particular, were forced by circumstances to relocate to South Africa in search of work [23]. As young men became economically independent, the dependence on the extended family became considerably reduced [25]. Agricultural activities that families had depended on were negatively affected as too were the institutionalized traditional frameworks and systems. Nthomang, Malinga-Musamba and Kubanga [24], have argued, "Thus, the erosion of the traditional welfare structures left many households vulnerable to poverty, hunger and in need of basic food, education, health, and housing services which the extended family used to provide but was now unable to" (pg. 58). The same sentiments were echoed by Parsons [23] who lamented that: "...by 1939, a Botswana child could look forward to a malnourished and uneducated childhood; grow up to spend his/her adult energies as a hired labourer for low wages; and at old age become impoverished and a burden on his/her children."

The above observation has succinctly captured the reality that obtained in many Tswana societies during the colonial period. Many families during that period, struggled to sustain themselves and fell into poverty which development had negative effects on standard of living and wellbeing. Due to the socio-economic shocks that obtained in the country at the time, the social welfare approaches in place then failed to cushion communities from poverty and vulnerability. This disturbance of the economic structure of the Tswana traditional societies therefore, called for external intervention [24].

During the 1950s and 1960s, the colonial government introduced social policies meant to somewhat cushion the locals; and these initiatives included the Bechuanaland Soldiers Benefit Fund, introduced to help the loss of livelihood and impoverishment suffered by soldiers returning from world war; and the Grant-in-Aid meant to help the country meet its recurrent and related expenditure [33, 34]. In addition, the Protectorate Five Year Development Plan which was launched during that period, provided a blueprint on socio-economic development in the emergent state of Botswana. This period marked the beginning of formal social welfare provision which is in place in Botswana today [24]. Furthermore, formal institutions for the provision of health services, education and social welfare services to address vulnerability to poverty and destitution, were also introduced. However, poverty remained an issue of some concern during this period.

Wass [35] explained that the main reason for the widespread poverty at the time was that there was lack of commitment on the part of the colonial administrators to develop the country in any meaningful way. In fact, British rule was apparently characterized by neglect, with only rudimentary health and education services in existence. Osei-Hwedie [36]: 80 corroborated this observation, and further explained that the services provided during this era did not develop into a coherent system of social protection across the country. Apparently the services were only rudimentary and most remarkably, were communally oriented and, as mentioned earlier, administered essentially by *Dikgosi* (i.e traditional chiefs).

Wass [35], further explained that while, during those early years, the country depended mostly on agriculture, however, over time the importance of agriculture began to decrease due to such factors as perennial drought, aridness of the land coupled with poor rainfall patterns. It is little wonder therefore, that during those

days, the country served as a reservoir of cheap labour [37], with many young people opting to try their luck in the mines and plantations in neighboring South Africa. The country found itself in an untenable situation whereby many in the population, depended essentially on remittances from migrant labour. Obviously dependence on remittances does not always augur well for meaningful standard of living and wellbeing.

6. Socioeconomic environment in post-colonial era

As previously noted, at Independence in 1966, Botswana was one of the poorest countries in Africa, with a GDP per capita in the region of US\$70 [38–40]. Economic opportunities were limited and the five-year drought period that hit the country severely impacted on subsistence agricultural production that many families had relied on. In an effort to move the country out of poverty, the new government had to make critical decisions regarding what social and economic policies to adopt in order to reduce extreme poverty at both national and household level. Chiepe [41] quotes the then President, Quett Masire as grappling with several questions: *'Because Botswana is such a poor country, we can undertake only a few projects and the task of choosing is much harder. Do we provide more schools or more hospitals ... Do we improve roads or water facilities.'* Clearly, the government at the time had difficult decisions to make (regarding what to prioritize) particularly in the first couple of decades following Independence [42]. In many ways, the authorities were caught between a rock and a hard place. As such, during the Transitional Plan for Socio-Economic Development (1966–1969) [33, 43], the government adopted a dual economic development strategy. This strategy allowed for investment in the productive sectors such as mining and agriculture [33, 43].

Botswana's fortunes turned around markedly in the 1970s following the discovery of large deposits of diamonds. This development led to the country, almost overnight, becoming one of the world's development successes [44]. Diamond mining, and good governance together with a relatively small population, enabled Botswana to rise from poorest to upper middle income status. Incontrovertibly, prudent management of resources and political stability had combined to see the country realize and maintain a high economic growth rate. Mafela et al. [45] stated that the phenomenal economic growth trajectory which was achieved, paid off as it resulted in the country attaining upper middle income status in 1991. These authors added that today, Botswana is a shining example of democracy, with a stable government, peace and tranquility. They might as well have added, 'with a stable economy' which had facilitated realization of meaningful standard of living and wellbeing for the population.

Evidently, as a consequence of the discovery of diamonds, Botswana has, over the years, experienced stable economic growth, which has been supported by prudent policies [44]. Gross Domestic Product (GDP) rose from an estimated US \$2.2 million at Independence to \$2.6 million in 2007/08 and rocketed to US \$18.34 Billion as at 2019 – a phenomenal jump indeed by any standard. Life expectancy too continued to improve through the years, moving from 46 years in 1965, through 55.5 years in 1971 to 65.3 years in 1991 and 68 years in 2011 [44]. Furthermore, the crude death rate per 1000 people fell from 13.7 in 1971, to 11.5 in 1991 and 6.25 in 2011. Even though the crude death rate rose to 12.4 in 2001 due to the impact of the HIV and AIDS pandemic, the government was quick to address this anomaly, *inter alia*, by introducing free antiretroviral therapy (when this became available), thereby considerably lowering the death rate once more.

Through the years, the country did experience serious challenges that threatened to reverse the improved standard of living and wellbeing. The country continued to struggle with such factors as drought and poverty, economic disparities, unemployment and HIV, and AIDS [30, 46]. These challenges obviously impacted negatively on standard of living and wellbeing of the country's population.

As the economy grew through reliance on wage employment and the cash based economy and formalized services guided by national state policies [47], traditional social structures became even more weakened and eroded mostly as a consequence of modernization and rural–urban migration [48]. These social changes affected family welfare practices such as volunteerism, communal spirit, and collective participation, which traditionally had enhanced solidarity and social protection [28, 47]. Standard of living and individual wellbeing were therefore adversely affected. The government, however, continued to intensify and improve standard of living through innovative economic development strategies, which included the rolling out of fairly comprehensive social protection and welfare programmes. Provision of welfare programmes and a marked increase in provision of social services yielded positive results as shown by poverty reduction and increase in literacy rates, among other indicators [49]. Social and economic development in the country, lead to improved wellbeing and quality of life of the majority of people in the country.

7. Community development and citizen wellbeing

While the discovery of diamonds was a major game-changer as far as Botswana's socioeconomic fortunes were concerned, it is common course that improved standards of living and wellbeing could not have been realized in the absence of meaningful community development. The Government appreciated that the wellbeing of the people could not be improved without community participation, hence in 1965, the authorities proceeded to establish a community development office [50] as a strategy to foster more sustained development of the country. The authorities indicated that community development would help build solidarity and agency by adhering to three practice principles namely, self-help, felt needs, and participation.

Thus the idea of introducing community development as a strategy for national socioeconomic advancement was a masterstroke given that almost all communities across the country believed in the main principles of communal or public participation and ownership of development. The government made the decision to create several community development positions to ensure that development would be balanced across the country. Consequently, as early as 1965, the country recruited and deployed community development workers across the country to facilitate all welfare activities [50]. The goal was that there would not be differing standards of living nationwide.

To a large extent, since Independence Botswana has performed extremely well in terms of improving both the standard of living and wellbeing of the people through community development approaches. However, implementation of this initiative has not been without hiccups; the strategy has always been accompanied by diverse and complex challenges that continue to threaten the wellbeing of the people. The early commentators on the history of socioeconomic development in Botswana such as Livingston [51] and Mitchison [52] highlighted that some people were unlikely to earn positive fruits out of the community development efforts being rolled out to improve the wellbeing and standard of living of the people. The reason for the failure realize benefits was that community development as a tool always tended to generate some social ills. For example, to improve the wellbeing of the people, community development efforts included the building of clinics, schools and also

creation of white collar employment; but this led to diminished reliance on agricultural production. Whereas these developments met the main domains of education, health and material wellbeing that are used to measure standard of living [53], the initiatives also had negative outcomes in some instances, given that ordinary people's way of life and even their eating habits had dramatically changed, creating new health challenges for the people in the process [51].

Other social ills that were noted to accompany community development, improved standard of living and wellbeing of the people included: disparities in rural and urban life, the tendency to put political interests ahead of the needs of the people, as well as poor implementation of policies and programmes meant to improve the wellbeing of the people [51]. The possibility that disparities in the wellbeing of the people would emerge in the country due to embracing of Western lifestyles introduced by foreigners, had been anticipated. And indeed this did come to pass. Mitchison [52] among others, highlighted the marked differences in lifestyle between people residing in urban (areas) and those based in rural contexts. Hesselberg and Wikan [54] too highlighted the widening gap in standard of living that had emerged between communities at the time, a pattern that apparently continues to exist even in present day Botswana.

To more clearly illustrate the rocky yet positive development pathways the country has trodden since Independence en-route to attaining upper middle income status, the next few paragraphs will now examine issues around how the standard of living and well-being of the population in Botswana have experienced drastic changes through the years, as well as the role played by community development in this regard.

8. Community development, standard of living and well-being in Botswana today

There is broad consensus that the government of Botswana has, over the years channeled a considerable amount of resources towards community development, thereby positively impacting the standard of living and wellbeing of the population [55, 56]. The poverty headcount index, for example, declined from 59% in 1985/1986 to 30.2% in 2002/2003 [26, 57] and then again to 23% in 2009/2010 [58]. Apparently, poverty in Botswana, as in many other developing countries, has mostly been measured using the poverty datum line (PDL), which is an estimate of the monthly cost of a basket of goods and services required to adequately meet the needs of a household. Currently, the country's PDL is calculated at P878.87 (\$97.65), and basing on this figure, nationally, a whopping 19.3% of the population lives below the PDL. While some of those living below the PDL have wages from employment, pensions, and remittances, those in extreme poverty are often unemployed or engage mostly in household and caregiving roles [59]. This group is the main target of the country's social safety nets, otherwise called the social protection system. Let us consider the impact of the social protection initiative in some detail.

To ensure opportunities for healthy and sustainable livelihood, and improved standard of living and well-being, especially for those living below the PDL, the government of Botswana, as noted earlier, introduced a formal social protection system, which constitutes public measures to provide income security for individuals [27, 47]. The social protection system is a public intervention mostly to support the poor and help households and communities to manage risk, and reduce poverty and vulnerability among the population [60]. Ntseane and Solo [28] concurred that, the government of Botswana, in an attempt to improve livelihoods and reduce poverty, introduced social safety nets for individuals,

families and groups. The packages introduced included *social allowance schemes* (e.g. orphan care basket, school feeding programme, community home based care); *social assistance schemes* (e.g. destitute persons programme, needy students programme, labour based drought relief programme, *ipelegeng*) and *social insurance schemes* (e.g. pension scheme, workman's compensation) [27].

The various social protection schemes have played a major part in terms of preventing and protecting individuals against life cycle crises and helped many meet basic needs and enhance their welfare [27, 28]. Over the years, the government of Botswana has invested a fair share of the national income towards social protection programmes, to shelter the said vulnerable and disadvantaged groups from poverty, even though spending has declined due to diverse challenges that the country has faced [61]. Well-managed mineral wealth and political stability have however made it possible for the government to promote these social protection measures to improve standard of living and wellbeing [42, 62]. Even though the government has introduced social protection programmes to address the burden of poverty, apparently a considerable majority of the population continues to struggle in economic terms [42, 57, 63]. Even so, heavy social development investment by the government has paid tangible dividends in promoting social services, including literacy (education) and health.

Apparently literacy did not feature highly on the list of priorities in the precolonial and colonial eras; it was only 10 years after Independence that the government seriously took note of this need [64]. Ever since, education has been adjudged a critical developmental priority in Botswana. The government therefore has invested quite considerably in education through expanding infrastructure and services [65]. The heavy investment in education has been meant to ensure that all citizens have access to at least 10 years of basic education. The National Commission on Education of 1976, and the National Policy on Education of 1977 proposed changes in the education policy, to allow those who were illiterate to get back into the education system and access basic education [64]. According to The Revised National Policy on Education of 1994 Botswana's priority is universal access to basic education (10 years in school) [66].

The increased education expenditure allowed free education in all public schools and reduced average distance to school). Furthermore, government efforts went into ensuring that vulnerable groups had access to education by introducing needy students assistance programme for children from poor families, as well as a school feeding programme [28]. Other than that, the government established a national literacy programme to improve literacy levels, as well as free distance learning programmes [28]. These improvements over the years have seen a rise in the adult literacy rate in Botswana, which as at 2014 was reported to stand at 85.9%, an increase from 68.58% in 1991 [40, 67]. There is some consensus that those with higher education tend to have lower rates of poverty and a better standard of living. It would therefore not be far-fetched to assume that these efforts have had a positive impact where standard of living and wellbeing of the masses is concerned.

Health standards have been improving since Independence. However, it experienced a drawback when the country was hit by the HIV and AIDS pandemic in the 1990s, which caused a decline in economic growth as the government was forced to divert a considerable amount of resources to fighting HIV [46]. The government however, vigorously fought this scourge with all its might. HIV and AIDS awareness and education campaign measures were put in place and by 2002, free HIV Antiretroviral (ART) medication had been introduced to all HIV positive citizens. Currently, it is estimated that about 90% of those requiring ART do have access [68, 69].

Even so, as can be imagined, these initiatives came at a cost in financial terms. The consequences of these challenges and the limitations of Botswana's diamond-led development model became apparent: economic growth slowed down, while inequalities remained high and job creation became limited [10], threatening standard of living and wellbeing. Despite the challenges, the government has forged ahead with its commitment to ensuring better standard of living and wellbeing of its citizens. Evidently, the government's commitment to the provision of social services to improve standard of living, remains unquestionable. This is confirmed by such indices as improved performance in universal access to health services, and also the fact that over 95% of the population live within 15 kilometers radius of a health facility [70].

Furthermore, apart from health, the government has also, over the years, invested heavily in such services as shelter [71], water and sanitation for the wellbeing of individuals [70, 72]. Additionally, efforts at provision of social welfare services have continued. As indicated in the National Development Plan 11, '*... existing social protection programmes were strengthened through enhancement of policies and strategies that aimed at cushioning the vulnerable and disadvantaged groups of the society, restoring their dignity, and improving their quality of life*' ([70]: 193). This clearly demonstrates that the government is seized with efforts to improve standard of living and wellbeing of the population.

9. Conclusion and way forward

The paper has demonstrated that in the context of Botswana, standard of living and well-being have varied by historical period, beginning from pre-colonial, through colonial, and post-colonial eras to the present. Also evident is the fact that community development has been a key tool for promoting social development, with a view to improving standard of living and wellbeing of the population. The variations in levels of social provision noted, have essentially been a function of the social and economic changes, and challenges that the country has experienced over the years, and which in some respects it continues to experience. However, despite the noted challenges, Botswana's socioeconomic trajectory, including its social protection regime, remains quite robust and has, over the years, grown from strength to strength. Be that as it may, a number of shortfalls have been noted in regard to the social development efforts of the country, particularly if Sen's capabilities framework is used to define standard of living and well-being.

Some commentators have expressed concern that the government's approach to some community development initiatives has tended to be rather top-down, suggesting lack of participation of the masses in decision making. This of course does not augur well for successful community development. Ferguson-Brown [73], among others, argued that the top-down approach (to community development) which involves trying to change attitudes to suit national plans rather than identifying needs at community level may actually have alienated the people. Alienated people do not participate; they may become overly dependent on the government. The government does seem to admit that some of its strategies may have inadvertently created a dependency syndrome among the populace. The Ministry of Local Government, for instance, while addressing this theme, observed that emphasis on service delivery, rather than on strengthening community governance structures for economic empowerment, had led to unbridled dependency on government social support mechanisms [55].

The country's social protection regime appears to be doing relatively well. According to the Regional Hunger and Vulnerability Programme (RHVP),

Botswana boasts of one of the most comprehensive state-led social protection regimes in the southern African region. The same agency further noted that in Botswana, “Programming for poor, vulnerable and excluded groups is comprehensive by African standards...” ([62]: 1). The RSVP has gone so far as to claim that the social protection system in Botswana can serve as a ‘model for Africa’. Even so, concerns have been raised in respect of the social protection system, and these include the apparent tendency on the part of the relevant authorities to simply focus on ensuring that social protection services are made ‘available’ and ‘accessible’ to everyone who qualifies, without putting sufficient attention to whether indeed the services are actually ‘being utilized’ by all concerned. Apparently, this has essentially been a function of inadequate monitoring and evaluation measures in place [28]. Other areas of concern raised in regard to social protection initiatives in place include lack of clear mechanisms that are in place for effective redistribution of the national wealth. Such is bound to impact negatively on standards of living and wellbeing.

RHVP [62]: 3 has observed thus, “*While most Batswana have benefited from these achievements, the new wealth is very unevenly distributed and many individuals and groups are marginalized economically, socially and/or geographically*”. Other than that, there has been concern that the social protection schemes had tended to suffer from lack of coordination, poor implementation, ineffective utilization of resources and lack of accountability [28]. Concern has also been expressed to the effect that some of the schemes have promoted a dependency syndrome. Gadbolae [74], for instance, argued that one of the social protection schemes (Destitute Persons Programme) had ushered in a dependency syndrome. What was needed, he argued, are effective mechanisms to facilitate capacity building and empowerment with a view to facilitate self-reliance.

To its credit though, the government appears to be open to learn from experience, which in itself is a major plus. It (government) has continued to push ahead with its community development agenda, as well as expansion of its social protection regime meant to benefit mainly the needy. It is little wonder therefore that Statistics Botswana [75] reported a decline in the overall number of persons living below the poverty datum line from 499,467 in 2002/3 to 373, 388 in 2009/10. Though more recent figures were not immediately available, this positive trend appears to be continuing, suggesting the standard of living and wellbeing of the population (as defined by Sen,) continues on an upward trajectory, credit to the various community development initiatives currently in place across the country.

Author details

Rodreck Mupedziswa*, Tumani Malinga and Poloko Nuggert Ntshwarang
Department of Social Work, University of Botswana, Gaborone, Botswana

*Address all correspondence to: mupedziswa@ub.ac.bw

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The Reform in Government Expenditure and the Standard of Living in Bahrain

Fatema Alaali

Abstract

The drop of oil prices since the second half of 2014 have affected the credit risk and liquidity situation in Bahrain. Therefore, Bahrain have implemented substantial economic diversification in the economic structure including manufacturing, refining, tourism, trade and finance. With the recognition of the importance of governments expenditure restructuring, Bahrain government introduced number of initiatives such as streamlining government expenditure, increasing revenues, and redirecting government subsidies towards eligible citizens. Understanding the relationship between revenues, government spending and economic growth is an essential perception in evaluating the efficiency of government's strategy in managing its resources and the impact on the standard of living in any country. This chapter examines the relationship between total government expenditure as well as sectoral government spending (specifically education and health sectors), oil revenues and the economic growth of Bahrain using time series data over the period 1989–2015. To achieve this aim, the vector error correction model (VECM) is employed. In order to ensure the sustainability of resources and maintain economic growth, Bahrain should continue managing its expenditure, by cutting down expenses on certain sectors through privatization, and increasing spending on health and education sectors.

Keywords: Economic Growth, Health Expenditure, Education Expenditure, Human Capital, Oil Revenues, VECM

1. Introduction

On the 2nd of June 1932, history was made in Bahrain when oil was discovered in the first well in “Jebel Al Dukhan” making it the leading country among the Arabian Gulf countries in oil discovery. Since the establishment of the first refinery, oil and gas have played a significant part in the economic side of Bahrain. This is translated in the value of the share of oil and gas revenues to total revenues of Bahrain. The Ministry of Finance reports show that the share of oil and gas revenues formed 60.4% of total revenues in 1990 and continued to increase and reached 87.8% in the year 2011.

There were many trials since the seventies of the 20th century to shift the economy from oil sector to non-oil sectors such as manufacturing, finance and tourism. One of the Bahrain Government initiatives to set the foundation of the

economic diversification was through its long-run strategy procedure “Bahrain 2030 Vision” that was established in October 2008. The main aim of this vision is to build a better life for every Bahraini. One of the guiding principles of this vision is the sustainability. Bahrain government is working on enabling the private sector to stimulate economic growth. By doing so, Bahrain Government will be able to employ its resources in the investment in its human capital through training and education specifically in the area of applied sciences.

The 2019–2022 Government Action Plan focuses on achieving number of objectives including the investment in citizens by developing and sustaining the government services in certain sectors such as education and health. Moreover, the action plan aims to support creativity, youth, gender equity and sports. As a subsequent of the collaboration parties of the society, the contribution of non-oil sectors to Bahrain GDP increased over time. **Figure 1** shows the contribution of the different economic sectors to the GDP of Bahrain. In the year 2019, the second largest contributor to Bahrain GDP after the oil sector is the Finance sector with 17% share. The manufacturing sector comes next with a stake of 15%.

With all of these attempts to achieve economic diversification, oil sector remains the highest contributor to Bahrain GDP. Since the drop in oil prices at the end of 2014, Bahrain is facing the largest budget deficit among the rest of the GCC countries. Number of initiatives were introduced between the years 2015 and 2017 managed to reduce the budget deficit from –13% to –10.1% of GDP over the same period.¹ The initiatives taken over this period includes i) decreasing operational expenditure, ii) establishing optional retirement program for the public sector employees, iii) Balancing the water and electricity revenues and expenditure, iv) assigning cash subsidies to the needy citizens, v) boosting the effectiveness of government spending, and vi) increasing non-oil revenues.

