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Etta Delores Jackson

*Antioch University - PhD Program in Leadership and Change*

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The Role of Geospatial Information and Effective Partnerships in the Implementation of the  
International Agenda for Sustainable Development

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A Dissertation

Submitted to the PhD in Leadership and Change Program of Antioch University  
in partial fulfillment for the degree of Doctor of Philosophy

May 2020

This dissertation has been approved in partial fulfillment of the requirements for the degree of PhD in Leadership and Change, Graduate School of Leadership and Change, Antioch University

Dissertation Committee

- S. Aqeel Tirmizi, PhD, Committee Chair
- Elizabeth Holloway, PhD, Committee Member
- Amor Laaribi, PhD, External Committee Member

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## **Dedication**

I dedicate this dissertation to my daughter Jacqueline Anne Routier and my grandson Dylan Tyler von Felbert who are the lights of my life.

## **Abstract**

The former United Nations Secretary-General Ban Ki-Moon (2014), repeated the core promise in the 1986 UN Declaration on the Right to Development, in which the General Assembly called for an approach guaranteeing meaningful participation of everyone in development and the fair distribution of the benefits of that development. To this end, partnerships are central and can lead to the dignity of the citizens involved as they participate in the development of their own communities. This dissertation research conducted in Manyatta A and B in the Port City of Kisumu, Kenya sought to do just that. The purpose of this study is to demonstrate the role of participatory development planning and collaborative technology platforms of geographic information systems (GIS) and GeoDesign in strengthening sustainable development and enhancing of human dignity. The study used a multimethod design comprised of participatory action research, situational analysis, problem tree analysis, and stakeholder analysis approaches in partnership with the government, academia, business, civil society, and other stakeholders. The study shows how the newly formed government structure, post devolution, provides a functional framework to assist county and city governments to better determine and envision the future they want. This vision can be realized more rapidly through integrated planning to achieve poverty eradication and social, economic, and environmental sustainability, which are the three pillars of the 2030 Agenda for Sustainable Development. The citizens of informal settlements represent those who are farthest behind and who should be given priority. This study demonstrated the potential of inclusive and participatory development planning in restoring the dignity of those groups. This dissertation is available in open access at AURA: Antioch University Repository and Archive, <http://aura.antioch.edu/>, and OhioLINK ETD Center, <https://etd.ohiolink.edu>

*Keywords:* Leadership, United Nations, 2030 Agenda for Sustainable Development, GeoDesign, Geographic Information Systems (GIS), Partnerships, Planning, Leave No One Behind, Citizen Engagement, Future We Want, Location-Based Data

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## List of Acronyms

- AAAA—Addis Ababa Action Agenda
- ACP—Africa, Caribbean, and Pacific
- CSO—civil society organization
- ECOSOC—Economic and Social Council
- GIS—geographic information systems
- GPS—global positioning system
- HLPF—High-Level Political Forum
- ICGC—Institute for Conscious Global Change
- IATF—Inter-Agency Task Force
- LDC—Least Developed Country
- MDGs—Millennium Development Goals
- MEP—Millennium Earth Project
- MoU—memorandum of understanding
- MSP—multi-stakeholder partnerships
- MCK—Municipal Council of Kisumu
- NGO—non-governmental organization
- OECD—Organisation for Economic Co-operation and Development
- PGIS—participatory geographic information
- PPP—public/private partnerships
- RC—resident coordinator
- RCMRD—Regional Centre for Mapping of Resources for  
Development
- SDGs—Sustainable Development Goals
- STI—Science Technology and Innovation

TFM—Technology Facilitation Mechanism

UN—United Nations

UNDESA—United Nations Department of Social Affairs

UNDP—United Nations Development Programme

UN-HABITAT—United Nations Human Settlements Programme

UNGGIM—United Nations Global Geospatial Information Management

## Chapter I: Introduction, Purpose, and Justification

### Problem Statement

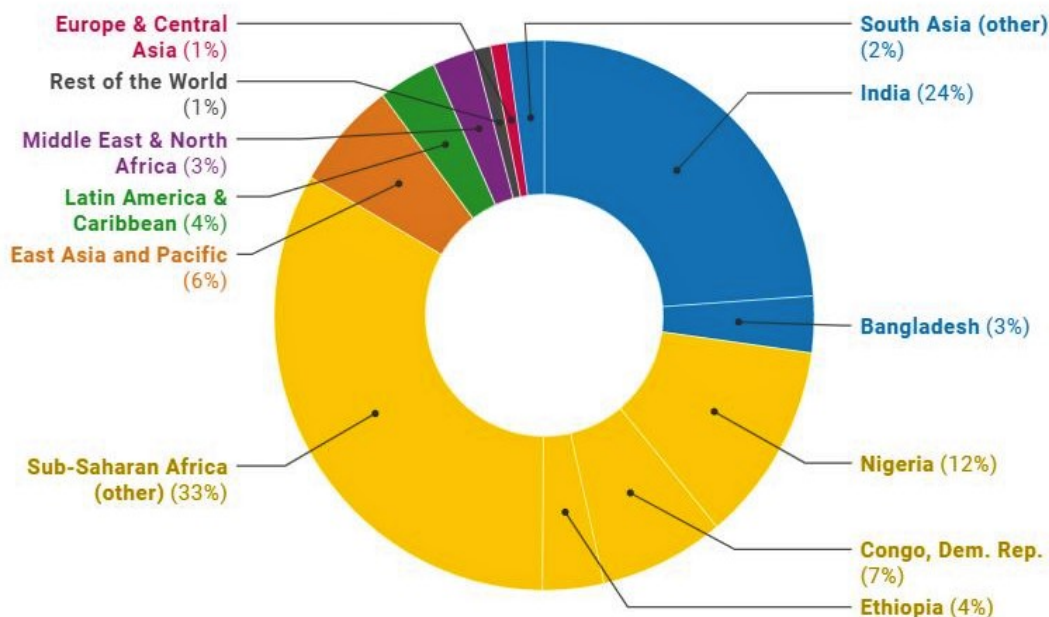
In June of 2012, in Rio de Janeiro, the United Nations Department of Economic and Social Affairs (UNDESA), together with academics, businesses, philanthropic organizations and civil society organizations, gathered to work out the framework for what would become the most transformative agenda in the then 70-year history of the United Nations. The Rio+20 Outcome Document, *The Future We Want* (United Nations General Assembly, 2012) provided the broad outlines for the development of an Open Working Group under the direction of the General Assembly to develop a set of sustainable development goals and targets that would leave no one behind, the official UN catchphrase for ensuring the eradication of extreme poverty. The document also indicated that unlike the development of the previous Millennium Development Goals (MDGs) whose target for delivery was the year 2015 (World Health Organization, 2000), this time the process would be inclusive, and the agenda would be transformative. Pingeot (2016) commended the United Nations for providing the leadership needed in the waning period of the MDGs at the Rio+20 Conference, which set the stage for the now-celebrated SDGs, especially as this relates to the cooperation with business post-2015.

In 2000, eight MDGs with 21 targets and 48 indicators were developed by the United Nations in an initial attempt to address extreme poverty and inequity in the LDCs and Developing Countries. A turning point for the achievement of peace and prosperity for people and planet through partnerships (referred to as the Five Ps of the SDGs) came on September 25, 2015 when the General Assembly of the United Nations, with the agreement of all 193 Member States of the United Nations, signed “Transforming Our World: The 2030 Agenda for Sustainable Development” (United Nations General Assembly, 2015a). The Agenda was hailed at that time as

the most inclusive and transformative document produced by the UN in its 70-year history, one that could potentially change the lives of the world's 736 million extreme poor as estimated by the World Bank Group (2015) in its report *Understanding Poverty*.

## Half of the world's poor live in just 5 countries

Share of poor people in the world by region or country, 2015



Source: PovcalNet

*Figure 1.1.* Global distribution of poverty. Copyright 2015 by World Bank Group. Used with permission.

Of this number, 368 million, or half, live in just five countries: India, Nigeria, Democratic Republic of Congo, Ethiopia, and Bangladesh. According to this same report, the number of poor people living in Sub-Saharan Africa is expected to rise in the coming years.

Economically, nations of the world are classified under UN Resolution 2768 (XXVI) in 1971 as: Developed Countries, Developing Countries, and LDCs according to UNDESA. Under the new 2030 Agenda for Sustainable Development, the overarching goal is the eradication of poverty for everyone, everywhere, by 2030, with the recognition that poverty exists in all 193 countries, to varying degrees. It is recognized, however, that the LDCs are the farthest behind and are in need

of special consideration if everyone is to successfully reach the goal of poverty eradication by 2030. To this end, there are far more aggressive partnership commitments being solicited by the United Nations on behalf of the 47 LDCs and 54 Developing Countries. An objective of the partnership commitments is to have the Developed Countries contribute to the LDCs and Developing Countries.

The newly developed 17 SDGs, along with their related 169 targets and 232 indicators, were designed to accomplish the unfinished mandate of the MDGs (United Nations General Assembly, 2015b). Speaking of this unprecedented accomplishment, Nikhil Seth (2015), then Director of UNDESA, appropriately observed that prosperity, security, and sustainability of our world can no longer be preserved by the application of concessional flows from the rich to the poor, but rather needs to be based on multiple actions undertaken by all, across the globe. This perspective that broadened the conversation about concessional flows was shared by other researchers. For example, Sam (2016) argued the SDGs should matter to everyone as this agenda gives the greatest hope to a world for peace, prosperity, people, planet, and partnership: “In a process that took several years and involved millions of people from all corners of the globe, from little villages in East Kenya to the Arctic, they voted to usher in a new era of change” (p. 7).

The main focus of this research is the activation of SDG#17: Means of Implementation which undergirds the whole 2030 Agenda for Sustainable Development and without which a successful implementation outcome would be in great jeopardy. The UN acknowledges that governments alone would not be able to create the future they want for their citizens and it is in that regard that a strong partnership framework is needed and to which UNDP is being restructured to assist governments in its delivery. The role of UNDP is to bring together UN

Agencies, business, civil society, academia, and philanthropic organizations to make their contribution in an organized manner. As the Agenda mandates, technology is to play a key role in the implementation efforts and it is to that end that Institute for Conscious Global Change (ICGC) is making its contribution by using geographic information systems (GIS), GeoDesign, Earth observation, and other related technologies to show how the implementation of the Agenda can be accelerated and in an integrated and comprehensive manner through effective partnerships.

### **Context and Purpose of Study**

The purpose of the proposed research study will be to examine the international agenda for development and to develop a research methodology that may inform the United Nations System, including governments, civil society, academia, and other stakeholders, on how geospatial information and effective partnerships could better serve the implementation process. The ICGC is an international NGO in Special Consultative Status with the Economic and Social Council (ECOSOC) of the United Nations. The ICGC is committed to working with the United Nations to accomplish its development mission and, to that end, the implementation of the 2030 Agenda. For too long, too many have languished in poverty living without the basic necessities of life and now, for the first time, there is a plan and a framework for how poverty eradication could be achieved. The Agenda contains 17 Sustainable Development Goals, their 169 targets, and 232 indicators. Together with the Global Indicator Framework (UNDESA, 2016), the Agenda's goals and targets are aimed at developing implementation mechanisms for each SDG as laid out in SDG#17; Means of Implementation, which is key to the realization of the entire agenda—acknowledging that Goal #17 has equal value in relation to the other 16 goals and undergirds the whole agenda.

The SDGs are:

Goal 1. End poverty in all its forms everywhere.

Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

Goal 3. Ensure healthy lives and promote well-being for all at all ages.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 5. Achieve gender equality and empower all women and girls.

Goal 6. Ensure availability and sustainable management of water and sanitation for all.

Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Goal 10. Reduce inequality within and among countries.

Goal 11. Make cities and human settlements inclusive, safe, resilient, and sustainable.

Goal 12. Ensure sustainable consumption and production patterns.

Goal 13. Take urgent action to combat climate change and its impact.

Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

Goal 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development. (United Nations General Assembly, 2015a, p. 12)

These goals are mandated to achieve social, economic, and environmental sustainability for

everyone everywhere to create a “Future We Want” (United Nations General Assembly, 2015a,

These goals are mandated to achieve social, economic, and environmental sustainability for everyone everywhere to create a “Future We Want” (United Nations General Assembly, 2015a, p. 1). Geographic information is the link that connects all those aspects given that it is a collaborative planning tool based on data; GIS is able to handle large amounts of complex data and to display and simulate that data in a visual form for more effective stakeholder engagement. This future is one in which the right to peace and prosperity for people and planet can become a reality through partnerships, ensuring the Five Ps of the SDGs: People, Planet, Prosperity, Peace, and Partnership.

### **Partnership Objectives**

Partnership is the means or vehicle by which the implementation of the 2030 Agenda is to be achieved. The concrete deliverables expected of countries are the following:

- mobilization of financial resources;
- transfer and adequate use of emerging technology;
- building and strengthening capacities;
- establishing a fair global trade system;
- creating synergistic systems to deal with policies and institutional coordination; and
- multi-stakeholder partnerships, and the crucial issues of data, monitoring, and accountability.

The following brief elaborations of the partnership objectives are to provide clarity and more detail of what is expected for these deliverables and which must achieve social, economic, and environmental sustainability for people and planet.

**Finance.** In this intergovernmental partnership arrangement that exists between the 15 Developed and the 54 Developing Countries, the Developed Countries have committed to



contribute .07 of their Gross National Income as official development assistance (United Nations General Assembly, 2015b, p. 22).

**Technology.** It has been determined that the majority of the LDCs are in the Global South, which is made up of Africa, Latin America, and developing Asia including the Middle East, are behind in their technological knowledge and skills. Therefore, there is a focused effort to have these countries partner with the North in a North-South cooperation to improve development objectives (United Nations General Assembly, 2015b, p. 22). The Global North consists of the following countries: United States, Canada, Europe, Israel, Japan, Singapore, South Korea, Taiwan as well as Australia and New Zealand.

**Capacity building.** Cooperation is encouraged among countries in the North-South and South-South to assist each other in developing their National Development Plans by incorporating into them the SDGs (United Nations General Assembly, 2015b, p. 22).

**Trade.** The 2030 Agenda seeks to promote a fair universal, rules-based multilateral and nondiscriminatory trading system (United Nations General Assembly, 2015b, p. 22).

**Systems issues.** There is a need for a set of systems interacting in symbiosis, in terms of the following:

- Policy and institutional coherence, which is aimed to stabilize global macroeconomics and policy coherence for sustainable development. In so doing, the respect for the leadership of each country and its policy space should be of primary consideration (United Nations General Assembly, 2015b, p. 23).
- Multi-stakeholder partnerships (MSPs) which are meant to allow for the mobilization and sharing of knowledge, expertise, technology, and financial resources by encouraging effective public, public/private, and civil society partnerships that builds

on the experience and resourcing strategies of partnerships (United Nations General Assembly, 2015b, p. 23).

- Data, monitoring and accountability, these functions are seen as significant additions to the 2030 Agenda and a greater indicator of its success; it is felt that the less than successful outcome of the MDGs was because of lack of accountability and the monitoring needed to provide oversight and tracking of progress (United Nations General Assembly, 2015b, p. 23).

The following questions were used to guide my research into exploring how, in fact, geospatial information may be an effective tool for bringing together a robust partnership to address the complexity of the SDGs as means of implementation.

### **Research Questions**

The research questions for this study align with those of the United Nations and the Institute for Conscious Global Change (ICGC). Through participatory action research and situational analysis, including positional mapping,<sup>1</sup> for implementing the international agenda for eradication of extreme poverty, I addressed the following:

- a. How may geospatially enabled Multisector Partnerships facilitate the 2030 Agenda implementation in the broadest sense?
- b. How may the GeoDesign method be used to support a participatory action research approach in the SDG agenda implementation?

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<sup>1</sup> Positional maps, “lay out the major positions taken, and not taken, in the data vis-à-vis discursive axes of variation and difference, concern, and controversy found in the situation of concern” (Clarke, 2005, p. xxxvi). The method will be further discussed in Chapter I and outlined in detail in Chapter II.

- d. In the informal settlement of Manyatta, what are the macro level financial, economic, and cultural forces, as identified through PAR, that are perceived by stakeholders to be critical factors in achieving the SDG agenda implementation?
- e. What are the major issues on which there are different positional perspectives being articulated at macro, meso and community levels?
- f. What may be the critical elements of partnerships in achieving the SDG agenda implementation as perceived by different stakeholder groups working with Manyatta?
- g. For Manyatta, how does the GeoDesign tool and partnerships can be created and sustained to facilitate SDG agenda implementation?

The goal of the research study is to contribute an integrated *how to* solution to the implementation of the complex agenda that is the 2030 Agenda for Sustainable Development. A mandate of the agenda is that it is country-led, citizens are engaged in the process, capacity is built, and there is transfer of knowledge from the Global North to the Global South. GeoDesign as an anchor and a method incorporates geography, data, and design and brings together all the “people of the place” from the government, United Nations, citizens, business, and civil society to work together for the benefit of those who have been left behind.

Action research changes people’s practices, their understanding of their practices, and the conditions under which they practice. It changes people’s patterns of “saying,” “doing,” and “relating” to form new patterns—new ways of life. It is a meta-practice: a practice that changes other practices. (Kemmis, 2009, p. 463)

Kemmis (2010) further stated that action research aims at changing three things: practitioners’ practices, their understanding of their practices, and the conditions in which they practice. Unlike conventional social science, as reported by Bradbury-Huang (2010), action research is meant to effect desired change as a path to generating knowledge and empowering stakeholders and is not primarily or solely meant to understand social arrangements. This research

approach represents, therefore, a transformative orientation to knowledge creation given that action researchers “seek to take knowledge production beyond the gate-keeping of professional knowledge makers” (Bradbury-Huang, 2010, p. 93).

The envisioned partnership engagement process involves the following steps:

1. Decide on a site or area of study.
2. Conduct multiple charrettes, which are collaboration sessions aimed at drafting solutions to a design problem, which should be conducted with approximately six key stakeholders at first to include: government officials; civil society; business; academia; beginning with a straw-man design.
3. Determine the statistical, geospatial, formal, and informal data needed for analysis and mapping for all 17 SDGs, especially goals 9, 11 and 17; (See Appendix E: Flowchart).  
A key mandate of the 2030 Agenda is the integration of all the goals. GIS is uniquely able to do so.
4. Determine the GeoDesign workflows between the participants and GIS process.
5. Develop a Detailed Strategic Plan of the geographic area chosen for study and development.
6. Engage the stakeholders for appraisal of the strategic development sketch-up.
7. Develop 3D models based on the detailed strategic plan.

Clarke (2005) explained that situational analysis (SA) and positional mapping, as used for action research, seek to investigate the issues of concern in a given situation, how the knowledge is situated, and the power dynamics that impact that situation. There are three kinds of situational maps that aid analysis: situational and relational, social worlds/arenas, and positional maps. Positional maps give voice to discursive positions that are taken and not taken in the data on

issues of concern and focus, and which are often but not always contested. SA together with positional, messy, and ordered maps were used determined by the critical areas that emerged from the data collected.

### **Researcher Stance**

I founded the Institute for Conscious Global Change (ICGC) 12 years ago with the purpose of contributing to the eradication of poverty for the 1.04 billion living in all 193 Member States of the United Nations. To assist in this effort, it was important to align ICGC with the United Nations, given its infrastructure, reach and influence globally. To accomplish this the organization applied for and received Special Consultative Status from ECOSOC, in July 2012. This accreditation allowed our organization to attend meetings and conferences making it possible to interface with the United Nations Secretariat, NGOs, United Nations agencies, and other bodies. It was also important to ICGC that our primary activity put forward in our Millennium Earth Project (MEP) become part of the United Nations official documents.

Subsequently, a request was made by the Permanent Representative of Jamaica to the United Nations on behalf of Jamaica's Ministry of Planning and Ministry of Foreign Affairs for permission to submit the MEP (UN General Assembly, 2016) proposal to the President of the General Assembly. These Ministries felt that the MEP proposal, outlined in four phases using geographic information systems (GIS), GeoDesign, and related technologies, was a sound one. In furtherance of this conclusion, the Permanent Representative of Jamaica submitted the MEP Proposal to the President of the General Assembly for inclusion in the documents of the 71st session of the General Assembly (UN General Assembly, 2016).

I had the honor to lead the processes for Special Consultative Status and the adoption of the MEP proposal. The importance of the achievement was to bring to the attention of the United

Nations the efficacy of the geospatial technologies capable of achieving the integrated and comprehensive implementation mandate of the 2030 Agenda. GeoDesign brings together the elements of geographic science, information technology, design technology and all key stakeholders to the table to plan together the “future they want.” And, that is appropriate in the case of each country, while at the same time assuring the eradication of extreme poverty, leaving no one behind, and creating peace and prosperity for people and planet.

I bring to the United Nations an outsider perspective. Ten years ago, when I first began interfacing with the United Nations, I took the time to learn how the institution functioned. It was clear to me then that the system needed significant reform. Not long after the 2030 Agenda was agreed upon by the Member States (United Nations General Assembly, 2015a), ECOSOC invited 12 independent advisors from all regions to evaluate the whole UN System to assess its fitness to implement the Agenda. The advisors’ report stated that, without radical reform, the UN would be unable to successfully implement the newly formed agenda. This, in my opinion, was one of the most consequential initiatives that had the potential to ensure that the Agenda succeeded.

The 2030 Agenda requires a stronger, better integrated and more strategic United Nations Development System. An Independent Team of Advisors recently offered ECOSOC a vision of a stronger system working as one. I trust we will all benefit from this bold diagnostic work and consider their wide range of proposals. (Ban Ki-Moon, as cited in Independent Team of Advisors, 2016, p. 2)

The report resulted in the UN Secretary-General leading a complete repositioning of the United Nations system and especially the United Nations Development Programme (UNDP), the primary development agency of the United Nations. This reform will lead to the Resident Country Coordinator in each country putting a team together of key stakeholders who can assist the government to effectively lead the development agenda for its own country. This also is the kind of nation autonomy I had envisioned when I founded ICGC where governments and citizens

would make the decisions about their lives with assistance from the outside. Geographic information systems technology, being a collaborative planning platform that is data-driven, provides the perfect vehicle for the needed transfer of knowledge of technology and capacity building.

We must all help keep up the momentum of our transformative agenda and make sure that lessons are shared and that best practices are replicated. The recent ECOSOC dialogue and the inputs of the Independent Team of Advisors (ITA) are also contributions in moving forward in an effective and coherent manner. (Jan Eliasson, UN Deputy Secretary-General, as cited in Independent Team of Advisors, 2016, p. 2)

### **Anticipated Gaps in Literature**

The research methodology chosen for this study is participatory action research, and situational analysis including social/arena and positional maps. The literature, which is reviewed in detail in Chapter II, supported the choice of action research as the most suitable research approach for the partnership mandate for achieving the sustainable development goals.

Participatory action research is the right approach for the study of partnerships and geospatial information for implementing the 2030 Agenda given that citizen engagement, knowledge transfer, and capacity building should be key outcomes in the implementation of the Agenda. Also, given the new-ness and complexity of the Agenda, this research initiative has the potential to add much needed information. Situational analysis allows the voices who have typically been overlooked to be heard in any given situation under investigation. Citizens will have the opportunity to determine the “Future They Want” for their communities, not dictated by outsiders.

The literature search and review did uncover enough support in the peer-reviewed literature to further the research toward my dissertation; however, there was a glaring absence of articles on situational mapping. This suggests the need for more work in this area and this study would provide a unique opportunity to contribute toward new knowledge generation. Of the

literature found on positional mapping, very little appeared in research in the social sciences; most was from the biomedical field. Another finding was the lack of information on the actual process of action research to which I hope to contribute. On a personal level, the exercise was expansive as this is a strong introduction to doing a literature review and is a great set-up for doing the required literature review portion of my dissertation. Additionally, the literature did not bring together the elements of participatory GeoDesign to complement situational analysis and positional mapping as an appropriate method and approach to support the implementation of the Agenda. This could be a result of the new-ness of the goals. Orland and Steinitz, (2019) referencing the *International GeoDesign Collaboration* describe GeoDesign as design at geographic scale which provides a collaborative approach and seeks to integrate multiple disciplines, uses geographical information systems (GIS)-based analytic and design tools to help explore alternative future scenarios in response to stated problems. In this regard, my research contributed to the conversation about GeoDesign as a geographic method being ideally suited for the large-scale challenge that SDGs present.

