

## Tanulmányok

### Green Growth in Sub-Saharan Africa: Local Innovations Providing with Sustainable Solutions for Socio-Economic Development

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#### **Abstract**

Sustainable development is a widely used concept across all fields of sciences and is often referred to as the solution to many of our current problems, such as climate change and global social inequalities. Also, it might be the key to the economic and social development of the African continent, especially of the Sub-Saharan region. With the help of seven case studies, I attempt to prove that grassroots, community-led initiatives based on innovative approaches to sustainable development can foster the economy, fight poverty and help preserve the ecosystem across Sub-Saharan Africa.

#### **Introduction**

Sustainable development is the key issue of the first decades of the 21st century: it covers a wide range of fields from economic growth to social equality to environmental protection. Given its significance, sustainability is not exclusively a matter for wealthy and developed countries in the Western hemisphere, but an inevitable solution to the social, economic and environmental problems of the global South, especially of Sub-Saharan Africa. Local, community-based innovations aiming to eradicate poverty and increase socio-economic welfare while conserving biodiversity play a crucial role in the long-term, sustainable development of these countries. In the following, I attempt to prove this hypothesis with the help of the analysis of seven case studies.

#### **Methodology**

In this research article I will focus on innovations aiming to achieve sustainable development and poverty eradication by creating individual solutions to the problems of the local community. Following a deductive approach, I intend to start from the theoretical level - by explaining the concepts of sustainable development and bottom of the pyramid (BOP) and offering an overview on the prospects of the Sub-Saharan region - and move towards the empirical level via the analysis of case studies. Empirical data, such as the SDG-Index, will be applied to help measure, assess and compare the output of each innovation. At the end of this paper, I will make an evaluation and draw a conclusion based on the quantitative and qualitative data utilized at the description of the cases.

#### **Theoretical background**

##### *The Concept of Sustainable Development*

According to the definition imposed by the World Commission on Environment and Development in the “Brundtland Report” in 1987, sustainable development refers to the “development that meets the needs of the present without compromising to the ability of

future generations to meet their own needs” [Jacobs, 1991: 59]. So, the concept of sustainable development aims to ensure that current economic production does not lead to such irreversible harm in the environment that would deprive next generations from the ability to fulfill their needs. Thus, the concept appears to have linked environmental protection to economic development, providing with a solution to the seemingly irreconcilable contradiction [Jacobs, 1991].

#### *Sustainable Development Goals (SDGs)*

Sustainable Development Goals (SDGs), also known as Global Goals were launched by the United Nations in 2015 with the aim “to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030” [United Nations Development Program, 2021]. The seventeen SDGs are inclusive and integrated, meaning that they require joint efforts from all UN Member States to achieve global social, economic, and environmental sustainability.

#### *Sustainable Development Goals Index*

The Sustainable Development Goals Index is an annual report that uses publicly available metrics and data to create tools aiming to measure and monitor progress on the achievement of the SDGs in each country, both developing and developed [United Nations Sustainable Development Solutions Network, 2021]. In this study, I will use data published in the latest report in 2020, with close attention to seven African countries in the Sub-Saharan region, namely Kenya, Madagascar, Malawi, Nigeria, Sierra Leone, South Africa and Uganda.

#### *Prospects for Achieving SDGs in Sub-Saharan Africa*

Achieving the Sustainable Development Goals (SDGs) is a major challenge for all African countries, including those in the Sub-Saharan region. In order to succeed, they need to combine economic growth with social inclusion and environmental sustainability [Henao et al, 2017]. Among other difficulties, Sub-Saharan countries face a large-scale demographic growth where the population is estimated to quadruple by 2100 [United Nations, Department of Economic and Social Affairs, Population Division, 2019] [Fig. 3]. Although, Africa has undergone a significant economic development since 2000, it is still struggling with poverty, diseases, a lack of energy and infrastructure, and an increasing threat imposed by climate change [Henao et al, 2017]. However, there are good reasons for optimism; the Sustainable Development Goals Center provides a framework for governmental policies as well as useful tools (e.g. backcasting analyses and costing templates) to facilitate the creation of long-term investment strategies [Henao et al, 2017]. Furthermore, the increasingly youthful population can be perceived as a great opportunity for Africa to take the lead in the labor market and to generate new, innovative and “green” jobs, also to take advantage of the entrepreneurial skills of its people [Omilola, 2014]. Finally, Africa abounds in precious natural resources that, if managed well, could contribute to the social, environmental and economic prosperity of the continent. To conclude, there is a significant potential for achieving the SDGs, but in doing so, African countries need to overcome their barriers and find integrated and inclusive solutions benefiting all layers of society.