As an attempt to investigate the long and short run impacts of the oil revenues and government expenditure on the economic growth of Bahrain, this chapter

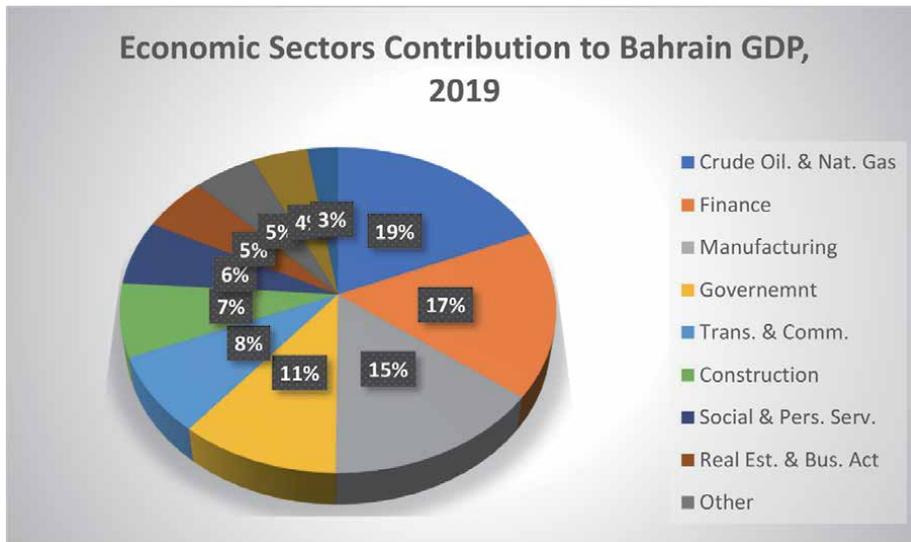


Figure 1. Economic sectors contribution to Bahrain GDP, 2019. [Source: Bahrain economic quarterly, Q3 2019 – Ministry of Finance and National Economy].

¹ Fiscal Balance Program document https://www.mofne.gov.bh/fbp_en.pdf.

employs yearly data for oil and gas revenues, total government expenditure and GDP growth and estimates the relationship between them using vector error correction model (VECM). Moreover, the sectoral relationship with the economic growth is examined using the ministry of health and ministry of education expenditures. The results show that oil and gas revenues have a positive impact on economic growth while the government expenditure affects economic growth negatively. However, when looking at the individual impact of education and health expenditure on economic growth, the estimation results indicate that both have a positive impact on economic growth of Bahrain.

The chapter is constructed as follows: a brief of the literature review is reported in Section 2. The employed data and methodology are explained in Section 3. Section 4 demonstrates the results, and the conclusions of this chapter are stated in Section 5.

2. Literature review

A considerable number of studies have concentrated on the relationship between natural resource wealth and economic growth. The motivation behind these studies is to investigate the potential benefit of this wealth in promoting economic growth. The results of most of these studies agree on the negative impact of the abundance natural resources. Using a large cross-country data, Sachs and Warner [1] conclude that the natural resource wealth has a harmful effect on the economic growth. Gylfason [2] interprets this harmful impact as the result of the false sense of security that these nations develop regarding their natural resources which may drive them to neglect human capital accumulation. But there is a great distinct between having natural resources and using it. Botswana is an obvious example for an African country whose 80% of its exports are diamonds, copper, nickel and gold could escape the natural resource curse. The reason behind this is that all the mineral revenues are spent on investment such as capital projects and recurrent spending on education and health [3, 4].

The literature proposes various channels through which gifted resources may obstruct economic growth. The first channel is the Dutch disease. The fluctuations in the prices of raw materials causes fluctuations in exports revenues which may cause variation in exchange rate. Volatile exchange rates lead to unpredictability that may harm the exports and foreign investments. Moreover, the natural resource-based industry may pay higher wages compared to other industries which makes it difficult for the other industries to compete. The second channel is through the massive natural resource rents accompanied by weak markets in most of the developing countries. The third channel is through decreasing the public and private motivation in human capital accumulation due to underestimating the long-term value of education. The fourth channel is through retarding the development of financial institutions which may dampen savings and investments that leads to reducing economic growth [5].

The relationship between the government spending and economic growth was investigated in an enormous number of studies with different types of economies. Different results were obtained from these studies due to the variable economic development levels, different periods of time and the use of distinct methodologies. For example, Barro [6] who employed a panel of 98 countries over 36 years found that growth is inversely related to the share of government expenditure. Using OECD sample, Agell et al. [7] found no conclusion about the effect of public sector spending on growth as the relation is easily tilted from negative to positive by introducing control variables. Devarajan et al. [8] who utilized data from 43

developing countries and conclude that an increase in the current expenditures affects growth positively whereas the capital expenditure has a negative impact on economic growth, which indicates that excess capital spending may become unproductive. In a study that used seven transition economies from South Eastern Europe, Alexiou [9] found that government spending on capital formation affects growth positively. The empirical evidence of Lamartina and Zaghini [10] paper provides evidence of structural positive correlation between GDP per capita and public expenditure in a sample of 23 OECD countries. Using data for EU-28 countries, Dudzevičiūtė et al. [11] investigated the government spending and economic growth nexus. Positive relationship has been detected in 4 countries, negative correlation in other 4 countries and insignificant relationship in the remaining countries.

A great number of empirical studies scrutinized the effect of the sectoral government expenditure on economic growth in different economies. For example, Baum and Lin [12] investigated the differential impact of the various types of government expenditures on economic growth using a sample of 58 countries. Their results show a positive impact of educational expenditures on economic growth but insignificant impact of welfare and defense expenditures on economic growth. In a study that used data from East Africa, Gisore et al. [13] found that expenditures on health and defense have positive impact on economic growth whereas educational expenditure has insignificant impact on growth.

At the level of GCC countries, Al-Yousif [14] applied a Granger-causality test to examine the relationship between education expenditure and economic growth in the six GCC countries and conclude that the nature of this relationship cannot be generalized across countries. Ghali [15] studied the relationship between economic growth and government expenditure in Saudi Arabia and found insignificant impact of government expenditure on economic growth. Hamdi and Sbiba [16] applied the Toda and Yamamoto procedure to investigate the relationship between government revenues, expenditure and gross domestic product using data for the six GCC countries over the period 1990–2010. Their results show that there is a unidirectional causality from government expenditure to GDP in Bahrain only while GDP granger cause government expenditure in Qatar and Oman. Ahmad and Masan [17] found that there are positive long run relationship between oil revenues, government expenditure and economic growth of Oman.

3. Data and methodology

3.1 Data

In order to achieve the objective of this study, annual Gross Domestic Product of Bahrain (GDP) at constant prices is obtained from the World Bank Data and used as a measure for economic growth. Oil & Gas Revenues (Rev), Total Expenditure (Exp), Ministry of Health Expenditure (H-Exp) and Ministry of Education Expenditure (E-Exp) are obtained from the Ministry of Finance. The time period of the study is from 1989 to 2015. All the variables have been transformed using natural logarithm transformation. **Table 1** presents the descriptive statistics of all the variables.

Variable	Mean	Std. Dev.	Min.	Max.
GDP	6844.221	2546.688	3202.183	11572.71
Rev	1.085	0.844	0.242	2.662
Exp	1.451	1.002	0.496	3.545

Variable	Mean	Std. Dev.	Min.	Max.
H-Exp	0.107	0.073	0.035	0.263
E-Exp	0.147	0.087	0.058	0.327

Notes: GDP is the Gross Domestic Product, Rev. is the Oil & Gas Revenue, Exp is the Total Expenditure, H-Exp is the Ministry of Health Expenditure and E-Exp is the Ministry of Education Expenditure. All the data are in millions of Bahraini Dinars.

Table 1.
 Descriptive statistics.

3.1.1 Stationarity tests

The basic procedure for testing the variables includes three steps. The first step is to test the stationarity of the variables and examine their integration level. In order to do so, the Augmented Dickey and Fuller [18] ADF test, Phillips and Perron [19] - PP and Kwiatkowski et al. [20] - KPSS are employed.

3.1.2 Cointegration test

After checking the stationarity of all the series and getting all the variables to be integrated of the same order, the second step is to investigate the presence of long run relationship between all the variables in each Model. Cointegration shows that the variables jointly move in the long run and the error term generated from the linear combination of all the variables measures the divergence of the variables from their joint long run relationship, which can be used to forecast their values in the future [21]. To determine this relationship, Johansen Cointegration Test is used [22, 23].

The procedure of cointegration is estimated using an unrestricted vector autoregressive model (VAR) with error correction specification:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-i} + \Phi D_t + v_t \quad (1)$$

where Y_t contains all n variables of the model which are integrated of order one - $I(1)$, Π , Γ_i and Φ are parameter matrices to be estimated, D_t is a vector with deterministic elements (constant, trend) and v_t is a vector of random errors. Eq. (1) indicates that there will be no relationship between two series of different cointegration order. Johansen cointegration test estimates the rank (r) of the matrix Π . If $r = 0$, all variables are not cointegrated. If $0 < r < N$, r cointegrating vectors exist. Johansen's cointegration test uses two likelihood statistics. The first is the Trace test, which examines whether the number of cointegrating vectors (r) is less than or equal to r . The second is the maximum eigenvalue, which test the number of cointegrating vectors is r against the alternative of $r + 1$ cointegrating vectors.

3.2 Methodology

Finally, when getting all the variables to be integrated of order one, $I(1)$ and cointegrated (joint movement in the long run), the short and long run relationships between Economic Growth, Revenues and Government Expenditure can be estimated. This can be done using the Vector Error Correction Model (VECM) that was developed by Engle and Yoo [24]. The VECM is used to allow for short-run adjustment dynamics and show the speed of this adjustment to the long-run equilibrium.

In a VECM it does not matter if some of the variables are endogenous, because no contemporaneous terms appear in the equation.

Model 1 is used to estimate the long and short run relationship between Bahrain economic growth, oil and gas revenues and total government expenditure.

Model 1:

$$\begin{aligned} \Delta \ln GDP_t = & \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln Rev_{t-1} + \alpha_4 \ln Exp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=1}^2 \beta_{2i} \Delta \ln Rev_{t-1} + \sum_{i=1}^2 \beta_{3i} \Delta \ln Exp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (2)$$

where Δ represents the first difference, $\ln GDP$ is the natural logarithm of gross domestic product, $\ln Rev$ is the natural logarithm of oil and gas revenues, $\ln Exp$ is the natural logarithm of total expenditure and ECT is the error correction term.

To examine the relationship between sectoral government expenditure and economic growth, Model 2 estimates the long and short relationships between economic growth and ministry of health expenditure.

Model 2:

$$\begin{aligned} \Delta \ln GDP_t = & \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln HExp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=1}^2 \beta_{3i} \Delta \ln HExp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

where $\ln HExp$ is the natural logarithm of ministry of health expenditure.

Model 3 examines the short and long run relationship between Bahrain economic growth and ministry of education expending.

Model 3:

$$\begin{aligned} \Delta \ln GDP_t = & \alpha_1 + \alpha_2 \ln GDP_{t-1} + \alpha_3 \ln EExp_{t-1} + \sum_{i=1}^2 \beta_{1i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=1}^2 \beta_{3i} \Delta \ln EExp_{t-1} + \gamma_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (4)$$

where $\ln EExp$ is the natural logarithm of ministry of education expenditure and ECT is the error correction term. The Akaike Information Criteria (AIC) is used to select the appropriate lag length.

4. Results

4.1 Unit root and Cointegration test results

The null hypothesis of the Augmented Dickey Fuller and Phillips and Perron tests is the existence of a unit root, whereas the null hypothesis of the KPSS test is that the time series variable is stationary. The three tests are implemented for the variables at level and at first difference. **Table 2** summarizes the results of the unit root tests. The results show that all the variables are stationary at first difference, which means that all of them are I(1).

Since $\ln GDP$, $\ln Rev$ and $\ln Exp$ are integrated of the same level, therefore Johansen's cointegration test is conducted to examine the long-run equilibrium

	ADF		PP		KPSS	
	Level	First diff.	Level	First diff.	Level	First diff.
lnGDP	-1.450	-4.472***	-1.380	-4.533***	0.067	0.076
lnRev	-1.046	-5.440***	-0.960	-5.606***	0.124	0.124
lnExp	0.108	-3.703**	0.052	-3.781***	0.215**	0.144
lnH-Exp	0.241	-2.237	0.115	-2.262	0.215**	0.141
lnE-Exp	0.776	-2.773*	0.600	-2.764*	0.219***	0.111

Notes: ADF is the Augmented Dickey and Fuller [18] unit root test. PP is Phillips and Perron [19] unit root test. KPSS is Kwiatkowski et al. [20] Stationarity test.

*, **, *** present 10%, 5% and 1% level of significance, respectively. lnGDP is the natural logarithm of Gross Domestic Product, lnRev is the natural logarithm of Oil & Gas Revenue, lnExp is the natural logarithm of Total Expenditure, lnH-Exp is the natural logarithm of Ministry of Health Expenditure and lnE-Exp is the Ministry of Education Expenditure.

Table 2.
Unit root test results.

Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	12	85.494		49.228	29.68
1	17	102.564	0.745	15.088*	15.41
2	20	109.320	0.418	1.575	3.76
3	21	110.108	0.061		

* indicates that this is the value of rank (r) selected by Johansen's multiple-trace test procedure.

Table 3.
Model 1 Cointegration test results.

relationship between the three series. **Table 3** shows the results of Model 1 Eq. (2) Cointegration Test Results. This test was estimated using 2 lags according to the AIC of a VAR model for the variables of interest. The trace statistic and maximum eigenvalue states that the null hypothesis of the presence of a maximum of one cointegrating equation ($r \leq 1$) cannot be rejected. This indicates the existence of a long-run relationship between economic growth, oil and gas revenues and government expenditure in Bahrain.

Johansen's cointegration test is applied to the variables employed in Model 2 Eq. (3) and Model 3 Eq. (4) using a maximum lag of 1 according to the AIC of a VAR model for both models. **Tables 4** and **5** indicate the presence of long-run relationships between economic growth and health expenditure and between economic growth and education expenditure, respectively.

Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	0	72.297		51.803	19.96
1	4	94.744	0.823	6.710*	9.42
2	6	98.198	0.227		

* indicates that this is the value of rank (r) selected by Johansen's multiple-trace test procedure.

Table 4.
Model 2 Cointegration test results.

Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% Critical value
0	0	76.193		55.709	19.96
1	4	100.070	0.841	7.955*	9.42
2	6	104.048	0.264		

* indicates that this is the value of rank (r) selected by Johansen's multiple-trace test procedure.

Table 5.
Model 3 Cointegration test results.

4.2 Vector error correction model (VECM) results

4.2.1 Model 1 estimation results

Since the economic growth, oil and gas revenues and government expenditure variables are stationary at first difference and have a long run cointegration, the VECM can be employed to investigate this relationship. **Table 6** presents the results of estimating Eq. (2) using VECM approach. The results show that oil and gas revenues have a significant positive impact on the economic growth of Bahrain whereas the government expenditure has a significant negative impact on Bahrain economic growth. The error correction term is negative and significant.

4.2.2 Model 2 estimation results

Table 7 reports the results of estimating Eq. (3) using the VECM approach. The results show that government expenditure on health has a long run positive impact on economic growth that is significant at 10% level of significance.

Long-run relationship				
lnGDP	1			
lnRev	0.844*** (0.104)			
lnExp	-0.544*** (0.135)			
constant	-16.931*** (0.869)			
Short-run relationships		$\Delta \ln GDP$	$\Delta \ln Rev$	$\Delta \ln Exp$
$\Delta \ln GDP_{t-1}$		0.261 (0.195)	2.590 (1.93)	0.2663 (0.587)
$\Delta \ln Rev_{t-1}$		-0.070** (0.028)	-0.032 (0.280)	-0.126 (0.085)
$\Delta \ln Exp_{t-1}$		0.085 (0.082)	0.566 (0.812)	0.099 (0.247)
ECT		-0.116*** (0.041)	0.478 (0.403)	-0.210* (0.122)

Notes: lnGDP is the natural logarithm of Gross Domestic Product, lnRev is the natural logarithm of Oil & Gas Revenue, lnExp is the natural logarithm of Total Expenditure and ECT is the error correction term. Numbers between brackets are std. errors.

*, **, *** present 10%, 5% and 1% level of significance, respectively.

Table 6.
VECM results – Model 1.

Long-run relationship		
lnGDP	1	
lnH-Exp	0.365*	(0.199)
constant	17.229***	(3.627)
Short-run relationships	$\Delta \ln GDP$	$\Delta \ln H - Exp$
ECT	-0.037***	-0.053 ***
	(0.003)	(0.009)

Notes: lnGDP is the natural logarithm of Gross Domestic Product, lnH-Exp is the natural logarithm of Ministry of Health Expenditure and ECT is the error correction term. Numbers between brackets are std. errors.
 *, **, *** present 10%, 5% and 1% level of significance, respectively.

Table 7.
 VECM results – Model 2.

Long-run relationship		
lnGDP	1	
lnE-Exp	0.576***	(0.0519)
constant	11.71	
Short-run relationships	$\Delta \ln GDP$	$\Delta \ln E - Exp$
ECT	-0.117***	0.169
	(0.051)	(0.107)

Notes: lnGDP is the natural logarithm of Gross Domestic Product, lnE-Exp is the natural logarithm of Ministry of Education Expenditure and ECT is the error correction term. Numbers between brackets are std. errors.
 *, **, *** present 10%, 5% and 1% level of significance, respectively.

Table 8.
 VECM results – Model 3.

4.2.3 Model 3 estimation results

Eq. (4) estimation results are presented in **Table 8**. The results indicate that government spending on education has a positive and highly significant impact on Bahrain economic growth.

5. Conclusion

This chapter employs yearly data over the period (1989–2015) for oil and gas revenues, total government expenditure and GDP growth to estimates the relationship between them using vector error correction model (VECM). Moreover, the sectoral relationship with the economic growth is examined using the ministry of health and ministry of education expenditures. The results show that oil and gas revenues have a positive impact on economic growth while the government expenditure affects economic growth negatively. However, when looking at the individual impact of education and health expenditure on economic growth, the estimation results indicate that both have a positive impact on economic growth of Bahrain.

The results imply that for Bahrain to maintain long run economic growth, there should be a strategic plan to invest in its human capital through raising the quality and quantity of education. This will lead to productivity growth through education's impact on innovation and creativity as well as the adaptation to any changes in economic situations. High quality education will allow people to participate actively in their societies. Moreover, an individual with a better health will enjoy more of productive years. So, one of Bahrain's channels to achieve sustainable economic growth is through redistributing its government expenditure to fulfill the requirements of education and health sectors.

Author details

Fatema Alaali
American University of Bahrain, Riffa, Bahrain

*Address all correspondence to: fatema.alaali@aubh.edu.bh

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Assessing the Sustainability of Community-Driven Development Projects in Lao PDR

*Piya Wongpit, Alay Phonvisay, Keuangkham Sisengnam
and Bounmy Inthakesone*

Abstract

The Community-Driven Development (CDD) approach has been applied to more than 5,000 subprojects in 2,000 villages in the Lao PDR. CDD has the potential to make poverty reduction efforts more responsive to the need, more inclusive, more sustainable, and more cost-effective than traditional, centrally led programs. Many CDD projects could not survive due to financial support since many CDD projects could not sustain costs. The overall objective of this research is to assess the sustainability of CDD projects in Lao PDR with the specific objectives to investigate whether the degree of community contribution does matter for the current existence of CDD projects and to assess whether the community's contribution could enhance the current performance of CDD projects. Logit regression is the main model to analyze the impact of the community's contribution to the sustainability of CDD projects in Lao PDR. The result suggests that community participation in labor and finance are key factors for the sustainability of CDD projects.

Keywords: community driven development, poverty reduction, sustainability

1. Introduction

1.1 Background

The Community Driven Development (CDD) projects have become an important channel of development assistance for village. CDD programs stem from the trust in local people by treating them especially poor people as assets and partners in the development process. Recently, more than 80 countries have implemented CDD projects.

Experiences from many countries show that by directly relying on poor people to drive development activities. CDD has the potential to make poverty reduction efforts more responsive to the needed, more inclusive, more sustainable, and more cost-effective than traditional centrally led programs [1].

In Lao PDR, the Poverty Reduction Fund Project (PRF) initiated the CDD in 2003 which was among the earliest CDD approach development project. The CDD approach has been applied to more than 5,000 sub-projects in 2,000 villages in Lao PDR. The CDD approach is considered an effective poverty reduction mechanism to promote local development and capacity building, improve service delivery, and

provide risk management instruments to the poor. Compared to an earlier generation of community-based rural development projects where communities acted as rather passive beneficiaries, recent CDD projects give communities more voice and place communities at the center of the development process [2].

While there is general recognition of the potential of CDD approach, there remain criticisms regarding: conceptual issues, practical issues, institutional issues. These shortcomings of CDD approach could decrease the effectiveness and sustainability of the projects.

Questions often arise among development practitioners whether CDD projects sustainable? Does the more participation of community on the project bring more sustainability? and what are factors determining the sustainability of CDD projects? These questions come from the fact that many CDD projects could not survive without continued financial support. Since many CDD projects are constructed in poor villages, they could not effort for operating and maintaining costs. Therefore, confirming a correlation between a CDD approach development project and its sustainability is critical especially for Lao PDR to achieve her sustainability poverty reduction goal.

It is thus interesting to observe the community's participation on the CDD project and relationship with the sustainability. The participation refers to the community participate on finance, labor, management, and coordination on the CDD project while the sustainability of defines as whether the project is still functioning and how the community response when the project requires the maintenance.

1.2 Objectives

The overall objective of this research is to assess the sustainability of CDD projects in Lao PDR. The specific objectives are to investigate whether the community's contributions do matter for the current existence of CDD projects and to assess the factors determining sustainability of CDD project.

2. Literature review

2.1 CDD project and sustainability

Community Driven Development is considered an effective poverty reduction mechanism to promote local development and capacity building, improve service delivery, and provide risk management instruments to the poor. Most of the evidence reviewed compares CDD project sites with communities that are otherwise similar but are either blank slates without any projects or have received other interventions of unclear method and provenance. Khwaja [3] compares a random sample of AKRSP projects with other projects in the same village that were built without any participation from the community. Consistent with the theory, Khwaja finds that community managed projects are better maintained than projects managed by the local government.

Khwaja's findings are consistent with Finsterbusch and Van Wincklin [4]. In their meta-analysis of project reports from 52 USAID projects that had participatory elements, they conclude that projects that were less technically complex were more effective, as were smaller projects. Facilities constructed with community involvement tend to be quite effective in improving access to public services. Paxson and Scady [5] for instance find that the Peruvian social fund, FONCODES, increased school attendance particularly for younger children.

Chase and Sherburne-Benz [6] evaluating the Zambia social fund report similar findings on school attendance. They also find that the presence of a school

constructed by the social fund seemed to increase household education expenditures, and the presence of a health facility increased use of primary care and prevalence of child vaccinations. Katz and Sara [7] analyze the performance of water systems in a variety of countries. They find that the performance of water systems was markedly better in communities where households were able to make informed choices about the type of system and the level of service they required, and where decision making was genuinely democratic and inclusive.