### **Rationale for Study**

The complex 2030 agenda mandates that the government of each country lead the implementation and that the citizens are engaged in the process as an assurance of sustainability. A multi-stakeholder partnership participation included the ministries of the government, civil society, academia, business, philanthropic organizations and the nine specific citizen groups, namely: Farmers, NGOs, Science and Technology Community, Children and Youth, Women, Business and Industry, Workers and Trade Unions, Indigenous Peoples and Local Authorities. The study engaged these voices to deliberate the issues in their community that contributed to being in extreme poverty. It was essential to this study that the information provided was



confirmed and agreed upon by the citizens and the information is heard by the decision makers. It is for this reason that the Ministry of Planning became the point of entry into the governmental system. The use of cartographic maps: situational, messy, and positional added to the visual representation of the hopes and aspirations of the community. GeoDesign as a planning tool further ensures that the information articulated and supported by the 17 SDGs and their targets are concretized in a formal design plan with a visual demonstration of how their neighborhoods can be radically changed to create the future they want and at the same time achieve the economic, social and environmental sustainability mandated by the 2030 Agenda for Sustainable Development.

### **Study Terms and Definitions**

The terminologies used in the vast world of the United Nations—which consists of 31 units—is quite different from ordinary scholarly literature, especially in the use of acronyms. I will provide clarification here of terms used in this study to facilitate a better understanding of the work.

- *United Nations* is an intergovernmental organization founded in 1945 with headquarters in New York City and is currently made up of 193 Member States. The mission and work of the United Nations are guided by the purposes and principles contained in its founding Charter. It is tasked with maintaining international peace and security, developing friendly relations among nations, achieving international cooperation, and being a center for harmonizing the actions of nations. It was established after World War II, with the aim of preventing future wars, and succeeded the League of Nations. The organization is financed by voluntary contributions from its Member States. The UN has six principal organs: The General Assembly; the

- Security Council; the Economic and Social Council; the Trusteeship Council; the International Court of Justice; and the UN Secretariat.
- *General Assembly*. The General Assembly is the main deliberative, policymaking, and representative organ of the United Nations. All 193 Member States of the UN are represented in the General Assembly, making it the only United Nations body with universal representation. Each year, in September, the full membership meets in the General Assembly Hall in New York for the annual General Assembly session, and general debate, which many heads of state attend and address. Decisions on important questions, such as those on peace and security, admission of new members and budgetary matters, require a two-thirds majority of the General Assembly. Decisions on other questions are by simple majority. Each year, a President of the General Assembly is elected to serve a one-year term of office.
  - *ECOSOC*. This is the principal body for coordination, policy review, policy dialogue and recommendations on economic, social, and environmental issues, as well as implementation of internationally agreed development goals. It serves as the central mechanism for activities of the United Nations system and its specialized agencies in the economic, social, and environmental fields, supervising subsidiary and expert bodies. It has 54 Members, elected by the General Assembly for overlapping three year terms. It is the central platforms of the United Nations for reflection, debate, and innovative thinking on sustainable development.
  - *United Nations Development Programme (UNDP)*. The United Nations Development Programme works in nearly 170 countries and territories, helping to eradicate poverty, reduce inequalities and build resilience so countries can sustain progress. As

the UN's development agency, UNDP plays a critical role in helping countries achieve the SDGs.

- *United Nations Environmental Programme (UNEP)*. The United Nations Environment Programme was established in 1972 and is the voice for the environment within the United Nations System. UNEP acts as a catalyst, advocate, educator, and facilitator to promote the wise use and sustainable development of the global environment.
- *Multi-stakeholder groups*. These are partnerships for sustainable development that are multi-stakeholder initiatives voluntarily undertaken by governments, intergovernmental organizations, major groups, and other stakeholders. These efforts contribute to the implementation of intergovernmentally agreed development goals and commitments, as was included in Agenda 21, the Johannesburg Plan of Implementation, the Millennium Declaration, the outcome document of the United Nations Conference on Sustainable Development (Rio+20) entitled *The Future We Want*, the Third International Conference on Small Island Developing States, and the 2030 Agenda for Sustainable Development.
- *Agenda 21*. Agenda 21 is a nonbinding action plan established by the United Nations regarding sustainable development and is a product of the Earth Summit held in Rio de Janeiro, Brazil, in 1992.
- *GeoDesign*. This refers to a method that gets all stakeholders and different professions involved in order to collaboratively design and realize the optimal solution for spatial challenges in the built and natural environments, utilizing all available techniques and data in an integrated process.

- *Geospatial information*. Geospatial information is also known as location information, is information describing the location and names of features beneath, on or above the earth's surface. At a basic level it relates to the basic topographical information found on a map.
- *High-Level Political Forum (HLPF)*. The forum was mandated in 2012 by the outcome document of the United Nations Conference on Sustainable Development (Rio+20), *The Future We Want*. The HLPF is the main United Nations platform on sustainable development. Its central role is the follow-up and review of progress on the 2030 Agenda for Sustainable Development's SDGs at the global level.
- *Voluntary national reviews (VNRs)*. VNRs aim to facilitate the sharing of experiences, including successes, challenges and lessons learned, with a view to accelerating the implementation of the 2030 Agenda. The VNRs also seek to strengthen policies and institutions of governments and to mobilize multi-stakeholder support and partnerships for the implementation of the SDGs.
- *Action research (AR)*. Action research is concerned with an agenda for social change that embodies the belief of pooling knowledge to define a problem in order for it to be resolved.
- *Participatory action research (PAR)*. PAR is collaborative research, education and action used to gather information to use for change on social or environmental issues. It involves people who are concerned about or affected by an issue taking a leading role in producing and using knowledge about it.
- *Situational analysis*. Situational analysis is systematic collection and evaluation of past and present economic, political, social, and technological data, aimed at

identifying internal and external forces that may influence the organization's performance and choice of strategies. Based on that data an assessment of the organization or community's current and future strengths, weaknesses, opportunities, and threats is made.

- *Positional mapping*. The third major cartographic strategy in situational analysis which emphasizes discursive positions taken and not taken in the data on issues of concern, focus, and often but not always contestation. Positional mapping allows the voices who have usually been left behind to be heard in any given situation under investigation.
- *Multimethodology or multimethod* research includes the use of more than one method of data collection or research in a research study.
- *Sustainable development* is the organizing principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depend. The desired result is a state of society where living conditions and resource use continue to meet human needs without undermining the integrity and stability of the natural system. Sustainable development can be classified as development that meets the needs of the present without compromising the ability of future generations.
- *The Future We Want*. The outcome document of the Rio+20 Conference in 2012 that provided the framework for the development of Transforming Our World: The 2030 Agenda for Sustainable Development.

- *Capacity building* (or capacity development) is the process by which individuals and organizations obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to do their jobs competently.
- *Secretary-General*. The Secretary-General of the United Nations is a symbol of the Organization's ideals and a spokesman for the interests of the world's peoples, in particular the poor and vulnerable. The current Secretary-General of the UN, and the ninth occupant of the post, is Mr. António Guterres of Portugal, who took office on 1 January 2017. The UN Charter describes the Secretary-General as the chief administrative officer of the organization.
- *Secretariat*. The Secretariat is one of the main organs of the UN and is organized along departmental lines, with each department or office having a distinct area of action and responsibility. The Secretariat is comprised of the Secretary-General and tens of thousands of international UN staff members who carry out the day-to-day work of the UN as mandated by the General Assembly and the Organization's other principal organs. The Secretary-General is chief administrative officer of the UN, appointed by the General Assembly on the recommendation of the Security Council for a five-year, renewable term. UN staff members are recruited internationally and locally, and work in duty stations and on peacekeeping missions all around the world.
- *Member States*. The United Nations consist of 193 Member States of the United Nations and each is a member of the General Assembly. Member states are admitted to membership in the UN by a decision of the General Assembly upon the recommendation of the Security Council.

- *Security Council.* The Security Council has primary responsibility, under the UN Charter, for the maintenance of international peace and security. It has 15 Members (5 permanent and 10 nonpermanent members). Each Member State has one vote. Under the Charter, all Member States are obligated to comply with Council decisions. The Security Council takes the lead in determining the existence of a threat to the peace or act of aggression. The Security Council has a presidency, which rotates, and changes, every month.
- *Trusteeship Council.* The Trusteeship Council was established in 1945 by the UN Charter, under Chapter XIII, to provide international supervision for 11 Trust Territories that had been placed under the administration of seven Member States, and to ensure that adequate steps were taken to prepare the Territories for self-government and independence. By 1994, all Trust Territories had attained self-government or independence. The Trusteeship Council suspended operation on 1 November 1994. By a resolution adopted on May 25, 1994, the Council amended its rules of procedure to drop the obligation to meet annually and agreed to meet as occasion required—by its decision or the decision of its president, or at the request of a majority of its members or the General Assembly or the Security Council.

### **Dissertation Structure by Chapter**

Chapter I provided an introduction including an overview of the Rio+20 which established the rationale for an agenda that would eradicate extreme poverty for over one billion people in all 193 countries of the United Nations; laid out the purpose and context for the study as laid out in the 17 SDGs, their 169 targets and 232 indicators; details my stance as a researcher, and my perspective as a researcher. It briefly identified key gaps in the literature especially in

relation to the use of situational analysis and positional mapping. Chapter I sketches the research questions, explains terms and definitions of the research, and provides a brief summary of the remaining chapters of the dissertation.

Chapter II is the literature and research review. This chapter examines the relevant literature for the areas of study, primarily the means of implementation of the 2030 Agenda through partnerships and geospatial information technology and using action research and situational analysis. Geospatial information technology is generally used to refer to the use of GIS, remote sensing, global positioning systems, spatial analysis techniques, and similar approaches to understand problems from the perspective of geography.

Chapter III describes the qualitative multimethod methodology, approaches of participatory action research, situational analysis, and positional mapping together with problem tree analysis and stakeholder analysis. It includes the method details and highlights the use of and interviews with key stakeholders bringing together the geospatial technology, informal and formal data, the partners, and the community to achieve sustainable change.

The two final chapters present the actual research. Chapter IV presents the findings and results, identifying the outcomes and significance of the dissertation research, and suggestions for future research. In Chapter V, “Discussion,” goes into the implications of leadership and change, and the application of my research findings to the field of research. This presents the evidence that the findings can be important in understanding how effective partnerships and geospatial information and GeoDesign technologies can add to the body of scholar-practitioner knowledge to advance and accelerate the 2030 Agenda implementation.



## Chapter II: Literature Review

The research study explores the relationships between multi-stakeholder partnerships, which underpins the international agenda for sustainable development, and, geospatial information as an integrating tool for comprehensive development through planning. The Agenda, as discussed earlier, was agreed upon by the Member States of the United Nations and is mandated to be led by the government of each country assisted by its citizens who are expected to be fully engaged. The United Nations Agencies, academia, business, civil society, and other stakeholders are expected to make up country teams that will provide implementation assistance to countries based on evidence-based data for decision making. Seth (2015) speaking to global partnerships said,

The new partnership for development established to tackle the problems of our contemporary world calls for many shifts. It requires a shift from North-South interaction to universal actions, a shift from creating a new policy framework to implementing the agreements to be reached in 2015, a shift toward stronger monitoring and review, and a shift toward trust and mutual benefits. (p. 42)

The literature review covered the areas of partnerships within the context of the delivery of the 2030 Agenda for Sustainable Development and found wide support for a framework that was effective and nimble. This is especially true as it relates to ensuring that those who are farthest behind. I was pleasantly surprised at the amount of literature available in the area of GeoDesign given it is a new concept/method which finds great synergy with participatory action research which are both designed to engage the citizens of any given community. Situational analyses and the associated situational, social, and positional maps provided the perfect cartographic alignment with GeoDesign and PAR for this research work.

### Partnership Framework for SDG Implementation

Beisheim and Simon (2016) define *multi-stakeholder partnerships* (MSPs) as non-governmental actors, such as civil society organizations and businesses, working with

governmental actors such as intergovernmental organizations and public donor agencies. MSPs have been divided into three categories for purposes of implementing: MSPs for sharing knowledge, MSPs for providing services, and MSPs for setting standards. The United Nations has been gradually working to develop and expand its MSP infrastructure over many years. In this relationship, the goal is to achieve a win-win situation in which public and private partners pool their resources and competencies to address common social, economic, and environmental issues more effectively. Answering the call of SDG target 17.14 which requires all countries to “enhance policy coherence for sustainable development” as a key means of implementation, the Organisation for Economic Co-operation and Development (OECD) advocates for the need to equip public servants, governments, and stakeholders to include civil society and the private sector with the skills and tools needed to enhance policy coherence (PCSD). This can be achieved by introducing tools for improving human and institutional capacity to implement the SDGs in a coherent manner at all levels of government (Organisation for Economic Co-operation and Development, 2018).

The UN’s first large-scale partnership with nonstate actors to include civil society and businesses came when Ted Turner donated \$1 billion (U.S.). This resulted in the founding of the UN Fund for International Partnerships (UNFIP) in 1998. The fund was established to manage the donation from wealthy businessman, Ted Turner, to establish the United Nations Global Compact (UNGC), which came two years later. A mandate of the Outcome Document, *The Future We Want*, from the Rio+20 Conference, was that the United Nations Secretary General would compile all voluntary commitments in an internet-based registry to be periodically updated.

On balance, Hale and Mauzerall (2004) did not feel that, since 1998, the governance of MSPs at the UN level had kept pace with their growing importance and the increasing knowledge

about the successful conditions for their maintenance. MSPs are meant to promote a holistic approach to development and governance in which the partnerships are greater than the sum of its parts and in which lasting and meaningful impact can be achieved at all levels of delivery. MSPs, therefore, include all the actors in the partnership space to include corporate, government, and civil society. Writing about the Global Knowledge Partnerships, Rahim (2003) explained MSP in the following way:

Strategic alliances between business, government and civil society are a growing feature of both developed and emerging economies. Such multi-stakeholder partnerships are necessary because it is increasingly clear that no one sector in society can deliver the complexities of sustainable development alone. (p. 2)

Glasbergen (2010) explained partnerships for sustainable development as a process in which actors from various sectors of society including Member States, corporations, and civil society may participate. In this process, Glasbergen proposed a “Ladder of Partnership Activity” containing five levels:

1. “Building trust”—At this level, Glasbergen argued, if partnerships are essential to achieving sustainability, then it is imperative that partners change adversarial interactions into collaborative ones with the aim of adding value for everyone which can only be achieved in an atmosphere of mutual trust if constructive collaboration is to be achieved.
2. “Exploring collaborative advantage”—After trust has been established, Glasbergen argued that the needs of each party should be nurtured. An example of this is that NGOs are bound by their identification with, and loyalty to civic values; the corporate mechanism dictates that businesses act in their own economic interest, and Member States are responsible to the people, and to deliver for them. In this regard,

- governments must think about the implementation gaps in their policies that can only be remedied through partnering with private entities.
3. “Constituting a rule system”—In this new social contract the partners formally invest in each other, and the contract specifies common problems defined by each and agree to a set of rules. The rule system should be comprised of both internal aspects, in which the mutual obligations of partners are defined, and external rules that relate to how the partnership will interact with other organizations.
  4. “Changing the market”—The aim of this stage is to ensure that the agreements of the previous phases can be implemented on a broader scale. The goal in building this model for partnership is to help in shifting the conventional commodity chain focused on economic profitability to one of social and environmental sustainability. At this stage, the internal and horizontal relationships begin to enter the more vertical, hierarchical structures of larger-scale social systems with which that partnership associates.
  5. “Changing the political order”—Partnerships, Glasbergen stated, should be analyzed not only on their own merits, but also in regard to the impact they have on the political order of our societies. It can be observed that partnerships have become part of the networks that govern societies and that political power has become dispersed among a variety of public and private actors. Studying partnerships, then, may help us to better understand and evaluate the diversity, dynamics, and complexity of governance in democratic societies on a more general level as well. (Glasbergen, 2010, pp. 3–8)

## **Member States**

At the heart of the partnership conversation are the Member States. The aim of the Agenda is to see citizens in Member States enjoy a better quality of life for which the SDGs were developed; and it is toward this end that the best partnership arrangement is being sought. The 193 countries of the United Nations System can be classified by geography, economics, and special circumstances. Under the banner of the new 2030 Agenda for Sustainable Development, the overarching goal is the eradication of poverty for everyone everywhere by year 2030, with the recognition being that poverty exists in all 193 countries to some degree. It is recognized, however, that the LDCs are the farthest behind and in need of special consideration if all nations are to reach overall goals successfully by 2030.

In this regard, there are far more aggressive partnership commitments being solicited by the United Nations on behalf of the 47 LDCs and 54 developing countries compared to the developed and developing nations. An objective of the partnership commitments is to have the developed countries contribute to these countries. The relationship between developed and developing countries runs deep and can be contentious. Most, if not all the Developing and LDCs, have been colonized by developed countries. It could be argued that it is the exploitation of the natural resources of developing countries and leaving them unprepared to govern themselves after independence that has created their current poverty (Alemazung, 2010). Let me hasten to add that the corruption of the governments of many of these Developing Countries and LDCs has also contributed to the impoverishment. Thirty-three of the 47 LDCs are situated on the continent of Africa which is home to the most post-colonized countries and, together with government corruption in many of these countries, they face the greatest challenge of achieving the 2030 timeline!

Effective governance in Member States is key to successful sustainable development. In 2000, under the banner of international cooperation and development and the area of governance, the highly significant Cotonou Agreement (2000) was established between 79 developing countries of Africa, the Caribbean, and the Pacific (ACP), excluding Cuba, with the European Union and was built as a partnership for change. The founding statute of the group is the Georgetown Agreement which was signed in 1975 and has its Permanent Secretariat in Brussels. The ACP Council of Ministers is the group's primary decision-making body assisted by a Brussels-based ACP Committee of Ambassadors. The agreement was established with three pillars:

1. development cooperation,
2. political cooperation, and
3. economic and trade cooperation (for the period 2000–2007).

Nkowanani (2010), in examining the relationship between the ACP countries and the European Union, looked at the distinction between good governance process and outcomes. The initiative was predicated on the rule of law, transparency, accountability, and good governance in economic management at all levels of inter- and intrastate engagement. The aim was also to contribute to poverty reduction, sustainable development, and integration of the economies of the 79 countries into the global economy through a paradigm of aid and trade for development (Nkowanani, 2010, p. 688).

Slocum-Bradley and Bradley (2010) are critical of the relationship between the countries of Europe and ACP countries, which they describe as paternalistic, and they also question the European Union's (EU) "good" governance and outcome claims. Slocum-Bradley and Bradley pointed to the United Nations Commission on Human Rights' key attributes of good governance

as transparency, responsibility, accountability, participation, and responsiveness, to the needs of the people and outcome to mean one that promotes growth and sustainable human development. They further argued that the EU governance process, which is marked by coercion, is a recipe for unsuccessful outcome for sustainable development. They recommended a change in that relationship to one of mutual respect and cooperation and respect for ACP sovereignty where there is a joint framework and responsibilities on both sides.

Pattberg and Widerberg (2016) writing on Global Partnerships for Sustainable Development, highlighted that the concept of transnational partnerships emerged at the 1992 Earth Summit, where Agenda 21 was launched in Johannesburg as Type II partnership. At the 2012 Rio+20 UN Conference on Sustainable Development, partnerships played a central role in creating the *The Future We Want* agreement. Pattberg and Widerberg outlined the meaning of transnational multi-stakeholder partnerships and posited nine conditions for successful and effective partnerships. The first six of the following list of conditions relate to the actors in the partnership, while the remaining three are about the context of that relationship:

1. Optimal partner mix
2. Effective leadership
3. Stringent goal-setting
4. Sustained funding
5. Professional process management
6. Regular monitoring, reporting, and evaluation to support organizational learning
7. Active meta-governance
8. Favorable political and social context
9. Fit to problem-structure (Pattberg & Widerberg, 2016, p. 46).

Pattberg and Widerberg (2016) further pointed out that while bottom-up transnational partnerships are perceived as having potential, findings do not support this. Their recommendation is a mapping of the governance architecture within a social and political context to better understand the challenges and opportunities that exist for partnerships to ensure more tailor-made solutions. Beisheim and Simon (2016) recommended that Member States devote a paragraph of their Ministerial Declaration of the High-Level Political Forum (HLPF) to address MSPs and how they are governed at the United Nations. They suggested that the United Nations General Assembly, or the UN Secretariat further develop and amend principles and guidelines for MSPs. Political guidance and negotiated declaration at the highest level could also be given on the contributions of MSPs by heads of state and other government entities who meet every four years to reflect on the implementation of the 2030 Agenda.

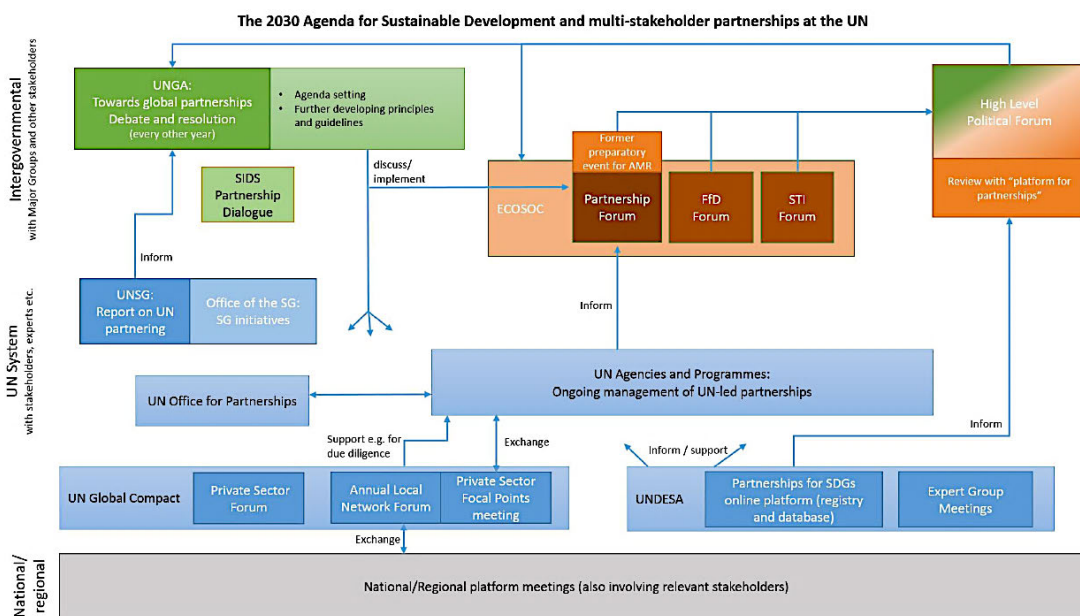
### **United Nations System**

The United Nations is a complex bureaucratic institution of 31 agencies which requires a leadership that is interactive, has a multilevel approach, is process-oriented, and agentic (Uhl-Bien & Marion, 2009) to make it fit for the purpose to achieve the 2030 Agenda. The current Secretary-General, Antonio Guterres, is undertaking a long-overdue reform of the entire UN System to better ensure the success of the SDGs. Some of the actors in the partnership space most relevant to the Agenda are: The United Nations Office of Partnerships, the United Nations Development Programme (UNDP), Member States, businesses, and, financial institutions and civil society. Financial institutions have included, the World Bank, the International Monetary Fund (IMF), regional banks such as the Asian Development Bank, the African Development Bank, European Development Bank, InterAmerican Development Bank, Caribbean Development Bank, philanthropic organizations, academia, civil society organizations/community based



organizations, international non-governmental organizations (INGOs), volunteers and other nonstate actors. In the following discussion, I will highlight the key actors, which are shown, including their relationships, in Figure 2.1. This diagram provides what a decentralized architecture of MSPs can look like, one that could help Member States consider the improvement of accountability and transparency (Beisheim & Simon, 2016). In resolution A/RES/70/224, discussing global partnership, the United Nations (2015a) defined partnerships as,

voluntary and collaborative relationships between various parties, both public and non-public, in which all participants agree to work together to achieve a common purpose or undertake a specific task and, as mutually agreed, to share risks and responsibilities, resources and benefits. (p. 4)



*Figure 2.1.* Sustainable development and multi-stakeholder partnership at the United Nations. From “Multi-Stakeholder Partnerships for Implementing the 2030 Agenda: Improving Accountability and Transparency,” by M. Beisheim and N. Simon, 2016. Copyright 2016, Marianne Beisheim and Nils Simon. Used with permission.