*The Bottom of the Pyramid (BOP)*

C. K. Prahalad - the author of the revolutionary book, *The Fortune at the Bottom of the Pyramid* - argues that the system of wealth distribution can be best imagined in the shape of a pyramid. Thus, the term Bottom of the Pyramid (BOP), also called “base of the pyramid”, refers to the large share of the population (some four billion people) who live at the bottom of this economic triangle, not benefiting from the various opportunities for income-generation available for those at the top.

*Opportunities at the BOP*

Four billion people – more than half of the world’s population - is considered to live at the BOP. They earn below \$3,000 in local purchasing power annually and contribute to a large, yet untapped market opportunity with an estimated worth of \$5 trillion [Fig. 1]. Africa alone accounts for an estimated \$429 billion market at the base of the pyramid [Fig. 2]. Although, individual capacity to purchase market goods and services might be limited for a single BOP consumer, by sharing and pooling resources, increased consuming capacity and new income-generating opportunities can be created, thus benefiting firms, consumers and a wide range of social and economic actors (NGOs, governments, non- and for-profit organizations), and contributing to a dynamic business development at the BOP. [Prahalad, 2006].

*The Role of Innovations at the BOP*

Innovative solutions are inevitable for the actors of the BOP market. Firms and entrepreneurs need to come up with new ideas and approaches in order to gain access to local communities and meet their needs with unique and personalized products and services. According to Prahalad, poverty alleviation must be part of the private sector as a “business development task” [Prahalad, 2006: 5] rather than remaining an unresolved (inter)governmental problem. In order to accomplish this task, innovative approaches are crucially important. For example, goods - that might otherwise be very expensive - can be available for the BOP consumers in individual or single-serving packages [Prahalad, 2006].

*The BOP in Sub-Saharan Africa*

The BOP in Africa accounts for an estimated \$429 billion market. With a 71% of aggregate purchasing power, the African BOP includes 486 million people (in 22 surveyed countries) [World Resources Institute, 2007]. The largest BOP markets exist in Sub-Saharan Africa where Ethiopia, Nigeria and South Africa alone are accounting for an aggregate income of \$202 billion [World Resources Institute 2007]. There is a great variety among different sectors, however, the food market – especially for those at the lowest income group, living on less than \$1 per day – is undoubtedly the biggest one in the Sub-Saharan region. In addition to food consumption, a large share of spending of the BOP households goes to housing and healthcare. Those belonging to higher income groups within the BOP tend to spend more on transportation and telecommunication [World Resources Institute, 2007]. An increasing demand for mobile phones and information and telecommunication (IT) services dominates the global BOP market but is growing fastest in the countries of Sub-Saharan Africa (e.g. in Nigeria the subscriber base increased more than forty times within four years) [World

Resources Institute]. Thus, the BOP dominates all market sectors in the Sun-Saharan region, offering a great opportunity for further economic development with the help of innovative solutions and bottom-up approaches.

### **Case Studies**

#### *Honey Care Africa, Kenya*

Honey Care Africa (HCA) is a social enterprise established by three Kenyan entrepreneurs in 2000 with the aim of promoting sustainable beekeeping and honey production in rural areas to fight poverty and to offer an alternative income-generating activity to households. The organization works with local communities and smallholder farmers in rural Kenya providing them with microfinance, training, and equipment necessary for the establishment of community-based apiculture [UNDP, 2012].

Beekeeping has a long tradition in Kenya, however, it is an underdeveloped and untapped rural industry associated with the arid and semi-arid regions and is still largely based on the use of inefficient tools such as hives made from hollowed-out logs or clay pots [UNDP, 2012]. In addition, areas with fertile soil and high levels of rainfall – that might be best suited for apiculture - had been used only for soil-based agricultural production. An estimated 80% of the land in Kenya is optimal for beekeeping, however, this potential hasn't been fully exploited [Khalfan et al, 2008]. The founders of Honey Care Africa fill this opportunity gap by encouraging impoverished farmers to start producing honey besides agricultural production.