Katz and Sara also report that community members were more willing to pay for investment costs when they had control over the funds and were particularly unwilling to contribute if funds were controlled by government staff or contractor. There is further evidence correlating greater community participation with better project outcomes. Isham and Kahkonen [8, 9] in two analyses of water projects in Indonesia and India and Sri Lanka confirm that greater community participation is associated with better water supply and that well designed community-based water services lead to improvements in health outcomes. Heterogeneity in project effectiveness is largely explained by the ability of a community to engage in collective action, and high levels of 'social capital' improve participation in design and monitoring.

This is also the conclusion of Rao and Ibanez [10] studying the Jamaica Social Fund who find that a community's capacity for collective action influences its ability to generate a successful application for funds. Regarding project sustainability, Khwaja's study suggests that since community managed projects are better maintained they are also more sustainable than those managed by local governments. Katz and Sara and Isham and Kahkonen also find strong associations between participation and sustainability.

2.2 CDD projects in Lao PDR

In Lao PDR, donors have increasingly used CDD components in their projects to promote effectiveness and efficiency of poverty reduction efforts. Since 2004, according to a social protection and community development project inventory compiled by the World Bank, 6 projects within Lao PDR maintained a CDD component. After 2 years, about 25 projects implemented by multilateral and bilateral donors, and INGOs, possessed a CDD component. Active donors include the International Fund for Agricultural Development (IFAD), the Canadian International Development Agency (CIDA), the United Nations Development Program (UNDP), the European Union (EU), the World Bank, the German Agro Action (GAA), Village Focus International (VFI), World Concern, as well as other INGOs.

CDD projects were mainly concentrated in the northernmost provinces, the provinces bordering Vietnam, and in the southern provinces. CDD projects aim to empower communities, reduce poverty, and improve economic and social conditions of the poor in rural and remote areas. These programs seek to enhance village capacity and increase local ownership by helping communities to identify and prioritize their needs and develop and implement community development plans. Community-based participatory planning and implementation is a common feature of CDD projects, usually accompanied by efforts to ensure women's participation.

In almost all provinces, CDD projects support education, health, livelihood activities, and agriculture. The education sector (infrastructure, support of formal and non-formal education, curriculum development, teaching materials) receives the greatest support, followed by the health sector (infrastructure, family planning and reproductive health support, health education and training, water and sanitation, mother and childcare), agriculture (agricultural training, food crop

and livestock production, irrigation), and livelihood activities. Most CDD projects support activities in the poorest provinces, but not necessarily in provinces with a high proportion of ethnic minorities. Most provinces receiving multiple projects with CDD components, such as Huaphan, Phongsaly, Oudomxay, Luangnamtha, Attapeu, and Xekong, face high poverty incidence; nonetheless, provinces such as Champasak, Xiangkuang and Savannakhet also receive a high number of projects despite being less poor. Since then, CDD components are widely adopted and implemented in most development projects country wide.

The largest Bank's CDD project in Laos is the Poverty Reduction Fund (PRF) supported by World Bank, which assists the development of small-scale, community-based infrastructure and other activities in the water, transportation, education, health, and agricultural sectors to reduce poverty in rural villages. The Poverty Reduction Fund Project (PRF) has been the World Bank's primary instrument for supporting community-driven rural development in poor upland districts. Building on the experience of a UNDP-supported pilot on participatory planning approaches in 2000, the PRF adapted and developed tools and detailed methodologies appropriate to the context of the poorest districts. The objectives of the PRF are to: (i) Assist villagers to develop community infrastructure and gain improved access to services; (ii) Build capacity and empower poor villages in poor districts to plan, manage, and implement their own public investments in a decentralized and transparent manner; and (iii) Strengthen local institutions to support participatory decision-making and conflict resolution processes at the village, khet, and district levels, involving a broad range of villagers including women, the poor, and ethnic minorities.

3. Methodology

3.1 Model specification

It is broadly recognized that participatory development has played a prominent role in the achievement of projects. Despite increasing advocacy, it is still questionable whether the inclusion of the beneficiary community in project management could elongate the serviceable durability of community-driven development (CDD) projects.

The aim of this study is to assess the sustainability of CDD projects. This study intends to investigate a wide range of factors, potentially determining the durable existence of CDD projects. The outcome variable of the current study is dichotomous, coding one if a CDD project is well usable and zero if that project is not currently usable or broken. Given a binary response to the usability of the project as a dependent variable, there are several techniques applicable to estimate the equation. Linear Probability Model (LPM) is a straightforward approach that can be used in this context. This technique is a linear regression estimated by the Least Square method. Despite its simplicity, LPM is possibly subject to many shortcomings. The most critical constraint is that this model violates an important assumption that the predicted outcomes should bound in the restrictive range of zero and one [11].

Alternative approaches, in addition to LPM, are Logit and Probit Models. These two models are non-linear techniques estimated by the Maximum Likelihood method. While the Logit Model is reliant on logistic distribution, the Probit Model estimates the equation under a normal distribution. Since there is no convincing reason to justify the superiority of one to another, this research employs the Logit Model to investigate the extent to which community participation, monetary contribution, poverty rate, project types, and their locations have

considerable impacts on the persistence of CDD projects. The structure of the Logit Model is shown and explained as follows:

$$L_i = \ln \left[\frac{\text{Prob}(Y = 1)}{\text{Prob}(Y = 0)} \right] = \beta_0 + \beta_1 PRF_i + \beta_2 CF_i + \beta_3 PR_i + \beta_4 FS_i + \beta_5 PO_i + \sum_{j=1}^{J-1} \delta_j TP_{ij} + \sum_{k=1}^{K-1} \theta_k LP_{ik} + u_i \quad (1)$$

where L_i denotes logit which is the logarithm of ratio between the probability that a CDD project is currently usable, $Y = 1$, and the probability that this project is not currently useable, $Y = 0$. PRF_i represents the share of Poverty Reduction Fund's money contributed to the project i . CF_i is the share of community's money contributed to the total value of project. PR_i stands for participation rate which is the proportion of households participating in the project over total number of households in the village. FS_i denotes projects selected by females in the village. PO_i is poverty rate which is the ratio of poor villagers over the total number of villagers. TP_{ij} represents project type j , including gravity-fed water system, Projects related to health, transportation, and projected related to education. LP_{ik} denotes the location of projects in province k , including Phongsaly, Huaphan, Luang Namtha, Luang Prabang, Oudomxay, Xiengkhuang, Savannakhet, Saravan, Sekong, and Attapue. β_0 is constant term. β_1 to β_5 are the parameters of PRF's contributed money, community's contributed money, females' involvement in the selecting process, and poverty

Variables	Descriptions
Still functioning	1 if a project is currently functioning and 0 otherwise
PRF contribution	The share of money contributed by PRF to the project
Community contribution	The share of money contributed by a community to the project
Participation rate	The proportion of participants in the project
Female selected	1 if a community is selected by females in the village
Poverty rate	The proportion of poor people in the village
Gravity-fed water	1 if a project is gravity-fed water and 0 otherwise
Health	1 if a project is related to health services and 0 otherwise
Transportation	1 if a project is related to transportation and 0 otherwise
Education	1 if a project is related to education and 0 otherwise
Phongsaly	1 if a project is located in Phongsaly and 0 otherwise
Huaphan	1 if a project is located in Huaphan and 0 otherwise
Luang Namtha	1 if a project is located in Luang Namtha and 0 otherwise
Luang Prabang	1 if a project is located in Luang Prabang and 0 otherwise
Oudomxay	1 if a project is located in Oudomxay and 0 otherwise
Xiengkhuang	1 if a project is located in Xiengkhang and 0 otherwise
Savannakhet	1 if a project is located in Savannakhet and 0 otherwise
Saravan	1 if a project is located in Saravan and 0 otherwise
Sekong	1 if a project is located in Sekong and 0 otherwise

Note: Irrigation and energy projects are reference groups for types of community-driven projects. Projects in Attapue province are reference groups for the location of projects.

Table 1.
 The description of variables in the logit model.

rate, respectively. δ_j and θ_k are parameters of explanatory variables representing the types of projects and their provincial locations. u_i is the stochastic disturbance of equation.

Before proceeding to analyze the sustainability of the CDD project, it is necessary to draw particular attention to what project sustainability in the context of this study is. There is no consensus definition of project sustainability in the literature.

Since this study considers many types of CDD projects altogether, it is hard to define what the sustainability of the project exactly means. To overcome this indistinctness, this analysis uses a loose meaning of project sustainability. Based on a study of Chatterley et al. [12], the sustainability of CDD projects in this study is defined as if the project is not visibly dilapidated and still well workable. In other words, it means that the project functions appropriately without any significant repair needs, at least during the reference period of the survey. The description of this indicator and other variables attached in the empirical analysis are explained in **Table 1**.

3.2 Data descriptions

Main data sources are from secondary data of suitability assessment in 2016 and 2019. In 2016, the assessment was organized in PRF's 10 targeted provinces for the

Variables	Obs	Mean	S.D.	Min	Max
Functioning	1,574	0.905	0.293	0	1
PRF contribution	1,574	0.897	0.076	0.134	1
Community contribution	1,574	0.101	0.073	0	0.960
Participation rate	1,574	0.361	0.159	0	1.461
Female's selection	1,574	0.492	0.500	0	1
Poverty rate	1,574	0.371	0.314	0	1
Water and sanitation	1,574	0.333	0.471	0	1
Health infrastructure	1,574	0.046	0.209	0	1
Transportation	1,574	0.196	0.397	0	1
Education infrastructure	1,574	0.357	0.479	0	1
Agriculture and irrigation	1,574	0.059	0.236	0	1
Energy	1,574	0.010	0.097	0	1
Phongsaly	1,574	0.056	0.230	0	1
Huaphan	1,574	0.216	0.412	0	1
Luang Namtha	1,574	0.063	0.243	0	1
Luang Prabang	1,574	0.119	0.324	0	1
Oudomxay	1,574	0.139	0.346	0	1
Xiengkhuang	1,574	0.097	0.296	0	1
Savannakhet	1,574	0.123	0.328	0	1
Saravan	1,574	0.057	0.231	0	1
Sekong	1,574	0.067	0.251	0	1
Attapue	1,574	0.064	0.245	0	1

Source: Author's calculation, 2020.

Table 2.
The summary statistics of variables.

project's establishment during 2012–2016 that includes 1,930 sub projects. In 2019, the assessment was organized in 10 provinces for the project's establishment during 2017–2019 that include 1,169 sub projects. Therefore, total sub project during 2012–2019 are 3,099 (Table 2). More than 100 sub projects for each province has been evaluated. Approximately 696 projects or 22% of total have been assessed in Huaphan province.

In respond to a research question whether the contribution of the community, the involvement of female villagers, poverty rate, project types, and project locations by provinces do matter for the sustainability of CDD projects, this research is mainly reliant on a database of Poverty Reduction Fund (PRF). The dataset contains the information of projects constructed from 2012 to 2019. The current study intends to emphasize CDD projects completed during 2012 and 2016. Those projects built and transferred to communities recently are not included in the analysis. This study solely focuses on all construction projects. Subprojects related to providing equipment and materials are excluded from the empirical analysis. After cleansing and removing missing data, the econometric analysis of this study is based on 1,574 projects.

4. Results

4.1 The community participation and sustainability

For many decades it has been believed the participation of communities is positively contribute to the sustainability of the project which means the more participation of the community on resources such as budget, labor, materials and the like, the more chance of sustainability of the project [13]. There is no surprise that community participation rate in term of money is low comparing participation rate in term of labor contribution. However, monetary community participation rate varies among the project types. This maybe due to the nature of the development project itself whether it require large amount of money to invest or not. Figure 1 shows the participation rate of community on the budget by activities. There are six activities of CDD project. On average the community participation on the budget is 8.58% where the community participates the highest percentage on agriculture and forestry activities because it is the main source of their income. In addition,

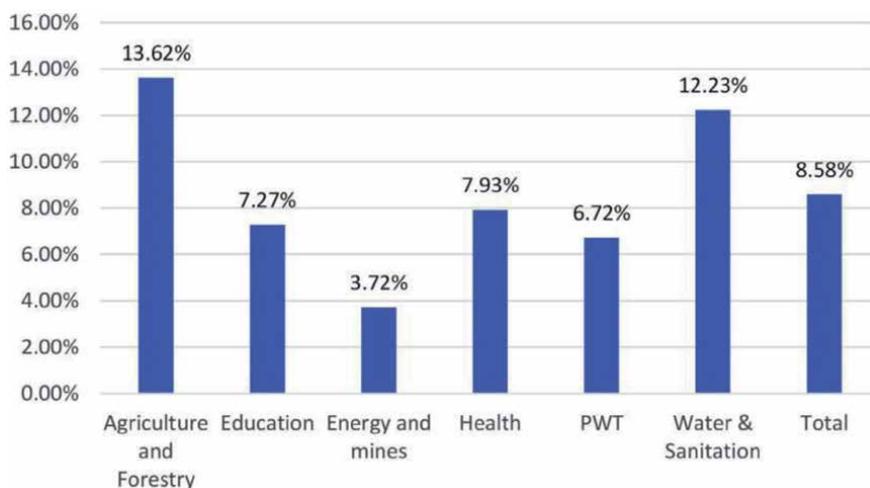


Figure 1. The participation rate of community on the budget by activities. Source: Monitoring and evaluation division, 2016 and 2019.

community spend more on water and sanitation because it is very important for their livelihood. On the other hand, the community participate only 3.72% of total budget for the energy and mine sector since the investment on these activities were expensive. Communities tend to participate more on labor rather than budget since they have limit budget. On average 33.1% of community's member participate to work on the CDD project (See **Figure 2**). They work more on energy and mine activities to compensate the less participation on the budget.

One component of sustainability in this paper is whether the project is still functioning. Approximately 2,939 projects or 94% of total project is still functioning where 3.7% of total projects is partly damage but those are already maintenance by the PRF (See **Table 3**). There are 43 non-functioning projects. The main cause of damage are due to the natural disaster such as flood, storm and land slide. There are 4 projects have not implemented in Attapue province and those are fresh market project.

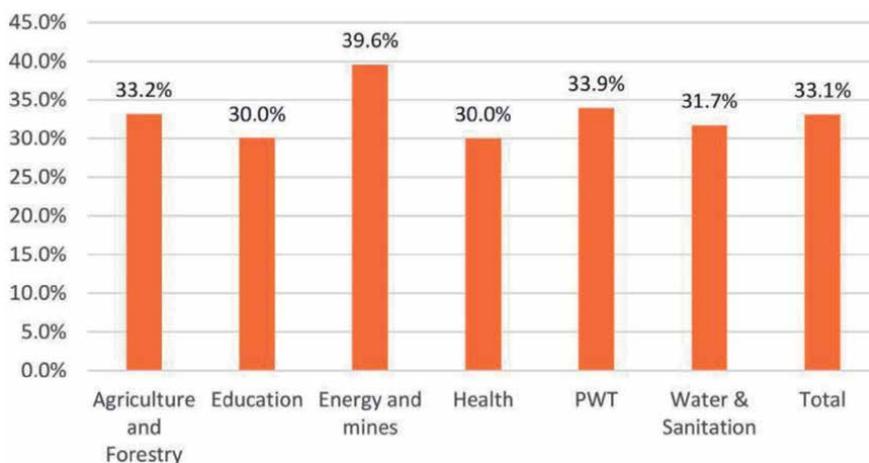


Figure 2.
The participation rate of community on labor by activities. Source: Monitoring and evaluation division, 2016 and 2019.

Province	No. project	Functioning	Partly damage	Non-functioning	Not implement	Request for maintenance
Savannakhet	435	409	24			2
Saravan	202	193	9	1		
Xiengkhuang	240	212	16	12		
Phongsaly	193	187	4	2		
Luangnamtha	168	160	7	2		
Huaphan	696	657	30	9		
Luangprabang	350	349	1			
Oudomxay	424	418	5	1		
Attapue	165	149	3	9	4	
Xekong	226	201	18	7		
Total	3,099	2,939	117	43	4	2

Source: Monitoring and Evaluation Division, 2016 and 2019.

Table 3.
Functioning of CDD project by province.

Functioning of the development project tends to vary among the provinces and the type of the projects due the differences of the geographical location and vulnerability of the project to natural disaster.

Huaphan province has the highest in term of number of projects and projects that are damaged and non-functioning, but it has low percentage of damage and non-functioning to total project. Xiengkhuang province has the highest rate of damage and non-functioning project. This is mainly due to the natural disaster such as flood and land slide.

Water and sanitation and public work and transport (PWT) sector have high percentage of non-functioning projects. This is maybe because these types of projects are easily affected by natural disaster especially during the rainy season. All of health project are functioning. Two projects in Savannakhet province to maintenance roads are in the process of requesting fund from PRF as it requires amount of fund. However, communities use village fund to repair the road and it is now commutable with fair condition.

4.2 The impact of community participation on the sustainability of CDD projects

This study applies the Logit Model to examine whether the variation of covariates does matter for the durability of CDD projects. This analysis includes the amount of money contributed by PRF and community, the involvement of females in the selection of projects, the types of projects, the locations of projects by provinces. The estimated results are presented in **Table 4**. In this table, it reports estimated parameters and their standard errors in the first two columns. Since the direct interpretation of the Logit Model is not easy for understanding, this study exclusively focuses on the marginal effects of the Logit Model. This estimated result is shown in the two remaining columns.

Table 5 shows the estimated results of the Logit Model. It is evidenced that the contribution of the community in the CDD projects does matter for the sustainability of projects. The share of money contributed by communities in the projects is positively and statistically significant at the 1 percent level. Holding other factors unchanged, a 1 percent increase in the share of the community's money in the total value of the project raises the likelihood that the project is still usable by, on

Sector	No. project	Functioning	Partly damage	Non-functioning	Not implement	Request for maintenance
Agriculture& Forestry	233	206	18	5	4	
Education	1,150	1,129	14	7		
Energy & Mines	34	32		2		
Health	145	139	5			
PWT	638	576	46	14		2
Water & Sanitation	902	854	33	15		
Total	3,102	2,936	116	43	4	2

Source: Monitoring and Evaluation Division, 2016 and 2019.

Table 4.
 Functioning of CDD project by project type.

	Logit		Marginal effects	
	Coefficient	S.E.	dy/dx	S.E.
Constant	0.379	0.476	—	—
Community contribution	4.327**	1.946	0.225**	0.103
Participation rate	1.761***	0.646	0.092***	0.035
Female's selection	0.158	0.186	0.008	0.010
Poverty rate	-0.032	0.312	-0.002	0.016
Water and sanitation	0.110	0.364	0.006	0.018
Health	-0.208	0.525	-0.012	0.032
Transportation	0.590	0.404	0.026*	0.016
Education	-0.443	0.339	-0.025	0.020
Phongsaly	1.216**	0.500	0.041***	0.011
Huaphan	0.008	0.298	0.000	0.015
Luang Namtha	0.576	0.436	0.024	0.015
Luang Prabang	1.701***	0.477	0.054***	0.011
Oudomxay	4.165***	1.039	0.092***	0.009
Xiengkhuang	1.827***	0.477	0.054***	0.011
Savannakhet	0.802**	0.375	0.032***	0.012
Saravan	0.677	0.454	0.027*	0.014
Sekong	2.074***	0.578	0.054***	0.010
Pseudo R-square			0.136	
Chi-square			133.9***	
Observations			1,574	

*Note: *, **, *** denote significant at the 10 percent level, the 5 percent level and the 1 percent level, respectively.*

Table 5.
The estimated results of the logit model.

average, 22.5 percent. Corresponding to the in-cash and in-kind contributions, the participation rate of households in the community is positively related to the survival of the project. This correlation is statistically significant at the 1 percent level. A rise in the participation rate of households in the community by 1 percent is associated with a 9.2 percent increase in the probability that the CDD project is still functioning at least during the time of the survey.

It seems that the engagement of females in selecting the CDD project exerts a positive impact on the durable existence of projects, constructed during 2012 and 2016. However, the linkage between the participation of female villagers in the selection of the CDD project and the durability of the project is not statistically significant. Consistent with the preliminary result that the proportions of the CDD projects selected by females between usable and non-usable projects are not significant at the conventional levels. Many CDD projects are intentionally constructed to improve the living standard of households in poor villages. The proportion of functioning projects in those areas is relatively low. Due to the lack of resource allocated to construction, management, and maintenance, CDD projects located in the area with a high rate of poverty are less likely to be still usable. Like the dummy variable controlling for the engagement of females in the selection of the project, the poverty rate in the village is not statistically significant at the conventional

levels. There is a minor difference between functioning and non-functioning projects across the types of CDD projects. According to the database of PRF, CDD projects are categorized into six types, water and sanitation projects, health infrastructure, transportation, education infrastructure, irrigation, and energy. The present study creates four dummy variables to control for water and sanitation, health infrastructure, transportation, and education projects. Other projects related to irrigation and energy are used as reference groups. The estimated result indicates that the probability that a transportation project, including road construction and maintenance, is currently usable is higher than irrigation and energy projects. On the contrary, the likelihood of being usable among water and sanitation, health, and education projects is relatively lower CDD projects in Ref. groups. Except for education-related projects, dummy variables for the types of CDD projects appears to be insignificant. Projects related to transportation are statistically significant at the 10 percent level. *Ceteris paribus*, the probability that transportation projects are still usable during the period of the survey is, on average, 2.6 percent higher than those projects in the reference groups.

The survival of CDD projects significantly varies across provinces in Laos. CDD projects are distributed across ten provinces. This research generates nine dummy variables to control if projects are located in Phongsaly, Huaphan, Luang Namtha, Luang Prabang, Oudomxay, Xiengkhuang, Savannakhet, Saravan, and Sekong provinces. CDD projects in Attapue province are treated as reference groups. **Table 5** shows that except for projects in Huaphan and Luang Namtha the likelihood that CDD projects in other provinces are significantly different from those in Attapue province. The estimate indicates that the parameters of province dummies appear to be positively and statistically significant at least at the 5 percent, except projects in Saravan which are significant at the 10 percent level. The probability that CDD projects are currently usable is found to be lower in Attapue compared to projects in other provinces. The estimate indicates a higher likelihood projects in Oudomxay than those in other provinces. Keeping other factors constant, the durability of CDD projects in Oudomxay province increases by around 9.2 percent compared to projects in Ref. province. The likelihood that projects in Attapue are currently usable is lower on average, 5.4 percent in comparison to Sekong, Xiengkhuang, and Luang Prabang, respectively.

In sum, the contribution of the community is a key factor determining the sustain ability of CDD projects. The participation of villagers in selecting and designing projects as well as their contributions in terms of money can increase the durable existence of CDD projects. The share of money contributed by PRF, the participation of females in the selection of projects, and the poverty rate do not significantly determine the persistence of projects. There is a small difference in the probability that CDD projects are usable across types of projects. This study finds that CDD projects in Attapue province are more likely to be not currently usable than those in other provinces.