*UNDP as an Integrator.* Development challenges are increasingly complex, requiring ever greater collaboration across sectors and partners to deliver impacts at scale and to utilize limited resources efficiently. The Secretary-General in his new strategic plan emphasizes that UNDP has a strong working relationship with the United Nations Population Fund (UNFPA), the United

Nations Children's Fund (UNICEF), and UN-Women is maintained. In addition, UNDP will also work with governments to strengthen the capacities of civil society organizations and to help countries create space and opportunities for civil society to effectively engage in sustainable development.

Partnerships undergird the whole 2030 Agenda and so the Secretary-General together with Member States, in making the UN System fit for purpose, moved to bring sweeping reform to UNDP, the development agency to assist countries put together an effective partnership able to deliver on the Agenda in an integrated way. To accomplish this UNDP needed to be an integrator and a key partner to bring the actors together who are central to the implementation of each country's national agenda.

*United Nations Development Programme—Key partner.* The United Nations Development Programme (2019) has explained that partnership is at the heart of everything they do and considers itself as the “partner of choice” (United Nations Secretary-General, 2017) in the UN System, a reputation gained by their long legacy of trust, and because the agency offers an almost universal presence made possible by its expertise, practical experience, and intellectual acumen across a wide range of development issues. The agency designs, funds and implements technical cooperation and capacity-building in developing and transitional countries. Because of the integral role of UNDP, it is the focus of the Secretary-General's reform of the UN Systems as it is key to the delivery of the 2030 Agenda in the 170 countries in which UNDP serves. UNDP also administers the United Nations Capital Development Fund (UNCDF) and United Nations Volunteer Programme, which are both important assets to the United Nations System. Approximately 25% or about \$5 billion of all contributions in the UN Development System, comes through its donor program and contributions and is managed by UNDP. Under the current

reforms, the UN pledges under UNDP to implement programmes together and differently. This includes continuing to support field offices in developing joint programmes, joint results groups, and joint workplans in support of country priorities. For financing, the UN has committed to the Addis Ababa Action Agenda of the Third International Conference on Financing for Development (United Nations Sustainable Development Goals Platform, n.d.) and within that context will work to leverage public finances, including official development assistance, and to support the adoption of policies to increase resource flows for the benefit of partner countries.

A three-year strategic plan from 2018 to 2021 has been laid out by the Executive Board of the United Nations Development Programme (2017):

By 2021, we want UNDP to:

- (a) Strengthen its relevance as a trusted partner in a complex and evolving development landscape, strongly committed to its mandate to eradicate poverty;
- (b) Be more nimble, innovative, and enterprising—a thought leader that succeeds in taking and managing risks;
- (c) Be more effective and efficient in utilizing resources to deliver results.

By 2021, we want to catalyse tangible progress on:

- a Eradicating poverty in all its forms and dimensions and keeping out of poverty.
- b Accelerate structural transformation for sustainable development, especially through innovative solutions . . .
- (c) build resilience to crises and shocks to safeguard development gains. (p. 2)

The United Nations Secretary-General is positioning the agency to become an operational backbone. UNDP would have a widespread country presence that serve as an operational platform for United Nations agencies and other partners; other agencies of the UN System would utilize UNDP's implementation capacity, which includes information technology, finance, and human resources infrastructure to enable them to operate effectively and cost-efficiently in difficult and sometimes risky operational contexts.

## Major Actors in Partnerships for Agenda 2030

In conjunction with the UN's own agencies, the key sectors engaged in the partnerships needed for implementing the Agenda are civil society, business, academia, and financial and philanthropic institutions. The following sections outline these sectors and their roles.

**Civil society.** At the founding of the United Nations in 1946, and written into the United Nations Charter, civil society was designated as the third sector of society, along with government and business. This third sector comprises civil society organizations and non-governmental organizations. Recognizing the importance of civil society organizations as partners to help support its work and advance its ideals, the United Nations has strengthened its involvement through the accreditation process. Through ECOSOC, civil society organizations are able to formally engage with the United Nations to advance the mission of the organization.

There are three levels of accreditation, namely, *General Consultative Status*, *Special Consultative Status*, and *Roster*, with each having lesser to greater privileges in their engagement with the United Nations in giving input to decisions (United Nations Economic and Social Council, 1996). These designations are distributed equally geographically to ensure there is fair representation in each region of the world.

Rahim (2003) explained that the category *civil society*, though disputed by the actors so designated, are “far from homogenous and include NGOs, charitable foundations, faith-based organizations, trade unions, academic institutions and other special interest groups” (p. 9). The size and influence of this third sector has been increasing steadily. The 2030 Agenda for Sustainable Development makes a great demand on civil society organizations which are seen as the people on the ground closest to the citizens who are to be served. A critical aspect of the 2030 Agenda delivery is citizen engagement and, to this end, national civil society, international

organizations, and community-based organizations, including faith-based organizations, are expected to be the eyes and ears of the national and international communities on the needs to be addressed. Rahim cited various international studies showing that the economic contributions and development aid made by civil society is significant and, together with the increasing vocal advocacy for social issues that are made easier by information technology to serve the marginalized, civil society is vital to the mission of Member States and the United Nations.

In defining civil society, Otto (1996) referred to the networks, movements, and organizations of nonprofit interest groups, which form to assert interests, identities, or causes outside state-based and controlled political institutions. She argued that NGOs have their foundations in the “new social movements” (p. 112), meaning organizations that aim to represent values and aspirations associated with peoples, rather than with states. These values also include the promotion of human rights, gender and race equality, environmental protection, sustainable development, indigenous rights, nonviolent conflict resolution, participatory democracy, social diversity, and social and economic justice.

In February 1993, the United Nations Economic and Social Council (ECOSOC) established an open-ended working group (OEWG) to update, if necessary, its arrangements for consultation with nongovernment organizations (NGOs) and to introduce coherent rules to regulate the participation of NGOs in international conferences organized by the United Nations (UN). (Otto, 1996, p. 107)

Haywood, Funke, Audouin, Musvota, and Nahman (2018), discussing the role of civil society organizations in South Africa, provided helpful information on how governments can engage with CSOs more effectively. Haywood et al. explained how the CSO Working Group met in September of 2017 to discuss and define a roadmap for CSO participation in the implementation of the SDGs in the country. In this process, CSOs with a clear SDG focus and expertise could better coordinate and mobilize toward the advocacy and implementation of the SDGs. In this respect, when the partnerships between CSOs and governments are weak, this

presents challenges to governments in SDG implementation. A point made by Zapatrina (2016) is the need for civil society organizations in-country to be part of a public-private and SDG partnership to provide an environment conducive to working in each country as too many projects are done in less than friendly circumstances. To this end, Zapatrina suggested that comprehensive communication strategies should be an obligatory part of PPPs-for-SDGs structures.

Writing of the intersection of NGOs and business, Tolentino (2012) applauded the major role of NGOs in environmental governance. The author pointed out that NGOs were the first to bring attention to the environmental risks caused by the consequences of the growing intensity of human activities particularly in the area of industrial growth. NGOs have the power and capability to “initiate action as supporters, advisers, sources of expert input and catalysts for change” (Tolentino, 2012, p. 45). Some NGOs have focused on the need to save the environment from the clutches of the corporate sector, while others ask how to help save business from the consequences of neglect of the environment. Boström and Hallström (2010) saw the need for a counter-power in the global arena between the state and global business and felt NGOs might be playing that role. This is acknowledged by a number of environmental and social NGOs who are helping to set better regulatory standards for more responsible global business.

**Business.** The advent of the 2030 Agenda has changed the relationship of the United Nations with the international business community significantly. Businesses that support corporate social responsibility and want to make the world a better place are now working with the UN to achieve this objective recognizing that this is not only good for the planet but good for business. Businesses and individuals can work with the UN System and within guidelines outlined by the United Nations Global Compact (n.d.) a lead agency and initiative through which these

activities occur. Businesses that join in this initiative must abide by 10 universal principles under four categories:

*Human rights:*

Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and

Principle 2: Make sure that they are not complicit in human rights abuses.

*Labour:*

Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.

Principle 4: The elimination of all forms of forced and compulsory labour.

Principle 5: The effective abolition of child labour.

Principle 6: The elimination of discrimination in respect of employment and occupation.

*Environment:*

Principle 7: Businesses should support a precautionary approach to environmental challenges.

Principle 8: Undertake initiatives to promote greater environmental responsibility; and

Principle 9: Encourage the development and diffusion of environmentally friendly technologies.

*Anti-Corruption:*

Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery (United Nations Global Compact, n.d., pp. 4–13)

The UN Global Compact was launched in 2000 and is considered the largest corporate sustainability initiative in the world, with over 8,000 companies and 4,000 nonbusiness

signatories based in 160 countries. The UN Global Marketplace (UNGM) allows companies and individuals interested in doing business with the UN System of organizations to engage, and those interested, can register at the site. With a global market of over \$15 billion (U.S.) annually for all types of products and services, the United Nations represents a very attractive place to do business and brings together UN procurement staff and the vendor community (United Nations, n.d.)

**Academia.** El-Jardali, Ataya, and Fadlallah (2018) made an accurate assessment that the 17 SDGs and their 169 targets are interconnected, and they intersect with all sectors of the government. This requires mindful coordination across all the sectors and actors. They also pointed out that it is clear that governments alone will not be able to successfully achieve the agenda while recognizing that the government is required to coordinate and steer the implementation. They further stated that decisions on policy to meet the SDGs should be informed by “policy-relevant evidence, co-designed and co-produced with the relevant stakeholders while taking into consideration local and political context” (El-Jardali et al., 2018, p. 1). They asserted that universities are uniquely positioned to lead this cross-sectoral implementation of the SDGs and provide an essential source of expertise in research and education on all sectors of the SDGs. Universities, they argued, bring a level of neutrality to the conversation which is needed and at the same time can be influential.

The following initiatives, relevant to business, are supported by the United Nations: Higher Education Sustainability Initiative, Principles of Responsible Management Education Initiative, and the Sustainable Development Solutions Network (SDSN) have encouraged some universities to engage with the SDGs and are coming on board. El-Jardali et al. (2018) pointed out that a recent United Nations report showed that the rate of progress on many SDGs is much slower than needed to meet the targets by 2030; and so, a question arising from this finding is:



how can universities especially those in low and middle-income countries, assume a more proactive role in the process? El-Jardali et al. recommended that universities who have the capacity and capability can “map, track and systematically document efforts to link research to policy and practice. They can develop relevant measuring, evaluation and reporting metrics to the indicators, which are crucial to progress toward 2030” (p. 4).

Haywood et al. (2018) added that at a broad level, the scientific and academic communities contribute to the SDGs through training, skills development, research, development and innovation; these are explicit needs under SDGs 9:4 and 9:5 which focus on clean and environmentally sound technologies, enhancing of scientific research, upgrade of technological capabilities of industrial sector, research and development, technology development, and research and innovation, especially in developing countries. Schäferhoff, Campe, and Kaan (2009), looking at MSPs from an academic perspective, saw them “as institutionalized interactions between public and private actors, which aim at the provision of collective goods” (p. 451). This definition excludes cooperatives, though the authors indicated that these can also play a role in the implementation of the 2030 Agenda.

Meza Rios et al. (2018) pointed out the importance of high school age students’ involvement to development and sustainability and asserts that the documentation gives evidence that “education provides a robust and durable foundation for journeying toward more sustainable communities, whether at the local, regional, national or global level” (p. 740). They said that to increase the probability that students of all ages will become, to some extent, agents of change, other types of knowledge are also critical. Referencing Frisk and Larson (2011), they concurred that effectiveness includes four types knowledge:

- declarative knowledge—how sustainability works,

- procedural knowledge—how to take action,
- effectiveness—how perceptions and beliefs affect actions, and
- social—how social norms affect actions.

These four types of knowledge and competencies can be created to achieve the SDGs.

Consistent with Sipos, Battisti, and Grimm (2008), Meza Rios et al. (2018) stressed the concept of using different types of learning and suggested that the balance of cognitive (head), psychomotor (hands), and affective (heart) makes for the whole person learning needed to realize truly transformative and sustainable education. They added that the literature agrees that these competencies are best acquired in a context that incorporates some form of experiential learning.

From the perspective of a developed country, there is a continuum of change in understanding that moves from an initial stance of indifference or ignorance through pity and charity to a partnership and development among equals; Buchanan and Varadharajan (2018) referred to this as a “tripartite continuum response model” (p. 2). They asserted that this research has important implications for global development education in developed nations. They reported on some of the challenges and obstacles that need to be addressed in order to enhance preservice teachers’ understandings of global development education. Their hope in advancing this framework was to help teachers and their students from an elite class in developed countries, progress toward an orientation that embraces, both ideologically and practically equal partnerships with people in developing nations.

**Financial and philanthropic institutions.** The World Bank Group<sup>2</sup> is arguably the foremost global financial institution and enjoys a unique position in the United Nations partnership sphere. It is a financial institution that has its own mandate, governance structure, and operational independence. The history of the United Nations and the World Bank dates back to the mid-1940s with the Bank's inception slightly preceding the UN's. There was an agreement between the two institutions making the World Bank a specialized agency of the United Nations, while at the same time recognizing it as an independent international entity. In fact, this unique relationship began with Articles of Agreement of the World Bank which were adopted even before the Charter of the United Nations was adopted at the Bretton Woods Conference in July 1944, even before the Charter of the United Nations was adopted a year later at the San Francisco Conference in June 1945. This relationship between the World Bank and the United Nations is governed by the agreement which entered into force by the two organizations in 1947. In fact, this unique relationship began with Articles of Agreement of the World Bank which were adopted even before the Charter of the United Nations was adopted at the Bretton Woods Conference in July 1944, and before the Charter of the United Nations was adopted a year later at the San Francisco Conference in June 1945. This relationship between the World Bank and the United Nations is governed by the agreement which entered into force by the two organizations in 1947.

The World Bank Group holds Observer Status at the United Nations making it able to participate in the General Assembly, the Security Council, and ECOSOC; however, it cannot

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<sup>2</sup> The World Bank Group is composed of five organizations that share a mandate to make loans and other forms of financial help to developing countries (including LDCs). These are: The International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA), and the International Centre for Settlement of Investment Disputes (ICSID). The World Bank proper is comprised of the first two of these (World Bank, n.d.).

vote. The World Bank Group and the United Nations have worked together in almost every region of the world and in many sectors including health; education; agriculture; climate change. The organizations also work with heads of institutions to staff on the ground, in a unique partnership around the shared goal of eradicating poverty and promoting a free world and a better future for everyone. The United Nations and the World Bank work together through intergovernmental, interagency, and country-level relationships. Hernandez (2017) saw a rising competition with the World Bank for development aid globally. This was based on looking at data on the impact of aid for the period of 1983–2012 almost exclusively in African countries. Hernandez compared the perception of financial support from donor countries outside the Development Assistance Committee (DAC) of the OECD, compared to the World Bank. The latter appeared to be providing an alternative of last resort for developing countries.

Aghumian and Gaarder (2017), speaking on behalf of the World Bank Group, emphasized the importance of partnerships and referred to an African proverb, “If you want to go quick, go alone; if you want to go far, go together.” They added, “What if we need to go far—quickly? . . . how can the World Bank Group go both far and quickly by working with its key partners? (p. 1). The enormity and complexity of the new 2030 Agenda for Sustainable Development, as crises become more complex and multidimensional, present a new challenge to financial institutions and UN agencies which can only be solved through collaboration. Aghumian and Gaarder further pointed to the following areas of collaboration to make the partnership with the World Bank and the United Nations more agile:

- “Start with a clear division of labor” (p. 8)—They cited the contentious relationship of the World Bank with UNDP due, in part, to overlap in their mandates

- “Strengthen common understanding through high-level dialogue” (p. 9)—They gave the example that regular strategic consultations between the World Bank Group President and the UN High Commission on Human Rights to establish better understanding of the priorities to guide joint policy, analytic and operational work in the future, is needed.
- Leverage staff experience and good relations with partner institutions” (p. 9)—There is a need for better facilitation in operational policies, institutional incentives, better communication, and staff exchange.

Denizer, Kaufmann, and Kraay (2013), aiming to better understand macro and micro correlates of aid-financed development project outcomes, used data from over 6000 World Bank projects between 1983 and 2011, to measure quality of outcomes within and between countries. The authors felt that measures of World Bank project manager quality also matter significantly for the ultimate project outcomes in terms of donor policies and aid effectiveness. They found that getting feedback on projects and restructuring them lead to better outcomes and that the complexity of a project is not necessarily a hindrance to its successful outcome. Also, Denizer et al. concluded that better returns could be realized if team leader characteristics are taken into account when making aid allocation decisions.

*National development banks.* The Addis Ababa Action Agenda (AAAA) of the Third International Conference on Financing for Development which was conducted in tandem with the development of the 2030 Agenda is the financially negotiated outcome to support the implementation of the SDGs with many actors in the financial and funding space playing a role. The paragraph preamble of the document states:

We, the Heads of State and Government and High Representatives, gathered in Addis Ababa from 13 to 16 July 2015, affirm our strong political commitment to address the

challenge of financing and creating an enabling environment at all levels for sustainable development in the spirit of global partnership and solidarity (United Nations Sustainable Development Goals Platform, n.d., para. 1)

The role of national development banks (NDBs) in achieving the 2030 Agenda to ensure sustainable infrastructure development is very significant especially given that this new agenda seeks to radically transform the way people live on the planet in terms of their quality of life. Studart and Gallagher (2016) claimed that NDBs have been greatly overlooked in favor of multi-lateral development banks (MDBs) but feel that NDBs are increasingly being depended upon to assist with infrastructure financing in the new century. Studart and Gallagher added that 250 national development banks hold assets of over \$5 USD trillion, which is considerably more than the \$1.5 trillion held by MDBs making them well positioned to take the lead in moving sustainable infrastructure in support of the SDG implementation. Studart and Gallagher compiled the regional distribution of the numbers of NDBs in the world (Figure 2.2).



*Figure 2.2.* Regional numbers of national development banks. From “Infrastructure for Sustainable Development: The Role of National Development Banks,” by R. Studart and K. Gallagher, (2016), p. 4. Copyright 2016 by Kevin Gallagher. Used with permission.

Bhattacharya, Oppenheim, and Stern (2015) asserted, “Better infrastructure is transformational for development, climate and the economy, and there is a path forward’ (p. 25). They argued for a progressive increase in investment in infrastructure needed over the next 12

years to support growth, structural transformation, and the broad achievement of the SDGs. They felt that one of the challenges is not just to produce more infrastructure but better infrastructure and that that is needed to meet growth and development goals and also respect planetary boundaries. They suggested that an increase of 1 to 1.5 trillion dollars in private sector and public funding will be needed.

Boston University's Global Economic Governance Initiative (GEGI) and the Brookings Institution's Global Economy and Development convened a Task Force on Development Banks and Sustainable Development to "examine the extent to which development banks are becoming catalysts for achieving a climate friendly and more socially inclusive world economy" (Studart & Gallagher, 2016, p. 1). This gathering concluded:

- "National development banks are overlooked but essential players" (Studart & Gallagher, 2016, p. 1). They discovered that with over 250 national development banks holding assets of at least \$5 trillion (U.S.), NDBs dwarf the western-backed multilateral development banks in scale, scope, and roots in local political economies.
- "Infrastructure is largely not a priority for the majority of NDBs" (Studart & Gallagher, 2016, p. 1). At best sustainable infrastructure is an afterthought. They argue that while no NDB emerges as a model sustainable infrastructure bank, with NDBs and MDBs working together, there are a number of important projects and programs that can be shared and scaled up in joint efforts.
- "NDBs are poised for a leadership role" (Studart & Gallagher, 2016, p. 1). Given that NDBs are in the same geographic areas where these projects exist, they are in a great position to play a leadership role in both promoting and expanding sustainable infrastructure at the national and global levels, through the International Development

Finance Club, which is a group of individual development banks who operate both individually and also as a cooperative association. Some NDBs have already begun to do so.

- “Prioritization from governments of sustainable infrastructure in their development strategies” (Studart & Gallagher, 2016, p. 2). Development banks, again because of their location can act quickly and with focus to policy directives at the national and subnational levels from governments as policy instruments.
- “To create platforms for blending instruments and co-financing” (Studart & Gallagher, 2016, p. 2). Studart and Gallagher saw NDBs as possible brokers and as go-betweens with parties such as climate funds, guarantee funds, official development assistance providers, MDBs, and private sector actors at the local and global levels given their ability to blend instruments at the project level.
- “To help develop, strengthen, and scale up sustainable infrastructure projects” (Studart & Gallagher, 2016, p. 2).

The Task Force felt that NDBs can identify gaps for infrastructure and incorporate sustainability criteria and in order to attract private capital; they work with government to establish legal, regulatory and institutional frameworks, and to create new instruments and securities markets adaptable to country circumstances and for broad acceptability and distribution of the benefits of projects. NDBs were also seen as being able to engage with the broader regional and international development finance community. The opportunity exists for the International Development Finance Club (IDFC)—and the World Federation of Development Finance Institutions (and its regional associations) to be assisted by NDBs to set mutually accepted goals, share best practices, measure and monitor progress; especially given the urgency to move from



billions to trillions for implementation that is socially, economically and environmentally sustainable.

In the area of funding and transparency, Adams and Martens (2015) referred to the repeated highlighting of these issues in UN resolutions A/RES/68/234 and A/RES/70/224 toward global partnerships in which both resolutions state the need for disclosure of partners, and the contributions and matching funds for all relevant partnerships, including at the country level. This is of concern to civil society representatives also who express concern and have called for development, disclosure, and description of financial arrangements for each partner in the partnership. A realistic financial arrangement should be established to allow legitimate civil society organizations to participate in the partnership process to achieve the objectives of the 2030 Agenda at the ground level where citizens live and work. This is the place where the SDGs will succeed or fail.

***Philanthropic organizations.*** With an “all-hands-on-deck” approach, Member States, civil society, business, and academia have joined forces to deliver on an agenda that has the potential to eradicate poverty and create the “Future We Want.” Realizing the ability of philanthropic organizations to make a significant contribution to this effort, they were brought on board to work with the United Nations in a more focused way. It has been determined that “to end poverty, protect the planet, and ensure prosperity for all, the global community agreed on 17 Sustainable Development Goals . . . to be achieved by 2030” a funding gap of some \$2.5 trillion must be urgently addressed.

To assist in filling this gap and to scale impact, the SDG Philanthropy Platform (n.d.) was established to partner with foundations to align their work to the SDGs and to collaborate with others like-minded organizations. The SDG Philanthropy Platform (SDGPP) is an online

collaboration platform led by UNDP, the Rockefeller Philanthropy Advisors, and is supported by the Conrad N. Hilton Foundation, Ford Foundation, Brach Family Charitable Foundation, and UN Foundation. It is a global and national facilitator that helps to optimize resources and efforts to achieve the SDGs. It does so by enabling effective collaboration with the broader ecosystem of funders. SDGPP provides access to information on what partners are doing, real-time data on relevant SDGs, and events and solutions that funders and others are supporting (SDG Philanthropy Platform, n.d.).

### **Technology as Enabler of Implementation**

Imaz and Sheinbaum (2017) asserted that the most important objective in the 2030 Agenda document is technology transfer, which presents a narrow vision and a limiting role to the science of sustainability. They further stated that if technology transfer is not recognized, the SDGs will continue to have only marginal success. In this respect, I now look at facilitations of technology by the UN to address these issues.

**The UN technology facilitation mechanism.** When the 2030 Agenda was adopted at the United Nations Sustainable Development Summit in September 2015, Science, Technology, and Innovation (STI) was positioned as a key means of implementation of the SDGs, and it was in this regard that the UN Technology Facilitation Mechanism (TFM) was launched. The primary fora to discuss topics about TFM that are of common interest among Member States and STI stakeholders in the context of the 2030 Agenda, has been the Annual Multi-Stakeholder Forum for STI. This is supported by the Inter-Agency Task Team on Science, Technology, and Innovation for the SDGs (IATT). At the Third Annual STI Forum in 2018, the action-oriented outcomes included the establishment of a work-stream dedicated to supporting discussions and initiatives on STI Roadmaps. The objective of the work-stream was to outline an intersessional work program

to inform and enrich STI Forum discussions on STI Roadmaps, focusing on tangible impacts to be achieved over the next 12 months. The primary focus was to shape consensus on common guidance, principles, and possible frameworks/methodologies for country-level STI Roadmaps.