Honey Care Africa operates through a network of various actors from local communities (with Kenya's 25 million rural poor being a target population) to development agencies, such as the Danish International Development Agency (DANIDA), and to governmental bodies, e.g. the Ministry of Forestry and Wildlife in Kenya [UNDP, 2012]. The firm produces modern, high-quality Langstroth beehives suitable for efficient honey production which are then distributed to rural farmers. The utilization of these movable-frame hives requires little time and effort (5-10 minutes per week) but can yield high amounts of good-quality honey [UNDP, 2012]. Farmers can purchase the hives via loans, or they can rent them through a beehive-leasing scheme. The projects of HCA also include site visits to determine if the land is appropriate for apiculture, and intensive trainings provided for local communities with additional information embedded (e.g. information on HIV/AIDS). At the end of the harvest season officers of Honey Care Africa purchase the raw honey at fair-trade prices and collect the produce for further processing and distribution [Khalfan et al, 2008]. With the help of its broad network of local and global stakeholders, HCA sells the pure honey products for market prices, thus generating profit and income for all actors involved in the supply chain.

The works of Honey Care Africa have a positive impact on both the environment and the socio-economic system. On the social level, projects of HCA have created an estimated \$250 of annual income for each participant, benefiting some 75,000 individuals - of whom 32,250 (~43%) are women - and keeping many households above the poverty line (defined as \$1,90 per day [World Bank, 2015]) [Khalfan et al, 2008]. On the environmental level, wide-spread

use of beehives resulted in an increased pollination, improving both the quality and quantity of the yields. Economic value of bee-pollinated crops in Kenya is estimated to be up to 40% higher than those crops that haven't been pollinated by insects [UNDP, 2012]. Besides that, HCA launched a "Bees for Trees" program with the initiative of promoting sustainable forestry and incentivizing the preservation of forests by giving beehives for individuals who are willing to cooperate in the conservation efforts [Khalfan et al, 2008]. Finally, HCA's "tripartite model" of cooperation has served as an example for other social enterprises [UNDP, 2012].

With a poverty headcount ratio at 15.9% (at \$1.90 per day) and with 29.4% of the population being undernourished, Kenya ranks among the worsts (123 out of 166 countries) in the accomplishment of the SDGs [Sachs et al, 2020]. However, the initiative of HCA has proven successful in fighting hunger and poverty, lifting tens of thousands of people above the poverty line.

Honey Care Africa can be a model for other firms entering the BOP market. Its unique approach enables an accurate response to the needs of the local consumers. At the same time, the activities of the company generate sustainable profits for all actors involved, thus investing in the long-term development of Kenya's BOP market.

#### *Marine Reserves for Octopus, Madagascar*

Marine reserves are protected marine areas designed to control the rate of fisheries exploitation and to increase the density and biomass of fish stocks [Benbow et al, 2014]. Community-based marine reserves in Madagascar have been first established in 2003 in the village of Andavadoaka, located in the southwest region of the country.

Fishing is the primary source of income for 71% of Andavadoaka's population [Khalfan et al, 2008], and traditional, low-cost fishing methods are utilized by the villagers. Women and children walk on the reef flats carrying a wooden stick or spear while men usually dive over the reef edge looking for octopus within dens [Benbow et al, 2014]. However, due to the increased market demand for exported fish, particularly fresh produce, has resulted in the overexploitation and overfishing of octopus stocks, also, it has transformed the local economy of fisheries from subsistence to export-driven [Khalfan et al, 2008]. Thus, the overuse of scarce natural resources led to a decrease in the quantity and quality of octopus available offshore, hence a seemingly irresolvable conflict of environmental protection and market interests has occurred in the region.

The establishment of community-based marine no-take-zones (NTZs) provided with a solution for the economic-environmental problem. Its aim was to protect octopus from overfishing and to restore and preserve the capacity of the stock to reproduce itself [Khalfan et al, 2008]. Temporary closures at fishing sites during key periods in the octopus' life cycle enabled the animals to nest and brood their juveniles, thus resulting in increased yields for fishermen. Village elders and community leaders implemented seasonal fishing bans with the creation of a local law called "Dina", and ensured that members of the community will adhere to the prohibition [Benbow et al, 2014]. Inhabitants of the village could also apply their

knowledge at the development of maps of fishing site boundaries during participative community meetings [Benbow et al, 2014]. In collaboration with 23 other villages, several NGOs, and organizations (e.g. Blue Ventures), an extended conservation plan, named Velondriake (“to live with the sea”) was established with the aim of protecting biodiversity and preventing unsustainable use and overexploitation of natural resources within a coastal area of over 20 kilometers to the north and south of Andavadoaka [Khalfan et al, 2008]. In addition, alternative income sources, such as ecotourism and mariculture businesses, had been developed to reduce the exclusive financial dependence on fishing of the local Vezo population [Khalfan et al, 2008].