5. Conclusion and policy implication

5.1 Concluding remark

The CDD project have been discussed on which factors impacts to the sustainability of the project in many countries. One of the key factors for suitability of the project is participation of community in term of capital and labor. This study aims to investigate the impact of community participation on sustainability of CDD project in Lao PDR. By doing that, the data base of PRF on project assessment was used to analyze the impact of community participation on sustainability through

the logit regression. In addition, field survey of functioning and non-functioning project is to reveal the factors of sustainability of the CDD project.

Main result shows that community participation on labor and finance are the key factors for sustainability of CDD projects while the female and ethnic participation is not statistically impact to the functioning of the project. This is due to the aim of CDD project to prioritize female and ethnic to be involve in the project. The project that communities decides as a priority project tend to be more sustainable than those decide by project authorities, donor, and local and central government.

While the CMS project is quite success in many countries, the quality of CMS projects in Lao PDR is still questionable. The result of field survey also supports that community participation on maintenance fund and ability of maintenance group are the key factors for sustainable of the project.

5.2 Policy recommendations

Base on the results of the studies, the policy recommendations are:

(1) Contribution of villagers is the key factors of sustainability, CDD project should be the role model for other government project; (2) There is some limitation of CFA project especially the value of investment, so it is very important that the PRF to reform the enabling policy and regulation of CFA project; (3) As the concern on quality of the CFA project, the capacity building of CBOs especially skills of planning, accounting, basic maintenance is required; (4) Poor village have insufficient fund and lack of skills and capacity for major maintenance and that cause the sustainable of the project. PRF should reserve fund for major maintenance for all project, establish rules and guideline on maintenance fund, provide technical support to maintenance group and PRF staffs especially a training on maintenance and request an assistant from technician to fixing and repairing for major problem; (5) Two villages expressed that responsiveness of local authorities on fixing issue often delayed. PRF and Village authorities should design to reduce the procedure on a report system.

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Author details

Piya Wongpit, Alay Phonvisay, Keuangkham Sisengnam and Bounmy Inthakesone*
Faculty of Economics and Business Management, National University of Laos,
Vientiane Capital, Lao PDR

*Address all correspondence to: b.inthakesone@nuol.edu.la

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Networking and Participatory Research Promoting Quality of Life and Well-Being in Portuguese-Speaking African Countries

Alister Chitetele Soy Pinto, Ana Pinto de Moura, Augusto Mário Miquitaio, Bas'llele Malomalo, Cristina Amaro da Costa, Daniela Queiroz Zuliani, Delfim Domingos da Costa, Gabriel Cunha Beato, Gaspar Afonso da Graça, Imaculada C.F. Henriques Matias, Jaqueline Sgarbi Santos, Leodinilde Pinto Caetano, Lilian Fernanda Galesi Pacheco, Maitu Abibo Buanango, Miclay Carvalho, Pedro Fernando Chimela Chume, Pedro Acosta Leyva, Vladmir Silves Ferreira and Maria Rita Marques de Oliveira

Abstract

Spread across the planet each human being, individually or in community, aspires for well-being and quality of life, according to the ideal of each one. However, we all believe that there are always ways to live better. For many people the measurement of a better life translates into the guarantee of social rights, the right to basic services, good land, seed and sufficient nutritious food for their community members. The Mechanism to Facilitate the Participation of Universities in the Food and Nutrition Security Council of the Community of Portuguese Speaking Countries is a cooperative academic network fomented by the Community of Portuguese Speaking Countries (CPLP) with support from the Food and Agriculture Organization of the United Nations. This mechanism works with teaching, research and extension in the CPLP Food and Nutrition Security Strategy. The pillars of CPLP Strategy are the strengthening of the governance of public policies on Food and Nutrition Security at all levels of government, social protection based on guaranteeing access to food and family farming with a strategy to increase the availability of good quality food, promoting social and environmental sustainability. CPLP University Mechanism has provided training processes for technicians

who work in public policies for Food and Nutrition Security and has contributed to the strengthening of postgraduate programs in Portuguese-speaking African countries. As consequence, it has favored participatory research and mixed methods as a theoretical methodological approach. Therefore, it seeks to focus on the territories of Food and Nutrition Security practices to transform reality, as recommended by CPLP Strategy, however, with the autonomous assumptions of the collaborative network. This chapter presents how local researchers perceive the results of a process of inducing an academic network to transform the local reality and promote Food and Nutrition Security in the context of the CPLP.

Keywords: Welfare, Academic networks, Community of Portuguese Speaking Countries, Food and Nutrition Security, Human Rights, Welfare

1. Introduction

Quality of life and well-being are strongly associated with access and availability of food, which meets biological, affective, cultural and environmental criteria. The effects of foods on wellbeing were strongly related to physical health, pleasure and emotional aspects. In this context, the human right to adequate food is one of the social rights recognized by the International Covenant on Economic, Social and Cultural Rights, adopted and opened for signature, ratification and accession by General Assembly resolution 2200A (XXI) of 16 December 1966. Forward, the right to adequate food was the subject of Covenant on Economic, Social and Cultural Rights General Comment No. 12: The Right to Adequate Food (Art. 11), adopted at the Twentieth Session of the Committee on Economic, Social and Cultural Rights, on 12 May 1999 [1]. In this document, the right to adequate food contemplates the dimensions of Food and Nutritional Security, namely, the availability and access to quality food in sufficient quantity, without compromising any other right and permanently being able to provide health and well-being. Extreme poverty rates violate the right to food and present themselves as one of the main challenges being faced among countries on the African continent.

In this context, in 2012, the Community of Portuguese Speaking Countries (CPLP) approved the CPLP Food and Nutrition Security Strategy, with the firm purpose of ending hunger and misery in member countries. The CPLP Strategy seeks to strengthen the governance of public policies in the area, encourage the production of food to improve their availability from family farming and promote social protection by improving access to food, fighting hunger and malnutrition.

Within the scope of this strategy is the search for the engagement of all sectors of society including social organizations, universities, parliamentarians, the private sector and the government. It was in this context that the CPLP University Mechanism emerged as an induced academic network that seeks to face the difficulties encountered in academic practice and at the same time actively participate in solutions to local and national problems.

This chapter presents the Mechanism of Universities of the CPLP, in the perspective of building autonomous networks, which, in addition to institutionality, conform to organizational instruments capable of promoting creative solutions, overcoming limitations and contributing to the consolidation of the food and nutritional security strategy at CPLP. For that, it brings a brief history of the construction of the strategy, presenting the perspective in each of the countries that make up the bloc, given that the different countries that make up the CPLP have different priorities in the Food Security and Nutrition agenda.

2. Standard of living and well-being in CPLP countries

Theoretical discussions, held at the Mechanism to Facilitate the Participation of Universities in the Food and Nutrition Security Council of the Community of Portuguese Speaking Countries around the terms quality of life and well-being of the population, have valued the progressive paradigms of the global South [2]. In the same direction, the ancestral paradigms of the peoples originating in Latin America and Africa have also deserved a prominent place [3].

Standard of quality of life and well-being have been debated in the scope of projects aimed at the development of nations. The theory of local development generally asks this question: How to evaluate local actions in favor of development? Orth [4] states the following indicators: first of all, local development is a matter of time; it is to realize that an artificial border exists between the economic and the cultural; Among the cultural factors of local development, four major concerns emerge: identity, quality of life, territorial or community integration and employment.

The concerns of local development are also taken into account by agents of the “theory of community economic development”. Its mission is to promote and support this theory for the social, economic and environmental improvement of Canadian communities.

Community economic development (CED) is defined as a measure taken at the local scale to create economic opportunities and improve the social conditions of communities based on a sustainable and integral basis; particular attention being directed to the most disadvantaged people.

A community process run by and for members, the CED is based on an integrated approach to social and economic development, and favors the economic, social, ecological and cultural well-being of communities.

CED is a solution to conventional approaches to economic development: the problems faced by communities, specifically unemployment, poverty, job loss, environmental degradation and delinquency, must be addressed in a comprehensive and participatory manner [5].

An important fact to be mentioned is that the development field is not only a theoretical field, but it is, likewise, a field of development practice, which implies a policy of implementation and evaluation of development actions. In this case, the community economic development values an integrative and participatory approach.

The theory of human development, elaborated by the United Nations Development Program, works in the same direction. It is a theoretical-practical field of development.

Human development implies the construction of an order of values in which the economic and political dimensions actually become instruments for overcoming material and cultural deprivations of human beings - that is, a new order based on the guarantee of inseparable civil, political, economic, social and cultural rights [6].

United Nations Development Program conception of development owes much to the Indian economist Amartya Sen. Through these two points of view, development must be treated in its broadest, most human dimension. For Sen [7]: “development is a process of expanding the real freedoms that people enjoy”. The author focuses

on human freedoms to contradict the narrower interpretations of development, such as those that identify development with the growth of the (GNP), increased personal incomes, industrialization, technological advancement or social modernization. At the same time, he recognizes that the growth of GNP, or of individual incomes, obviously, can be very important as “means” of expanding the freedoms enjoyed by members of society. However, freedoms depend on other determinants, such as social and economic provisions (for example, education and health services) and civil rights (for example, the freedom to participate in public discussions and inquiries).

Thus, development requires the removal of the main sources of deprivation of liberty: poverty and tyranny, lack of economic opportunities and systematic social destitution, neglect of public services and intolerance or excessive interference by repressive states.

The sustainable development paradigm has sought to bring the appreciation of the environment in addition to quality-of-life indicators linked to economic, social, cultural. Grenier [8], concerned with the establishment of criteria to develop an evaluation and taking the knowledge of native (indigenous) peoples as a reference, defines sustainable development from the view of the World Commission on Environment and Development.

Sustainable development is a development that responds to current needs without impairing the ability of future generations to respond to their own needs. The sustainable development of agriculture and natural resources represents the use, management and conservation of natural resources and also the orientation of technological changes to ensure the satisfaction of human needs, specifically in food, water, housing, clothing and fuel for current and future generations [...] [8].

Granier [8] brings in his text nine objectives for sustainable development according to the World Commission on Environment and Development list: 1) leverage for growth; 2) change in the quality of growth; 3) meeting essential needs in matters of employment, food, energy, water and sanitation; 4) maintenance with a viable population level; 5) preservation and care for the resource bases; 6) the reorientation of technology and risk management; 7) the fusion of environmental and economic issues in decision making; 8) reorientation of international economic relations; 9) an increasingly cooperative development.

In dialog with World Commission on Environment and Development and Matowanyika, Grenier [8] shows that sustainable development that takes into account local and national realities is based on the integration of these five variables: biophysical and socioeconomic resources; external factors, such as available technologies and development ideologies; internal factors, including socio-cultural belief systems and local production and technology bases; demographic factors and political and economic factors.

Mamani [9], intellectual indigenous from Bolivia, brings this criticism to the Western paradigm that thinks of development as the growth or increase of something; also understood as evolution. For him, behind the concept of development are the concepts of progress, planning and production which, added to science and technology, constitute a vision of the prevailing reality of the world forged since the second world war. For this author, the word development as a concept and a way of life is totally inherent in “living better”.

In this context, Mamani [9] establishes a difference between what he identifies as western anthropocentric paradigms, namely, the individualist paradigm that has the axis of “living better”, the collective paradigm, which has much to do with political left, which has as its axis the “well-being of the human being”, and the

ancestral paradigm of the indigenous peoples. It is a community paradigm that has the “Vivir Bien/Buen Vivir” as its horizon.

“Vivir Bien/Buen Vivir is life in fullness. It is knowing how to live and know how to coexist in harmony and balance; in harmony with the cycles of Mother Earth, the cosmos, life and history, and balance with all forms of existence, visible and invisible, in permanent respect” [9].

Instead of being content with the definitions produced by progressive thoughts on food security and food sovereignty, even when well intentioned, Mamani [9] suggests the term “dignified food with identity” to think about public policies for food and nutrition security since the ancestral paradigm of the original peoples. In other words, this means, first, what food should be for everyone, and when it is said for everyone, it is referring to all forms of existence, not only for human beings, but for all beings that inhabit Mother Earth, because here it is conceived that everything is part of the balance of life. When it is said with “identity”, it refers to establishing its own forms of food production; with its logic, with its own technologies, which allow people to produce healthy food, to recover healthy seeds as well. All of this makes it possible to maintain the greatest nutritional wealth of food and preserve the land. The principles that apply in this logic are to protect life before the market; and respect for Mother Earth’s cycles.

Using the ancestral paradigm of ubuntu, Malomalo [3] states that it is an alternative, proposed from the global South, to face the planetary crisis imposed by capitalist development. He believes that the use of this term, like “Viver bien” [9], is the first step towards decolonization: epistemological decolonization and then other forms of political, economic and cultural decolonization. In this regard, instead of using the term development in an adjective way: alternative development, sustainable development, even though it is within an alternative theoretical repertoire, it is necessary to radicalize the debate using native terms such as ubuntu/bisoity, aiming to establish an epistemological alternative towards new society. Ubuntu also aims to build a human society based on respect for nature and the ancestry of each people.

3. The CPLP University mechanism

The Mechanism for Facilitating the Participation of Universities in the Food and Nutrition Security Council of the Community of Portuguese Speaking Countries was created in the context of CPLP Strategy in 2012 [10]. The ESAN-CPLP was established in a meeting of heads of state, held in Maputo-Mozambique in the same year, with the purpose of ending hunger in the CPLP countries. Moreover, the CPLP University Mechanism Coordination Committee was elected in 2015. This Coordination Committee includes representatives from nine universities, two of which are in Brazil, two in Portugal and one in each of the other countries (Angola, Cape Verde, Guinea-Bissau, Equatorial Guinea, Mozambique, East Timor and São Tomé and Príncipe). The objectives of CPLP University Mechanism are as following:

1. Strengthen research in the scientific community of Portuguese-speaking countries, which takes as an object of study the food systems in this political and economic bloc, in terms of guaranteeing the right to adequate food, food sovereignty and Food and Nutrition Security policies.
2. Develop cooperative training processes within the scope of the CPLP, from short courses to postgraduate courses, aimed at the development of inclusive, sustainable and sensitive to nutrition food systems.

3. Promote the inclusion of researchers, teachers and students in social dynamics at different levels of territorial organization, contributing to the development of food systems in this political and economic bloc.

The Universities Mechanism acts independently, in line with the strategies of the Food and Nutrition Security Council of CPLP. In 2015, the work plan included a research and development program centered on three lines: i) Strengthening food and nutrition security governance; ii) Promotion of access and use of food to improve the livelihoods of the most vulnerable groups; iii) Increasing availability of food based on small producers. These three lines correspond to the lines of action of CPLP Strategy.

To accomplish these objectives, it was planned a survey of the potentialities, weaknesses and needs of research and development in Food Sovereignty and Food and Nutrition Security based on the systematization of existing information, for each Mechanism country. Subsequently, it was intended to develop integrated research, involving at least three member states. Nevertheless, during the first two years, despite some initiatives within the scope of the CPLP University Mechanism articulation committee, this network did not raise any significant advances, which can be directly attributed to the MU-CONSAR-CPLP. Taking into account the difficulty to implement regular face-to-face meetings, due to geographic distance among the different elements that compounds the MU-CONSAR Coordination Committee, virtual communication was pursued, in order to structure and trigger this process. This was a long period of debate, in a context of a great diversity of conceptions of food and nutrition security, development models and academic dynamics. In the beginning, the differences generated strangeness that over time disappeared to make way for a network of exchange and production of knowledge.

The strengthening of diplomatic cooperation relations between the countries of the south in strategic areas, among which Food and Nutrition Security was prioritized during the governments of Lula da Silva and Dilma Rousseff, with significant investment of resources and advocacy, providing the induction of technical cooperation networks and academic.

As a result of previous processes of articulation of Brazilian researchers with government sectors, in 2018, the University Mechanism obtained financial support from the Brazilian government, that provided the hiring of technical personnel to carry out the research, and allows that the Coordination Committee meets twice a month, using an online platform (NutriSSAN Platform), to discuss (essentially) two topics: research and education. Nevertheless, countries like Angola, Guinea-Bissau are unable to maintain their presence at meetings regularly due to essentially technical communication problems. With Equatorial Guinea and East Timor, it was not yet possible to establish an academic cooperation relationship. In addition to systematic online meetings, the CPLP University Mechanism researchers have participated in face-to-face meetings, called the “Summer Schools”, which were held in Brazil (2–5, May 2018) and Mozambique (14–18 November 2018), in addition to a technical mission carried out in São Tomé and Príncipe. The purposes are the strengthening of the group’s cohesion and the theoretical-methodological deepening for academic work.

During the meeting of CPLP heads of state, held in Dilli in 2015, a multilateral cooperation was proposed for the improvement of training programs at different levels of formal and informal education, as well as the expansion of the offer, whether in postgraduate courses or in short courses not leading to a degree. To this end, the approach was to offer courses aligned within the objectives of ESAN-CPLP Strategy for the countries of the bloc: i) the development of specific cooperative programs, ii) the realization of a face-to-face course to build a guiding reference

framework of CPLP University Mechanism action and iii) the creation of an academic mobility program.

In 2016, the University of Afro-Brazilian Lusophone Integration (UNILAB) joined the group to follow the work of the CPLP University Mechanism coordination committee and started to occupy the second chair of Brazil in 2017. From UNILAB, discussions began for the collective construction of a proposal for post-graduate course in Food and Nutritional Security. The proposal was built collectively through online meetings and the courses have already been implemented in Brazil, Cape Verde, São Tomé and Príncipe and Mozambique. The resources for the implementation are minimal, because many tasks are distributed among the group of teachers through a process of solidarity cooperation (**Figure 1**).

The works in the development by the mechanism of CPLP involve online courses for the higher education professionals (400 h) involving 180 students in double degree process involving Brazil, Mozambique, São Tomé and Príncipe. The



Figure 1. Final screen of video lessons with visual identity and partners of the specialization course in food and nutrition security, 2019.



Figure 2. Opening of the summer school at UniZambeze, Tete, Mozambique, 2018.

students are government technicians, teachers and agents of food and nutrition security, challenged to develop projects that transform local contexts, such as the development of innovations for family farming practices and care for the environment, health and wellness. The specialization course program was developed collectively, involving professors from universities close to the students. Teachers who supervise final course projects also went through a training process involving virtual environments and participatory research. This virtuous interaction provides to the teachers who receive students from other countries the knowledge that makes them more sensitive to the problems of the student's local context, giving students access to information and the possibility of intervening in their reality in a systematic way using a method. As for teachers at local universities, these exchanges enrich the training processes they seek to teach by researching and intervening in reality.

The virtual environment has facilitated the process of cooperation between actors in academia and between them and the government and other social actors. However, the face-to-face meetings facilitated by FAO or the Brazilian government were fundamental to generate bond and feeling of belonging among the members of the University Mechanism (**Figure 2**).

4. Cooperation processes in research, teaching and extension

Much of the knowledge produced at the university is unknown to society and part of what is produced may not meet their needs. It is assumed that, in the face of multiple crises (economics, health, environmental, ethics ...), it is necessary to create mechanisms for the dialog between the academic community among its peers and with the actors of the different scenarios where life happens. It is necessary to seek favorable scenarios for the production and dissemination of knowledge and the insertion of the academic community in actions to promote local development and well-being. Food systems are intimately and potentially inserted in the processes of local development and guarantee of rights to health and well-being.

The insertion of academic practices in the territory not only promotes and strengthens actions to promote environments favorable to local development, healthy and sustainable inclusive food systems, but also qualifies the teaching process. The presence of the academy can permeate all scenarios of the food system and the policies that support it, putting into practice specific skills of the researcher, in a contextualized way in reality, without replacing other roles, such as the role of providing, promoting, defending the right to food.

Academic practices that promote local development emphasize traditional knowledge and the empowerment of disadvantaged minorities, including women, traditional peoples and communities. In times of uncertainty, an issue as global as food and nutrition can make the most of social participation processes, with the aim of transforming reality.

The universal guarantee of the right to adequate food presents itself as one of the greatest challenges for humanity, whether due to inequities in access, or due to the not-so-distant threat of depletion of natural resources [11] and, even more, the limitations for propose and develop processes for evaluating its performance, due to the multiplicity of factors.

In this way, participatory processes [12] gain relevance to promote the insertion of research in the local social, political, economic and environmental dynamics for a better understanding of the situation and the vulnerability processes in which it is established. The second element refers to the need to place individuals as political

subjects, building their own knowledge, in order to develop coping strategies and claim their rights.

These arguments are consistent with the principles of participatory research, which seeks to involve research actors as agents and owners of their own knowledge, able to analyze their problems and develop their own solutions [13]. It seeks to “place the control of knowledge in the hands of groups and collectivities that express collective learning both in their conscience and commitment to collective action” [14].

In our view, the starting point must always be the reality of the territory from different perspectives and levels of intervention. Intersectoriality, interdisciplinarity, systemic thinking and the dialog of knowledge are taken as a basis. This approach may need tools to systematize and organize information.

Food and Nutrition Security is multisectoral and transdisciplinary and benefits from all types of research. However, participatory inter/transdisciplinary research is able to synthesize knowledge and produce innovation/transformation. Participating research should not be confused with extension, although it occurs in extension scenarios. This research follows a method and its results are validated by the logic of academic production. It is about making research meaningful, bringing it closer to issues of interest to society, having it as an ally. At CPLP University Mechanism, it is assumed that the exchange of experiences, collaborative work and the effective participation of the academy in Food Sovereign and Food and Nutrition Security public policies promote the research skills and the necessary subsidies for sustainable, healthy, fair and inclusive food systems.

The transformation of food systems and more inclusive ways of food production and trade are at the heart of global discussions, identified as challenges to a more sustainable and healthy life on the planet. This discussion went from ideas and theories to the agenda of decision makers around the world. The current food systems, despite technological advances, high productivity in agriculture, livestock and the diversity of food supplied by industry, available in supermarkets and other establishments, do not guarantee the health of the consumer or the food on everyone's table. Hunger and obesity are on this agenda, as are the processes of production and distribution of food that are sustainable and inclusive [15].

The concept of the food system is very broad and represents an integrating and meaning-producing element in this field of knowledge and practices. The food system articulates the analysis of different food activities and covers the flow of food without neglecting the actors involved. Thus, the sowing, harvesting, production, distribution and consumption processes are perceived in an interconnected manner and based on existing relationships. As food moves from side to side and is transformed, it is necessary to consider the existence of subjects above all.