The second priority established at the 2018 forum was initiating discussions on possible elements of a global initiative or international assistance mechanisms to facilitate the development of such roadmaps. To accomplish these outcomes, the workstream would support a collective effort by a group of volunteering countries and would also facilitate a multi-stakeholder collaborative approach among the Inter-Agency Task Force, other UN agencies, non-UN partners, and stakeholders. One of the notable deliverables of the roadmap workstream that IATT made to the STI Forum in 2018 was an online information repository platform. It was created by compiling and making available a selection of STI or STI-related roadmaps from organizations and agencies both within the UN system and beyond. The purpose of this platform was to facilitate efficient and effective access to, and, exchange of information among stakeholders on the most current work being done by each organization in support of the development of STI roadmaps for SDGs. In this context, the platform will become an online resource portal on the state of STI policy-setting frameworks and will contribute to enhancing the capacity of Member States in integrating STI in development processes. Another outcome of the meeting was the proposition of the United Nations Inter-Agency Task Team to establish the Global Pilot Programme on Science, Technology, and Innovation Roadmaps for the SDGs. A call to action was issued to countries to volunteer to have such a pilot conducted on the basis of the guidelines outlined in the TFM roadmap.

**United Nations Global Geospatial Information Management.** In 2011, ECOSOC established the United Nations Committee of Experts on Global Geospatial Information

Management (UN-GGIM) as the first intergovernmental body to set the global agenda on the use and management of geospatial information. It coordinates among countries and international organizations and other stakeholders, and develops strategies to build geospatial capacities of nations, especially in developing countries (UNDESA Statistics Division, n.d.). In 2017, the United Nations and the World Bank agreed to collaborate on a joint vision to promote growth and prosperity through creating and strengthening geospatial information capacity and development (United Nations Committee of Experts on Global Geospatial Information Management, 2018). The objective of the collaboration was to develop an Integrated Geospatial Information Framework that countries can use to develop and enhance their own geospatial information management. To this end, an Integrated Geospatial Information Framework (n.d.) was developed consisting of three parts: *An Overarching Strategic Framework*; an *Implementation Guide*; and, the *Country-level Action Plans*.

The Overarching Strategic Framework is intended to give high-level policy and decision makers, institutions, and organizations within and across governments a framework within which to work to develop a national plan that would integrate existing development plans with the SDGs in alignment with the mission and vision of each country and according to their needs, priorities, and circumstances. The framework consists of seven underpinning principles, eight goals, and nine strategic pathways to be used to create a national approach. The principles are as follows: transparency and accountability; information accessibility and ease of use; strategic enablement; collaboration and cooperation; an integrative solution; sustainable and valued and are consistent with the direction given for “how” the agenda is to be implemented, one of collaboration in partnership, sustainable and integrated in delivery.

The Implementation Guide's eight goals are as follows: effective geospatial information management; leveraging of international cooperation and partnerships; increased capacity, capability and knowledge transfer; sustained education and training programs; integrated geospatial information systems and services; economic return on investment; enhanced stakeholder engagement and communication; enriched societal value and benefits. The goal of this guide is to provide guidance for governments to establish holistic nationally integrated geospatial information frameworks in countries in such a way that transformational change is "enabled, visible and sustainable" (United Nations Committee of Experts on Global Geospatial Information Management, 2018, p. 4).

The Implementation Guide's nine strategic pathways provide the "how, when and who?" (the subtitle of the document, *Country-level Action Plans*) and are intended to assist countries prepare and implement their own country-level action plans while taking into consideration national circumstances and priorities. The country-level action plans are to include elements such as the economic impact and value of geospatial information systems, identification of investment needs, priorities, analysis of socio-economic benefits and potential funding sources. According to United Nations Committee of Experts on Global Geospatial Information Management (2018), the plans are to have the following components:

- *Governance and institutions*: Establishes the leadership, governance model, institutional arrangements, and a clear value proposition; it includes commitment to achieving an Integrated Geospatial Information Framework (p. 7).
- *Policy and legal*: Establishes framework to institute appropriate national geospatial information legislation and policy (p. 19).

- *Financial*: Aims to help countries see the benefits of investment, business models, financial partnerships and opportunities realized (p. 20).
- *Data*: Aims at data curation and delivery and data supply chain interlinkages in which custodianship, acquisition, management, and fundamental geospatial data themes are emphasized (p. 21).
- *Innovation*: Helps to bridge the digital divide and promote innovation and creativity through innovation, improvement of process, technology, and technological advancement as possible.
- *Standards*: Aims to create technical, semantic, data and legal interoperability and establish best practices standards (p. 23).
- *Partnerships*: Aims to strengthen international collaboration and community participation; also, industry partnerships, joint ventures, cross-sectoral and interdisciplinary corporations (p. 24).
- *Capacity and education*: Includes professional development, workplace training, entrepreneurship, formal education and the raising of awareness. Establishes long lasting capacity building programs and education systems (p. 25).
- *Communication and engagement*: Establishes monitoring and evaluation, planning and execution, integrated engagement strategies and stakeholder identification (p. 26).

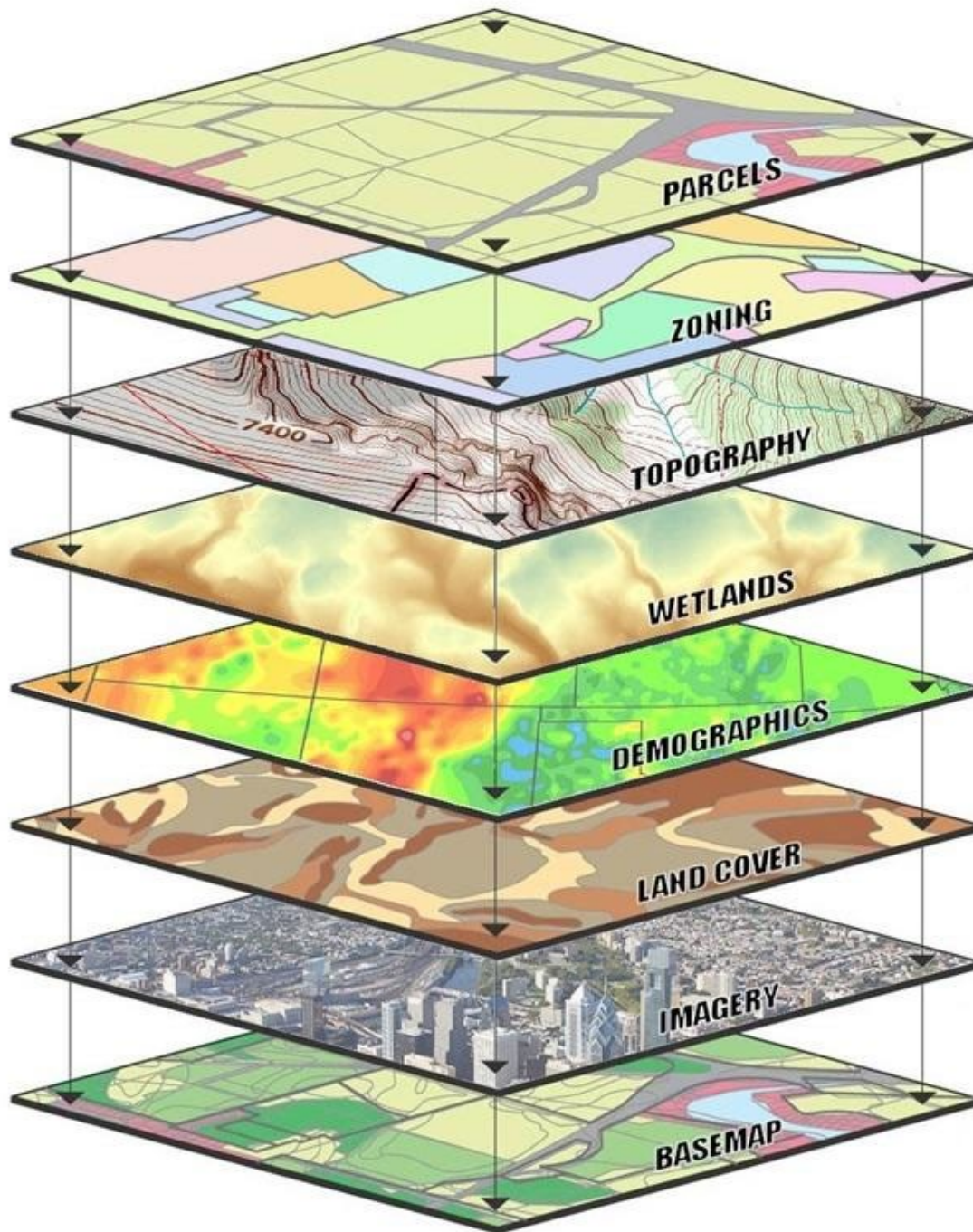
**Geospatial information, GeoDesign and related technologies for implementation.** An important aspect of the SDGs is that they are interlinked and, therefore, their implementation was designed in an integrated manner to ensure the success of the whole agenda. The idea was that if success is achieved in their implementation, the lives of everyone and the planet will be greatly improved socially, economically, and environmentally. A geographic information system (GIS) is

generally defined as a system that captures, stores, manipulates, analyzes, manages, and presents geographic or spatial data. GIS applications, on the other hand, are tools that allow users to create interactive questions, analyze spatial information, edit data in maps, and present the results of these queries.

**Participatory GIS.** Dunn (2007) explained public or participatory GIS (PGIS), stating that it explores aspects of the control and ownership of geographical information. Of importance also is the representation of local and indigenous knowledge and the ability to scale and scale up web-based approaches. Dunn further highlighted the fragile and transitory nature of PGIS to explore a world where conventional GIS has a stronger foothold. Dunn cited the need for development in information and communications technologies (ICTs) to bring geographical information into the public mainstream.

PGIS is an innovative approach increasingly being used by governments to support data collection and management operations and is being introduced for consideration, evaluation and adoption. Given that some governments lack the resources to collect the data required to support operations, some data sets reside in the private sector. Yet, citizens and all other parties need to work together to the mutual benefit of the sustainable development of the country; PGIS reduces the workload of governments while empowering citizens and communities. It promotes interactive participation of stakeholders integrating and managing spatial information and uses information about specific landscapes to facilitate broadly-based decision-making processes that support communication and community advocacy. McCall (2003), discussing the strengths and weaknesses of the utility of PGIS, stressed the implications for greater participation, empowerment, and ownership of and access to spatial information, and for governance in general because of ownership of the data. PGIS aligns very well with action research and participatory

action research as a methodology in empowering the citizens with whom the issues lie. Figure 2.3 illustrates the layer visualization approach commonly used in GIS.



*Figure 2.3.* Illustration of typical GIS data layers. From “GIS Data Layers Visualization,” by U.S. Geological Survey (2016). Public domain.



Geographic information systems or geographic information science (GIS) deal with boundaries—what is “in” and what is “out”; to be able to do this, the discussion itself must have some boundaries (Gold, 2006). Geospatial information science provides increased transparency and accountability for citizens. With the combination of the cloud (remote storage of data), sharing of data, maps, and pertinent information, GIS is allowing increased engagement with citizens. GIS can succinctly show many different kinds of trends in the community visually, enabling constructive and informed conversation for government ministries, citizens, and other stakeholders.

Social, economic, and environmental sustainability are the three pillars on which the 2030 Agenda (United Nations General Assembly, 2015a) is based, and geographic information science provides the capacity for the most appropriate response for its implementation. Given that groups are fundamental units underlying intra-organizational, organization-wide, and interorganizational activity in society, social behavioral studies on group use of GIS can help in understanding the social implications of GIS (Nyerges, Jankowski, & Drew, 2002). PGIS is, therefore, used when group communication technology is integrated with basic GIS capabilities, leading to an enhanced application of GIS. In some emergency conditions, focus groups may use GIS fed by field data to create community mapping which, despite the fact that its quality may not be high, has the advantage to be rapidly performed making it useful for an early response (Laaribi & Peters, 2019). The knowledge that citizens have of the area in which they live and any maps, however simple, they may have been created can become very helpful in emergency situations to visualize the area and inform decision making.

**GeoDesign.** GeoDesign is a method that brings geographic analysis into a collaborative process allowing governments, citizens, designers, planners, geographers, and civil engineers to

find and design resilient solutions to 21st century challenges like population growth, decreasing resources, disaster mitigation, climate change, and many more. Flaxman (2010) explained the workflow of GeoDesign as a design and planning method which tightly couples the creation of a design proposal with impact simulations informed by a geographic context. In an ideal case, he stated, a planner or designer receives real-time guidance on performance at every phase of design, from early site visit or conceptual sketch to final detail. The use of contextual geographic information means that design performance can be evaluated relative to local conditions, and that evaluation can and should consider off-site impacts. The focus is on supporting a ‘human in a loop’ kind of design, providing continuous feedback on multiple aspects of performances and producing “designs-in-progress rather than on a post-hoc evaluation” (Flaxman, 2010, p. 29).

GeoDesign is a technology that has emerged as an essential tool providing the perfect formula for a data-driven integrated and holistic approach to implementation of the 2030 Agenda as stated. The GeoDesign method consists of four elements: GIS, information technology; design technology and the people of the place (stakeholder engagement). This is sketched by Steinitz (2012) in Figure 2.4.



*Figure 2.4. Components of the GeoDesign method. From *A Framework for GeoDesign* by Carl Steinitz (2012), p. 4. Copyright 2012 by Carl Steinitz. Used with permission.*

The most effective method for collecting this data is with the use of the Global Navigation Satellite Systems (GNSS), chief among them being GPS, used with hand-held devices. With this technology, ordinary citizens are able to participate in the data collection and the research about their situated village or towns and conditions. More specifically, this technology assists in massive point-based data collection, at the individual level, ensuring that no one is left behind. GIS is uniquely designed to allow for the storage of extremely large and complex amounts of data as is needed for the 17 SDGs, 169 targets, and 232 indicators involved in the Agenda for 2030. GIS and GeoDesign are meant to be utilized by communities in the following ways:

1. Integrated into school curricula.
2. Develop government agencies' capacity.
3. Visualize the current landscape and future development plans.
4. Improve citizens' attitude toward future development.
5. Engage citizens in sustainable planning.
6. Enable timely reporting on local SDG indicators (Appendix E)

Flaxman (2010) argued that participatory GeoDesign allows for the involvement of all parties with a stake in the sustainable development and growth of an area. This ensures that everyone's voice is heard and that all have a hand in the design and construction of their future. The combination of expertise and voices involved in GeoDesign also ensures a holistic process. The four essential categories of GeoDesign are: information technologies—GIS, 3D and 2D design programs; geographic information sciences (geology, hydrology, etc.); design professionals (architects, urban planners, and designers) and the people of the place including local citizens, in collaboration with governments, the UN, business, academia, and philanthropic organizations.

Wilson (2011) emphasized that data is central to geographical technologies and provide the pathways in which geographic investigations are brought forward. Wilson discussed the importance of the mattering of data; He explains *mattering* as data products that result from specific practices, adding that there is an affective aspect of data which is imaginative, generative, and evocative. Batty (2013) explained what GeoDesign is not: namely, a return to the old ways of overlay mapping, but instead is a way of combining, using, and adapting the tools of geospatial science to very different contexts. At the heart of GeoDesign lies participation in the process and an understanding of the science of the geography which is both a prelude as well as an afterword to design. At the same time, design is regarded as a constant and continuing process of reaching out for solutions and useful responses to urgent problems. Figure 2.5 shows Steinitz's (2012) schematic of model development and the roles of stakeholders in GeoDesign.

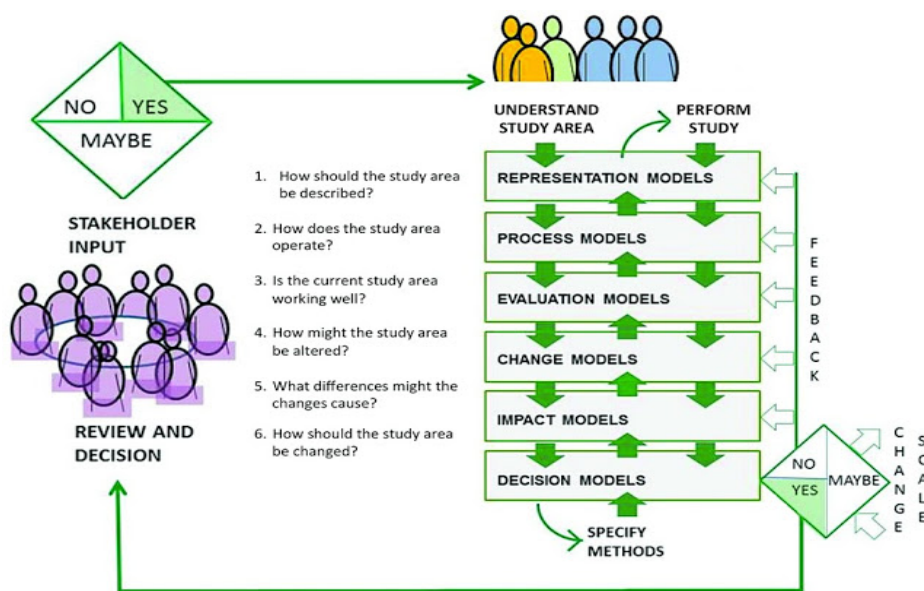


Figure 2.5. GeoDesign framework of development of models and roles. From *A Framework for GeoDesign* by Carl Steinitz (2012), p. 25. Copyright 2012 by Carl Steinitz. Used with permission.

According to Steinitz (2012), the GIS and GeoDesign application in the change process addresses the following questions by first looking at the world as it is:

- How can we describe geography and as it relates to data inventory?
- How does geography work?—addressed by developing process models.
- How can we alter geography?—answered by developing capacity sustainability models.
- What are the alternative scenarios?—which relates to the world as it could be and addressed by the creation of designs and sketches.
- What are the consequences of change?—the evaluation and analysis.
- How should geography be changed?—looking at decisions and values of the community.

Figure 2.6 illustrates this six-step process.

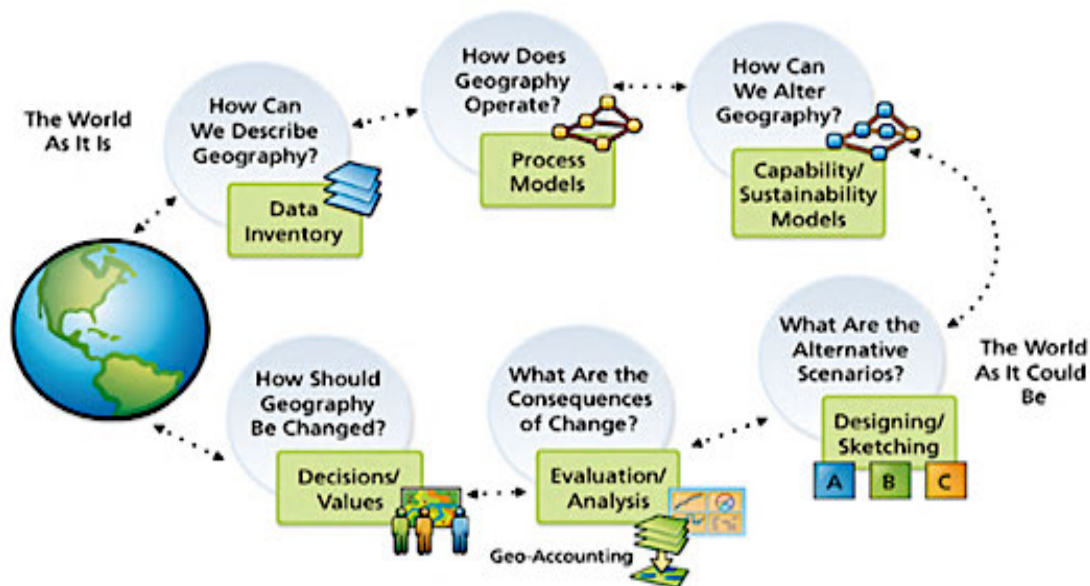


Figure 2.6. GeoDesign workflow. Copyright 2009 by Environmental Systems Research Institute (ESRI), 2009. Used with permission.

Wilson (2015) described GeoDesign as both matter and meaning, both material and discursive. He explained that to practice GeoDesign is to draw upon both of these forces, which would be the concretization of both ideas and effects. Thus, GeoDesign is part of a broader

techno-scientific endeavor that draws together investment with development and fashions a problem space while in the process of providing specific solutions.

According to the Outcome Document from the Science, Technology, and Innovation (STI) Forum held in Brussels in 2018,

Innovative, market-ready integrated technological solutions that can substantially contribute to the achievement of the SDGs already exist. These technologies are not sufficiently deployed on a global scale because policy and decision makers are unaware of their existence or their potential to contribute to achieving the SDGs or lack the political will to implement them. (G-STIC, as cited in Dodds, 2018, para. 9)

In this regard, a next step for The Institute for Conscious Global Change (ICGC) is to help countries become more aware of the development planning tools that can be used to achieve integrated planning for development with scale built into the system—planning that is a combination of top-down and bottom-up approaches and along the lines shown in Figure 2.7, which shows the multisequential process of planning. The elements of the process can be decoupled and decentralized to support the development of a country by progressively scaling up implementation from the local to the national levels (Black & Franklin, 2011).



*Figure 2.7.* Multiscalar GeoDesign. By Gregory LeMaire of ICGC. Copyright 2017 by Institute for Conscious Global Change (ICGC). Used with permission.

### Summary of Literature Review

The literature review brought together the intersections of geospatial information and what could be effective partnerships for implementation of the 2030 Agenda for Sustainable

Development. Given that the global agenda is relatively new, it was good to see the number of peer-reviewed articles available to support partnerships, which is the underpinning for success in implementation of the Agenda. A sufficient number of articles existed in multi-stakeholder partnerships which, for purposes here, comprise Member States, the United Nations—especially UNDP—civil society, business, academia, financial institutions. This group includes regional and national banks together with the World Bank, who all contribute in different way to achieve knowledge transfer, technology transfer, capacity building, financing, trade and working together to share resources and expertise. Because of the new-ness and complexity of the Agenda, this research initiative has the potential to add much needed information to implementation of the 2030 Agenda. Given how recently these fields arose, I was pleasantly surprised to find the amount of literature on participatory geographic information systems and participatory GeoDesign. Engaging with citizens in the use of these technologies is gaining support and is a welcomed advance. This is timely as it provides the ideal opportunity for technology transfer that can ensure sustainability and eradicate poverty through ownership and use of data for concrete and conscious development of communities. GeoDesign as a participatory method is uniquely suited to fulfill the mandate of the global agenda to facilitate multiscale development planning. Foster (2014) describes GeoDesign as the third wave of geographic information systems (GIS), with geography and data being the first two.

### **Chapter III: Methodology**

The research study was global in scope and was conducted in a community setting which is an informal settlement, Manyatta, in the Port City of Kisumu in Western Kenya. The intention was to explore how geospatial information technology with special focus on GeoDesign together with an effective partnership framework could be helpful in the 2030 Agenda implementation. The initial phase of the research effort was to construct a partnership team of individuals from all the relevant stakeholder groups of government, the UN System, civil society, business, and academia. Phase 1 of the research study involved a meeting with the partnership teams located in both Nairobi and Kisumu City, which is home to the Manyatta informal settlement. The aim was to get their input into the best way to proceed in assessing, collecting data, and engaging with the citizens in Phase 2. Phase 2 involved meeting with the participants of Manyatta with the assistance of a research associate who is a member of the community and who had worked extensively with them. The data collection effort included a 500 household (HH) survey, key informant interviews (KII), a focus group discussion (FGD), and a participatory action research (PAR)/situational analysis/GeoDesign group discussion. In addition, the qualitative participatory approach, problem tree analysis, and stakeholder analysis were used to extract more detailed information from the residents and leaders of the community to accomplish the GeoDesign.