The initiative proved to be very successful; following a longer (November 2004 – June 2005) and a shorter (December 2005 – April 2006) period of temporal fishing closure, there was a significant increase in the mean size and number of the octopus caught [Benbow et al, 2014]. Similarly, remarkable growth in fisher revenues from fisheries had been achieved [Benbow et al, 2014]. However, the presence of free-rider fishermen on the open-access fishing sites following closures resulted in smaller per capita yields for Andavadoaka’s villagers. So, effective control of fishing efforts on opening days needs to be ensured in order to maximize profits for local people [Benbow et al, 2014]. Despite the problem of “outsiders”, short-term (less than four month) prohibitions seemed to be efficient tools both for boosting fishery outputs and for creating economic benefits.

According to a study carried out by the UN, “marine and coastal area-based management can contribute towards a wide range of SDGs and targets, in addition to SDG 14 ‘Life below water’ [UN Environment, 2018: 19]. Thus, in the case of Andavadoaka’s Marine Protected Areas, the project facilitated the attainment of the SDGs and provided Madagascar with a blueprint for community-based marine resource management [Khalfan et al, 2008].

In addition to its contribution to the SDGs, the project also fostered the development of the local BOP market. It has increased revenues and created additional income sources for many people in Madagascar, where the poverty headcount ratio is still at 75.9% (at 1.90 per day) [Sachs et al, 2020].

#### *“Cows to Kilowatts”, Nigeria*

Cows to Kilowatts is a project based in Ibadan, Nigeria which involves various non-governmental organizations (e.g. the Global Network for Environment and Economic Development Research, or the Sustainable Ibadan Project) and research institutions. Its aim is to convert abattoir waste into energy with the help of a biogas plant while providing the local community with clean drinking water, and access to cheap cooking gas and fertilizer [Khalfan et al, 2008].

Abattoir waste pollution poses a serious threat to both humans and the environment, especially in Ibadan, the second largest city of Nigeria, where the combination of inadequate municipal infrastructure and rapid population change resulted in significant water and air contamination [Brown, 2006]. Wastes from the slaughtering processes of Ibadan’s Bodija

Municipal Abattoir are rinsed into open drains that connect to surface water and later percolate into groundwater [Khalfan et al, 2008]. It is estimated that 60% of the city's inhabitants get water from hand-dug wells vulnerable to contamination [Brown, 2006]. Polluted water from the abattoir carries high levels of disease-causing microorganisms (e.g. Salmonella), pesticides, antibiotics, and industrial chemicals that may enter the human food chain [Brown, 2006]. Thus, communities in low-income neighborhoods, located downstream of the abattoir are particularly vulnerable to the pollution caused by slaughtering activities [Khalfan et al].

The construction of a biogas plant offers an alternative solution to the problem; it converts abattoir waste into energy and simultaneously decreases greenhouse gas (e.g. methane) emissions. The plant operates as an anaerobic fixed-film digester in which microorganisms are attached to an inert medium. This technology accelerates the process of digestion and makes it more efficient. The plant is estimated to produce 8-9 kilowatt hours of electricity from one cow per day, an amount that is enough to provide a family with cooking gas and some lighting [Brown, 2006]. As one of the largest installations in Africa, Ibadan's biogas digester supplies 5,400 families with cheap cooking gas on a monthly basis, at 25% of the market price of liquified natural gas [Khalfan et al, 2008]. In addition, the digester produces high-quality organic fertilizer which is then sold to low-income farmers for about 5% of the standard price [Khalfan et al, 2008].

The biogas plant has various positive impacts on both the environment and human health and well-being. First, it improves sanitation via the reduction of water pollution. Waste is efficiently converted into energy, thus preventing it to reach the water surface, enabling the local population to benefit from the clean water. Second, it produces cheap cooking gas and high-quality fertilizer. This contributes to a reduced demand for other substitutes (e.g. charcoal and wood) for cooking gas and provides low-income households with affordable alternatives. Consequently, it also reduces the emission of greenhouse gases (e.g. methane and carbon-dioxide) and helps preserving forests and natural vegetation [Khalfan et al, 2008]. Third, being free of smoke, biogas improves indoor air quality, thus benefiting primarily women and children who are exposed to the cookstove smoke far more than men [Brown, 2006]. Finally, a biogas plant has a life cycle of over 20 years, and it is estimated to return financial investments within 4 years [Khalfan et al, 2008].