Under the reference of right to adequate food, as a universal right [1], food sovereignty and Food and Nutrition Security policies as the banner of the dispute, as well as the right to produce, contribute to the construction of more just, sustainable, inclusive and resilient food systems that promote health. At the center of this discussion are the thinkers who support the logic of endogenous development, social technologies, solidary economics, emancipatory critical education, science to the south and university extension itself [16].

The transformation of food systems puts us before a paradigm shift, leading us to rethink our technologies to find new answers. More than that, it leads us to innovate and reinvent ourselves in our research questions. It makes us aware that it will be necessary to transform academic practice, from transdisciplinary perspectives. CPLP University Mechanism works in a proposal for action based on the inseparability of teaching-research-extension, which seeks to integrate the production of

technological solutions with training practices, adopting collaborative networks as a strategy to solve complex problems.

The insertion of food sovereignty and Food and Nutrition Security on the government policy agenda, as well as the development of efficient and effective processes in the governance of these policies are the great challenges for the sustainability of food systems, the guarantee of the human right to food, health and well-being suitable for all.

Within the context of the CPLP Food and Nutritional Security Council, a great effort has been made to strengthen the governance of these policies among member countries by creating laws and public policy councils with a view to engaging everyone. The academy has been called upon to participate in these processes acting directly on public policies, promoting innovation or training processes (**Figure 3**).

In the context of public policies, academy can contribute by generating evidence from research and knowledge that already exists, advising management processes, engaging in advocacy processes for the interests of sections of the less favored population, and promoting consensus through appropriate methodologies; it can, within the territories, promote innovation by generating technologies and, finally; promoting training processes for technical staff, developing information and training activities for the population, seeking to generate changes in behavior and skills in favor of the well-being and quality of life of the population (**Figure 4**).

The engagement of academy in public policy processes is determined by historical, cultural and conjunctural issues. And in this case, the actions of international organizations, for example, the Food and Nutrition Security Council of CPLP and FAO facilitate the process. Below we present how the members of the University Mechanism got involved and perceive the process in their countries.

4.1 Angola

Individual's life passes and develops in a time and space, being determined by social actions and behaviors for which a certain education is necessary as a process of transmitting social meanings in a society. Angolan society is in a constant process of change; this includes intellectual economic, social, and educational needs, among others that make up the well-being of societies.

Participation in CPLP University Mechanism has been favorable because through this mechanism, the university has the possibility to share and acquire knowledge related to food sovereignty and Food and Nutrition Security as well as the transmission or dissemination of this information in different areas of society. The mechanism has been arousing interest in the issue of Food and Nutrition Security, as it is a topic that most Angolans are still unaware of.

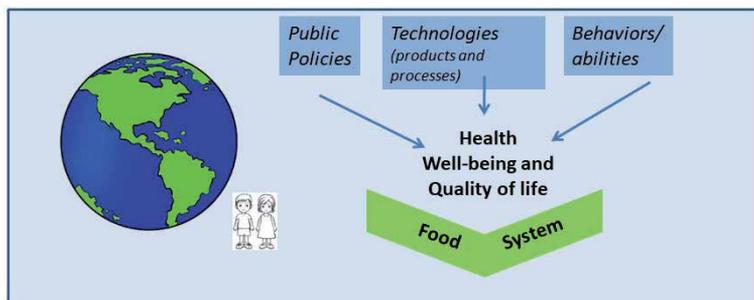


Figure 3.
Guidelines for the performance of the academy in public policies.

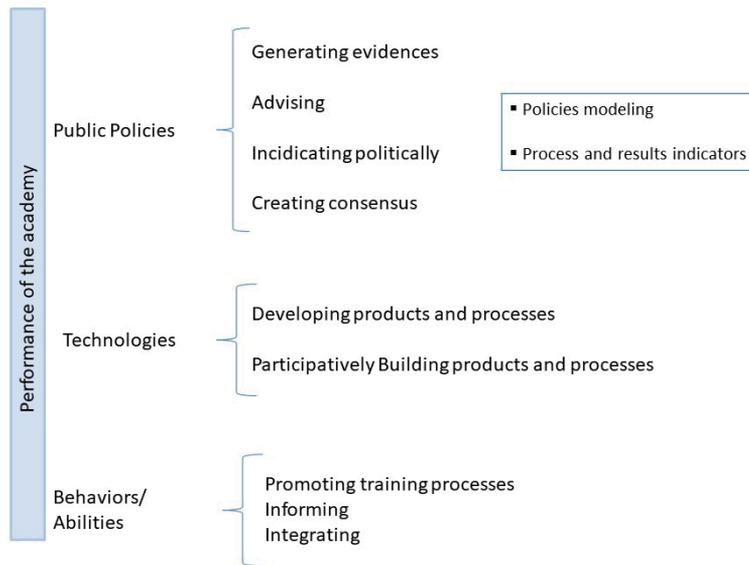


Figure 4.
Performance of the academy in public policies.

Inclusive and participatory research is a fundamental factor because through this, we seek community involvement in the analysis and resolution of problems in their own reality, developing and creating strong bonds, avoiding gaps between researchers, teachers, government entities and members of society in general. In this sense, the university, through extension, has sought to collaborate to the maximum extent with the communities to identify potential problems, the elaboration of an action plan that aims to put an end to the problems now identified.

In Angola, the government has created programs aimed at fighting hunger and poverty, although in many cases it has not been implemented for different reasons. In the current context, the government created the program to support production, export diversification and import substitution (PRODESI), aiming at the acceleration of national (local) production and the creation of wealth, generating employment opportunities within the communities and consequently the generation of a reasonable family income. PRODESI has a great potential for participatory actions involving the University.

Angolan researchers at CPLP University Mechanism believe that greater interaction between public authorities, academia and civil society is important in order to have a country with policies designed and focused on social well-being, where the right to food is a fundamental element.

4.2 Brazil – Ceará and Bahia

The University of Afro-Brazilian Lusophone Integration (UNILAB), one of the universities that make up the University Participation Mechanism at CPLP University Mechanism, is a young institution that is inserted in the context of internationalization and interiorization, as an expansion strategy and democratizing access to higher education in Brazil and in the CPLP countries. Located in northeastern Brazil, it operates in two different territories - Maciço do Baturité, state of Ceará and Recôncavo Baiano, in Bahia, with the principles of solidarity cooperation among Portuguese-speaking peoples as its north.

In this context, the integration of UNILAB in CPLP University Mechanism meets the vocation of a University in strong harmony with the demands of the territories where it is inserted, as well as the other Portuguese-speaking countries, in which there are formal cooperation processes. However, about the theme of Food and Nutrition Security, although it permeated the actions developed in teaching research and extension, especially in the Agronomy graduation course,



Figure 5.
Training process involving theory and practice in agroforestry systems training (Redenção-CE, Brazil, 2019).



Figure 6.
Traditional cassava plantation in the Recôncavo Bahiano region, Brazil, 2019.

there was no conceptual appropriation that would lead to the understanding that the construction of Food and Nutrition Security is relevant to different areas of the knowledge. Based on the project to Strengthen Teaching, Research and Extension for Sovereignty and Food and Nutrition Security in the CPLP and at the UNILAB, developed by the Pro-Rectorate of Institutional Relations with resources from the Brazilian Ministry of Science, Technology, Innovations and Communications, there was an expansion of the debate on Food and Nutrition Security at the University and the integration of professors and researchers from different areas in addition to those related to agrarian sciences.

In the context of the project, in addition to the Summer Schools and Technical Mission, the aforementioned Specialization in Food and Nutrition Security was carried out, promoting the solidary participation of researchers from the institution. It should be noted that the moments of face-to-face meetings in the countries are of paramount importance for the construction of the activities to be carried out by the group, in addition to giving prominence and visibility to local researchers. In Bahia, activities are developed between the university and the surrounding communities, regarding the reconstruction of traditional cassava fields. A process of continuous training in Agroforestry Systems was carried out in Ceará, involving students from the UNILAB Agronomy graduation course, together with EMBRAPA Agroindustry Tropical, in addition to the participation of teachers in Participating Research in Sovereignty and Food and Nutrition Security (short course developed by partner UNESP). All actions have resonance in the territories, to the extent that they are appropriated by different actors and translate into course completion works, participation in scientific events and a pedagogical environment for building changes in the local reality. It is worth remembering that in the context of Food and Nutrition Security Council of the CPLP, there is recognition of the importance of agroecology and family and peasant agriculture as strategic in promoting Food and Nutrition Security, especially in rural areas, where most of the actions developed in the context of CPLP University Mechanism are concentrated (**Figures 5 and 6**). In Brazil, the development of a post-doctorate to be carried out in Guinea-Bissau and research on Food and Nutrition Security in Cape Verde are underway.

4.3 Brazil – São Paulo

UNESP (State University of São Paulo “Júlio de Mesquita Filho”) is a free, public, multicampus university that has been a member of CPLP University Mechanism since 2015. It was founded in 1976 and today represents one of the most important universities in Brazil, being among the top three of the State of São Paulo.

The Center for Science, Technology and Innovation in Sovereignty and Food and Nutritional Security - INTERSSAN (<http://interssan.com.br/>) is coordinated by the Integrated Teaching, Research and Extension Group at UNESP, which is responsible for activities with the academic network of CPLP University Mechanism. In this network, INTERSSAN shares with UNILAB the coordination of the work agenda, organizing monthly online meetings in order to execute the work plan with Food and Nutrition Security Council. Besides that, it has received students from partner universities in its postgraduate programs and participated in the discussion for the creation of postgraduate programs in partner universities. It manages the Moodle platform to offer distance learning courses at the graduate level or to disseminate knowledge. It has also articulated bibliographic productions in co-authorship.

The involvement in the training processes of CPLP University Mechanism, as well as research and extension, has strengthened the work of INTERSSAN researchers, providing the exercise of teaching and research processes in the critical and

participatory logic. As an example, the orientation of the course conclusion work in the UNESP/Zambeze University partnership involved around 30 researchers from UNESP. Another example was the development of educational material for children (Figure 7).

4.4 Cape Verde

The University of Cape Verde is the first public institution with the character of a university in the country and is therefore a reference for Cape Verdean higher education. Its organic composition consists of five faculties and it has six campus spread over several locations in two islands.

Its history can be traced back to the immediate period of post-independence, when the country's first higher education school was founded in 1979. In 2006, after the meeting of three independent public high schools, the University of Cape Verde was created.

The University of Cape Verde has been part of CPLP University Mechanism since its creation in 2015, through the School of Agricultural and Environmental Sciences, created on 23 December 2011. This School provides degree courses in Agronomy and Zootechny and intends to open in the coming years the courses in Environmental Engineering and Forest Engineering (Figure 8).

4.5 Guinea-Bissau

Guinea-Bissau is a country that is building relations with CPLP University Mechanism, through the University Amílcar Cabral (UAC). It is a public institution of higher education, created in 2003 and reinstalled in 2012 after a long period of stoppage.

It is the first and only public university in Guinea-Bissau. Its mission is to create, transmit and disseminate the culture of humanistic, artistic, scientific and technological knowledge, contributing to the promotion and scientific development of Guinean society. Its goal is to improve the ability to anticipate and respond to social, scientific and technological changes with a view to community development and increasing social cohesion.



Figure 7. Children's video prepared by INTERSSAN, in partnership with CPLP University Mechanism, 2020. Available at: <https://youtu.be/8rrfeNcspgU>



Figure 8.
Fair for the promotion of agroecological practices held by Uni-CV, Cidade de Praia, 2018.

The UAC also aims to promote and contribute to the consolidation of the values of freedom, the culture of peace, citizenship and human rights. In its administration, it is governed by principles of democracy and participation based on respect for identity and balance between the polytechnic and university subsystems, aiming to promote doctrinal independence in relation to any philosophical, political, ideological, esthetic or religious conceptions.

It also favors pluralism of opinion, freedom of expression and thought and promotion of intellectual tolerance. Along these lines, it encourages the active participation of all university bodies in ordinary academic life.

It is considered that the role of students and their organizations should not be neglected, with special emphasis on the essential functions performed by non-teaching staff. For this reason, strategic action is directed towards teaching and scientific research, at the national and international level so it is important to attend to human resources with respect for their adequacy and good management. Thus, UAC has not measured efforts to favor a good synergy with CPLP University Mechanism since 2015, to expand its international operations and partnerships.

4.6 Mozambique

Mozambique's participation in CPLP University Mechanism has been ensured by a representative and alternate from the Zambeze University (UniZambeze). It is a Mozambican public higher education institution founded in 2009, located in the city of Beira, which has six faculties, four of which are located in the central provinces of Manica, Tete and Zambézia, and the rest in the province of Sofala.

Most undergraduate courses, especially those taught in the first three provinces, have the potential to contribute positively to sustainable food systems and to increasing the availability of diverse and nutritious foods.

Thus, in these places, the training of small producers in the communities has been prioritized, with a view to equip them with better productive practices, as well as training young people in vocational courses, with the objective of facilitating self-employment in the civil construction and agro-livestock production sectors, enabling the expansion of conditions for access to food.

In its participation in Food and Nutrition Security Council of the CPLP, UniZambeze, in addition to strengthening its staff, has been a vehicle for raising awareness among Mozambican society regarding the need for sustainable eating practices and public policies with a view to improving access to food. In this context, in 2019, UniZambeze hosted the second edition of the CPLP University Mechanism Summer School, held in the city of Tete.

In 2020, in cooperation with UNESP, UniZambeze hosted the first specialization course in Food and Nutritional Security, taught in this country, which explains the very high demand. 130 students participate actively in this course, including managers from the public and private sectors, as well as social activists belonging to different Civil Society Organizations, coming from different parts of the country and from different areas of knowledge that dialog with Food and Nutrition Security.

This diverse participation gives the course a peculiar characteristic and potential for the promotion and search for sustainable solutions to community and population challenges in general. This includes preventable diseases and nutritional deficiencies, with a view to achieving individual and collective well-being, within the scope of local development.

Hence, the option for participating research was appropriate to the context. The experience in this course allowed UniZambeze to think about the possibility of introducing a *stricto-sensu* Postgraduate course, especially for students who complete the specialization, who can continue with the training, if they want to.

This fact may happen in the near future, and may have some support from Professors indicated by CPLP University Mechanism, in addition to professors of the institution. Some of these professors participate in the Participatory Research in Food and Nutrition Security course and/or have concluded recently training in the Course of Trainers in Digital Scenarios in Sovereignty and Food Security, both taught by UNESP.

Due to its participation in CPLP University Mechanism, UniZambeze was invited to join the National Council for Food and Nutritional Security of Mozambique, created in 2017, which has the task of advising the Government on inter-ministerial coordination and promotion of Food and Nutrition Security and right to adequate food. And because Food and Nutrition Security Council of CPLP is intended to unfold at the provincial and district level, UniZambeze will be able to actively participate in the training of these Councils and will share the experiences learned by the countries that are part of CPLP University Mechanism and that have consolidated their councils.

4.7 Portugal

Portugal joined the CPLP University Mechanism in 2015. Since 2018, the Polytechnic Institute of Viseu and Universidade Aberta have represented Portugal in the CPLP University Mechanism Coordination Committee. The University Mechanism of Portugal is also part of the CPLP University Mechanism representation in the Working Group on Nutrition and Food Systems, created within the scope of the CPLP Food and Nutritional Security Council, in January 2019.

The Polytechnic Institute of Viseu is one of the polytechnic higher education institutions in Portugal, located in the central region, which actively participates in activities linked to society, with emphasis on projects developed at the level of family farming and sustainable food systems. Within its schools, it offers different levels of higher education in different scientific areas, namely in the area of environmental, agronomic, forestry and veterinary sciences and social and economic sciences (<https://www.ipv.pt/acesso.htm>).

The Universidade Aberta (UAb) is the public distance learning university in Portugal. It is a member of the Distance Education Association of Portuguese Speaking Countries. Due to its vocation and nature, UAb uses in its teaching activities, the most advanced distance learning methodologies and technologies aimed at education without geographical borders or physical barriers, and with a special focus on the expansion of Portuguese language and culture in Portuguese-speaking countries (migrant communities and Portuguese-speaking countries).

Thus, UAb offers, anywhere in the world, higher education (degrees, masters and doctorates) and Lifelong Learning courses, in the following domains: Sciences and Technology, Social and Management Sciences, Distance Education and Humanities (<https://portal.uab.pt/>). In the context of food, the Master's course in Food Consumption Sciences (<https://www2.uab.pt/guiainformativo/detailcursos.php?curso=25>) stands out in its online offer.

The University Mechanism network in Portugal is composed of eight Higher Education Institutions, and 18 researchers, with different scientific backgrounds: agronomy, zootechnics, biology, food engineering, pharmaceutical sciences. This network actively participates in regular online (monthly) CPLP University Mechanism Coordination meetings, for better planning and better execution of the Mechanism work plan. It also participates actively in the different activities developed by University Mechanism, at the level of the following axis: teaching, research, extension.

In this regard, the participation of different researchers from the CPLP University Mechanism network in Portugal stands out in the *lato-sensu* specialization course in Food and Nutritional Security, proposed by UNILAB and UNESP. It is also worth mentioning the participation of researchers in the different Special Interest Groups: SIG Sustainable Agri-food System, SIG Community of Portuguese Speaking Countries, SIG Obesity.

The CPLP University Mechanism network in Portugal actively collaborates with the Civil Society Mechanism of the CPLP Food Security Council, highlighting in this regard the recent actions: International Forum on Relevant Territories for Sustainable Food Systems (July 2019); Workshops: Human Right to Adequate Food and Public Policies at the Local Level (2018), Conversations @ table: International Exchanges on the Post-COVID-19 Food System (2020).

Likewise, a number of research projects related to family farming and right to adequate food are underway within the Decade of Family Farming, in partnership with CPLP civil society mechanism and several other partners from academia and civil society (for example, the project “Contributions from Family Farming to the Promotion of Sustainable Food Systems and Diets”, within the scope of the National Rural Network and the cooperation project “TERRASafe - Healthy Territories with Family Farmers”, which involve Brazil, Guinea Bissau and Mozambique).

4.8 São Tomé and Príncipe

The University of São Tomé and Príncipe (USTP) is a public institution of higher education that resulted from the need to create a structure capable of bringing together the different institutions and training centers in order to provide functional and institutional uniformity to higher education in São Tomé and Príncipe. USTP was created in 2014 and has been a member of CPLP University Mechanism since 2015. USTP assumes itself as the institution responsible for the scientific, cultural, social and economic development of this geographic and linguistic space with around 200 thousand inhabitants. The objective of the USTP is to provide quality higher education, research and extension that enable the formation of citizens with

the capacity for entrepreneurial action and independent reflection, necessary for the country's sustainable development.

Within the scope of the CPLP University Mechanism, USTP, Uni-CV and UniZambeze hosted the Specialization Course in Food and Nutrition Security promoted by UNILAB and UNESP. USTP has been working closely with the civil society network for Food and Nutrition Security, Food and Nutrition Security Council of the STP, Center for Agricultural and Technological Research (CIAT-STP), as well as with the government in order to ensure Food and Nutrition Security, and improving the living conditions of the rural population through participatory research. Currently, USTP in cooperation with UNILAB and UNESP is working to implement a Master's course in Agroecology and Rural Development with a focus on Rural development, Agroecology, public policies for food security and the Empowerment of rural Women.

5. Final considerations

Healthy, sustainable and inclusive food systems are on the global agenda and represent a fundamental condition for the health and well-being of populations. This worldwide effort establishes general guidelines and points to the need for profound changes in economies and ways of life, putting globalization in check. However, there is a need for valuing diversity in the search for solutions to local, regional and national issues. Ancestral knowledge emerges as elements to be revisited and an important asset among CPLP countries. Teaching-research-extension processes that take into account the dialog of knowledge and life in territories in different dimensions and diversity are potentially more appropriate for transforming the reality of many families into food insecurity. The strengthening of a national network of researchers is of paramount importance for each country to develop and implement appropriate policies capable of guaranteeing the well-being of its population. In turn, each national network is nourished and strengthened when interacting with other networks. This is the working logic of CPLP University Mechanism.

Although they conform to different realities, especially Brazil and Portugal, Portuguese-speaking countries have similar challenges for which the construction of solutions discussed in a community has been shown to be able to build paths. Much of the shared challenges, especially in the African countries of the bloc, are associated with young democracies, in need of consolidation. However, for the whole group, there is a need for the use of natural resources in order to guarantee sustainable and healthy production systems. In this context, the consolidation of research networks has become an effective instrument, as efforts and resources converge to overcome challenges. The paths paved by the debate and exchange of experiences strengthen the local networks, enhancing the efforts of the countries with regard to teaching, research and extension.

Author details

Alister Chitetele Soy Pinto¹, Ana Pinto de Moura², Augusto Mário Miquitaio³, Bas'illele Malomalo⁴, Cristina Amaro da Costa⁵, Daniela Queiroz Zuliani⁶, Delfim Domingos da Costa⁷, Gabriel Cunha Beato⁸, Gaspar Afonso da Graça⁹, Imaculada C.F. Henriques Matias¹, Jaqueline Sgarbi Santos⁶, Leodililde Pinto Caetano¹⁰, Lilian Fernanda Galesi Pacheco⁸, Maitu Abibo Buanango³, Miclay Carvalho⁹, Pedro Fernando Chimela Chume¹¹, Pedro Acosta Leyva⁴, Vladmir Silves Ferreira¹² and Maria Rita Marques de Oliveira^{8*}

1 Department of Education, University José Eduardo dos Santos, Huambo, Angola

2 Department of Science and Technology, University Aberta, Porto, Portugal

3 School of Pharmaceutical Sciences, State University of São Paulo – UNESP, Araraquara, Brazil

4 Institute of Humanities and Letters, University of Afro-Brazilian Lusophone Integration – UNILAB, São Francisco do Conde, Brazil

5 CI and DETS and CERNAS Research Centres, Agrarian School, Polytechnic Institute of Viseu, Portugal

6 Rural Development Institute, University of Afro-Brazilian Lusophone Integration – UNILAB, Redenção, Brazil

7 University Amílcar Cabral, Bissau, Guinea-Bissau

8 Center for Science, Technology and Innovation in Sovereignty and Food and Nutritional Security (INTERSSAN), State University of São Paulo - UNESP, Botucatu, Brazil

9 Department of Life and Land Sciences, University of São Tomé and Príncipe, São Tomé, São Tomé and Príncipe

10 Institute of Public Policy and International Relations, State University of São Paulo – UNESP, São Paulo, Brazil

11 Pedagogical Direction, Zambeze University, Beira, Mozambique

12 School of Agricultural and Environmental Sciences (ECAA), University of Cape Verde, Cidade da Praia, Cape Verde

*Address all correspondence to: maria-rita.oliveira@unesp.br

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Socio-Economic and Environmental Implications of Gold Mining in Afro-Descendant Communities from Colombia

*Maria Alcalá-Orozco, Jenny Palomares-Bolaños,
Neda Alvarez-Ortega, Jesus Olivero-Verbel
and Karina Caballero-Gallardo*

Abstract

The ethnic diversity of Colombia is one of the most attractive characteristics of the country, which includes the Afro-descendants, *Raizal* and *Palenquero* populations, who have led an ancestral lifestyle that is an essential component of the culture and heritage of the nation. Thus, the well-being of these communities is translated into a primary need to guarantee their quality of life, in addition to generate a contribution to their struggle for the recognition, inclusion and guarantee of their fundamental rights. In this chapter, a bibliographic analysis was performed in order to evaluate both the conditions in which the Afro collective territories are found, and the different forms of organization of the populations entitled as community councils, with a particular focus on vulnerable populations located in the department of Cauca. In addition, a conceptual diagnosis of the multiple socioeconomic, environmental and health impacts derived from gold mining in Colombia was developed, with special interest in the studies that have been carried out in populations located in areas of great biodiversity, including the Colombian Amazon, biogeographic Chocó and Bolívar, departments in which Afro-descendant communities also live. Finally, a detailed analysis of the different aspects of mining that affect the quality of life and the welfare state of the communities is provided, and some aspects are proposed to be taken into account by the actors involved to achieve the least negative impacts of these activities, emphasizing the current state of the Colombian case.