The research design of the study was qualitative multimethod (Collier & Elman, 2008) and aimed at helping an informal settlement, Manyatta, in Kisumu City, Kenya create a community that reflects their needs and aspirations. Specifically, this multimethod study utilized primarily qualitative methods with the inclusion of descriptive statistics from a brief survey in the action research deliberation. This research design was determined by the unique nature of the many elements and actors to be studied and engaged, respectively. A qualitative design looks at



the issues to be studied through a theoretical lens (Creswell & Creswell, 2018) which orients the study in terms of questions of race, class, gender, power, and other issues marginalized groups face. It requires the researcher to become clear to participating groups and communities, about his or her positionality as it relates to culture, history, and personal bias and particularly as it relates to the participating community. Seth (2015) speaking to global partnerships says:

The new partnership for development established to tackle the problems of our contemporary world calls for many shifts. It requires a shift from North-South interaction to universal actions, a shift from creating a new policy framework to implementing the agreements to be reached in 2015, a shift toward stronger monitoring and review, and a shift toward trust and mutual benefits. (p. 42)

The 2030 Agenda has been described as among the most transformative actions in the history of the United Nations (United Nations General Assembly, 2015b). It is also very complex. An important mandate of the delivery of the Agenda is that it should be country-led, the citizens should be engaged, capacity should be built and there should be technology and knowledge and transfer to those from the Global North to the Global South.

The qualitative multimethod design was decided upon given that the aim is to interpret and to co-construct the meaning the participants attribute to their experiences as citizens of the landscape of Manyatta, Kisumu. Participatory action research was ideal in uncovering the current issues in the settlement that have been a deterrent to the social, economic and environmental viability of the community. The uniqueness of the settlement provided the insights needed to plan the future considering the 17 sustainable development goals with their 169 targets using situational analysis. The mapping the positions of the voices of the community and especially those that have been historically left behind were brought out in the PAR, problem tree analysis, and stakeholder analysis discussions. These discussions allowed for the exploration and answering of the following research questions:

- How may geospatially enabled multisector partnerships facilitate the 2030 Agenda implementation in the broadest sense?
- How may the GeoDesign method be used to support a participatory action research approach in the SDG agenda implementation?
- What role may participatory action research play in implementing geospatial information facilitated partnerships for sustainable development through citizen engagement?
- In the informal settlement of Manyatta, what are the macro level financial, economic, and cultural forces, as identified through PAR, that are perceived by stakeholders to be critical factors in achieving the SDG agenda implementation?
- What are the major issues on which there are different positional perspectives, as uncovered by situational analysis, at macro, meso, and community levels?
- What may be the critical elements of partnerships in achieving the SDG agenda implementation as perceived by different stakeholder groups working with Manyatta?
- For Manyatta, how are the GeoDesign tool and partnerships created and sustained to facilitate SDG agenda implementation?

The 2030 Agenda is new; a clear strategy for implementing it has not yet been done. The mandate of the agenda is that it is implemented in an integrated and comprehensive manner led by the country involved with the engagement of its citizens. There is a concern based on the recent Secretary-General Report and Global Sustainable Development Report (United Nations Department of Economic and Social Affairs, 2019, p. 123) indicating the fear that the Agenda implementation is not moving at a pace that would ensure that the timeline of 2030 is met. This research pilot has the potential to show how with an effective partnership arrangement and

technologies like GIS and GeoDesign, which are designed for citizen engagement and participation, can help to accelerate the achievement of the global agenda. The 2030 Agenda for Sustainable Development is a transformative agenda in need of a comprehensive solution. The intersection of participatory geographic information science and participatory action research allows for social geography to be in the service of partners to meet the challenge of eradicating extreme poverty for over 1.4 billion people in all 193 UN countries.

Action research, as stated by Glassman, Erdem, and Bartholomew (2013), is focused less on democratic processes and egalitarian decision-making and more on understanding a collectivity's problems through the eyes of the participants. Capacity building, knowledge and technology transfer are the sustainability elements that will ensure that the social economic and environmental pillars of the agenda are achieved through partnerships. Location based data collection is one mechanism that can ensure no one is left behind. Those in the LDCs are by definition, the farthest behind and require special consideration on the march to the 2030 timeline. The largest informal settlement in the City of Kisumu, Kenya, Manyatta, was chosen as the site for this research study. The knowledge and information generated in my study was aimed at assisting the county, the city and the many stakeholders who interface with the citizens on the ground. This information also serves to inform the larger United Nations system of how one community can implement the 2030 Agenda in an integrated and comprehensive manner. Related to that, this study shows the role technology and multi-stakeholder partnerships (MSPs) can play in holistic planning to accelerate the process of meeting the 2030 Agenda's timeline.

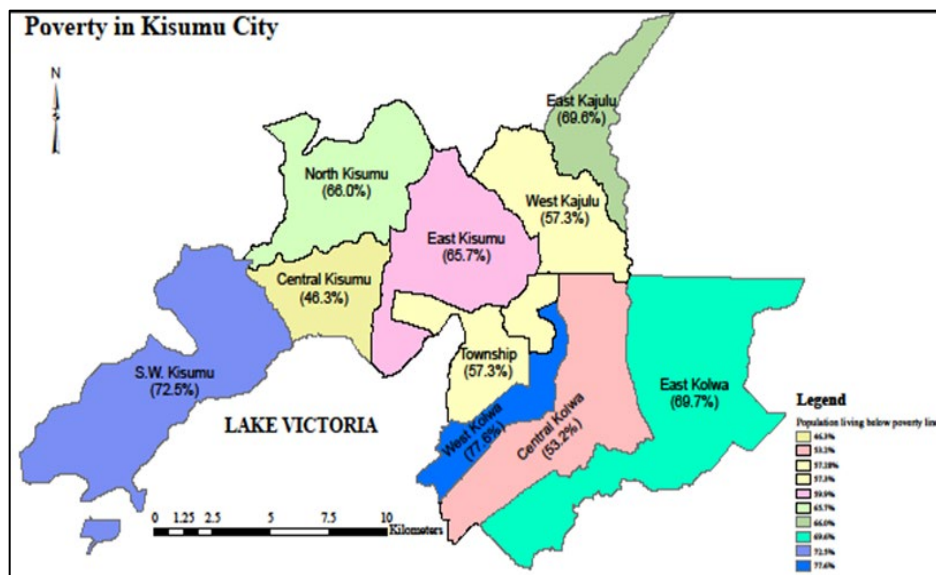
The qualitative multimethod methodology chosen for this research study in and for Manyatta can help to give meaning to both the citizens, government, the United Nations, and other stakeholders of what life is like in a slum (also called an *informal settlement*). Action

research as a qualitative approach and together with situational analysis and positional mapping are the design tools used within the framework of the global agenda to give voice to the situation that exists in Manyatta. Under the umbrella of participatory action research and to register the voices of the residents of Manyatta, household surveys, key informant interviews, and focus group discussion together with situational analysis, problem tree analysis, and stakeholder analysis informed the GeoDesign of the community.

### **Background and Study Site**

Manyatta in the City of Kisumu reflects the kind of community that the United Nations would characterize as one that is the farthest behind in achieving the 2030 Agenda because of its level of poverty and should be given the most attention. It therefore represents the ideal community for this research study to show how extreme poverty can be eradicated through citizen engagement, integrated comprehensive development planning that is country led. Manyatta had experienced no planning and is the largest informal settlement in Kisumu which is described and characterized by development pressures, economic transformation, and rapid population growth (Maoulidi, 2012).

The City of Kisumu is a port city in Kenya that sits on Lake Victoria and has an elevation of 3,711 feet. The city covers a total area of 417 sq. km, of which 297 km is land and 120 sq. km is water mass. It is the third largest by population in Kenya with 390,164 inhabitants according to the 2009 census as reported by the Millennium Cities Initiative (Maoulidi, 2012), a project conducted by the Earth Institute of Columbia University in Kisumu City, Kenya. The report further stated that present-day Kisumu consists of 25 sublocations that may be grouped into 10 locations as shown in Figure 3.1 which also indicates the distribution of households living at or below Kenya's poverty line.



*Figure 3.1.* Percentage of population living below the poverty line in districts of Kisumu City. From *Kisumu Millennium Development Goals Multisector Household Survey (2012)*, by M. Maoulidi, 2012, p. 15. Copyright 2014 by Moumie Maoulidi. Used with permission.

A household survey based on the multidimensional poverty index was also carried out with more than 600 households in Kisumu. Figure 3.2 shows the main areas within the Kisumu Municipality.



Figure 3.2. Kisumu Municipality with 25 sublocations, Kisumu Millennium Development Goals Survey (2012), by M. Maoulidi, 2012, p. 15. Copyright 2014 by Moumie Maoulidi. Used with permission.

The full data from the census are shown in accordance with the 2009 Census and the report by Maoulidi (2012), of the total population of 390,164, women make up 49.9% of Kisumu's population while men represent 50.1%. Approximately 64% of the total population is under 25 years. A notable characteristic of Kisumu's population is a large number of children under five years old: they make up 16% of the population; 36% of the population are children of schooling age between the ages of three and 17. Women of reproductive age comprised 51% of the female population. About 58% of the total population was in the labor force. The elderly population make up only 3% of the population. It must be noted that the results of this report are pre-SDGs and taken in the era of the MDGs.

## Kisumu 2009 Census

Age Cohorts	Males	Females	Total
0-4	30,481	30,697	61,178
5-9	24,110	24,690	48,800
10-14	21,894	23,144	45,038
15-19	20,531	24,042	44,573
20-24	23,194	28,225	51,419
25-29	22,235	20,163	42,398
30-34	15,705	12,398	28,103
35-39	10,715	8,613	19,328
40-44	7,371	6,293	13,664
45-49	5,871	5,290	11,161
50-54	4,308	3,638	7,946
55-59	2,909	2,431	5,340
60-64	2,022	1,867	3,889
65+	3,239	4,088	7,327
<b>Total Population</b>	<b>194,585</b>	<b>195,579</b>	<b>390,164</b>

Kenya National Bureau of Statistics (KNBS) 2009

<b>Doubling Time</b>	<b>25 years</b>
<b>Population Density</b>	<b>1,052 people per sq. km</b>

### Major Demographic Indicators

Demographic Groups	Percentage of Population
Children Under 5	16%
Children of Schooling Age (3-17*)	36%
Population Under 25	64%
Women of Reproductive Age (15-44**)	51%
Labor Force (15-64)	58%
Elderly Population Over 60	3%

\* Definition of 'Schooling Age' from data.uis.unesco.org

\*\*Definition of 'Reproductive Age' from WHO Fact Sheet No°334

Figure 3.3. Population characteristics for Kisumu, Kenya, 2009. From Kisumu Population Data Earth Science Institute, Columbia University, (n.d.). Prepared from data from the Kenya National Bureau of Statistics. Copyright 2012 by Earth Science Institute Columbia University. Used with permission.

The Millennium Cities Initiative report prepared by Maoulidi (2012), provided valuable information on which to build for the study in Kisumu to address the city through the lens of the SDGs versus the MDGs that was the focus of the study. A later report about Kisumu by Simiyu, Cairncross, and Swilling (2018) described the study area of Kisumu as the third largest city in Kenya with a population of approximately 420,000 people situated in the western region of the



country, within Kisumu County. Jones (2017) defines informal settlements as “unplanned” settlements not authorized by the State and in that regard, Kisumu is estimated to have the highest proportion of residents living in informal settlements of all cities in Kenya, estimated at 47%. These settlements are Obunga, Bandani, Nyalenda A, Nyalenda B, Manyatta A, Manyatta B, Manyatta Arab, Kaloleni, and Kibos (Simiyu et al., 2018).

The Kenya National Bureau of Statistics (KNBS) conducted a new round of census in August 2019. These results, when available, will add updated information to base more accurate conclusions and to inform decision-makers for Manyatta’s transformation in the future.



*Figure 3.4.* Aerial view of Manyatta, an informal settlement in Kisumu, Kenya. Courtesy of the Urban Design Lab at the Earth Institute, Columbia University. Used with permission.

The focus of the study was to examine the needs of the approximately 50,000 inhabitants of Manyatta who are particularly situated due to race, income, geography, ethnicity, and past colonization, who live in an unplanned community with little access to public services. The aim was to see how these needs could be addressed using an effective partnership framework and technology to inform decision-making.





*Figure 3.5. Participatory geospatial mapping in Kisumu, Kenya. From “Kisumu Kuoyo Manyatta Participatory Mapping Clip 2010.avi,” by Regional Centre for Mapping of Resources for Development (RCMRD). Copyright 2010 by RCMRD, 2010. Used with permission.*

### **Key Stakeholders**

As discussed in Chapter I, partnership is the vehicle through which the implementation of the 2030 Agenda is to be achieved. The concrete deliverables of the 2030 Agenda described in Chapter I are mobilization of financial resources, transfer and adequate use of emerging technology, building and strengthening capacities, establishing a fair global trade system, and creating synergistic systems to deal with policies and institutional coordination, multi-stakeholder partnerships, and the crucial issues of data, monitoring and accountability.

The following elaborations provide more clarity of what is expected. A results-oriented partnership structure is reflected in Figure 3.6 and provided a framework within which stakeholders were engaged in the participatory process for the planning and design and should continue to be a model used for a successful implementation process.



*Figure 3.6.* Stakeholder engagement framework model in Manyatta. Developed by Gregory LeMaire. Copyright by author.

At the Earth Summit Conference of the Environment and Development, Agenda 21 was adopted, and nine sectors of society were formalized as the main channels through which broad participation would be facilitated in UN activities related to sustainable development. These are officially called *Major Groups* and include the following sectors: business and industry; children and youth; farmers; Indigenous peoples; local authorities; non-governmental organizations; science and technology community; women; workers and trade unions. In 2012 at the Rio+20 Earth Summit the UN concurred on the importance of effectively engaging these nine sectors of society and was reaffirmed in its outcome document *The Future We Want* which highlighted the role that Major Groups can play in pursuing sustainable societies for future generations. In addition, Member States invited other stakeholders, to include local communities, volunteer groups and foundations, migrants, and families, as well as older persons and persons with disabilities to participate in the UN processes related to sustainable development. These

nine major groups now encompass civil society, academia, business, foundations and philanthropic organizations.

UNDESA is the primary development agency of the UN and works very closely with major groups and other stakeholders through a coordinating body of facilitators known as the Organizing Partners. These organizations are comprised of accredited organizations to ECOSOC and are invited to facilitate between the Major Groups, other stakeholders and UNDESA. Organizing Partners are tasked with coordinating inputs and streamlining communications from their particular constituencies.

It must be noted that RCMRD is a geospatial organization established by the United Nation Economic Commission for Africa (UNECA) and the African Union in 1975 to provide geospatial assistance to 20 counties in Eastern and Southern Africa. ICGC has signed a MoU to work jointly with RCMRD to further the 2030 Agenda implementation in Africa. RCMRD was also the sponsoring organization for this research study in the country of Kenya identifying key individuals and stakeholders whose input was relevant for the research study. RCMRD also gave support to gaining access to the relevant stakeholders and sites as appropriate in accordance with the local norms and regulations of Kenya. The Environmental Research Systems Institute (ESRI), the largest GIS software developer in the world donated the ArcGIS Server Software to ICGC eight years ago to enhance the geospatial work of the organization with the United Nations and Member States. Technical and personnel support was offered through Ms. Pauline Okeyo, the then Professional Services Manager, at ESRI's East Africa Office in Nairobi.

### **Approach to Research Design**

Action research and participatory action research have been determined to be the most appropriate research approaches for this study, in light of the emphasis on community

engagement in the Agenda's documentation, as reviewed in Chapter II. In addition, its correspondence and consistency with the GeoDesign approach guided the larger project which was the GeoDesign of the Manyatta informal settlement. Especially given the historic legacy of Kenya, which emerged from colonialism only 60 years ago, the ideas of Arendt (1958) are very applicable and in line with the research approach. That legacy of colonialism involved a top-down system of governance and poor planning which accounts for the many informal settlements which exist. The recent devolution creating 47 counties and more local control is meant to address these issues. Arendt argued that action research is about people taking action to improve their personal and social situation and offering explanations for why they do so, adding that this action involves *thinking*, the highest form of human achievement, and is the basis of any liberal democracy.

Unlike conventional social science, action research is meant to effect desired change as a path to generating knowledge and empowering stakeholders and is not primarily or solely meant to merely understand social arrangements (Bradbury-Huang, 2010). Bradbury-Huang (2010) suggested that this approach to research represents a transformative orientation to knowledge creation given that action researchers "seek to take knowledge production beyond the gate-keeping of professional knowledge makers" (p. 93). McNiff (2013) argued that the purpose of all research is to generate new knowledge and that action research inquiry generates a kind of knowledge that contributes to sustainable personal, social, and planetary wellbeing. Further, Bradbury-Huang suggested, when that new knowledge is generated it feeds into new theory (2010).

The global agenda for sustainable development is relatively new having been agreed upon in 2015. A real concern was that the citizens of Manyatta might not have even heard of the

Agenda or, even, of sustainable development (a concept that goes back to the World Commission on Environment and Development<sup>3</sup> (1987).

The study confirms, in part, the point made by McNiff (2013) that the purpose of all research is to generate new knowledge, also advocated by McNiff and Whitehead (2006). In that regard, action research, as part of a life of inquiry, generates the “kind of knowledge that contributes to sustainable personal, social and planetary wellbeing” (McNiff, 2013, p. 17). An observation I have made when visiting LDCs, is that the citizens are so absorbed with the issues of day-to-day survival that it is difficult to engage them in meaningful conversations about the future. The emotional and mental space is not available to have that level of engagement. In this regard, the civil society representatives of the nine major groups who grasp the cultural, language and history of these groups, are the most effective way of gathering the information needed. The case in Manyatta was that these representative groups fully participated.

As indicated by Herr and Anderson (2012), the term *action research* leaves the positionality of researchers open, not making clear whether they are insiders or outsiders. However, the term *practitioner researcher* puts the insider/practitioner at the center of the research which often tends to decenter other important stakeholders, such as clients and other community members who should also be at the center of the research. Herr and Anderson further explained the importance of positionality and especially the need to fully explain how action researchers position themselves within the setting of the research, as this will determine how the researcher thinks about power relations, research ethics, and the validity or trustworthiness of the findings. Action research, they stated, usually takes place in settings that reflect a society characterized by conflicting values and an unequal distribution of resources and power.

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<sup>3</sup> This was also commonly referred to as the Brundtland Commission.

A participatory action research engagement puts the researcher and the community in a collaborating relationship. The initial meetings and conversations of people familiar with the community provided the set up for going on the ground to have the physical context for information. In this respect, I traveled to Kenya in August and remained for approximately two weeks to immerse myself into the community to have a first-hand assessment and to be better able to interpret the information I receive. It should be noted that situational analysis and positional mapping are part of the research design.

### **Action Research and Participatory Action Research: Functional Differences**

McNiff and Whitehead (2006) explained that action research brings together a rich tapestry of people with different values and commitments working together with the same purpose of finding how to create a more socially just world. These are the values communicated by the global goals. A challenge of action research, however, is that there is no clearly delineated route map, and so researchers in the field change perspectives often. It should be kept in mind that the key issues are about the politics of knowledge and theory, namely who counts as a knower, who is able to offer explanations, about what, what counts as knowledge, and who makes decisions about these matters. Referring to Sowell (1987), McNiff and Whitehead argued that it is necessary to keep in mind the difference between visions and interests and, then, to get people to think about their visions and why they hold them. The goal is a commitment to diversity in a community and to critical thinking that produces the desired results. Herr and Anderson (2012) reminded that action research is a reflective process, deliberately and systematically undertaken, and requires some form of evidence to be presented to support assertions made. It is inquiry done *by* or *with* the insiders of an organization or community and should never be done *to* or *on* them.

Herr and Anderson added that action research puts insiders and outsiders at the center of the research.

McCutcheon and Jung (1990) in discussing the meaning of *collaboration* stated,

Collaboration is systematic inquiry that is collective, collaborative, self-reflective, critical, and undertaken by the participants of the inquiry. The goals of such research are the understanding of practice and the articulation of a rationale or philosophy of practice in order to improve practice. (p. 148)

Action research, they stated, should take place in settings that reflect a society characterized by conflicting values and an unequal distribution of resources and power. The notion of reflexivity then becomes crucial since action researchers must examine closely the perceived notions of improvement or solutions in terms of who ultimately benefits from the actions undertaken.

Grady and Kolk (1998) envisioned action research as a cycle (Figure 3.7) in which a client-system infrastructure is developed with the following steps:

1. Diagnose, identify, or define the problem with success as the goal.
2. Develop a plan of action to improve what is the current situation.
3. Act to implement the plan and collect data.
4. Analyze the data and form conclusions.
5. Report the results; adjust the theory and begin again.
6. Observe the effects of action in the context in which it occurs.
7. Reflect on these effects as a basis for further planning, subsequent action and on, through a succession of cycles.



Figure 3.7. The action research cycle. Copyright 1998 by M. Grady, M. Kolk, and Creative Educator. Used with permission.

In sum, as outlined in a statement signed by 60 advisory editors of the journal *Action*

*Research*, has these core features:

By *partnership and participation*, we are referring to the quality of the relationships we form with primary stakeholders and the extent to which all stakeholders are appropriately involved in the design and assessment of inquiry and change. By *actionable* we refer to the extent to which work provides new ideas that guide action in response to need as well as our concern with developing action research crafts of practice in their own terms. By *reflexive* we mean the extent to which the self is acknowledged as an instrument of change among change agents and our partner stakeholders. By *significant* we mean having meaning and relevance beyond an immediate context in support of the flourishing of persons, communities, and the wider ecology. (Bradbury-Huang, 2010, p. 98)

McIntyre (2003) explained the functional difference between action research (AR) and PAR, stating that PAR as used in project engagement in diverse research projects use a variety of research practices that are also related to a wide range of political ideologies. However, the underlying tenets specific to the field as used in the majority of PAR projects are as follows:

- a collective commitment to investigate an issue or problem,
- a desire to engage in self- and collective reflection to gain clarity about the issue under investigation,



- a joint decision to engage in individual and/or collective action that leads to a useful solution that benefits the people involved, and
- the building of alliances between researchers and participants in the planning, implementation, and dissemination of the research process.

McIntyre further stated that though participatory action research is a form of action research what differentiates it is that while action research involves practitioners as both subjects and coresearchers, in participatory action research the people otherwise thought of as being studied, actually participate in building and testing causal inferences. PAR thus aims at creating an environment in which the participants both give and get valid information; they are able to make free and informed choices, which includes the choice not to participate, and generate internal commitment to the results of their inquiry.

Whyte (1989), in his comparison of the action sciences in general, with PAR being one of them, described the difference this way: Action science focuses more on interpersonal relations and intrapsychic processes and involves a detached observer who documents in detail the intervention process. In this scenario, new ways of thinking and feeling precede the course of action as the researcher gains more control of both the intervention and the research processes. PAR, on the other hand, focuses more on social structures and processes which are likely to depend on what Whyte calls “creative surprises” (p. 383), which are new ideas that emerge unexpectedly during the intervention process. This makes it very difficult to plan to have a detached observer to document the intervention process objectively and in detail. There is great advantage in the use of the twin approaches of PAR and participatory GeoDesign in the engagement of participants in the implementation process. According to Corburn (2002), some challenges to communities, however, are obtaining an accurate sense of the workings of the

existing built environment and having an understanding of how the built environment functions relative to the local needs. For small communities, Kemmis (2010) argued, financial resources and expert staff are usually unavailable and, as a consequence, difficult and complex decisions become the responsibility of lay leaders. To mitigate this, communicative planning, collaborative learning, and discovery are recommended. In this regard, a comprehensive development of Kisumu is being undertaken to which the research study and GeoDesign of Manyatta will be a complement.

### **Praise for and Challenges to PAR**

PAR has many strengths including its emphasis on recognizing the fact that people are social beings, within political, economic, and social contexts (McTaggart, 1989). In this respect, PAR “is strongly value orientated, seeking to address issues of significance concerning the flourishing of human persons, their communities, and the wider ecology in which we participate” (Reason & Bradbury, 2002, p. xxii). As such, the participants are not mere subjects of the research but instead are active contributors to the research who participate in all phases of the research process.