Biogas technology also contributes to the achievement of the SDGs, particularly SDG6 ("Clean water and sanitation"). In Nigeria, almost 30% of the population has no access to clean drinking water, while only 39.17% uses basic sanitation services. In addition, only 0.15% of anthropogenic wastewater receives treatment [Sachs et al, 2020]. Ibadan's biogas plant significantly improves all these indicators, facilitating the attainment of the SDGs.

Furthermore, the project enables the development of the local BOP market. The construction, management and operation of the digester requires workforce, thus creating job opportunities. Also, it provides low-income households with access to energy and clean

water, while supplying impoverished urban farmers with cheap and affordable organic fertilizer. So, it contributes to the dynamic development of the local market at the individual and micro level.

*Tiwai Health Village, Sierra Leone*

The Tiwai Island Wildlife Sanctuary, an UNESCO World Heritage Site, is an environmentally protected area located in the southeast part of Sierra Leone. It is home to a Health and Fitness Center including a Village Life Hotel, an Integrated Traditional Medicine/Western Medicine Village, an Arts and Crafts Market Village, and horticultural gardens [Khalfan et al, 2008]. The Tiwai Island Wildlife Sanctuary is operated by the Tiwai Island Administrative Committee (TIAC) consisting of the Environmental Foundation for Africa (EFA), Tiwai's main implementing agency, Njala University, primarily responsible for research programs, and several other NGOs, community representatives and MPs [The Environmental Foundation, 2012].

The initial idea was to preserve the island's biodiversity which is one of the richest on the earth in primate species [Khalfan et al, 2006]. Local communities of the Barrie and Koya Chiefdoms refrained from farming, hunting, mining and logging in order to protect the natural environment [Khalfan et al, 2006]. However, the civil war in Sierra Leone - which took place between 1991 and 2002 - disrupted all the research and conservation programs and resulted in a large number of refugees who were encamped near high biodiversity forests, thus posing a threat to the wildlife population (e.g. by hunting for bushmeat) [Khalfan et al, 2008]. The Tiwai Island Wildlife Sanctuary was re-opened in 2006, however, it couldn't provide local communities with adequate revenues due to a lack of tourist traffic caused by the small size and inaccessibility of the area [Khalfan et al, 2008]. To offer a solution, TIAC linked biodiversity conservation with "travel-for-health" ecotourism, thus benefiting both local communities and the environment.

The Health and Fitness Village is owned and operated by the local community and it offers medical treatments and healing services to visiting tourists. These services are primarily based on indigenous knowledge including traditional Sierra Leonean ethno-medical practices (e.g. physiotherapy and herbal, dental or bone treatment) and allopathic medicine [Khalfan et al, 2008]. The concept of "forest-as-healer" and of a "sacred bush" provides a framework for the project, linking it to the initiative of biodiversity conservation [Khalfan et al, 2008]. Besides its eco-tourism services, the center provides formal training to medical students, and it is home to a variety of research programs (e.g. indigenous knowledge research or biodiversity monitoring) [Khalfan et al, 2008]. Furthermore, to offer an alternative income source to mining and hunting, the center grants skills trainings (e.g. in arts and crafts) to members of the local community [The Environmental Foundation for Africa, 2012].

The Tiwai Health and Fitness Village project has positive eco-inclusive impacts. On the social scale, it benefits local communities via the investment in infrastructure and other amenities [The Environmental Foundation for Africa, 2012]. With the help of skills trainings, it



empowers people and provides them with increased revenues and alternative career paths in tourism and healthcare [Khalfan et al, 2008]. In terms of environmental impacts, the Tiwai project successfully preserves the unique and pristine ecosystem, also, it incentivizes the protection of high-biodiversity areas with the creation of a more positive approach towards conservation efforts [The Environmental Foundation for Africa, 2012]. Furthermore, the Wildlife Sanctuary benefits international students and researchers as it provides them with access to a diversely populated ecosystem [The Environmental Foundation for Africa, 2012]. Finally, workers of the Tiwai Center, as well as their families, will profit from the membership of the National Social Security Insurance Scheme, thus decreasing their vulnerability [Khalfan et al, 2008].