Keywords: Afro-Colombianity, ethnic diversity, contamination, mercury

1. Introduction

Afro-descendant ethnic identity is the set of customs, values and feelings integrated into the individual and collective daily life of the Colombian population. This term can then be considered as one of the most valuable historical assets for each of the Colombians, regardless of their skin color. Afro-descendant communities since colonial times have established themselves throughout the national territory,

making them part of the heritage and culture that identifies the country. The *Afro* term that defines this ethnic group starts from the concept of African descent as a result of the geopolitical history that began in the Colombian Pacific [1]. Currently, within this broad group, not only the Afro-descendant communities of the Pacific are recognized, but also the native groups of the San Andrés Archipelago and all the people located anywhere in the Colombian territory that meet the established conditions of historical descent, origin and cultural independence [2–4].

The territories in which these communities have been located throughout history correspond to areas of great biodiversity, whose environmental dynamics and survival have been highly deteriorated as a result of extractive activities, mainly those related to gold mining because of the use of mercury (Hg). The execution of these projects not only brings with it the destruction of the ecosystem, it also leads these communities to face a problem that violates their rights to well-being and protection of their health. The situation is even more serious, considering that there is a great lack of knowledge of the adverse effects that such activities may generate.

Other consequences derived from illegal mining activities are those concerning the lack of food and nutritional security of vulnerable populations, effects that are also widely related to the planting of crops for illegal use, forestry megaprojects, and the internal armed conflict. This entire cycle of alarming situations is described in the 2011 National Human Development Report, as well as in the 2018–2022 Black Communities Development Plan, which are focused on the living conditions and territories of these populations [5, 6].

In accordance with the above, this chapter was developed in order to describe the fundamental concepts that define the Afro-descendant communities that inhabit Colombia, from a geographic, legal, cultural, environmental and historical point of view. Throughout this chapter, the recognition of the fundamental rights of these populations will be taken into account, as well as the different forms of organization of the communities titled as *community councils* or *collective territories*, emphasizing those located in the department of Cauca.

The importance of this study is based on the right to health and well-being that Colombian Afro-descendant populations have by law, with a view to develop policies that improve conditions of inequality, as established in the 2019 report on human development [6]. The methodological development of this chapter was carried out through a documentary revision that included the search, collection and analysis of information obtained in multiple databases, as well as from other studies, documentation and research carried out on community councils and Afro-descendant communities, in the legal, economic, demographic, geographic and historical framework. Likewise, the databases of the United Nations Development Program (UNDP), the Black Communities Development Plan (BCDP), the Ministry of National Education, Victims Unit, the Constitutional Court, and the Ministry of Interior, Ministry of Culture, Ministry of Mines, as well as statistics from National Administrative Department of Statistics (DANE, by its acronym in Spanish) and the Colombian Mining Information System (SIMCO, by its acronym in Spanish), were revised. A diagnosis of the information obtained was carried out with special emphasis on activities related to gold mining, and on the potential socio-economic and environmental risks for the Afro communities.

Finally, it is important to mention that the bibliographic analysis carried out in this section was developed in order to have an integrated vision of the conditions in which the Afro-descendant collective territories are found, as well as the multiple impacts derived from the gold mining activities and extraction processes. Thus, this chapter arises from the desire to create a significant contribution to the struggle of these groups for their human security and social well-being.

2. Afro-descendant communities in Colombia

Colombia is a country with a wide ethnic and cultural diversity, in which the rights of all its inhabitants are recognized. In this sense, the 1991 constitution, in addition to the equality of human rights without any discrimination, also guarantees the participation, protection, recognition, decision-making and equality of the entire Afro-descendant population [7]. Since then, many Afro-descendant communities that live in vulnerable conditions have been recognized in the country, and are a priority for the competent authorities [8–12].

Law 70 of 1993 defines the *Afro-descendant communities* in its article 2 as a set of families of Afro-descendants who have their own culture, share a history and have their own traditions and customs within the countryside-town relationship. The Colombian constitutional court includes within this group, the Afro-descendant communities of the Pacific, the traditional groups of the Archipelago of San Andrés and Providencia (Raizal), and all people located anywhere in the Colombian territory that meets the established conditions of historical descent, origin and cultural independence, as is the case of the Palenquero communities living in the Municipality of Mahates (Department of Bolívar) [13–15].

Colombia is the third country in America with the largest number of Afro-descendant population. Thus, according to data from the DANE, between 18 and 22% of the country's total population is Afro-descendant, a percentage in which about 8.500.000 Colombians participate [16]. Similarly, the DANE has established in the National Population and Housing Census with an ethnic differential approach in 2018, that there is an estimated total of 4.671.160 people belonging to the Afro-descendants, Raizal and Palenquero populations, which is equivalent to 9.34% of the total national, approximately [17].

The guidelines for the development plan for Afro-descendant communities 2018–2020 have established that currently, this population in the country is mainly concentrated in twelve regions: Pacific Nariñense, Pacific Buenaventura-Valle, Pacific Chocoana, Pacific Caucano and Patía, San Andrés and Providencia, Urabá, Chocó, Antioquia-Córdoba, Caribbean, North of Cauca-South of Valle, Bajo Cauca Antioquia-Córdoba-Sucre, Caldas and North of Valle. These sites concentrate approximately the 91.6% of the total Afro-descendant population in the country, the rest are distributed within 876 municipalities [6, 18–20]. The distribution of the Afro-descendant, Raizal and Palenquera population in the Colombian territory is shown in **Figure 1**.

2.1 Afro-descendant communities in the biogeographic Chocó

Biogeographic Chocó is the Colombian territory with the largest number of Afro-descendant communities since colonial times. This region includes the Colombian Pacific, humid forests, hydrographic basins, estuaries, mangroves and coastlines. Some statistics indicate that 82.7% of the population that inhabits this department is Afro-descendant, which is comprised of 60 community councils in charge of overseeing the rights of the territories and their inhabitants [6, 23, 24].

According to Rolland [25] in the department of Chocó, and specifically in the Bajo Atrato region, the introduction of the Community Council figure produced great changes in the local organizational system: the figure of the Community Action Board (JAC, by its acronym in Spanish) that had worked for a long period of time almost disappeared from the political landscape of the region. Today, in the area, some communities - mainly mestizo - are still organized in the form of the Community Action Board, but are in a minority situation. Local Community

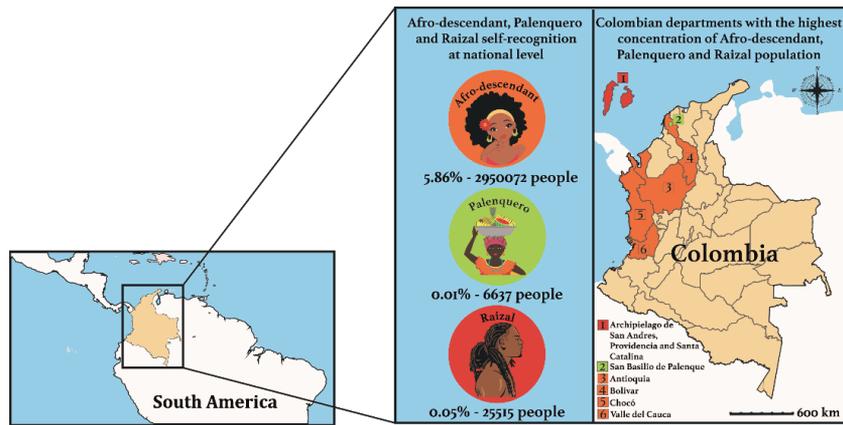


Figure 1. Distribution of the afro-descendant, Raizal and Palenquera population in the Colombian territory. The number of people belonging to each population corresponds to that reported by DANE [21]. The percentage of each population was calculated taking into account the projection of the total Colombian population for the year 2020 according to DANE [22] and the number of people belonging to each group for the year 2018.

Councils are constituted as intermediate political forms between a classic form of community organization, and a new form of authority in the process of construction, founded on identity ethnicity and the collective appropriation of a titled territory.

The promotion of the ethnic rights of Afro-descendant and mestizo communities drives an innovative political context that is more participatory, and that allows the construction of a new collective political subject, the Association of Community Councils and Organizations of bajo Atrato, (ASCOBA, by its acronym in Spanish). Such political subject includes the identification, social representation and territorialities of the biogeographic Chocó population. Being an *ascobatic* becomes a new political identity for the inhabitants, who includes individuals from different ethnicities, as well as displaced and peasant people [26].

Article Fifth of Law 70 defines the entire range of functions provided for the Community Councils of the Pacific communities. This political figure plays an important role as environmental and traditional authority, and as justice organ of the Afro-descendant culture. In this sense, this article stands that the Community Council must watch over the use and conservation of natural resources, act as mediatory organ to solve and conciliate internal conflicts, and watch over the preservation of cultural identity [13]. In general terms, the common activities of the Board of Directors of the Community Council include three main factors: the administration of the territory and the issue of boundaries with other communities, management of timber resources, and the role of dialog with the Colombian government, with Non-Governmental Organizations (NGOs) and with municipal administrations. The Afro-descendant riparian communities from the biogeographic Chocó were titled by the Colombian State between 2000 and 2001. Notions of cultural identity and Afro-descendant ethnicity, recognized by Law 70, become essential tools that allow sustaining the territorial claims of community members [25].

2.2 Communities of the Archipiélago de San Andrés, Providencia and Santa Catalina

In the region of the Archipelago of San Andrés and Providencia live Raizal communities, whose descendants are Afro-Anglo-Antilleans. It is a department made up of three islands that are equivalent to a territorial extension of 52.5 km²,

with an approximate population of 73925 inhabitants [27]. This population shares two linguistic forms, *Creole* and Caribbean English, and religious traditions that include the baptism. The Archipelago is also inhabited by people arriving from continental Colombia, mainly from the Colombian Caribbean coast, Valle del Cauca and Antioquia. In the specific case of the San Andrés island, there is a foreign migration of people from Syria, Libya, Turkey and Palestine, who are called *Turks*, and who currently manage the trade of the islands. This group came driven by commercial initiatives from other places of Colombia, such as Maicao or Barranquilla, or directly from their countries of origin. Additionally, it is important to mention the existence of another group, the *half and half*, *mitimiti* or *fifty-fifty*, which correspond to the sons and daughters of a foreign or continental mother or father, and of an island-raizal mother or father, who are the mestizos in this insular context [28]. The Archipelago is an area of great cultural wealth, declared by United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2000, as part of the *Man and the Biosphere Reserve program* [29].

Currently, the inhabitants of the Archipelago proclaim a movement for the Self-determination of its inhabitants, AMEN-SD, which takes into account a series of historical demands of the Raizal People, under the banner of the Right to Self-Determination of Peoples with the support of the national and international regulatory authorizations. Thus, the reparation to the possible damages caused by the national state policies and the defense of the model of sustainable development, the culture and the territoriality of the Raizal people, are the great proposals of AMEN-SD. The group is made up of various local organizations, among which are: SAISOL –San Andrés Isla Solution-, Barrack New Face, SOS –Sons of the Soil- INFAUNAS –Independent Farmers United National Association-, KETNA – The Ketlena National Association, Just Cause Foundation, and Cove Alliance [30].

2.3 The community of San Basilio de Palenque

The community of San Basilio de Palenque is located in the municipality of Mahates, in the department of Bolívar. This population is located approximately 70 km from Cartagena. It achieved its freedom in 1603 and became the first free people in America. The inhabitants of this community speak the Afro-descendant Creole language called *Palenquero* [31, 32].

In the community of San Basilio de Palenque there are multiple organizations that watch over the well-being of its inhabitants. One of these social movements is the Black Communities Process (PCN, by its acronym in Spanish), which has the greatest strength both in this area and in Cartagena, represented by the Regional Palenque and a group of organizations of diverse character, such as the “Jorge Artel” Corporation, the “Gavilaneo” Afro-Caribbean Social Integration Council, the Festival of Drums and Cultural Expressions of Palenque Corporation, the Network of Community Councils, among other groups [33]. In addition to these mixed organizations, there are also other feminist movements, such as the Association of Afro-descendant Women of the Caribbean “Graciela Cha Inés”, which also integrates the Local Committee of the Network of Afro-descendant Women, an entity that in turn, coordinates in this region of the country to women’s organizations belonging to the National Network of Afro-descendant Women “Kambiri” [34].

This region was declared “Oral and Intangible Heritage of Humanity” by UNESCO in 2005, and in addition, the Colombian Ministry of Culture approved by resolution 2245 of 2009, the Special Plan for the Safeguarding of San Basilio de Palenque, declared as an asset of Cultural Interest in the National Environment and included in the representative list of Intangible Cultural Heritage [35] achievements after which there was a dedicated and intense work in order to preserve its historical

value [36]. Due to the efforts of the organizations, the institutionalization of the government agencies that deal with policies for the Afro population, together with the perseverance of organized groups in the communities; it has been allowed the maintenance of their cultural and historical heritage [37]. In addition, there has been a phenomenon of identity reaffirmation, and valuation of being *palenquero* or Afro-descendant, with an important component of gender identity. Undoubtedly, this is a population of special interest given its preservation of the African tradition through time, which remains in force today.

2.4 Communities of the big cities

Afro-descendant communities are distributed in practically the entire national territory, mainly in the Valle del Cauca, Cali, Buenaventura, Antioquia, Bolívar, Chocó, Cauca, Atlántico, and Sucre regions [17].

Despite being distributed over a wide territory, the communities largely share their traditions and culture. In general, for Afro-descendant men and women, natural resources are essential for the sustainability of the planet and for biodiversity. The knowledge related to the care and use of territories largely corresponds to the main tool for preserving the environment in which they live. Likewise, the gender roles for these communities are well defined, and these are based on activities and the use of resources. For instance, tasks that require greater physical strength are reserved for men, and the rest of the spaces are activities carried out by women and children, or by the general community. For the Afro-descendant population, the territory expresses organizational forms around fishing, mining, hunting, searching for wood, planting and harvesting. In addition, the territory is made up of knowledge of the healing properties of medicinal plants [35].

Another of the key aspects for the Afro communities located in the big cities corresponds to their rites and traditions. For these groups, ancestral resistance is vital to preserve their culture and knowledge. The festivities are the representation of the collective sentiment, the reflection of the adaptive process and various forms of reinterpretation of cultural symbols and meanings. In Colombia, Afro-members mobilize from different areas of the country to participate in events such as the Barranquilla Carnival, the Kings' Party - in the Andean Festival of Blacks and Whites -, the Devil's Festivals, and the Balsadas de los Santos in the Pacific, in which the inheritances of the African culture are expressed with enough color and iconographic content [38, 39].

The organization of these communities in cultural and social movements has contributed to the establishment of actions in favor of equal opportunities for the Afro-descendant population. For this, it is necessary the proper interaction between the decisions of the governments and the reality of the people. Thus, the generation of scientific evidence of the environmental and social problems that these communities are facing is highly encouraged.

3. Afro-descendant community councils

Afro-descendants are a group of families that have proclaimed their own culture and traditions. Transitory article 55 of the 1991 political constitution and the subsequent issuance of Law 70 of 1993 allowed the recognition of these communities in the national territory. This meant the possibility of forming community councils for Afro-descendant populations, in order to collectively title the lands where they traditionally have lived [40].

The establishment of Afro-descendant community councils is one of the main tools to safeguard the rights of these populations. Thus, a number of political and

Department	Number of collective titles	% Based on total titles
Chocó	57	35.2
Nariño	41	25.3
Valle	33	20.4
Cauca	17	10.5
Antioquia	12	7.4
Risaralda	2	1.2
Total	162	100

Source: PNUD [5].

Table 1.
Departments with the largest number of collective territories titled in Colombia.

social acts are favored for the well-being of each of the individuals who are part of the community, thus backing free and independent decisions in the realization of their projects, their own political organization, and collective titling of their territories. For these communities, the right to territory is inalienable [8, 41].

In the context of environmental management, participation of community councils in decision-making is not only essential, it is also mandatory on the part of entities and/or companies that seek to develop economic projects that involve territories in which these communities inhabit. Thus, Colombian legislation has established that those responsible for the project to be carried out must prepare environmental studies with the participation of these ethnic groups [42].

In Colombia, the vast majority of community councils and collective territories are located in the departments of Chocó, Nariño and Valle del Cauca (**Table 1**). These organizations are in charge of titling such areas, implying to date, an approximate of 162 [5]. Some of the most recognized councils in the country are: Bajo Mira, Los Cardonales, Playa Renaciente, Santianga, Santo Domingo de Tanando, la Toma, Cajambre River, Naya River, Salahonda, Caribbean Community Councils network and the Cauca Community Council network [43, 44].

4. Gold mining in Colombia and laws related to this activity

In Colombia, mining activities, and in particular those related to gold extraction, imply great economic interest by large public and private entities within the legal framework of their projection, as well as by small communities who carry out these processes in an artisanal way. In the country, Antioquia, Chocó, Bolívar, Nariño, Caldas and Cauca, are consolidated as the departments with the highest gold production, with a total of 1.32 million ounces, between 2015 and 2017 [45].

Although it is true that in Colombia there are a number of gold mining activities that do not have a mining title, the country has developed some strategies in order to regulate these processes. Thus, Law 685 of 2001 was designed with the purpose of controlling the technical aspects of these activities and promoting the exploitation of mining resources within the framework of legality. In addition, the code states that such activities must be met through multiple stages, which include prospecting, exploration, construction and assembly, exploitation, processing, transformation, and transportation and promotion of minerals found in the soil or subsoil, since they are of national or private property [46].

On the other hand, article 79 of the constitution establishes that all people have the right to enjoy a healthy environment. The law also guarantees the participation

of communities in decisions that may affect them. It is the duty of the State to protect the diversity and integrity of the environment, as well as to conserve areas of special ecological importance, through the promotion of education [4]. Another of the efforts that the government has made to regulate mining activities in the country consists in the issuance of the General Environmental Law of Colombia (99-1993), by which the Ministry of the Environment was created, whose main function is the protection of resources and due process for the execution of environmental projects [47].

Given that one of the main problems of gold mining activities carried out on the territories in which afro communities live is the release into the environment of Hg used for gold extraction, with the consequent appearance of toxic effects on ecosystems and human beings [48], on October 10, 2013, the Government of Colombia, along with 91 other countries, signed the Minamata Convention on Hg [49]. This treaty seeks to protect human health and the environment from anthropogenic emissions of this toxic element. Thus, the country deposited the Instrument of Ratification of the Convention on August 26, 2019, thereby becoming an active member of this organization [50].

Additionally, the commitment to the Minamata Convention led the Congress of the Republic to approve Law 1658 of July 15, 2013, through which a series of provisions are established for the commercialization and use of this toxic element in different industrial activities, setting requirements and incentives for its reduction and elimination [51]. The Ministry of Environment and Sustainable Development joined these initiatives in 2015, formulating, together with several government entities, the Single National Hg Plan, with the aim of developing strategies that lead to an early application of the Minamata Convention. This Plan was, at the time, considered the first route to be followed by the National Government for the implementation of mechanisms that contribute to the gradual and definitive elimination of Hg in the mining, industrial and commercial processes throughout the national territory, and that affect the environmental health of ecosystems [52].

Despite the aforementioned actions, mining from its foundations in pre-Colombian times to the present day is governed under illegality policies, using ancient techniques that are very difficult to change, and that contaminate the environment and, in turn, harm the health of the populations that inhabit these sectors [53]. Given that these sectors or collective territories correspond to areas of great biodiversity, the exploitation of resources by private companies have increased, and although they generate an economic contribution to the communities, they also constitute a potential hazard for both Afro-descendant and indigenous peoples [54].

4.1 Socio-economic impacts of mining activities

In many countries, gold mining is an activity of great economic impact. Thus, its defenders allege that its development allows the use of resources of territories, which is reflected in financial and trade benefits. In Colombia, mining projects, in addition to generate income to the affected areas, occupy an important place in the general economy of the country. Additionally, without taking into account the conditions in which they are developed, they involve local labor, a situation that positions this activity as one of the main livelihoods for low-income families [55, 56].

Small-scale gold mining is an important livelihood opportunity in Colombia. Since most of the mining is done in informal spheres, it is not easy to get exact numbers. For instance, in Latin America it is estimated that there are currently more than 500.000 active small-scale gold miners. This number does not yet include the number of people who indirectly depend on this sector by providing services to miners, which would be many hundreds of thousands more [57].

Despite the possible benefits of resource extraction as an economic activity, there are many other adverse effects for the populations that live in the territories where the exploitation processes take place. In the particular case of Colombia, gold mining brings with it a set of complex situations, including violence, illegality, and armed conflict [58, 59]. According to Andrade et al. [60], in the case of large-scale mining, it is important to recognize that it is a powerful political and economic actor, which usually generates imbalances between companies and governments, with detrimental effects on sovereignty and governance. As such activities demand a lot of capital; they could have effects on the local and national economy, especially because their development and employment implies the distribution of income and rents. The fact that localities impacted by small-scale gold mining generally have a weak institutional development, favors the prevalence of income extraction models over the generation of economic and social value. In the case of mining activities that are carried out in a legal form, there could also be participation of environmental NGOs, which are co-opted by private interests, with may indicate potential damage to environmental public goods.