However, PAR does have some challenges for both the researcher and participants. Greenwood and Levin (2007) pointed out the diversity in meanings. New researchers often find the approach confusing given that the terms “action research” and “participatory action research” are often used interchangeably. Secondly, there is usually a lack of access to a sufficiently comprehensive and balanced way to learn about the diverse origins, theories, methods, motives, and problems associated with this field which is so complex. Gillis and Jackson (2002) also indicated that PAR could also be challenging due to the inclusion of community members in the research team, who may struggle to maintain their commitment to the research project over time, given that PAR requires time, knowledge of the community, and sensitivity on the part of the

researcher to the agenda of participants. PAR involves a divergence of perspectives, values, and abilities among community members and consensus for determining what social issues require attention and the timeframe anticipated for the change might thus be difficult (Gillis & Jackson, 2002; McNiff & Whitehead, 2006).

Issues of power imbalances between researchers and community members and the means for establishment of real equality in relationships should be addressed before beginning PAR research (Gillis & Jackson, 2002; Maguire, 1987). Wadsworth (1998) noted that there can be uncertainty or a lack of agreement regarding the direction and overall purpose of the inquiry, which can lead to the wrong questions being asked, or the wrong direction taken, resulting in irrelevant data. And, there may also be misunderstandings regarding the perceptions of the participants about the social issue to be addressed, and, also, possible conflict about the interpretations and analysis of the research. Basically, PAR brings in more decision-makers throughout the research process, including ones who, by definition, are unfamiliar with the way that scholarly inquiry unfolds. The approach used in the study of the Manyatta project was participatory action research and was a perfect fit based on the interactive nature of the planned study and the mandate of the international development goals of the Agenda for 2030.

### **Situational Analysis with Positional Mapping**

The visit to Manyatta in August gave me a very good understanding of the situation of Manyatta from an economic, social, and environmental perspective. The aim in the method of situational analysis, following Clarke (2005) and Clarke, Friese, and Washburn (2015), is to deconstruct the partnership mechanism at the national, regional, and local levels and examine how it plays out at the local level; this is critical because it is at this level that the international agenda for sustainable development is actualized and extreme poverty eradication is tackled.

Capacity building, citizen engagement, and knowledge transfer are key goals of a successful partnership. In situational analysis, the situation itself becomes the unit of analysis, and the analyst makes maps to analyze the situation itself and allows us to see how the research topic is “situated”; one such approach to mapping is referred to as positional maps (Clarke et al., 2015). Positional maps are used in situational analysis to emphasize the discursive positions taken (and not taken) on issues of concern and focus that are often contested. Positional maps, unlike situational and social and world/arena maps, do not include representations of individual, collective, and/or institutional actors, but instead focus exclusively on the positions in a debate. An important assumption in using positional maps is that individuals, groups, and institutions often have multiple and even contradictory positions on a given issue of concern (Washburn, 2013). Clarke’s (2005) provided a widely used set of examples on various applications of positional maps in grounded theory studies. For a detailed discussion about the generation and use of positional maps, I refer readers to Chapter 3 of Clark’s (2005) *Situational Analysis: Grounded Theory After the Postmodern Turn*.

Positional maps can assist analysts in seeing complexities, variations, and diversity, in situations where previously only binaries and/or longstanding, oversimplified divisions may have existed. This is achieved by focusing on the wide range of articulated positions. This kind of positional mapping allows analysts to see long held lines of controversy and division in new ways. One of the most analytical, innovative, and useful aspects of positional mapping is how it helps analysts see traditionally muted and silent positions in situations of inquiry rather than just those that are clearly articulated. This allows for alternatives to the usually dominant voices in the analysis. The voices that have been silent often have very interesting and important positions which have the potential to generate new lines of inquiry. Moreover, they are often the voices of

those whose well-being is most affected by the factors under study. More details about the nature and application of these positional maps in relation to this dissertation research are included in Chapter IV. It is important to keep in mind that positional maps are intended to be maps of positions articulated in the discourse on their own terms and not intended to represent individuals, groups, or institutions, especially those not accustomed to analyzing discourses. The PAR discussion provided the perfect opportunity to hear the voices of those across the multi-stakeholder spectrum who are usually not heard.

Positional maps are meant to represent a wide range of positions and are usually constructed from a range of discursive materials gathered through fieldwork, participant observation, interviewing, texts, and documents of various kinds, including websites. However, to be successfully applied, those using positional maps need to have a good grasp of the major issues in the situation of inquiry on which different positions are being articulated. In the case of the 2030 Agenda for Sustainable Development, in order to include not only the goals, but the targets and indicators, it is important to take note of the key issues at stake in the positions and perspectives of the citizens; clarity is needed on what matters most from their different positions and views. These can form the foundation for the construction of the different axes, in that, positional maps involve and can be a challenging aspect of the process. Positional maps usually have two axes along which positions are taken and are usually constructed in terms of “more versus less,” although other categories are used. A challenge of the positional mapping process is determining which issues to place on the axes, and also, which two axes to place on the same map in comparing and charting different actors’ positions. In this case, it is suggested that the biggest, hottest, and most controversial issue in the overall debate and the two main criteria argued about should be chosen.

An advantage of positional maps is that they push the researcher and provide the opportunity to look exclusively at the positions in the debates in the given situation in order to separate them out from individuals and groups and to look carefully at the full range of individual positions in the data under consideration. This is helpful in assisting the researcher to go beyond old ways of thinking and to see and embrace new understandings and see fresh perspectives (Clarke et al., 2015). The 2030 Agenda whose goal is the eradication of extreme poverty provides a new framework to imagine a new and better life if implemented of which this integrated development planning initiative can be the beginning.

A second advantage of using positional maps is that they allow us to see positions missing in the data made possible by filling in the grid of the two axes of “more versus less” on the grid with positions found in the data and where a range of positions are laid out. It is then easier to include “Position Not Taken” on the map which can be unexpected but also surprising and interesting, yielding questions that can emerge if there are, otherwise, gaps in the data and these things are not to be spoken of. It is in these ways that positional maps can be useful in opening up to how we analyze the data.

### **Research Study Site**

The area and situation under consideration, to repeat, is Manyatta, an informal settlement in the City of Kisumu in the County of Kisumu, Kenya. Given that the overarching goal of the 2030 Agenda is the eradication of extreme poverty, and the aim is to achieve social economic and environmental sustainability, the objective is to explore how situational analysis using geospatial information may allow for these objectives to be realized. Within this context, an examination of the “situation” in Manyatta in the context of extreme poverty eradication was the focus.

Manyatta is one of the three major slums in Kisumu, Kenya's third most important urban centre on the shores of Lake Victoria. The population of Kisumu in 2009 was estimated to be approaching 400,000 according to the national population and housing census, with a projected annual growth rate of 2.8%. The census also placed the population of Manyatta at 24,308 with a density of 103 persons per hectare (ha) across a spatial extent of 2.36 km<sup>2</sup>. Based on an average household size of six persons in Manyatta slums and applying an annual growth rate of 2.8% from 2009, the population in the year 2019 can be estimated at 30,000 persons with 5,000 households.

Jones (2017) defines slums as dwellings which have become substandard through construction, age, subdivision, or neglect, and which generally have low to negligible levels of services. On the other hand, informal settlements are considered illegally settled, or have "extra-legal approval from the landowners or current residents to allow occupation" (Jones, 2017, p. 2). Slums are not necessarily illegal informal settlements though they could have pockets of slums.

Admittedly, there is difficulty in acquiring reliable data. UN-HABITAT (2003) found that there were difficulties in measuring the extent and definition of the boundaries of these kinds of settlements. This report pointed out that officially recognized boundaries for slums rarely exist, and that they often merge indiscernibly into formal areas of housing, industrial or rural areas. In cases where suitable data is not available for informal settlements, geospatial technology is used to measure the area in square km from aerial photographs. However, this may be understating the scale of the problem, since it makes no allowance for population densities that are often higher in informal settlements than in formal settlements. Technologies, including remotely-sensing, such as aerial imagery or high-resolution satellite data have proven to be very useful. Chitekwe-Biti Mudimu, Masimba, and Jera (2012) have asserted that GIS has

revolutionized the usability of information for planning, internationally and add that there is a conscious effort to develop skills sets that will enable communities to accurately link information collected. They add that GIS has created the possibility of linking social data with spatial data.

Simiyu et al. (2018) posited that informal settlements have unique socio-economic characteristics which are in need of development efforts tailored to the specific needs of each settlement. Their analysis of informal settlement in Kisumu, in terms of housing, living conditions, and a multidimensional poverty index, showed deprivation. This deprivation was evident in the following ways: lack of adequate services at the compound level, poor access to infrastructural services, low levels of education, and low quality of housing. Simiyu et al. pointed out that because landlords have tenure security, they can use land ownership as leverage for development and improvement of the living conditions for their tenants. The authors also recommended that landlords could work with the relevant institutions in basic service provision, along with government ministries, and through collaboration with the local government with all stakeholders in policy and implementation. Their recommendations are directed at three levels:

- the neighborhood level within the settlements through which resources can flow in and out of the settlements,
- the compound level through the provision of basic services, and
- the household level through proper management of basic services and infrastructure.

These three levels of services reflect the primary stakeholders involved and the complementary roles that each can play to achieve holistic improvement and development of informal settlements in Kisumu. Additionally, these shared development approaches should be geared toward providing services, and effective management strategies of services that are shared. These services and infrastructure should include sanitation and solid waste management.



The Global Agenda is very complex and presents a methodological challenge to address them and to provide the highest quality and relevance of the research while ensuring that the voices of those who are traditionally left behind are accounted for.

A key issue for people living in informal settlements is land use and ownership and the assignment of formal addresses with streets and lot numbers. In many Developing Countries and LDCs, there are no proper addresses meaning there are no street names, no house numbers, therefore, we do not know where people live! The global count of approximately four billion globally living without a known address is quite alarming (Geere, 2016). Not having an address means that those citizens are deprived of access to services, to banking loans, or to establishing a formal business. This also results in the lack of tax collection and in this regard, everyone is losing: the individual and the community overall. To improve the quality of life for the residents, Situational Analysis of the community took into account the geographic elements of the settlement such as: existing developments, road networks, the Auji River, lagas (ephemeral streams), topography, and soil typology. These elements together with the human contribution in their own words as to how and why the development of the community was needed was invaluable to the process.

### **Overview of the Research Design**

The first phase in the research design process was to put in place the partnership framework needed for a successful research study. This was followed by the next phase which included: a sampling frame for the four tools used for data collection: HH, KII, FGD, and PAR/situational analysis for GeoDesign; assemble the workforce to include my research collaborator, Mr. Beda Ogola, 10 research assistants, two GPS experts and five community mobilizers; training and role play of the research assistants and pretesting in a similar informal settlement; quality assurance

and control which involved a daily evening review of surveys done for accuracy and reporting and redress of any issue; administrative clearance from the County and City Planning Offices for collection of data in the settlement for use in the research study; and in addition the sponsorship of the RCMRD of the research study in Kenya. The next phase was the implementation of a 500 household surveys, interviews of 11 key informants, a focus group discussion of 13 participants, and a PAR/situational analysis discussion to provide the data for the GeoDesign of the community. The aim of this endeavor was always to achieve the social, economic, and environmental outcomes for sustainability and poverty eradication.

The study used the most recent and formal statistical data provided by the Kenya National Bureau of Statistics, geospatial data from the RCMRD and the GIS Department of the County of Kisumu, and informal data gathered from citizens. Data was shared and cross-checked with the citizens groups for validity and reliability. The instruments used were questionnaires, surveys and focus groups, a PAR/situational analysis/GeoDesign group, plus additional data points for private health facilities, private education facilities, and informal water points were collected.

### **Partnership Framework for In-Country Research**

The partnership framework of people and organizations that came together in support of a successful outcome of the research study in Manyatta, Kisumu City comprised the following members:

- Ms. Janet Awino Ogot (Winnie Janet)—Coordinator and Vice-Chair of Programs, Kisumu County Women's Leadership Caucus; multi-stakeholder partnerships operating in Kisumu; (Key Individual);
- Dr. Emmanuel Nkurunziza—Director General, of the Regional Centre for Mapping Resources for Development (RCMRD);

- Professor Dr. John B. Kyalo Kiema—Technical Director, (RCMRD);
- Ms. Pauline Okeyo—GIS Professional, GIS Educator, Spatial Policy Advocate for ESRI;
- Mr. L. Vincent Mtaroni—Technical Officer with RCMRD;
- Professor Emmanuel Midheme—GIS Department, Maseno University, Kisumu;
- Mr. Stephen Sule—Office of City Planning in Kisumu County Mayor’s Office;
- Hon. Dickson Obungu—Kisumu County Minister of Planning;
- Mrs. Mirriam Omala—Senior Advisor to the African Union to the United Nations, native of Kisumu, and sponsor of the research work;
- Ms. Evelyn Khaemba—In-country organizer of partners from the African Union Office in Kenya;
- Dr. Nashon Adero—Chief Research Consultant; and
- Mr. Beda Ogola—Research Supervisor

Phase 1 of the study to secure a strong partnership framework continued with a visit accompanied by Winnie Janet Ogot to Maseno University Main Campus in Maseno and conversation with Dr. Boniface Oluoch Oindo, the Head of the Earth Sciences and Environmental Studies Department who redirected us to the GIS Department in Kisumu. The meeting resulted in a conversation with Dr. Emmanuel Midheme of the Department of Geography and GIS and later with Dr. George Wagah who provided encouragement and moral support. Taita Taveta University through Dr. Mirianne Maghenda, Dean of the School of Agriculture and Earth Science together with Dr. Nashon Adero, Lecturer and Research Consultant contributed greatly to the research study through consultation and the execution of

the research on the ground with expert personnel with special note of thanks to Mr. Beda Ogola, a most competent supervisor.

### **Research Work Plan**

Data is central to the implementation of the 2030 Agenda. Only through the social, economic, and environmental information provided by the “people of the place” of any community can decision makers, to include the citizens, can a plan be designed to create the future they want. Both cartographic situational maps and GeoDesign plans were used to present the data, reflect, and refine the plans to accurately reflect the wishes of the community.

**Sampling frame.** The field survey employed these types of data-collection tools to help optimize data variety: HH questionnaire, KII questionnaire, and a focus group discussion questionnaire. To reach statistical significance, a representative sample of 10% of the population of 5,000 household was considered appropriate. Thus, 500 households interviews were conducted. A random stratified sampling was performed, basing the stratification on the geographical spread of the households across Manyatta. High-resolution satellite imagery was used to guide a weighted spatial distribution of the 500 HHs. To cater for special cases such as the need to include special groups, maximum-variation purposive sampling was applied as well. KII considered different groups of respondents to achieve diversity from private sector/business, local government, and civil society. The key informants, therefore, included administrators (chiefs), religious leaders, community/business leaders, county government representatives (ward administrators), civil society (youth & women leaders), and a planning expert (county planner).

In total, 11 key informants were interviewed with a keen observation to gender parity for each category as much as possible. The FGD engaged were purposely selected and facilitated

participants to reach a solid consensus or informed divergence of points on sustainable solutions—which needed to be mutually owned for long-term impact. Sampled household heads representing the directly affected groups—“people of the place,” youth and women leaders, experts, and opinion leaders were the members of the conducted sampling frame. An experienced moderator, Mr. Beda Ogola, facilitated the session, assisted by a secretary to record notes. Joventure Hotel VIP Boardroom, in Kondele was the venue hired for the FGD. A fourth group discussion that included at least three representatives from each of the previous groups (HH, KII, FGD) called the PAR/ situational analysis/GeoDesign took place at the same above-mentioned venue. This group of decision-makers were the key contributors to the GeoDesign of Manyatta.

Two handheld GPS/GNSS receivers were used to capture the coordinates of the interview points as a measure of proof for geographical sampling. The captured points of interest facilitated scalability in manipulating and validating the data within the GIS.

**Workforce.** The implementing workforce consisted of a team of two quality assurance consultants and 10 field RAs. The Quality Assurance Team was led by Nashon Adero and assisted by Beda Ogola as the field supervisor. The former is an expert possessing more than 15 years of experience as Policy Analyst in Kenya’s public policy think tank, Geospatial Engineer, and University Lecturer. The latter is an internationally exposed mathematical statistician, a holder of MSc in Statistics, with more than five years of experience in conducting field surveys, FGDs, and data analysis. The 10 RAs were officially engaged after training and pretesting using the approved questionnaires (Appendices A, B, and C). Each RA administered a minimum of five questionnaires daily for 10 consecutive days. The RAs were experienced university graduates who have been working on similar assignments and are also native speakers of the local language,

Luo, spoken in Manyatta. The questionnaires were mostly open-ended though there were also fixed “yes” and “no” questions that required ranking based on the scale provided. The questionnaires were therefore semi-structured.

**Training, role play, and pretesting.** Before deployment, the RAs underwent a one-day intensive and interactive training session to comprehend the contents of the questionnaires. The exercise culminated in a role play to expose the RAs to different viewpoints and challenges they would likely face when administering the questionnaires. The following day was occupied by pretesting in an actual environment similar to the study area, Obunga, also a slum within Kisumu, was conducted. The training venue had a capacity that accommodated the 15 persons and was equipped with a high-resolution beamer and a whiteboard. Morning and evening tea was served.

**Quality control and assurance.** Quality control and assurance permeated the exercise from the planning stage to the execution of the research study. Interactive evening sessions between the supervisors and the RAs were conducted to review performance for timely redress. This measure ensured the accuracy and completeness of the data collected each day. The results from these tools were also subjected to a stakeholder forum for validation. Spatial validation was achieved by superimposing the geocoded data collection points onto a digital map of Kisumu showing settlements, roads, and key landmarks. Quality assurance was implemented at four main levels: training, fieldwork supervision, quality checks on the designed, completed interview instruments, and performance evaluation before and after data entry and processing. To ensure data-collection quality and cost-effectiveness, a scientific formula was applied to evaluate the individual performance of each RA. This approach has been confirmed to boost productivity, accuracy, and the motivation to excel and cooperate.

**Administrative clearance and coordination.** To ensure smooth running of the entire exercise, the following points were key:

- Meeting and securing approval from Kisumu the County and City Planners,
- sponsorship letter from RCMRD for country research required by the Antioch University Institutional Review Board (IRB),
- prior communication with opinion leaders, and
- a clear statement on how the opinion leaders or community mobilizers will be motivated, usually by giving them a modest token comparable to existing trends.

### **Participatory Action Group for GeoDesign**

The PAR group included approximately 19 members representing key leadership positions in the community of Manyatta, which included key informants, focus groups, and head of household members). An examination of the data that emerged from HH, KII, and FGD data indicated that an additional participatory tool, problem tree analysis, was needed to better identify what they felt was the core problem, the root cause(s) and effects impacting the Manyatta community. The following four sessions with this group proceeded using the components as outlined.

*Session 1:* Researcher and research collaborator engaged with the PAR/GeoDesign group to go through problem tree analysis process (See Chapter IV for details).

- a) Purpose: To identify the core problem, the root cause or causes of the core problem and to communicate the effects of that problem having. This was based on the review of available data from HH surveys, KII interviews, focus groups, and meeting with the City Planner and Environment Director.

- b) Goals: To achieve consensus on the issues and as they affect Manyatta A and B similarly or differently.
- c) Role of PAR members in the overall research plan gave valuable input into the description of the situation for situational mapping and GeoDesign.
- d) Timeline: The first session lasted approximately 3-4 hours.
- e) Logistics for the session included meeting at the Joventure Hotel VIP Boardroom, where tea was provided before beginning. Four to five Research Assistants were in attendance to assist with note taking, recording of responses from respondents and ensuring that enough bottles of water were on the table and available for each participant.

*Session 2: Engagement with PAR Group in the research approach, stakeholder analysis.*

- a) Purpose: To have the group determine who among them and the larger community of stakeholders locally, nationally and globally who they feel have the power, influence, and also, the interest to help in solving the problems/issues they identified in the prior problem tree analysis session.
- b) Goals: Identify those persons who they felt had High and Low Power/Influence against Interest in the Stakeholder analysis matrix.

*Session 3: Participatory GeoDesign of the Manyatta they currently live in.*

- a) Logistics: The community was naturally divided in the two groups of Manyatta A and B and provided with large sketch paper to design the Manyatta they now live in.
- b) Each group was assisted by the assistant city planner who was a member of the PAR Group and a CBO Planner, respectively.



*Session 4:* Each group was asked to design the Manyatta they wanted and that would include the data collected from the HH, KII, FGD and would include an additional set of data points of the health, education, and water points collected at the end.

*Session 5:* After four months within which time the ideas communicated in session four were mapped and designed, this session was conducted on February 22. All members of the initial PAR group from the community were present. The participants evaluated the Detailed Strategic Plan for Manyatta to ensure it reflects accurately the design aspirations they engaged in. They were provided with 3 by 4 ft maps of the strategic plan. The session was moderated by Mr. Maxwell Otieno, a grassroots physical planner and member of the PAR group who led the discussion to ascertain what changes they would like to see in the design.

*Session 6:* The final session took place March 1, 2020, in which all but one member of the group present. Eight 3-by-4 ft maps were provided to allow for smaller groups to interact. This time Mr. Antony Okundi, Urban Planner, was in the room instead of being present virtually at the February meeting to ensure there was greater clarity in capturing their concerns for changes to the plan and that corrections were made in real time. The session was again moderated by Mr. Maxwell Otieno. The planned outcome is that the County Planning Office will validate the GeoDesign of Manyatta and with the goal of incorporating it into the comprehensive development plan underway for the City of Kisumu. I was present virtually for both sessions five and six.

### **Data Analysis**

The face-to-face interviews were transcribed and written up and the data that emerged was shared with the community for accuracy and credibility during the PAR Discussion.

Situational, and positional cartographic maps were constructed from this data to clarify the issues and give big picture views that are geographic, social, and positional (See details in Chapter IV). Observations made of the “situation” that is the study area were cross-checked with citizens for confirmability. Focus group meetings were recorded in written form and then described back to the group, so they were able to make any needed corrections. Consistent with the PAR framework and GeoDesign, engagement with approximately 19 key stakeholders to include: residents, government officials; civil society; business; academia was conducted. The aims were to determine the data needed, determine workflows, and to develop a detailed strategic plan and a 3D model consistent with the feedback of the group. Adjustments were made to both the situational and GeoDesign visualizations progressively to reflect the accurate aspirations of the key stakeholders.

Participatory Action Research (PAR) GeoDesign Group			
Stakeholder Meetings	Research Activities	Source of Data	Resource Dignitaries
	1. Preparation for Kick-off.		
1. Kick of meeting.	a) Notes from kick-off	Head of Household	1. Village Elder
2. Review of the HH, KII and FGD data.	meeting shared with the research committee	Questionnaire	2. HH of Manyatta A and B
a) Problem tree analysis	before meeting 2	Key Informant Interview	3. Assistant City Planner
b) Solution tree analysis		Focus Group Discussion	4. County Head of PWD
3. Situational Mapping meeting.	2. Compile findings of meeting 2 from:		5. Community Mobilizer-Janet
a) Situational mapping	a) Head of Household (HH)		6. Business Chairlady
b) Proposed future model mapping	b) Key Informant (KII)		7. Ward Administrator A
	c) Focus Group (FGD)		8. Ward Administrator B
4. Final meeting on GIS/GeoDesign-Joint Recommendation to County and City Planning Ministry	3. Distribute notes to the committee before meeting 3 in preparation of SA.	Situational Analysis (SA) data	9. Senior Chiefs- Manyatta A & B
	4. Prepare summary of findings from SA for Meeting 4. Prepare for GeoDesign meeting with County City.		10. Physical Planner- Grassroots
			11. Head of Programs –Angaza Jamii CBO
			12. Sociologist- UN Habitat
			13. Youth Representative

Figure 3.8. Participatory action research (PAR) group process. Copyright by author.

## **Overview of Research Phases**

**Phase 1 of field research.** My travel to Kisumu City, Kenya in August 2019, began the on-the-ground research work. I first met with partners including the RCMRD and the professional advisor for ESRI. Both are geospatial institutions located in Nairobi and serve African countries who worked closely with me on the research in Kisumu. The contact made with representatives from over 12 key stakeholders for face-to-face meetings, focus group meetings, and making personal observations of the study area of Manyatta when in Kisumu, paid off. This included the County Minister of Planning and the City Planner of Kisumu and key representative of the nine major groups of stakeholders.

**Phase 2 of field research.** I returned to Kenya September 21st for three weeks and executed the above-mentioned research plan in the informal settlement of Manyatta and according to the timeline given. Details of the work in Phase 2 are provided in Chapter IV.