The project of the Tiwai Health Village contributes to the sustainable development of the region, also, it facilitates the achievement of the SDGs in Sierra Leone. The initiative promotes awareness by reaching out to schools in the region, also, it helped the establishment of local primary schools, thus fostering the attainment of SDG 4 (“Quality education”) [Sachs et al, 2020]. In addition, the protected area of the Tiwai Island Wildlife Sanctuary contributed to the accomplishment of the SDG 15 (“Life on land”).

Regarding the BOP market in Sierra Leone, the Tiwai project significantly increased its development. The center attracts tourists and visitors from foreign countries, thus generating revenues for impoverished people traditionally relying on hunting or mining as their only source of income. With the construction of better infrastructure, the project also enables local communities to access products and services (e.g. social security) that are otherwise inapproachable to them.

#### *Green Impact Technologies, Malawi*

Green Impact Technologies (GIT) is a Malawian enterprise, established in 2018, with the aim of promoting access to clean, renewable energy. Founded by local entrepreneurs, the innovation is supported by various stakeholders, including national and international organizations (e.g. United States African Development Foundation), research institutes (e.g. Malawi University of Science and Technology), governmental bodies, and NGOs [SEED, 2021].

In Malawi, only 11% of the population (42% of urban and 4% of rural population) has access to electricity [SE4All Africa, 2016]. Electricity is produced largely from biomass (85%) in an unsustainable manner, although with 3,000 hours of sunshine annually, solar energy could be a renewable alternative [Wolters et al, 2020]. However, rural and low-income communities –accounting for 87.41% of the population who live at \$3.20 per day [Sachs et al, 2020] – cannot benefit from the services of large firms and suppliers because they are lacking an adequate amount of savings. Thus, even if companies provide them with renewable energy sources, many Malawians stay without access to clean electricity.

Green Impact Technologies tackles down these challenges with its new, innovative approach. The company installs solar home systems in the houses of rural, impoverished communities, thus providing them with clean and sustainable electricity: by 2020, they have

served 5,000 households [Wolters et al, 2020]. GIT's pay-as-you-go (PAYG) model allows last-mile customers to pay periodically, thus enabling low-income families to purchase a solar system that would otherwise be unaffordable for them. Customers first pay a small installation fee to local agents, then they reimburse the remaining amount over a three-month period through mobile money [Wolters et al, 2020]. The monthly fee for electricity is lower than the amount customers would spend on charging electric devices over the same period [Wolters et al, 2020]. Besides its solar home systems, GIT offers certified products with a 2-year warranty as well as after-sales services and trainings to local agents [SEED, 2019]. By developing a biogas plant, the company aims to transform agricultural waste at Tsagano market into energy, and to provide local restaurants with alternative energy sources [SEED, 2019].

The innovative method of Green Impact Technologies has various social and environmental impacts. On the social scale, GIT enables rural, impoverished people to benefit from electricity, e.g. to spend longer hours studying or running their businesses [SEED, 2019]. The implementation of solar home systems also helps preventing health issues originating from the use of charcoal indoors [SEED, 2019]. Regarding its environmental impacts, GIT contributes to a significant reduction in CO<sub>2</sub> emissions (reducing emissions by 50,000 tCO<sub>2</sub>eq) as well as in deforestation, both arising from the use of charcoal and firewood as fuels [SEED, 2019]. The development of a biogas plant will also create benefits, from waste management to emissions reductions to energy supply.

In terms of the SDG Index, Malawi ranks 152nd out of 193 countries [Sachs et al, 2020], and faces significant challenges in the achievement of the goals. However, Green Impact Technologies contributes to the realization of these goals, particularly SDG 1 ("End poverty in all its forms everywhere") and SDG 7 ("Ensure access to affordable, reliable, sustainable and modern energy for all") [SEED, 2019].

The enterprise of Green Impact Technologies is a good example for promoting the development of the BOP market. With their innovative PAYG model, they provide base of the pyramid consumer with access to market products and services, thus offering them a wide range of opportunities and benefits (e.g. studying or running their businesses for longer hours, utilizing their electronic devices for an extended period of time). GIT also creates job opportunities via the training of local agents, generating additional income sources for the rural population.