In Colombia, gold mining is considered one of the greatest generators of foreign exchange, but as a large percentage of this activity is illegal, these resources cannot be used. According to the National Development Plan 2018–2022, the importance of the mining-energy sector is reflected in the main macroeconomic variables. For 2017, the GDP of the sector amounted to \$ 44.2 billion, equivalent to a 5.35% of the total; contributed royalties of \$ 6.9 billion; exports for USD 20.9 billion FOB, equivalent to 55% of the country's total exports, and represented USD 4.1 billion in direct foreign investment (6.65% of the total). The current development plan has established as a priority, to carry out these activities with environmental and social responsibility, since these activities are considered as one of the engines of economic growth in Colombia, at the same time that the sector attracts investment, generates royalties, taxes and compensation, resources that the Government considers necessary for the reduction of poverty and territorial development [61].

According to this Plan, the mining-energy industry must establish new productive chains in the territories, which seek the generation of goods and services with greater added value, increasing national and territorial income, strengthening local employment and increasing national productivity. On the other hand, to guarantee the security of energy supply, the development of different forms of generation is required, consolidating current sources and promoting the country's participation in the international energy market. Energy security represents for Colombia an unrepeatability opportunity to strengthen national competitiveness and promote regional development and other sectors. To achieve this objective, it is necessary to consolidate the sector as a catalyst for the development of sustainable territories and to carry out actions that ensure agility, timeliness and coordination in decision-making by national and territorial government entities, to ensure their orderly and responsible use.

For its part, the 2010–2014 Development Plan classified mining as one of the five development locomotives in the country and prohibited dredgers, mini-dredges, backhoes and other mechanical equipment in mining activities without a title or license. However, the use of this machinery, instead of decreasing, has multiplied to date. Only in Chocó, according to the report of the United Nations Office for Drugs and Crime in mid-2016, the presence of dredgers grew between 2012 and 2013 by 184 percent, and that department, along with Antioquia, has 79 percent of the 78.939 hectares devastated by illegal mining in recent years. The figure may be higher, as excavations multiply every day.

According to national reports, the Comptroller General of the republic has established that part of the responsibility for this uncontrolled increase in the

phenomenon lies in the lack of preventive actions, imposition of sanctions and also in the absence of technical support to Police operations by the Regional Autonomous Corporations. Likewise, the control body reports that the processes carried out by the CARs hardly end with a real sanction and actions that repair the damage caused. The same happens in the criminal part. Thus, of 75 cases prosecuted between 2011 and 2015 in Antioquia, only six ended with an accusation against the offenders; in Cauca, out of 51 processes, only 4 were indicted. The Comptroller's Office recognizes that the presence of illegal armed groups around illegal mining generates pressure and threats that make it difficult for the State to act. Meanwhile, the predation continues. One of the most serious cases is that of the Samingo River. There, officials are constantly attacked and threatened both by the communities that carry out the exploitation and by the armed actors who control the business. In that area there are about 2,000 people who depend on the gold that they extract from that tributary of the Patia [62].

Despite the multiple efforts of the government to combat the negative effects of illegal mining, high levels of illegality are still perceived, it is for this reason that it is necessary to guarantee responsible mining by the actors involved, which will be translated into concrete and efficient actions. In this case, it would be necessary to legalize policies that allow the preservation of natural reserves, in order to counteract the negative effects left by this practice.

Large mining that would be acceptable must generate economic and social opportunities for involved participants, adding value to the economic chains. In turn, companies could make an important effort to diversify local economies, reducing levels of dependency on a single source of value generation, and working hand in hand with local governments and communities to strengthen their institutions and human and technical resources.

4.2 Environmental and human health impacts

In the environmental context, mining activities (gold extraction) involve one of the biggest problems worldwide because of the Hg use, a highly toxic metal for human health and ecosystems in general. It is well known that these activities generate a negative impact that affects natural resources, which in turn, affects the well-being of people. Therefore, various studies have evidenced the presence of this metal in multiple environmental and human matrices, deteriorating the quality of aquatic ecosystems [63], soils [45], fish [64], and human health [48, 65–67]. Thus, the use of Hg in this type of activities has made it one of the most dangerous pollutants in the environment, in fact, for WHO, this metal is in the top ten of substances of special interest, and which pose major public health problems [68].

The identification of this toxic metal has been subject of investigative priority in Colombia. Several studies have shown high levels of contamination in Afro-descendant mining populations. For instance, in the Colombian Pacific (Quibdo and Paimado), Hg levels in human hair of up to 116.40 $\mu\text{g/g}$ have been identified, exceeding the maximum allowed limit of this element for this matrix. Air total Hg (T-Hg) levels were also high, especially inside gold shops, being up to 200.9-fold greater than the background. Although the presence of this toxic in hair shows the exposure of people, its concentrations in fish, main source of protein for the inhabitants of the region, are also of high concern. Mercury concentrations in fish from Atrato River were above the WHO limit (0.5 $\mu\text{g/g}$), with greatest concentrations in *Pseudopimelodus schultzi* and *Ageneiosus pardalis*, two of the most consumed species by local families [69]. Other studies carried out in the biogeographic Chocó demonstrate that the capital of the department is not the only one affected. Tadó and Unión Panamericana are also two Afrocolombian regions in which Hg pollution is widespread [70].

In relation to the Hg concentrations found in hair of inhabitants from other Colombian departments with gold mining problems, the pollution pattern and general panorama are also of high concern. Olivero-Verbel et al. [63] reported elevated hair T-Hg levels from inhabitants of the Mining District of San Martín de Loba, located in Southern Bolívar (2.1 µg/g), in which these activities are extensively carried out, especially in the municipalities of San Martín de Loba, Barranco de Loba, and Hatillo de Loba. These Hg levels were similar to those reported by Olivero-Verbel et al. [65] for Achi (2.44 µg/g) and Montecristo (Bolívar) (2.20 µg/g), but above those corresponding to Morales (Middle Magdalena) (1.50 µg/g) [71], La Raya (Bolívar) (5.27 µg/g) [65], and Caimito (Sucre) (4.91 µg/g) [72].

The Colombian government has defined the *Areas with Mineral Potential for Strategic Mining*, which are mainly located in the Andean region, biogeographic Chocó, Sierra Nevada de Santa Marta and the Amazon. With the strategic mining areas thus defined, the question arises about the commitments generated on other environmental assets. Among them, biodiversity is one of the main points to consider, since it is clear that large-scale open-pit mining generates net losses that cannot be compensated. In the Amazon, one of the areas with the greatest richness of species in the world, the country should be ready to sacrifice vast areas of jungle, which has not been completely identified and debated. Another important negative consequence of this situation is the increase of mining activity on mountainous areas. Indeed, the humid tropical Andes would be one of the most affected critical points of biodiversity in the world (hotspots) due to the loss of species and disruption of ecological systems. The facts that protected areas are characterized by representativeness of ecosystem types, and that biodiversity comprises multiple manifestations of wealth, assemblages or endemism's, should be considered. This constitutes mining as an enormous contributor to loss and degradation of biodiversity [60].

Although pollution problems are always thought of as a phenomenon that affects human health, in few cases their impact on organisms that share a habitat and that add value to the environment is evaluated. According to the 2018 Ministry of Health report, the extraction of gold that involves Hg amalgamation processes, results in the dumping of approximately 1.000 tons of Hg [45]. Generally, once in the global atmosphere, the Hg⁰ released as a result of mining activities can circulate for months and continuously disperse; this species of Hg will undergo various chemical reactions of photochemical oxidation and will become inorganic Hg, which will be combined with the water vapor and travel back to the surface of the earth and aquatic bodies. This chemical form can be converted into other Hg compounds of different solubility, such as Hg sulfide, which has the capacity to accumulate in the sediment, or it could be transformed by microorganisms that process sulfate in methylmercury (MeHg). This conversion is critical because the organic form is much more toxic than the inorganic, and aquatic organisms require more time to eliminate it, leading to bioaccumulation and biomagnification processes throughout the food chain [73].

Organisms that are at a higher level of the trophic chain can consume the MeHg processing bacteria, which could also release it or be later ingested by plankton, which is consumed by higher organisms. This pattern continues as small fish/organisms are eaten by progressively larger fish, until they are processed and distributed, and finally acquired by humans [74].

Unfortunately, once in humans, this element affects different target organs, including the nervous system, kidneys, and liver, causing mental disorders and damage to the motor, reproductive, speech, vision, and hearing systems. Various studies have reported severe cases of poisoning and death due to contamination with this metal [75, 76]. When ingested by pregnant women, MeHg has the ability to cross the placental barrier, accumulating in the brain and central nervous system of the developing fetus [77].

In addition to the effects on ecosystems that mining activities produce thanks to the use of Hg, it is important to remember that small-scale gold mining requires a lot of labor, uses simple technology (including artisanal) and limited mechanization, it is mainly informal, outside the legal frameworks of nations and out of sight of national policies [78]. The scope of activity fluctuates, responding to different factors, such as the international price of gold and the political measures taken by nations that can stimulate, but also hinder, small-scale miners in their search for gold. As the scope of activities increases, problems related to small-scale mining increase accordingly. Thus, mining is characterized by a disorderly occupation of territories, chaotically organized mining operations and dangerous working conditions. This activity causes deforestation and deterioration of soils and riverbeds. However, the full scale of these negative impacts is still unknown [79].

Probably, the health risks that are most often overlooked in small-scale gold mining are those associated with occupational safety. Every day, miners are exposed to long hours of work in hot and humid conditions, they work in uncomfortable physical positions, they are exposed to constant and loud noises, bathe in contaminated water, and live in houses with poor waste management, just to mention a few conditions [80]. In addition to this, the danger of working in a mining raft can cause injuries to arms, legs and back, for this reason, fatal accidents are not uncommon [81]. These dangerous working conditions should receive special attention from the authorities responsible for the formulation of environmental and labor policies and regulations. As long as gold mining remains a sector surrounded by spheres of informality, occupational health and safety is unlikely to become a solved problem for those who carry out these extractive processes.

5. Afro-descendant communities and mining in the Department of Cauca

The department of Cauca is located in southwestern Colombia, between the Pacific coast, the high Magdalena Valley and the Amazon region, with an area of approximately 29,308 km². It limits to the north with the department of Valle del Cauca, to the northeast and east with the departments of Tolima and Huila, to the southeast with Caquetá and Putumayo, to the south with Nariño, and to the west with the Pacific Ocean. It currently has 42 municipalities [82].

The main rivers of this region are born in the Colombian massif (Cauca River, Magdalena River, Caquetá River) as well as the eastern mountain range that crosses the entire Cauca territory. The department of Cauca is recognized for its great biogeographic diversity, which is distributed among the Isla Gorgona, Munchique, Nevado of Huila, Puracé, and Serranía de los Churumbelos National Natural Parks, and the Doña Juana-Cascabel Volcanic Complex. These places increase their tourist interest and signify an important line in the country's economy [83]. In addition to tourism and the beautiful landscapes rich in flora and fauna, the economy of the population that inhabits the Cauca territory is linked to agricultural production, livestock, commerce, the exploitation of wood and gold mining. Particularly, agriculture has been developed in the north of the department. Its main crops are sugar cane, traditional corn, rice, banana, fique, yucca, potato, coconut, sorghum, cocoa, peanuts and African palm [82].

The Department of Cauca is also a strategic territory of the armed conflict. Its rich geography made up of inter-Andean valleys and jungles that extend from the Central Cordillera to the Pacific, is attractive to communities that have become responsible

for the illegal exploitation of resources [55]. Thus, in this region, informal gold mining is carried out mainly in the municipalities of Argelia, Cajibío, Caldoño, Guapi, López, Patía, Santa Rosa, Santander de Quilichao, Timbiquí, Timbo, and Totoro [84] (Figure 2).

Cauca is the fifth Colombian department with the highest number of population known as Afro-descendants. Thus, it has been constituted as one of the most inhabited regions by Afro-descendant populations, after the Pacific and the Colombian Caribbean [86]. Given that the majority of this population recognize themselves as belonging to this ethnicity, the analysis of the life conditions of the Afro-descendant communities that live in vulnerable circumstances is of high importance, as indicated by the MPI (Multidimensional Poverty Index of Colombia), with a total percentage of 32.5 [17].

The Afro-descendant communities in the department are organized into community councils of which the following stand out: Campesino Palenque Monte Oscuro, El Samán, Vereda La Paila y Cabecera Municipal, Comzoplan, Corregimiento Centro de Caloto Pandao Caloto, Guachené y Santander de Quilichao, Aires de Garrapatero, Cauca River Basin, Micro Basin of the Teta and Mazamorrero Rivers, Timba River Basin, Páez-Quinamayo “CURPAQ” River Basin, and de Pilamo [87, 88].

The main mining areas of the department are located in the municipality of Buenos Aires, where there exists a cooperative of miners entitled *Coomultimineros*, which, in addition to grouping them, is responsible for intermediating mining supplies [43]. Mining occupies the second most important economic activity of the region, developed by its inhabitants in a traditional way (mining of reef and alluvium).

Special attention deserves the fact that collective properties of Afro-descendant communities, become part of the mining territory, due to the acute processes of cultural change and social impacts that they entail. The definition of the country's mining areas should be made considering the vulnerability to climate change [60], and given the multiple problems that have been exposed in relation to gold mining and conditions of vulnerability and poverty of Afro-descendant communities in Colombia, governmental actions must be taken to protect such population and preserve its biodiversity.

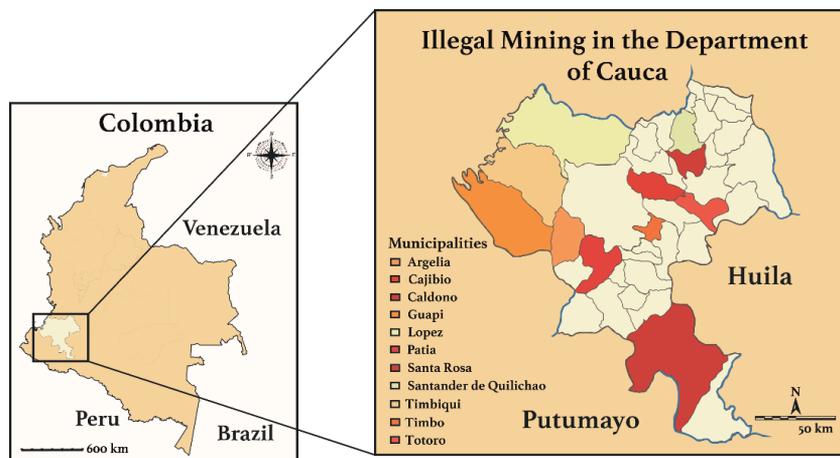


Figure 2. Map of the Cauca department representing the main illegal mining points. Source: Pares [85].

6. Implications of gold mining on the well-being and quality of life of communities

Mining activity is as old as the history of the earth, it is extremely important for the income of countries that have mineral wealth, especially gold, which acquires an important purchasing power in the market, thus benefiting the individual and collective economy, as well as the state. This constitutes non-renewable natural resources that ideally should be exploited causing minimal or no impact on the ecosystem and human health. The paradigm of wealth accumulation and the power of the market induces deformed ways and styles of life that affect individual and collective health, which undoubtedly affects the well-being and quality of life of the communities involved. Such is the case of the present investigation, in which health problems and socioeconomic impacts related to mining activity have been identified from the moment of exploitation until the process to obtain gold [89].

As suggested by Scarlett and Bish [90], mining must be considered as one of the clearest indicators of the evolution that human beings have experienced since their first steps on earth, starting with the Stone Age, and passing through the Bronze and Iron Ages. Curiously, this nomenclature already perfectly reflects the enormous importance that mining activities have had in evolution. Without mining and the evolution that it entails, human development towards the desired welfare state would be very different from what is currently known.

Mining operations have evolved over the centuries, going from small artisanal activities to the large multinational mining companies that exist today [91]. Although both methods of mining exploitation still coexist, informal mining is considered to be the main responsible for the uncontrolled impact on ecosystems and quality of life, especially in developing areas such as the Department of Cauca. Thus, it is possible to find today, small rafts or dredges where only one or two people can work, or mining companies in which the number of jobs can be hundreds or thousands.

As mentioned, mining is a strategic sector worldwide. A large number of products surrounding daily life comes from mining, either directly, or after having undergone some type of metallurgical transformation. Despite the global relevance of the sector, it is an activity that faces a series of difficulties for its development that make it difficult to guarantee the rights and safety of workers [92]. Given that these mineral resources cannot be mobilized, their location affects certain protected areas, either environmentally or culturally, which makes it a socially controversial activity. For this reason, in recent decades the mining companies that have the respective titles have focused their efforts on obtaining globally sustainable results, combining improvements in production with the search for social and environmental sustainability, all reinforced by the laws that regulate the sector, aimed at combining the activity with the environment that surrounds it in the most appropriate way possible for all related actors [93].

Although gold extractive processes are being increasingly regulated worldwide, the Colombian case still has many aspects to address. The development of Afro-descendant communities that live in areas of great biodiversity, necessary for the exploitation of these resources, has been highly influenced by a series of social aspects. Thus, mining has also unleashed setbacks in the fight against organized crime. Within the framework of these activities, there are five types of conflicts determined by the way in which the illegal armed actors are linked to such activity: Direct exploitation, in which the armed actors are engaged in mining or exploiting miners; exploitation resulting from eviction, which occurs when armed groups displace artisanal, informal or illegal miners; mega-projects, characterized by being located in ethnic territories, threatening not only the environment, but also the

way of life and the rights of the communities; the conflict derived from new oil or mining discoveries in areas recovered by the Government; and finally, the self-defense modality, which takes place when mining companies arrive in the territories accompanied by private security companies, co-opt local politics or pay illegal taxes to the armed groups [94].

Another aspect to highlight of the implications that mining activities have on the well-being of the communities is that related to tax avoidance and poverty. The multimillion dollar profits of this market are recorded daily. But this *boom* is not reflected in the producing municipalities. Despite the high dividends produced by the sector, well-being in areas of mining influence is minimal, even the start of these activities represents a deterioration in the health, well-being and safety of the neighbors to the mines. All of the above, without considering the gap that exists to determine who should be responsible for the environmental damage generated by this activity [94].

As indicated, some illegal armed groups have used the mining industry to take advantage of gaps and inabilities to benefit economically. This critical social reality has brought negative effects such as displacement and social conflict. In this sense, since the Colombian Mining Code was approved in 2001, there have been overlapping titles in areas of national parks and *paramos*, as well as violation of the rights of artisanal mining communities, and of those who are settled in implicated territories [95].

Given the implications of mining, it is proposed to generate interdisciplinary educational programs among the direct and indirect actors of the involved communities, who, in consensus, seek to implement a continuous education plan for protection, use of clean technologies and conservation of the ecosystem. This teaching-learning process will allow miners and people who live around the extraction areas to reflect on the dangers generated by informal or artisanal mining activity due to the use of Hg and other chemical substances on human health [89].

7. Conclusions and perspectives

Based on the information obtained from the bibliographic research, regarding the contextualization of organizational aspects of the Afro-descendant communities in Colombia, and the state of mining in these communities, it can be concluded that the Afro-descendant population has been recognized as important members of the Colombian population for many years, representing approximately 10% of the country's total inhabitants.

The departments with the largest number of Afro-descendant communities are: Valle del Cauca, Chocó, Bolívar, Antioquia, Cauca, Nariño, Cesar, Atlántico, Magdalena, Sucre and Córdoba. The titling of the collective territories has been carried out thanks to the formation of Community Councils, which are in charge of ensuring their special territoriality and welfare rights. These communities are part of the culture and daily life of Colombians. For this reason, their inclusion in security and social protection projects is essential for decision-making. In addition, from the legal field at the national level, their rights are recognized, including consultation and integration in environmental management processes.

It is evident that mining is an activity that is carried out in Colombia, to a greater extent, in inadequate technical and technological conditions, which bring with them problems of environmental contamination for natural resources, and put the health of the communities at risk, especially for the Afro-descendant communities, main inhabitants of mining areas. These activities are mainly distributed in the departments of Antioquia, Chocó, Bolívar, Nariño, Caldas and Cauca.

In addition, it is important to highlight that gold mining activities have an economic-social impact with benefits and damages. Some studies argue that mining represents the only livelihood for the inhabitants of the regions in which it is carried out. However, its development does not offer any security or training for workers.

Due to the unlimited number of impacts that mining has, it faces several challenges that must be addressed as a priority, especially those related to tax avoidance and poverty.

The well-being of native populations that inhabit areas of ecological and cultural importance is undoubtedly affected by the development of these extractive activities. For this reason, the social implications of informal mining should be highlighted, conditions in which the majority of people who engage in artisanal mining find themselves. With these illegal processes, the possibility of guaranteeing the progress of the communities is evaded, and, on the contrary, such poverty conditions are promoted so that these areas are a source of inequality, exclusion and violence.

One of the main solutions to implement to make mining a business that benefits the country and is sustainable with the development of the communities, could consist in the creation of an institution that is responsible for repairing, as far as possible, the environmental damage that are derived from mining, that only use suitable areas for this activity and do not endanger natural parks, *paramos* and special areas. Likewise, this institution could be in charge of technifying the processes in the areas of mining influence and, above all, that it produces well-being in the quality of life of the inhabitants of these areas.

It is important to promote the creation and development of government policies for the protection of these informal miners. In all their aspects, it is evident the risk of exposure to pollution and the need in the context of sustainable development. In addition, informal mining brings with it corruption, violence and armed conflict that delay peace processes.

Finally, in the environmental framework, gold mining activities also have a strong negative impact, especially as a result of the use and contamination of ecosystems with Hg. This environmental risk is supported by studies that show that pollution of water, soil, air, flora and fauna ends up affecting the health of vulnerable populations. Thus, the prevention of exposure of Afro-descendant communities should be considered a national priority, since the areas of greatest mining exploitation coincide precisely with the collective territories of those communities.

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Conflict of interest

The authors declare no conflict of interest.