**Summary of PAR component of the research.** The design of the research was aimed at showing how geospatial information together with effective partnerships can result in peace and prosperity for people and planet through collaborative work. Manyatta, an informal settlement in the County of Kisumu offered both opportunity and challenge for this discovery. Partnerships being the glue that holds the SDGs together for successful implementation of the county and city development plan for the settlement, Manyatta represents a community that could be considered farthest behind. This research project has helped to discover how a data-based technology with design elements can transform the geography of Manyatta to formalize the informal settlement. This formalization will in turn better ensure that basic services can be delivered to the community. The development of a Detailed Strategic Plan of Manyatta, based on data, mapping,

planning and GeoDesign and in accordance with SGS#11 (Make cities and human settlements inclusive, safe, resilient, and sustainable) was the desired outcome of the research project.

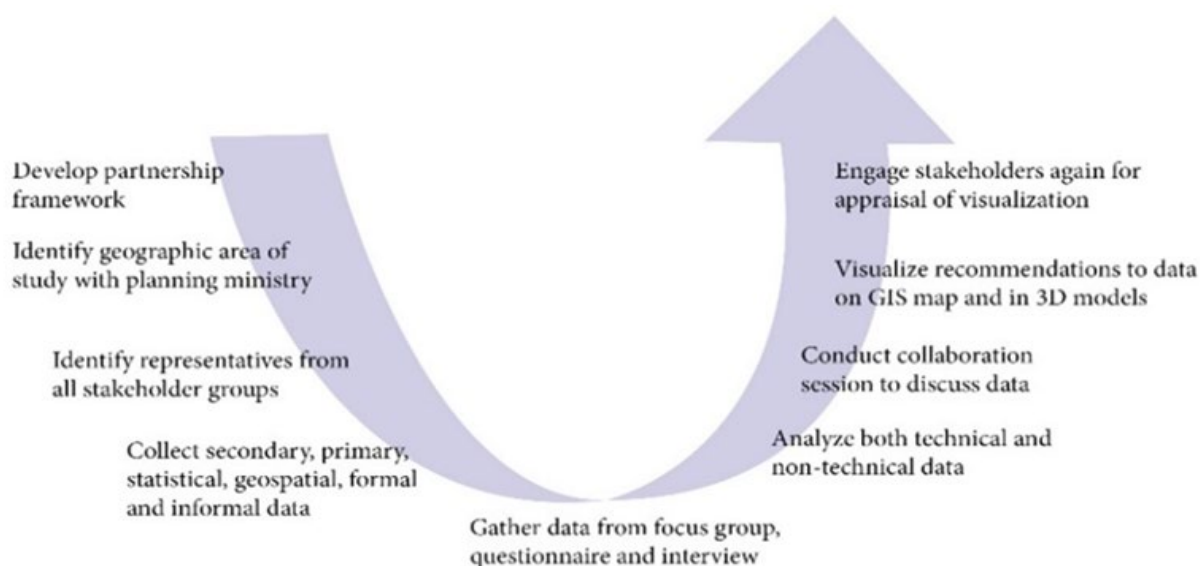


Figure 3.9. Research process for this study. Copyright by author.

### Situational Analysis of Kisumu

“Kisumu is a name derived from a Luo word, *kisuma*, meaning a place where the hungry get sustenance; this could have been due to its role as a regional centre for barter and trade” (UN-HABITAT, 2005, p. 13). Kisumu is estimated to have the highest proportion of residents living in informal settlements estimated at 47% according to the National Council for Population Development. According to Huchzermeyer (2009) and UN-HABITAT (2005), much of the land in these settlements is freehold obtained through inheritance. Over time, some owners have constructed rental housing and continued to live within their pieces of land, while others have constructed rental housing and moved to live in other areas. A challenge in formalizing informal settlements, which Jones (2017) explained, is governments reshape and restructure the lifestyles of residents to align with formal market measures. This, he stated, has a disadvantaged impact on communities. A question of concern is if formalization of informal settlements can lead to the

eradication of poverty in these communities. Jones, in referencing the New Urban Agenda, the Outcome Document of Habitat III, indicated that the objective is to achieve better sustainable global urbanization. It is hoped that the New Urban Agenda's sustainable urban development becomes a major conduit for achieving sustainable development in an integrated manner at global, regional, national, and local levels.

A situational analysis of the city of Kisumu was done in collaboration with the Municipal Council of Kisumu, the Government of Kenya, and UN-HABITAT to assess the present state of the slums in the municipality of Kisumu. The focus of the study was infrastructure, land use, housing, social services, and livelihood. The analysis synthesises the perceptions and values of the slum dwellers and the main stakeholders involved in slum-related issues in the seven slum settlements comprised in Obunga, Bandani, Nyalenda A, Nyalenda B, Manyatta A, Manyatta B, Manyatta Arab, Kaloleni, and Kibos. Collection and analysis of secondary data was initially done and included interviews of key informants together with consultations with key stakeholders. The situational analysis reported that focus group discussions with community members held in each of the settlements were very informative and brought to light a rich knowledge base. The report highlighted the fact that Manyatta is the only area in the Kisumu slum belt where roads are well-designed, and the network has been improved to increase accessibility to more than 60% of the settlement. Additionally, major roads have been realigned and road construction has allowed developers to put down a water distribution network for the whole area. A point is made that the lower part of Manyatta has to cope without proper road and water networks like the rest of the slum belt because it was not included in the slum upgrading program. Lower Manyatta, which is referred to as Manyatta B, only has motorized access from Nairobi. This report provided very

good background information for my research work. It should be noted again that both Manyatta A and B were chosen for the research study.

In support of the formalization of the settlement using geospatial information technology, when slum dwellers in Haiti were asked what was the single most important thing that would improve their lives, their response was not, education for their children, better house, food, health care, or the like but instead having a land registry! In most informal settlements there are no proper addresses, no street names, no house numbers; no institutions have registries where citizens actually live. To reiterate, an estimated four billion people in the world live without addresses (Geere, 2016); because these citizens are not on the map, there is limited or no access to services, to banking loans, businesses, and, consequently, there is no tax collection. These conditions dictate the urgency with which the 2030 Agenda should be implemented and the technology, financial and intellectual resources are available where there is political will.

Information gathered from representatives of the nine stakeholder groups and the government representatives provided valuable information from each perspective. Those perspectives included Consultations with the Minister of Planning for the County and the City Planner for Kisumu City, the key stakeholders and sample population of the settlement, efforts were made to work with a sample that include members of the nine major groups: business and industry; women, children, and youth; science and technology; local authorities; workers and trade unions; Indigenous peoples; framers; non-governmental organizations. The data collected reflected as many of the 17 SDGs, their targets, and indicators as was possible.

**Detailed study procedures.** The research begun with the following tasks:

- Collect all the secondary data available on Manyatta to date.
- Collect initial data in the area agreed upon on consultation of the above stakeholders.

- Reflect on the data.
- Make a plan for changed action.
- Ensure that permission was obtained prior to making observations or examining documents produced for other purposes, given there was shared ownership of the research.
- Describe the work of others and their points of view to negotiate with all those who participated in PAR before publishing any of the work.
- The researcher will accept responsibility for maintaining confidentiality throughout the research process (McTaggart, 1989).

**Credibility and confirmability.** Trustworthiness is a key element of qualitative research which should meet the criteria of credibility, transferability, dependability, and confirmability (Korstjens & Moser, 2018). To ensure credibility of the data collected from the citizens, Trained Research Assistants (RAs) who are natives of Kisumu and who speak the Lou mother tongue and understood the subtle nuances of the culture and language were who conducted the surveys and interviews. These RAs had extensive engagement with the slum community of Manyatta. Data collection tools used were focus groups interviews, household surveys, geo-referenced, KIIs, and PAR. These allowed for cross-referencing of the data for greater confirmability. This gave confidence that the findings of the research were based on the stories of the participants, are their own words and not those of the researcher to reflect potential biases.

### **Ethical Considerations**

The ethical considerations in PAR were of key importance for the successful research study. Winter (1987) outlined the following ethical principles that researchers should consider when conducting PAR:

- Ensure that all relevant persons, committees, and authorities have been consulted, and that the principles guiding the work are accepted prior to commencing the research.
- All participants must be allowed to influence the work, and the wishes of those who do not wish to participate must be respected.
- The development of the work must remain visible and open to suggestions from others throughout the research process.
- The researcher must also ensure that permission is obtained prior to making observations or examining documents produced for other purposes, as there is a shared ownership of the research.
- Descriptions of others' work and points of view must be negotiated with all those who participated in PAR before publishing any of the work.
- The researcher must accept responsibility for maintaining confidentiality throughout the research process.

O'Brien (1998) added to the ethical principles of PAR, by stating that decisions regarding the direction of the research and their outcomes are collective. It is, therefore, essential that the researchers be explicit about the nature of the research process from the beginning, including all personal biases and interests they may have while at the same time, ensuring that there is equal access to the information generated in the process for all the participants.

### **Chapter Summary**

In explaining the integration of PAR into GIS a key point made by Elwood (2009) is that research should not be conducted for its own sake, but to support action that addresses the social and community questions or needs that motivated the research. Thus, the exposure to the social



and political construction of spatial data and GIS technologies, promotes critical reflection on the politics and power relations of research.

Citizen participation is usually seen as a vital aspect of democracy according to Michels and De Graaf (2010), adding that many theorists claim that citizen participation has positive effects on the quality of democracy. They argued that citizen involvement has a number of positive effects on democracy such as the following:

- It makes people more responsible for public matters.
- It increases public engagement and encourages people to listen to a diversity of opinions.
- It contributes to a greater degree of legitimacy of decisions.

Michels and De Graaf (2010) concluded that to have a healthy democracy, the citizenry at the local level and all relevant groups and interests must be represented. To recap, we now have the following in place:

1. A strong partnership framework of government and representatives of multi-stakeholder partners
2. A well-designed research plan to include:
  - A sampling frame for the four tools used for data collection: HH, KII, FGD, and PAR/situational analysis for GeoDesign;
  - An assembled workforce to include my research collaborator, Mr. Beda Ogola, 10 research assistants, two GPS experts, and five community mobilizers;
  - Training role play of the research assistants and pretesting in a similar informal settlement;

- Quality assurance and control which involved a daily evening review of surveys done for accuracy and reporting and redress of any issue; and
- Administrative clearance from the County and City Planning Offices for collection of data in the settlement for use in the research study, and sponsorship from the RCMRD.

Chapter IV will present the execution of the plan for data collection to inform the GeoDesign of Manyatta and included:

- Administration of 500 georeferenced household surveys over 10 consecutive days by 10 Research Assistants accompanied by community mobilizers and GPS experts;
- Administration of 11 KIIs of decision makers in Manyatta;
- A focus group discussion of 13 participants, also decision makers to include representatives of the government and multi-stakeholder groups;
- A PAR/situational analysis discussion to inform the GeoDesign of the settlement; and
- Collection of additional data points for: private educational and health facilities and data points informal water points.

## **Chapter IV: Findings and Results**

The research study conducted in the informal settlement of Manyatta in the City of Kisumu, Kenya was aimed at discovering how geospatially enabled multisector partnerships may facilitate the 2030 Agenda implementation in the broadest sense. To support this overarching question, it was important to understand these supporting issues:

- How may the GeoDesign method be used to support a participatory action research approach in the SDG agenda implementation?
- What role may participatory action research play in implementing geospatial information facilitated partnerships for sustainable development through citizen engagement?
- In the informal settlement of Manyatta, what are the macro level financial, economic, and cultural forces, as identified through PAR, that are perceived by stakeholders to be critical factors in achieving the SDG agenda implementation?
- What are the major issues on which there are different positional perspectives being articulated at macro, meso and community levels?
- What may be the critical elements of partnerships in achieving the SDG agenda implementation as perceived by different stakeholder groups working with Manyatta?
- For Manyatta, how does the GeoDesign tool together with partnerships be created and sustained to facilitate the SDG agenda implementation?

The study results and findings in answer to these questions above are presented under five categories outlined below:

The five broad categories guiding the study were:

1. background information and conceptual framework;

2. field data collection: implementation framework;
3. findings from survey, interviews, and focus group;
4. participatory action research; and
5. situational analysis informing GeoDesign.

### **Background Information, Conceptual and Implementation Framework**

The International Agenda for Sustainable Development was adopted by the General Assembly of the United Nations on September 25, 2015, and agreed to by all 193 Member States. This was a call to action that would bring together governments, civil society, academia, business, philanthropy, and other stakeholders working together in partnership to achieve peace and prosperity for people and planet by the year 2030. The Agenda was to be country-led and no one should be left behind in the effort to create the future envisioned by each country. The purpose of this research study in the informal settlement of Manyatta in the City of Kisumu, Kenya is to localize the sustainable development agenda to transform the lives of its citizens. The study's focus was the engagement of the stakeholders through an action research methodology and to demonstrate how the use of geospatial information including GeoDesign which is essential to a citizen engaged, integrated comprehensive planned approach to eradicate extreme poverty.

Through Ambassador Macharia Kamau, Kenya played an integral role in development of the 2030 Agenda for Sustainable Development as one of the co-chairs of the Open Working Group under the direction of the General Assembly that resulted in the document, *Transforming Our World: The 2030 Agenda for Sustainable Development* (United Nations General Assembly, 2015b). It follows then that Kenya would be one of the countries in the forefront on the implementation of the global agenda. According to the Kenya Ministry of Devolution and Planning, in 2008, President Mwai Kibaki launched Vision 2030, a national agenda for

sustainable development which is a long-term development blueprint for the country and is motivated by a collective aspiration for a better society by the year 2030 (Government of the Republic of Kenya, 2007)

The overarching goal of Vision 2030 is to transform Kenya into “a newly-industrializing, middle income country which provides a high quality of life to all its citizens in a clean and secure environment and to also create a globally competitive and prosperous country with a high quality of life by 2030” (Government of the Republic of Kenya, 2007, p. 1). The agenda was developed over three years from 2005 to 2008, in collaboration with all the provinces of Kenya. The development plan has four pillars aimed at moving the economy up the value chain, by assessing the existing opportunities and challenges facing Kenya’s economic growth. To realize this objective, a diagnostic analysis was conducted in 2006–2007 and covered over 20 subsectors of which the following were given priority: tourism, agriculture and livestock, wholesale and retail, trade, manufacturing, financial services, business process offshoring and IT-enabled services that have the potential of raising GDP. Vision 2030 contains three pillars as follows:

- *Economic pillar*: The economic, social, and political pillars of Kenya Vision 2030 are anchored on the foundations of macroeconomic stability; infrastructural development; science, technology, and innovation; land reforms; human resources development; and security and public sector reforms.
- *Social pillar*: It aims to help Kenya embark on a journey toward widespread prosperity which involves the building of a just and cohesive society that enjoys equitable social development by improving the quality of life for all Kenyans. This is to be accomplished by targeting a cross-section of human and social welfare projects and programs, namely, education and training; health, water and sanitation; environment,

housing and urbanization, and gender; and youth, sports and culture while ensuring that special provision is made for citizens with various disabilities and from marginalized communities.

- *Political pillar*: The aim is to envision a democratic political system that is “issue based, people-centered, result-oriented and accountable to the public” (Kenya Vision 2030, n.d., para.1). It is to be a democratic system that reflects the aspirations and expectations of its people.

In “Devolved Government and Local Governance in Kenya,” Hope (2014) explained the structure and potential benefits of a decentralized government in Kenya. In a two-thirds majority (67%) vote, the public in a referendum for a landmark 2010 constitution recognized the sovereignty of the people and enshrined a bill of rights. This decentralization outlines the rationale and advocacy for a framework and the institutions that underpin and support the devolved government structures that the constitution proposed in 2010 for improving local and, consequently, national governance in the country. An important outcome was the establishment of 47 county governments that included the boundaries of the counties, the relationship between and among county governments, and the functions and powers of these county governments.

Additionally, the constitution covered matters such as fiscal decentralization, equitable sharing of national revenue between the national and county governments, the borrowing powers of the counties, and staffing of county governments. Hope (2014) further explained that after colonized countries gained independence, many African countries, including Kenya, emphasized efforts to build a nation-state which, therefore, had a centralizing effect together with negative impacts on the efficiency of delivery of public services and local governance.

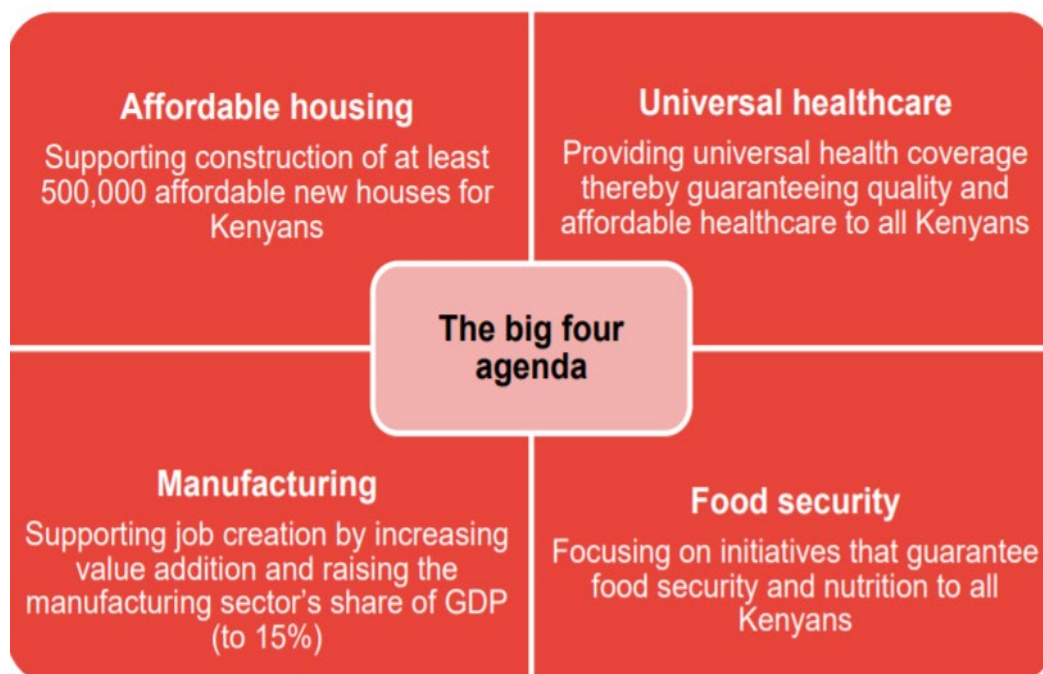
According to Mwenzwa and Misati (2014), citing Kanyinga (2001), and Kanyinga and Njoka (2002), after independence, the government inherited many structures from the colonial government which have not been positively transformed to affect the lives of the masses. Any transformation, they say, has generally benefited the self-interest of the incumbent political elite. In this regard, the Kenyan State has never been structured in the interest of the masses and the public good, cites (Gakuru, Mwenzwa, & Bikuri, 2007). Mwenzwa and Misati (2014) acknowledged that governance influences development and, therefore, “political maladministration is a recipe for underdevelopment” (p. 247). Instead, it has been used as a tool of coercion, enforcement, and maintenance of the oppressive regime of the politico-economic elite, whose interests never coincide with those of the common man. According to Nyanjom (2011), decentralization has three fundamental dimensions: administrative, political, and fiscal, which may occur independently or jointly. Nyanjom added that the decision to devolve was based on the failure of the government to deliver on revenue collection and service delivery.

Hope (2014) referencing Oloo (2008), explained that during the colonial era, local governments in Kenya were considered to be fairly autonomous and had significant sources of revenue. However, after the country attained independence in 1963, local authorities were weakened and simultaneously developed a bad reputation for incompetence. The movement toward the devolution from a centralized government, said Hope, is an attempt to improve and deliver public services and local governance in a cost-efficient way. This would also increase the administrative capacity and productivity of the public sector. Prior to the enactment of the 2010 constitution, the autonomy of local governments in Kenya was restricted by national government oversight of the local authorities and their actions and argues that highly centralized government systems have negative impacts on democratization.

The Kenya Ministry of Devolution and Planning (2017) stated that Vision 2030 provides the anchor for the implementation of Agenda 2030 for Sustainable Development in Kenya. Armed with lessons learned in the end term report of the MDGs, it provides the foundation on which to establish a roadmap for the implementation of the SDGs. To this end, the government directed all government ministries and department agencies to mainstream the SDGs into their policy, planning and budget systems to also include monitoring and evaluation. In addition, the Inter-Agency Technical Committee was formed with membership from the private sector, civil society, development partners, faith-based organizations, and the youth, all under the banner of “leaving no one behind.” This is consistent with Mwendwa and Misati (2014) who noted that “any development endeavor requires that the end result is defined so that it acts as the guide and motivation among the stakeholders” (p. 247).

The Kenyan government has developed what it calls its Big Four Initiative (Omolo & Owino, 2019)—subtitled “A Pro Poor Analysis,” to address both Agenda 2030 and its own National Vision 2030 simultaneously by focusing on increasing manufacturing, food security, provide universal health coverage and affordable housing.





*Figure 4.1. Kenya's Big Four Agenda from Kenya's 2019/20 Budget. From Kenya's 2019/20 Budget and the Big Four Agenda: A Pro Poor Analysis, by Miriam Omolo with Boniface Owino, 2019, p. 8. Copyright 2019 by Development Initiatives. Used with permission.*

Under its four pillars the government plans to accomplish the following:

1. Support value addition and raise the manufacturing sector's share to 15% of GDP by 2022.
2. Focus on initiatives that guarantee food security and nutrition to all Kenyans by 2022 through expanding food production and supply, reducing food prices to ensure affordability and supporting value addition in the food processing value chain.
3. Provide universal health coverage that will guarantee both quality and affordable healthcare to all Kenyans.
4. Provide at least 500,000 affordable new houses by 2022 and thereby improve the living conditions for Kenyans. (Omolo & Owino, 2019, p. 7)

The overarching goal of the 2030 Agenda is the eradication of poverty and it is toward this end that this action research study conducted in Kisumu, Kenya at the local level and in the informal settlement of Manyatta A and B, a reflection of those who are farthest behind, is aimed.

Figure 4.2 outlines Kenya's poverty situation.

Poverty measure	2005/06	2015/16
Extreme poverty	9.1	8.6
Overall poverty	45.9	36.1
Food poverty	45.8	32.0
Gini Index (income inequality)	47.6	39.5

Source: Kenya Integrated Household Budget Survey, 2015/16<sup>2</sup>

*Figure 4.2. Poverty incidence in Kenya by percentage. From Kenya's 2019/20 Budget and the Big Four Agenda: A Pro Poor Analysis, by Miriam Omolo & Boniface Owino, 2019, p. 5. Copyright 2019 by Development Initiatives. Used with permission.*

The aim of this study is to demonstrate a potential approach toward making an impact on the implementation of the 2030 Agenda at global, national, and county levels. And, the local level, as in the case of the work done in the informal settlement of Manyatta in the City of Kisumu. The decision to do this innovative work of demonstrating “how” the 2030 Agenda can be implemented in an integrated way, according to the UN mandate, using GIS technology was a major consideration of the study. The GIS platform brings stakeholders at the global, national, and subnational levels together to enhance policy, institutions, and generational coherence (OECD, 2018); this integrated approach is a way to manage trade-offs and maximize synergies across the SDG targets. SDG#17: Means of Implementation was designed to bring governments, businesses, civil society, academia, and citizens together to collectively mobilize to end all forms of poverty, fight inequality and tackle climate change (Rizza, 2019). It is within this context of bringing together all the key actors from the government, most specifically the Ministries of Planning at both the county and city levels in the County and City of Kisumu that the research was undertaken. Together with major actors to include the Chiefs of Wards A and B, business

leaders, landlords, youth, women, religious leaders, ward administrators at the location level of Manyatta, the respondents articulated their aspirations for the community from the data provided by the HH surveys, KIIs, focus group discussion, and (PAR) discussion.

The flagship projects planned by the County Government in Kisumu County are part of the Governor's Manifesto *Kisumu Stand Up* as acknowledged in the Kisumu County Integrated Development Plan (County Government of Kisumu, 2018, p.50). These have the potential of positively impacting the economic welfare of the people in Kisumu and by extension, the whole of Manyatta through the following initiatives:

1. Roads, transport, and public works;
2. Agriculture, livestock, and fisheries:
  - a) Rice Development Project,
  - b) revitalization of the cotton industry,
  - c) development of fisheries and maritime infrastructure,
  - d) aquaculture technology development.