#### *Hustlenomics, South Africa*

Hustlenomics is a social enterprise based in Johannesburg, South Africa. Its aim is to provide affordable, accessible, sustainable, and adequate housing for the poorest communities using recycled construction waste as the main building material [SEED, 2019].

Soweto (South Western Township) - located in the suburban area of Johannesburg – has approximately 2 million inhabitants and an additional 10, 000 newcomers per year who settle down in the city in search of better opportunities [Wolters et al, 2020]. However, these rural

families often lack financial resources to afford adequate housing, so they live in informal backyard metal shacks [Wolters et al, 2020]. These shacks are not equipped with bathroom, electricity or running water, and they often pose a great threat to human life [Wolters et al, 2020]. Moreover, frequent floods and storms, primarily caused by climate change, even worsen the conditions [Wolters et al, 2020].

The 35-year-old social entrepreneur, Nhlanhla Ndlovu came up with an innovative solution to address these problems [Ledwaba, 2020]. As a local Sowetan who grew up in improper living conditions, Ndlovu understood the necessities of the community and offered an alternative solution [Ledwaba, 2020]. He initially started to extend his own family house from recycled building material with the help of his friends, and they soon established a company [Ledwaba, 2020]. As the local community showed great interests, Ndlovu re-planned his business structure to operate on an efficient scale and to provide alternative housing options even for the poorest families [Ledwaba, 2020].

Hustlenomics replaces informal metal shacks with durable backyard homes that are made from recycled bricks and soil and are equipped with sanitation facilities, electricity, and running water [Wolters et al, 2020]. The company uses an interlocking brick technology which enables them to finish the construction work within a month [Wolters et al, 2020]. The costs are covered by a shared financing model: expenses are initially payed by Hustlenomics who get their investments back through monthly payment [Ledwaba, 2020]. Rural-to-urban, low-income families rent the houses from the homeowners for a price that is comparable to what they paid for the metal shacks, and the owners use this rent to pay back the costs of the house until they obtain full ownership. A long-term contract enables the owners to cover the costs over the course of 54-month (18 months per room), also, it ensures that tenants can stay in their new homes after the pay-back period [Wolters et al, 2020].

Although a relatively new start-up enterprise, Hustlenomics has already benefited the living conditions of many of Soweto's inhabitants. The company has provided affordable and accessible homes for the poorest families (who earn below R3,500 a month), and is planning to build one new home every month in the following year [SEED, 2019]. The construction of the houses creates employment opportunities, thus benefiting the local community. In addition, Hustlenomics provides workers – focusing on women and youngsters - with training in sustainable construction methods [SEED, 2019]. Besides its positive social impacts, Hustlenomics operates in an environmentally friendly way, upcycling construction waste and disseminating eco-bricks to local stores and homeowners [SEED, 2019].

In relation with its socio-environmental impacts, Hustlenomics also contributes to the sustainable development of South Africa. In terms of the achievement of the SDGs, the country ranks as the 110th (out of 193 countries) [Sachs et al, 2020]. Hustlenomics helps fostering the attainment of SDG 8 ("Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"), SDG 11 ("Make cities and

human settlements inclusive, safe, resilient and sustainable”), and SDG 12 (“Ensure sustainable consumption and production patterns”) [Sachs et al, 2020].

Soweto’s BOP market can also profit from the activities of Hustlenomics. BOP consumers not only benefit from extended job opportunities and better living conditions, but – in the long term – access to running water, proper sanitation facilities, and electricity enables them to perform better on the labor market, also, it builds up their self-confidence (that is particularly beneficial for women and youngsters). Thus, on the long run, Hustlenomics contributes to the overall development of the local BOP market.

#### *Microcare, Uganda*

Microcare was initially established in 2000 as a non-profit organization, and it turned into a private company in 2004 [Khalfan et al, 2008]. The aim of the Ugandan enterprise is to provide adequate health insurance protection to low-income communities who would otherwise be excluded from the national healthcare system [Khalfan et al, 2008].

In Uganda, domestic general government health expenditure accounts for only 1% of the GDP [World Bank, 2018], while the primary reason for people to fall into extreme poverty is illness [Dimovska et al, 2009]. The national healthcare insurance coverage faces significant limitations, such as adverse selection or moral hazard, and it has restricted affordability due to its high costs and premia [Khalfan et al, 2008]. To address these problems, the Ugandan Ministry of Health introduced a Community Based Health Financing model (CBHF) to provide with an alternative solution to the national insurance plan [Khalfan et al, 2008]. CBHF empowers communities to finance healthcare through the pooling of their own resources, thus resulting in a system where services are uniquely adjusted to the needs of each community [Dimovska et al, 2009].