Appendices and nomenclature

Hg	mercury
MeHg	methylHg

UNDP	United Nations Development Program
BCDP	Black Communities Development Plan
SIMCO	Colombian Mining Information System
DANE	National Administrative Department of Statistics
JAC	Community Action Board
ASCOBA	Association of Community Councils and Organizations of Bajo Atrato
NGOs	non-governmental organizations
UNESCO	United Nations Educational, Scientific and Cultural Organization
SAISOL	San Andrés Isla Solution
SOS	Sons of the Soil
INFAUNAS	Independent Farmers United National Association
KETNA	The Ketlena National Association
PCN	Black Communities Process
% based	percentage based
GDP	Gross Domestic Product
USD	American Dollar
FOB	Free on Board
WHO	World Organization of the United Nations
µg/g	Micrograms/grams
T-Hg	Total- mercury
km	kilometers
km ²	square kilometers.
ha	hectares
CURPAQ	Páez-Quinamayo River Basin

Author details

Maria Alcala-Orozco, Jenny Palomares-Bolaños, Neda Alvarez-Ortega, Jesus Olivero-Verbel and Karina Caballero-Gallardo*
Environmental and Computational Chemistry Group, School of Pharmaceutical Sciences, Zaragocilla Campus, University of Cartagena, Cartagena, Colombia

*Address all correspondence to: kcaballerog@unicartagena.edu.co

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An Analysis of Economic Determinants and Crime in Selected Gauteng Local Municipalities

Rufaro Garidzirai

Abstract

The relationship between macroeconomic objectives and crime is intertwined and cannot be overemphasized. This subject has created an endless debate and at the centre of this debate is what causes the other? In contributing to this academic debate, the current study investigates the impact of macroeconomic objectives on crime. Furthermore, the study examined the question “what causes the other?”. In achieving these two aims, the study employed a Pooled Mean Group and the Granger Causality analysis from 1996–2019. The Pooled Mean Group results reveal that poverty and inequality are the main causes of crime in the Gauteng province. On the other hand, economic growth, education and employment reduces crime. Since Gauteng is the economic harbor of Africa, many jobs should be created therein to reduce poverty and inequality that have a negative impact on crime.

Keywords: macroeconomic objectives, crime, Gauteng, Pooled Mean Group, Granger causality

1. Introduction

Over the years, the typecast perception that crime remains high in South Africa has become exact and unquestionable. This notion is illustrated by the current high crime rate of 85 percent [1]. Worth noting is that South Africa's crime rate began to rise around the 1980s and intensified after 1994. One of the contributing factors is the increase in population growth that increased crime activities such as murder, robberies, car hijacking, property theft and domestic violence [2]. The Gauteng province is not exempted from this challenge since it is the economic harbor of all African countries. It is one of the most well-developed provinces in the continent in terms of financial and economic standards [3]. The province contributes about 40 percent towards the Gross Domestic Product in South Africa, and 10 percent towards the Gross Domestic Product in the continent [4]. The province also attracts domestic and international investors through the Johannesburg Stock Exchange and other key economic sectors such as mining, manufacturing and service sectors [5]. All these economic activities attract crime, thereby conferring the obligation on every government to minimize crime as it has economic, social, emotional and physical effects. Thus, the United Nations Goal 16 of violence reduction, peace and justice should be upheld [6].

In reducing violence and maintaining peace, macroeconomics objectives should be promoted, and a balanced mix should be maintained. There are two schools of thought on crime reduction and macroeconomic objectives, namely the complementary view and the substitutive view. The complementary theory posits that a balanced macroeconomic mix reduces the crime rate in any economy [7]. That is to say, sustainable economic growth, employment, reduced poverty, stable prices and international trade improve the individual economic welfare and eventually reduces crime. The substitutive theory postulates that there is no empirical evidence to back the claim that a balanced macroeconomic mix reduces crime. Rather, the theory contends that unemployment, poverty, stagnant economic growth, inequality and high inflation increases crime activities. Simply put, a lack of economic development in any economy leads to an increase in criminal activities. The authors further assert that poverty and inequality have negative effects on society [7, 8].

There is no doubt that the relationship between macroeconomic objectives and crime has created an endless debate. Hence, investigations are continuing to contribute to these debates. This chapter is one of the studies contributing to this debate by analyzing the impact of macroeconomic variables on crime, with a focus on Gauteng's municipalities. The chapter is envisaged to make three contributions. First, several studies have focused on the effects of crime on macroeconomic objectives, and according to the author's knowledge, no study has examined the impact of macroeconomic determinants on crime. Second, few studies done on economic variables and crime were on a national level, and few/no studies were done on a local municipality level. Thus, the study is expected to cover this research *lacuna* by examining the nexus between economic variables and crime in the economic harbor of Africa. Third, this study focused on all macroeconomic objectives with the recommendation that if all these variables are addressed, crime will decline. Therefore, the study used economic growth, income inequality, poverty, trade openness and inflation as independent variables, and all the crimes committed in the Gauteng province were used as dependent variables.

2. Gauteng crime stylised facts

Crime in South Africa can be traced back to the apartheid era. Although crime can be traced back to the apartheid era, violent crime rose sharply from 1994, and it is continuing even today. An average of 17 000 murders have been recorded for the past three decades [2]. This trend is also the same on murder. The murder related crimes existed since 1950 and rose to the peak slightly before independence, that is 1993. Post-independence murder related crimes declined by an average of 4 percent upto the year 2015 [2]. This was regarded as a significant change considering the high population growth. Currently, the murder related crimes are high but not as high as pre-independency.

Worth mentioning is that national crime trends are more similar in major cities such as Durban, Johannesburg, Pretoria and Cape Town. However, this study focused on the Gauteng province. The province is dominated by crimes such as robbery (includes car hijacking) and common assault recording an average growth of 2.8 percent and 2.1 percent respectively for the past decade. These two crimes were caused by the abuse of alcohol, domestic violence misunderstandings and firearms ownership [2]. It is reported that the majority of the people that own firearms do not have licenses and are therefore not trained to use them. Sexual offenses and murder were also found to have an average growth of 1.7 percent and 1.4, respectively [2] (SAPS, 2020). Sexual offenses were caused by dysfunctional relationships and the lack of social skills in society. Furthermore, murder was driven by violence,

arguments, revenge and community retaliation. Of importance is that unemployment was also found to be the main cause of all these crimes. By its expanded definition, unemployment in Gauteng is recorded at 46 percent [2].

3. Literature review

The relationship among economic growth, poverty, inequality and crime can be explained by social disorganization theory, Becker's economic theory and the strain theory. All these theories combined best explain how variables under study contribute to well-being of the society. For example, social disorganization theory posits that poverty, stagnant economic growth and inequality weaken the organization of the society [9]. Importantly is that the social disorganization is disturbed by the economic operations of that society. In the event of shortage of basic goods and services, lack of income and lack of economic activities bring both economic and social stabilities leading to an increase in the crime activities increases in a society. The social disorganization theory is closely linked with the strain theory which stipulates that individuals with the low level of income tend to be frustrated when they are surrounded by those with high level of income [10]. The strain theory put more emphasis on lack of economic activities to murder, prostitution, property theft, robberies, violence etc. Worthy mentioning is that lack of economic activities has led to an increase in the commitment of these crimes. Therefore, criminals the probability of getting caught vs. their suffering and end up engaging in crime activities [11].

Becker further pointed out that poverty, stagnant economic growth and income inequality force low-income households to commit crime to improve their economic situations. The theorists emphasized that the cultural and educational background plays an important role in crime activities. For instance, a school drop-out have forgo the legitimate living by earning a decent salary, however, lack of schooling increases the chances of increasing crime in that society. Because of that reason, unemployment will increase, poverty increases, income inequality widens and economic growth remains stagnant. In summary, all these three theories complement each other. All the theories point to the fact that economic factors have a bigger to play to the well-being of a society. If the economics is not right, then the society becomes disintegrated causing an increase in crime.

Anser et al. [12] studied the economic growth, inequality, poverty and crime nexus in 16 different countries. The study used the Generalized Method of Moments from 1990–2014. The results indicate that unemployment and income inequality have an inverse relationship with crime. Thus, an increase in the income gap between the rich and the poor and increase in unemployment lead to an increase in the number of crimes in these countries. Webster and Kingston [13] investigated the nexus between poverty, inequality and crime in Britain. The authors found out that crime increased as the poverty rates and income inequality increased. This was more practical during 1980 to early 1990s where unemployment was significantly high and after the Global financial crisis of 2008. Using a Wald causality test, Tang and Lean [14] examined the inflation, unemployment nexus in the United States from 196—2005. The results reveal a positive relationship between crime and inflation. The authors argue that an increase in inflation causes an increase in crime activities. Furthermore, the authors argue that inflation causes unemployment and unemployment causes crime.

A relationship between poverty and crime was also investigated by Cheteni et al. [7], Dong et al. [15], Kaylen and Pridemore [16] and Hooghe et al. [17]. For instance, Cheteni et al. [7] examined the association between drug-crime and poverty in South Africa. The authors employed an Autoregressive Distributive Lag from 1995–2016 and found a strong positive relationship between poverty and crime.

Kaylen and Pridemore [16] posit that poverty causes homicide tendencies and concluded that poverty and homicide are inseparable. This is in line with the study done by Dong et al. [15] who examined the relationship among income inequality, poverty and crime in China. The study focused on homicide cases from 2014 to 2016 and found that low-income households commit homicides crime compared to middle and upper earners. Hooghe et al. [17] studied the impact of unemployment on crime from 2001 to 2006 in Belgian municipalities. A spatial regression was employed and the results reveal that unemployment and inequality causes crime in these municipalities. Another observation is that crime related activities are more in urban municipalities compared to rural municipalities. An interesting result was found by Metz and Burdina [18] who found that a huge gap between average earners and low-earners causes crime related activities such as robberies and house burglar. Garidzirai and Zhanje [19] and Jonck et al. [20] argue that education contributes to crime reduction to a larger extend, thus, it should be promoted for economic development.

Goulas & Zervoyianni [21] investigated the relationship between crime and economic growth in 26 different countries over a period 1995–2009. The authors employed a panel data technique and the results reveal an inverse relationship between crime and economic growth. Thus, an increase in economic growth reduces crime levels in these two countries. Mullok et al. [22] studied the same relationship between crime and economic growth in Malaysia from 1980–2013. The authors employed a time series analysis: An Autoregressive Distributive Lag and results reveal a strong positive relationship between economic growth and crime. The authors posit that an increase in the economic activities in the economy creates room for many crime activities. Prasad [23] examined the relationship between trade openness and crime in India. The study found that crime increases if the imports are encouraged in India. On the other hand, crime will reduce if the exports are more than imports. In Brazil, Dix-Carneiro et al. [24] document that crime should be analyzed from a labour market perspective. Thus, majority of the workforce should be employed to reduce crime. Therefore, trade liberalization should always address labour issues for crime to be reduced.

4. Research properties and methodology

This section discusses the data properties and research methodology used in this chapter.

4.1 Data properties

This chapter's data was sourced from the Global Insight and it ranged from 1996–2019. The chapter focused on Gauteng local municipalities namely: Ekurhuleni metropolitan; City of Johannesburg metropolitan; City of Tshwane metropolitan, Emfuleni, Lesedi, Midvaal, Merafong, Mogale city and Rand west local municipality. The data used for these municipalities include: crime, economic growth, unemployment rate, trade openness, education, poverty and income inequality. **Table 1** provides a summary of the variables used in this chapter.

An increase in goods and services is expected to reduce crime since economic growth increases job opportunities. This creates more income avenues. Conversely, economic growth exerts more crime when goods and services produced only benefits few people in a region. This leaves many unemployed youths with nothing to do and this breeds a seed of crime in a society. Employment is also expected to decrease crime activities according to the Becker's theory. The theory suggests that

Variable	Proxy	Description	Priori expectation
Crime	Incrime	All crimes committed in the Gauteng region	Dependent variable
Economic growth	lngdp	Increase in goods and services per population	+ or -
employment	lnemp	Number of people employed in the province	—
Poverty	lnpov	Number of people living under the accepted line	+
Trade openness	Intrad	Sum of exports and imports/ GDP	+/-
Income inequality	lngini	The income gap between the rich and poor	+
Tertiary education	lnedu	Number of people with at least a post-high school certificate	—

Source: Own Compilation.

Table 1.
Summary of variables used.

an increase in employment plays a critical role in reducing crime [14]. Poverty is expected to increase the crime rate in this study. The rationale is that poor households commit crime in order to improve their lives [13].

Trade openness is expected to influence crime positively or negatively. There are two reasons attached to this. First, if a country or a bloc uses many trade controls, majority of traders engage in illegal trade which increases crime in a society [11]. Second, a lack of economic or trade control increases the number of goods and services circulating in the society thereby decreasing crime activities in a society [11]. Income inequality increases the number of crime activities in a society. A huge income inequality frustrates households with low income and end up devoting to crime as a solution to their problems and this is in line with the strain theory of crime [10]. On the other hand, education is expected to reduce the number of crime activities in a society. Education increases some household earnings that leads to a higher opportunity cost of crime. Education also influence a household personality trait that makes one disciplined.

4.2 Descriptive statistics

The descriptive statistics summarizes the data set used in this study. It serves two purposes. First, descriptive statistics illustrates the basic information of variables employed in the study. Second, descriptive statistics shows the potential relationship among the variables used in the study. Thus, **Table 2** gives a summary of the variables used in the study focusing more on the mean of variables. The descriptive statistics illustrate that Gauteng trades with other provinces and this is shown by an average of 52 percent. The results also show the dominance of inequality and crime in the local municipalities shown by average of 41 and 40 percent respectively. The results are also in line with the national statistics [25]. In addition, poverty rate and unemployment were also found to be dominant in the province exhibiting an average rate of 30 and 20 respectively.

4.3 Panel unit root test

Panel unit root is the first estimation technique used in the estimation of variables. Garidzirai et al. [26] stipulates that it used to determine whether the variables are stationary and determine the order of integration. In achieving these two aims. Lin, Levin and Chu and the Pesaran and Shin were used to determine the stationarity of variables and order of integration. These tests have a null hypothesis of unit root test.

Variable	Mean	Standard Deviation	Minimum	Maxi
Lncrime	40.12	17.25	26.20	83.20
Lngdp	4.80	3.70	-1.29	9.02
lnemp	20.19	12.27	15.42	29.4
lnpov	30.39	14.21	14.32	45.29
Intrad	52.15	29.42	20.12	30.32
lngini	41.38	16.38	30.21	70.41
lnedu	20.89	6.83	10.59	50.28

Source: Own Compilation.

Table 2.
Descriptive statistics.

Thus, a null hypothesis is rejected if the p- value is less than 10 percent. The results reveal that lngdp, lnepov, lntrad and lngini are stationary at levels. Therefore, the variables are integrated at level one 1(1). Variables such as lncrime and lnunm were found not to be stationary at levels, therefore, became stationary at first difference. The panel unit root test concludes that the variables are integrated at 1(0) and 1(1). Noteworthy is that panel unit root test prescribes the research methodology to use. For instance, if the variables are stationary at levels, a panel least square is estimated while if the variables are of different level; levels and first difference then a Panel Autoregressive Distributive Lag is deemed fit [26]. In the event that the variables are integrated at first difference, a Panel – VAR or Panel – VECM is appropriate [27]. Since the panel unit root tests indicate a combination of zero and one a Panel Autoregressive Distributive Lag under the Pooled Mean Group is deemed fit (**Table 3**).

4.4 Methodology

Since the variables were found to be integrated at levels and first difference a Pooled Mean Group (PMG) was deemed fit for this chapter. A PMG allows the researcher to estimate the long-run relationship without performing cointegration tests since this model is the new cointegration test [26, 28, 29]. Another advantage of using this model is that it gives robust and accurate parameters. In addition, the model eliminates the risk of using data with a unit root and it is appropriate for all samples [30]. Furthermore, a PMG allows a researcher to analyze both short-run and long-run relationship. Noteworthy is that, a Hausman test was employed to confirm whether the PMG is the appropriate and accurate estimator to use. The PMG model is illustrated in Eq. 1:

$$\Delta lncrime_{i,t} = \varnothing_i \left(lncrime_{i,t} - \beta_i X_{i,t-j} \right) + \sum_{j=1}^{p-1} \gamma_j^i \Delta (lncrime_{i,t-j}) + \sum_{j=0}^{q-1} \delta \Delta (X_i)_{t-j} + \mu_i + \varepsilon_{it} \tag{1}$$

Where lncrime is the dependent variable and X = poverty, gini, unemployment, economic growth, education and trade openness in the Gauteng provinces. The signs δ and γ represents the short-run coefficients of dependent and independent variables respectively while I is cross sections and t for time. β is long-run coefficients while u represents fixed effect and e = error term.

Variable	Level	LLC	IPS	Decision
lncrime	Level	2.468	2.698	1(1)
	1st	1.390***	1.028***	
lngdp	Level	2.349**	3.198**	1(0)
lnemp	Level	-2.490	-2.681	1(1)
	1st	1.351***	1.987***	
lnpov	Level	-1.061**	-1.590*	1(0)
lntrad	Level	1.359***	1.592***	1(0)
lngini	Level	1.357*	2.490*	1(0)
lnedu	Level	0.987***	1.498***	1(0)

Source: Own compilation from Eviews software. Note: *, **, *** represents 10, 5 & 1% respectively.

Table 3.
 Panel root results.

Variable	ADF Statistic	Conclusion
lncrime	-5.30***	cointegration

Source: Own compilation. *** represents 1 percent level of significance.

Table 4.
 Cointegration test.

To determine whether a long-run relationship exists, cointegration tests were employed using the Kao test. The test sets the null hypothesis on no cointegration implying there is no long-run relationship among the variables under study. The rule of thumb is to reject the null hypothesis if the variables are below 0.10 and conclude that the variables under study have a long-run relationship. The cointegration results are illustrated in **Table 4**.

5. Empirical results

This section reports the cointegration results, long-run relationship and the short-run relationship.

5.1 Cointegration results

Although other studies do not support the use of PMG cointegration test, this chapter carried the cointegration test using the Kao. The test results suggest the presence of cointegration between economic variables and crime at 1 percent level of significance. Since the cointegration among variables has been established, a long-run and short-run relationship was discussed using the Pooled Mean Group in section 5.2.

5.2 PMG results and discussions

The empirical results show a Hausman test of 0.3182 which accepts the null hypothesis that PMG is the appropriate estimator compared to MG and DFE. Therefore, this chapter used the PMG and compared with other estimators for robustness of the results. The PMG results illustrate that economic growth inversely influence crime activities. A 1 percent increase in economic growth decreases crime

by 0.48 percent. This negative coefficient is line with both the MG and DFE models and this supports the Becker’s economic theory that states that economic growth reduces the level of crime activities in an economy. Furthermore, these results are in sync with other studies such as [21] who posit that an increase in economic growth reduces the level of crime in an economy. However, Mulok et al. [22] found interesting results that an increase in goods and services increases the number of crimes committed in an economy. Education is inversely related to crime in the Gauteng municipalities. A 1 percent increase in post-secondary education reduces crime by 0.52 percent. This result was expected and the findings are in line with the study done by Garidzirai and Zhanje [19] and Jonck et al. [20] who concluded that education gives a household exposure that reduces crime rates.

In line with a priori expectations, employment was found to inversely influencing crime in the Gauteng local municipalities. This result confirms the findings of Tang and Lean [14] who concluded that employment keeps individuals busy to the extent that they do not contemplate of crime activities. A 1 percent increase in employment reduces crime activities by 0.93 percent. The PMG results also illustrate that income inequality positively influence crime in Gauteng local municipalities. A 1 percent increase in income inequality increase the crimes by 0.87 percent. This result was expected and confirms the findings by Anser et al. [12] and Kingston [13] who concluded that income inequality increase crime activities in an economy. Poverty was significant and positively influencing crime which suggests that more people living in poverty are likely to commit crime in Gauteng local municipalities. This is shown by a 1 percent increase in poverty which leads to a 0.69 percent in crime activities. Cheteni et al. [7] and Dong et al. [15] also share the same sentiments that poor people have a higher probability of committing crime. This is also in line with the strain theory which stipulates that individuals with the low level of income tend to be frustrated when they are surrounded by those with high level of income [10]. Surprisingly, trade openness was found to be positively influencing crime but statistically insignificant.

Variable	PMG	MG	DFE
Long-run			
lngdp	-0.48*** (2.49)	-0.35* (1.39)	-0.67** (1.03)
lnemp	-0.93*** (-1.80)	-0.40** (-2.98)	-0.23*** (-2.29)
lnpov	0.69** (2.09)	0.03*** (1.02)	0.09* (1.39)
lngini	0.87*** (-3.47)	0.38** (-2.39)	0.27* (0.47)
lntrad	0.21 (2.39)	0.53 (3.40)	0.67 (2.50)
lnedu	-0.52** (3.59)	-0.30* (2.38)	-0.16** (2.20)
Short-run			
ECM	-0.6184*** (2.49)	-0.5175** (3.28)	-0.4827* (3.63)

Source: Own compilation.

Note: *, **, *** represents 10, 5 and 1 percent respectively. Figures in parenthesis are T-statistics. Hausman test p-value 0.3182.

Table 5.
Long-run and short-run results.

Table 5 also shows an Error Correction Model estimated using the PMG, MG and DFE estimators. Since Hausman test proposed the use of PMG over MG and DFE showing a significant and negative ECT of -0.6184 . This means that 61.84 percent of disequilibrium in the Gauteng municipalities is corrected in the upcoming period. Thus, the model moves back to equilibrium after 1 year 6 months ($1/0.6184$). Banerjee et al., [31] share the notion that the higher ECT the stable the relationship between economic variables and crime in the Gauteng provinces.

6. Conclusions

This chapter examined the influence of economic factors on crime in Gauteng's local municipalities. The results reveal that the province is dominated by income inequality and poverty in Gauteng's local municipalities. However, the chapter also found that the stability of economic variables is instrumental in reducing crime in the Gauteng local municipalities. These results are in sync with the theoretical and empirical literature that reached a general consensus that economic growth, employment, low poverty rates, education, trade openness and low Gini coefficient reduce crime. Since crime, poverty and income inequality is dominant in the province, there is, thus, scope to promote education, employment and economic growth for crime reduction purposes. More efforts should be directed to the reduction of the aforementioned socioeconomic challenges. There has to be an increase in the education of technical skills that creates both formal and informal employment in the local municipalities. The chapter further suggests that the local government initiate community projects that create employment and income for the community members. Although this chapter has achieved its objective, one limitation has been identified. The chapter did not include other socioeconomic variables such as income, gender and age. However, these variables will be incorporated in the upcoming study.

Conflict of interest

“The authors declare no conflict of interest.”

Author details

Rufaro Garidzirai
Walter Sisulu University, Butterworth, South Africa

*Address all correspondence to: garidzirairufaro@gmail.com

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The authors of this volume provide a window into what influences the quality of life, why people live longer, and why we are relatively better off compared to decades ago. While the potential ways of measuring life quality are abundant, understanding what causes improvement requires careful study and consideration. This volume provides useful insight into these challenges and helps to highlight a clear and important separation between wellbeing and standard of living, both relevant to assessing the quality of life. Standard of living refers to the material welfare of a group. Wellbeing, on the other hand, encapsulates harder-to-measure subjective preferences. Together they help us to understand the quality of life of certain groups at specific times, and in specific communities.

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