Microcare was created out of a CBHF initiative and it soon established a network of cooperation with communities, corporations and other micro-finance institutions [Khalfan et al, 2008]. The company also receives funding from international donors such as the Australian Regional Bureau for Development Cooperation, or the European Union’s SUFFICE program [Dimovska et al, 2009].

The company operates in a unique way, integrating medical, IT, insurance, financial and management expertise, and applying a cost-effective administrative system that is based on the real-time monitoring of receipts and expenditures [Khalfan et al, 2008]. Microcare also applies a consultative process, continuously negotiating with local communities (e.g. traditional burial societies) in order to adjust the premia and services to their needs and financial constraints, thus reducing the risks of adverse selection [Khalfan et al, 2008]. Product tangibility is another important component of Microcare’s working mechanism: it provides preventive health services (e.g. health education sessions) targeting HIV/AIDS, malaria, water-borne diseases, and maternal and child health, so customers feel that they benefit from the insurance even if they do not fall sick [Dimovska et al, 2009]. A sophisticated information technology platform, using fingerprints with electronic recognition, enables the company to

reduce the risk of potential fraud [Dimovska et al, 2009]. Microcare operates on both commercial and community markets which enables it to reach economies of scale while simultaneously expanding its activities for informal agrarian populations [Khalfan et al, 2008].

The innovative solutions of Microcare have many beneficiaries. On the one hand, they improve the quality of life for many, assuring access to adequate healthcare services. Because customers do not postpone seeking help in case of an illness or an injury, the risks arising from self-medication or household accidents can be significantly reduced [Khalfan et al, 2008]. On the other hand, communities benefit from the educational trainings and sensitization initiatives offered by Microcare, also, they actively participate in the design and implementation process of the health insurance program, thus discovering their ability to manage public issues [Khalfan et al, 2008].

Microcare also contributes to the achievement of the SDGs. In Uganda, only 45% of the population has access to universal health coverage (UHC) which includes essential health services such as reproductive and maternal care, or the treatment of infectious diseases [Sachs et al, 2020]. The innovations of Microcare foster the improvement of the healthcare system, also, they facilitate the attainment of the SDGs, particularly SDG 3 (“Ensure healthy lives and promote well-being for all at all ages” [Sachs et al, 2020]) in Uganda.

Finally, Microcare has introduced a wide range of market innovations primarily targeting BOP consumers, as its services are adapted to low-income populations [Khalfan et al, 2008]. Community-based selection proved to be more efficient than adverse selection, as it helps reducing potential risks [Khalfan et al, 2008]. Microcare also manages to keep loyalty of its healthy customers by offering them tangible products (e.g. jerry cans with water purification tablets) and useful services (e.g. preventive educational trainings) [Khalfan et al, 2008]. With its simple and transparent administration fostered by a modern information system based on real-time monitoring, Microcare handles to reduce its costs, thus providing access to quality health insurance at a price affordable to many [Khalfan et al, 2008].

### **Conclusion**

The seven cases mentioned in the previous section demonstrated that local innovations are playing a key role in a socially just and environmentally sustainable economic growth. Each innovation contributes to the achievement of the SDGs, although at different levels [Fig. 4]. In addition, these innovations provide with functioning models that are applicable to other organizations and enterprises. Larger and more established firms, such as Honey Care and Microcare, have naturally a larger impact as their organizational, financial and management capacities enable them to reach out to a wider range of communities (even outside their country of origin). However, grassroot initiatives that operate on a smaller scale (e.g. Marine Reserves, Green Impact Technologies, Hustlenomics, Tiwai Health Village, Cows to Kilowatts) have the advantage of adaptability because they can adjust to local needs quickly and effectively due to their strong community-embeddedness. Overall, each innovation aims to

offer alternative solutions from a new approach; they recognize BOP consumers as active and participative actors of the market. As Prahalad stated in *The Fortunes at the Bottom of the Pyramid*: “If we stop thinking of the poor as victims or as a burden and start recognizing them as resilient and creative entrepreneurs and value-conscious consumers, a whole new world of opportunities will open up.” [Prahalad, 2006: 1].

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