The Governor's Kisumu County development plan includes extensive physical planning and urban development. This will have an impact on the people of Manyatta and help to provide the revenue needed for implementation of a development plan and have sustained economic and social viability.

### **Profile of Study and Study Area: Manyatta**

Manyatta is one of the major slums in Kisumu, Kenya's third-most important urban centers on the shores of Lake Victoria. The residents are, mainly, either low-income earners or unemployed, living in poor conditions and deprivation of basic infrastructure services. Ensuring multi-stakeholder partnerships and inclusiveness is a key principle of *leaving no one behind*. The

National Vision 2030 and the County Initiatives for development set the standards for progress toward the realization of the 2030 Agenda for Sustainable Development. By focusing on the slum dwellers in Manyatta, this field study represents a group of slum dwellers who are representative of a larger population of citizens locally, nationally, and globally who have been left behind and are among those who are the most vulnerable. They are the casualties of noninclusive development and policy processes. Such crucial groups are regular victims of polarization, marginalization, seclusion, or total exclusion from the process of setting development agenda. They are, however, important generators of the indigenous ideas required to inform sustainable development to leaving no one behind.

Mapping and geo-visualization techniques were applied to ensure inclusive stakeholder representation during data collection. This is an essential tenet in, and a prerequisite for, supporting scalability in acquiring actionable location-based intelligence. Though mapping is an old practice with significant implications for development studies across spatial scales, its utility has yet to be fully exploited through active citizen engagement. GeoDesign is an emergent and integrated methodological framework for visually facilitating multi-stakeholder inclusion at scale. The leading concept guiding this study is the collaborative design and realization for the optimal solution for spatial challenges in the built and natural environments.

Manyatta is a peri-urban estate on the eastern outskirts of Kisumu, Kenya's third most important urban center on the shores of Lake Victoria. It is home to one of the major slums in the city. The slums consist largely of informal semi-permanent housing for the poor, many of whom migrated from rural areas in pursuit of economic opportunities in the city. The slums have grown for decades skirting around the center and suburbs of Kisumu since independence. The other well-known slums in Kisumu include: Kondele, Nyawita, Obunga, and Nyalenda. The

socioeconomic, environmental, and spatial properties of Manyatta qualify it as a suitable candidate for research on participatory development planning.

Less than half (44.4%) of the Manyatta slum community displayed a total lack of information about the SDGs while a quarter (25.6%) had only a faint understanding of the same. Only a 10th of the population (10.6%) had clear information on the objectives of the SDGs, the targets against which to assess their performance, and the strategies in place for their implementation.



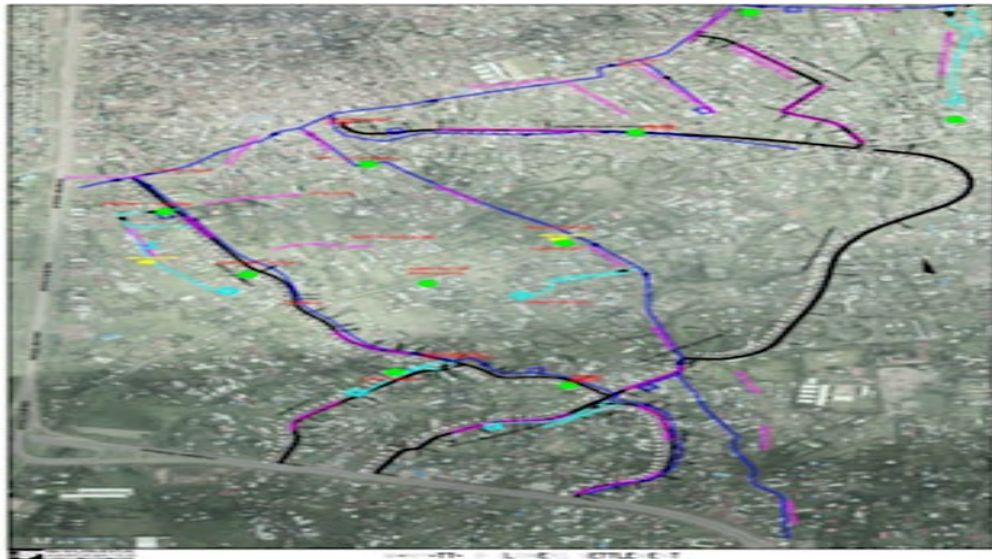
*Figure 4.3.* The Team of Research Assistants in Kisumu, Kenya. Photograph by author.

**Social and demographic characteristics.** Manyatta is one of the sprawling informal settlements within Kisumu city. Being a lakeside city facing the influx of people through rural-to-urban migration, it provides cheaper housing to both natives and new immigrants. This pattern creates high population density, thereby, overstretching the available basic amenities. The unplanned settlements house large household sizes with a high dependency ratio given the conditions of economic poverty and the deprivation of critical infrastructure services. The

*dependency ratio* here is the standard way of indicating the number of dependents per breadwinner; hence, a high ratio indicates the incidences of the many dependents relying on one bread winner. The residents of Manyatta are mainly low-income earners and the unemployed. The majority of residents have no tenure security. Few have access to piped water and sanitation. Crime is also prevalent in Manyatta. Manyatta, like the other slums in Kenya, traces its history to colonial marginalization which relegated Africans with low education to neglected sections of emerging colonial towns. The subsequent rapid population growth and limited resources in the young independent Kenya were aggravated by governance failures. Such populations outran the capacity of government to provide adequate housing and similar basic infrastructure services.

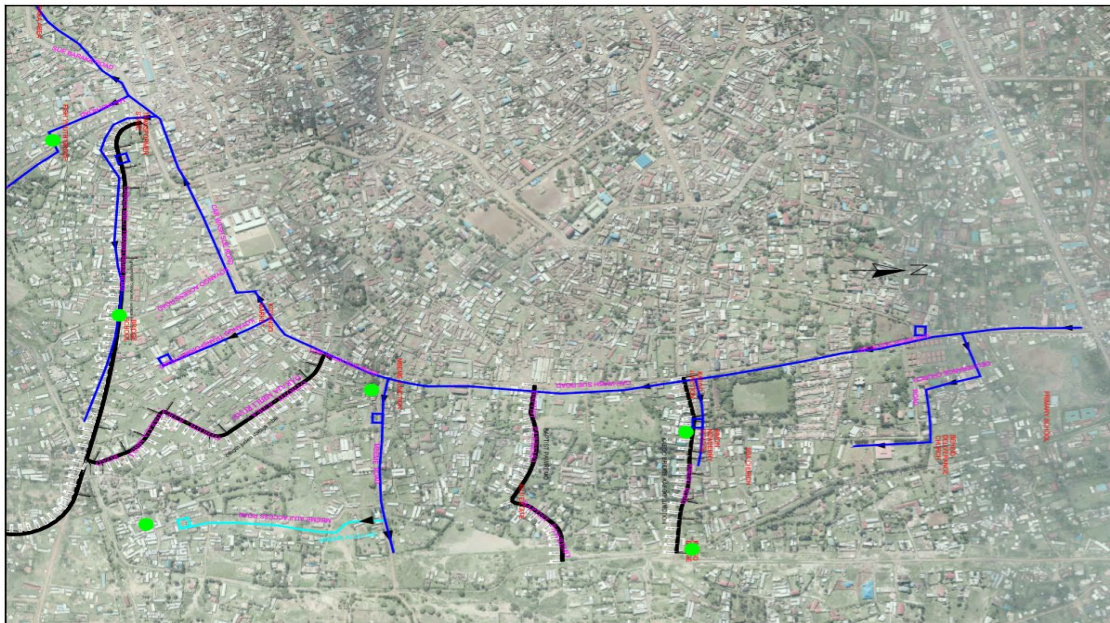
Manyatta slum is made up of two main administrative units: Manyatta A and Manyatta B, each acting as a Ward or Location at the same time. This implies each administrative unit has a Chief representing the National Government and a Ward Representative representing the County Government. Manyatta A is about twice as populated as Manyatta B with each further divided into smaller units. Manyatta A has six units and 10 subdivisions, namely, Flamingo Lower, Flamingo Upper, Gonda Lower, Gonda Upper, Magadi Upper, Magadi Lower, Kondele Lower, Kondele Upper, Metameta, and Kona Mbuta. Manyatta B is made up of three subdivisions: Kuoyo, Upper Kanyakwar, and Lower Kanyakwar. The population of Kisumu in 2009 was estimated to be approaching 400,000 according to the Kenya national population and housing census, with a projected annual growth rate of 2.8% (Kenya National Bureau of Statistics, 2010). The census also estimated the population of Manyatta (the main area of interest) at 24,308 with a density of 103 persons per hectare (ha). Based on an average household size of six (6) persons in Manyatta slums and applying an annual growth rate of 2.8% from 2009, the population in the year 2019 was estimated at 30,000 persons with 5,000 households.

**Spatial characteristics.** Manyatta is an exemplar of informal settlements. Its location is near the city centre, making commuting to work and school largely manageable to the residents. The main slum covers a spatial extent of 2.36 km<sup>2</sup>. The high density of settlements and proximate administrative wards in Manyatta are shown in Figures 4.4 to 4.6. The three images below reflect the infrastructures contained in Manyatta: major roads, water pipes configurations, and streetlights. Figure 4.7 below reflects a map that merges of the first three maps.

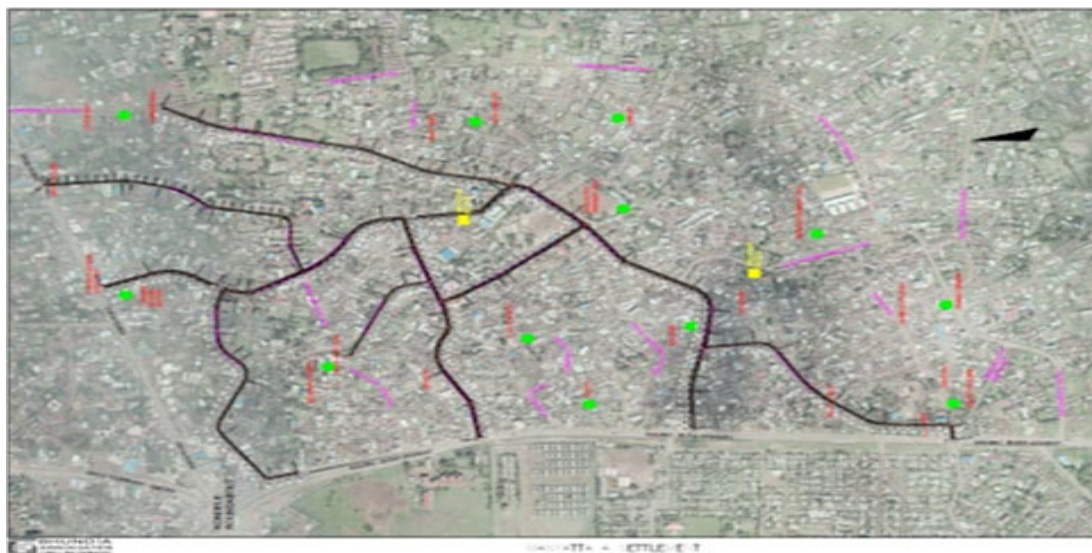


*Figure 4.4.* Density, roads, and water infrastructure in Manyatta, Kisumu, Kenya, Manyatta B lower layout. Aerial photographs used courtesy of the County Government of Kisumu. Copyright, KIWASCO. Used with permission. *Note:* The information was true as at the time of data collection and will not be used for any other purpose other than for research for the specific study.



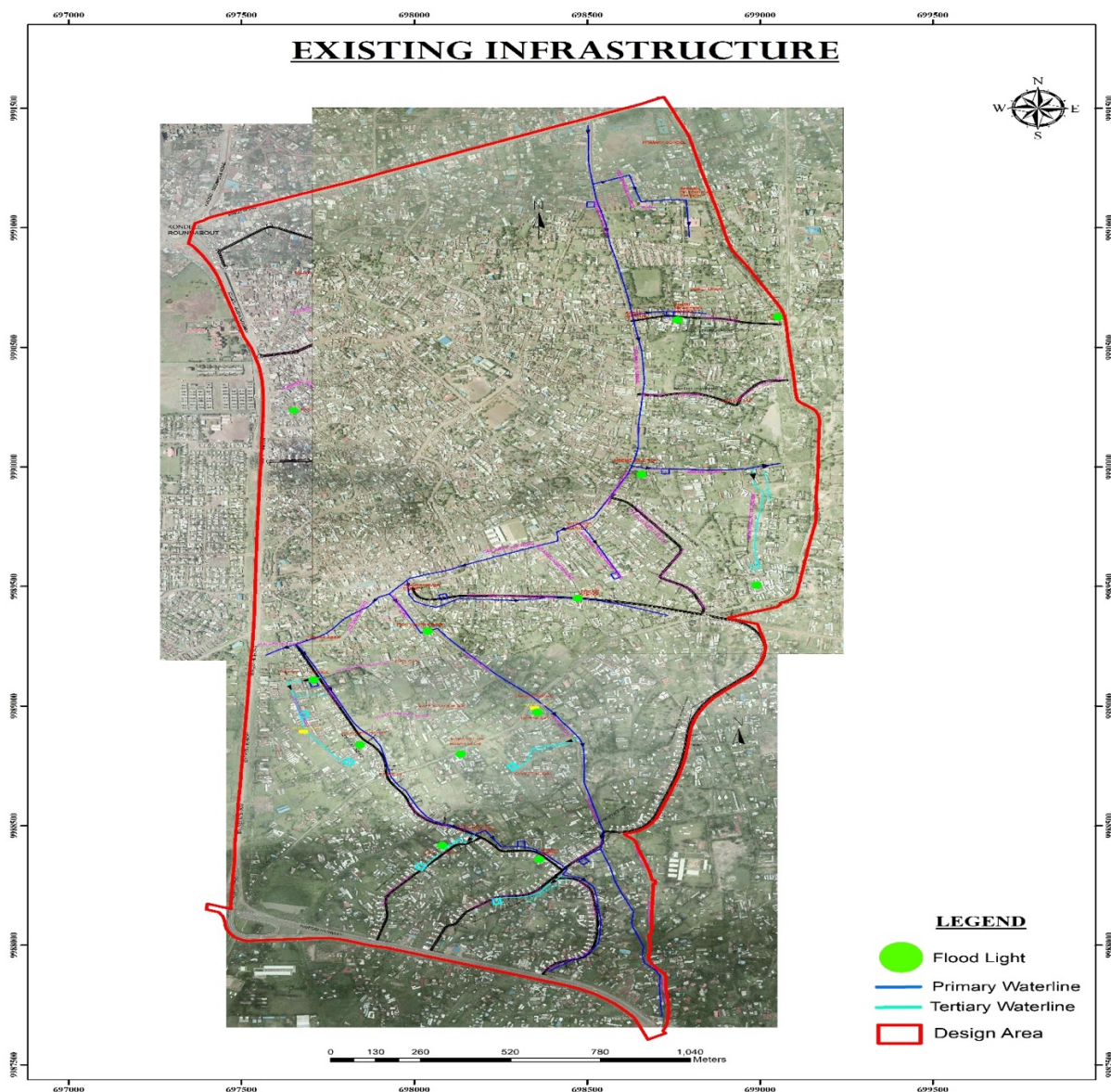


*Figure 4.5.* Density, roads, and water infrastructure in Manyatta, Kisumu, Kenya, Manyatta B upper layout. Aerial photographs used courtesy of the County Government of Kisumu. Copyright, KIWASCO. Used with permission. *Note:* The information was true as at the time of data collection and will not be used for any other purpose other than for research for the specific study.

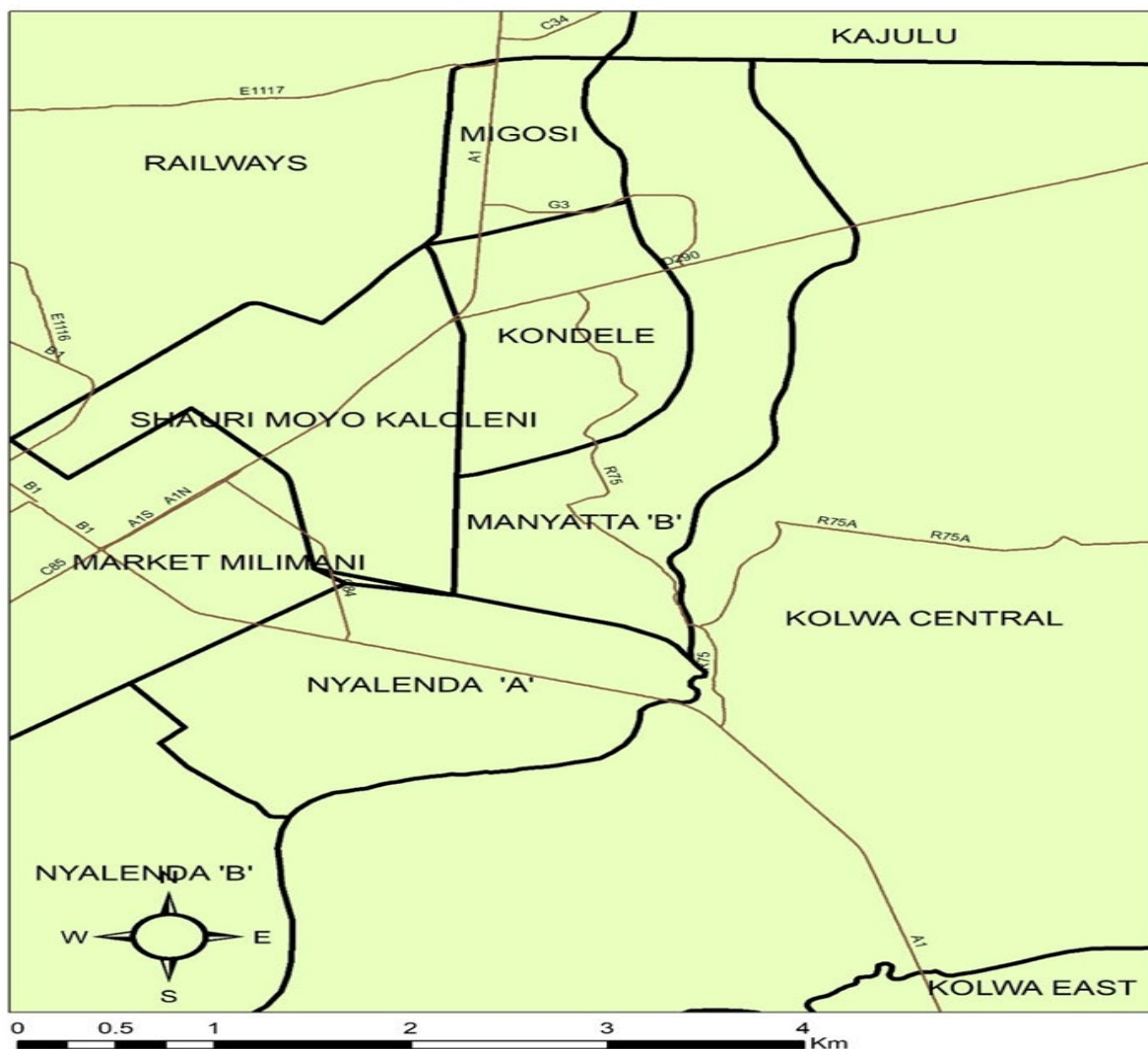


*Figure 4.6.* Density, roads, and water infrastructure in Manyatta, Kisumu, Kenya, Manyatta A layout. Aerial photographs used courtesy of the County Government of Kisumu. Copyright, KIWASCO. Used with permission. *Note:* The information was true as at the time of data collection and will not be used for any other purpose other than for research for the specific study.





*Figure 4.7. Density, roads, and water infrastructure in Manyatta, Kisumu, Kenya, Manyatta A and B layout. Aerial photographs used courtesy of the County Government of Kisumu. This merges the maps in Figures 4.4, 4.5, and 4.6. Created by Antony Okundi. Copyright KIWASCO. Used with permission.*



*Figure 4.8.* Manyatta and its surrounding administrative wards. Image compiled from data layers using ArcGIS and based on administrative and road network GIS data layers sourced from Kenya open data portal. In the public domain.

**Environmental situation.** In this informal settlement, as is usually the case in most, without a waste management infrastructure, waste is thrown out along the roads and around the houses (Figure 4.8). There are no maintained public toilets, the decaying organic wastes which causes foul smell with serious air pollution within the slum are characteristic. Recently, commercial waste collectors facilitated by community-based organizations have begun to charge the community to manage the waste. The County Government of Kisumu has also started to officially recognize the private waste collectors and register them. Despite the recent ban on

plastic bags by the National Environment Management Authority (1999) the bags are still in use. The Household, KII and FGD and PAR information provided by the citizens of Manyatta substantiated the findings made by the Kisumu County Environment Policy Report (County Government of Kisumu, 2019) and also by Kisumu Integrated Solid Waste Management (KISWaMP) Plan (County Government of Kisumu, City of Kisumu, 2017) which indicated significant waste management failures which have resulted in the following:

1. Management and administration failures and weaknesses
2. Infrastructure deficit—in terms of waste management facilities
3. Space limitations aggravated by poor planning, leading to the deficiency of land for waste disposal facility; and,
4. Technical incapacity in terms of human capital and equipment for efficient and effective waste management.

The Auji River runs through the slum as it flows into Lake Victoria. Though its water is polluted due to the poor waste management conditions in the area, the residents still use it directly for drinking and other domestic purposes. Piped water is scarce and expensive to the residents. Private water vendors offer a less costly alternative, but the water quality issue remains unresolved because there is no regulation (Figure 4.8). Poor drainage leads to flooding of the slum during rains. The flood waters are highly contaminated by the mismanaged waste, hence a major public health risk.



*Figure 4.9.* Waste thrown around Manyatta roadside and a private water well in Manyatta. Photographs by author.

**Manyatta’s economic situation.** Manyatta is mainly served by small retail shops, with stalls concentrated along Kondele-Kibos Road. There were only two markets at the time of conducting this study, namely, Manyatta and Kosawo. The others are open-air markets operating on specific days of the week only. Job creation is diminished since formal industries capable of absorbing significant workforce are lacking. In Kenya, the Jua Kali industry (translated “in the hot sun”) has been a common creator of employment through artisanship/craftsmanship. They also offer training through apprenticeship. They are mostly open and deal with metalwork, woodwork, and similar works of creative talents.

Formal Jua Kali industries are important sectors in utilising the labor abundance among youth. They also salvage the fate of the majority who cannot make it to advanced formal education levels due to poverty or latent talents that cannot be discovered in the exam-oriented formal education system in Kenya. Manyatta did not have any such type of Jua Kali at the time of this dissertation research, but only the small informal types owned and operated by individuals, hence not meeting the high demand for jobs.

**Sociological dimensions of study area.** The population of Kisumu and by extension, Manyatta is made up mostly of the Luo among the 43 ethnic tribes living in Kenya. The Luhyas which occupy Western Kenya also form a large percentage of Manyatta residents followed by other smaller ethnic tribes like the Kikuyus, Kalenjin, Maasai, Kambas, and Kurias, among others. Majority of the residents in Manyatta are Christians comprising around 90% with Muslims and other religions together making up the other 10%. Among the Christians, the majority religions are: Seventh Day Adventists, Catholics, and Anglicans which together make up approximately 80% and the other 20% made up of smaller religions. The inter-ethnic relations in Manyatta are quite diverse with cross-ethnic marriages presenting no barriers. As expected, the Luos who are in the majority marry across other ethnic lines and that has led to a great peaceful coexistence among the various communities. In the recent past, politicians have exploited these relationships to their benefit. The slum is composed of a majority of females who are single mothers and are head of the households. The male population consist of the youths between ages 18 and 35 and who are mostly jobless and hang around bus stops and social joints. However, the community for the most part live harmoniously despite their many challenges. Kisumu became the epicenter of research for malaria and other vector borne diseases and for HIV-AIDS more recently (Geissler, 2013). The County Government of Kisumu (2019) environment policy report confirmed that these diseases have continued to be a problem for the community and was also borne out by the research study.

### **The Study in the Context of Global Sustainability Agenda**

The SDGs encompass both the policy agenda for societal progress and the deliberate imperatives for shared prosperity. The United Nations System Staff College Knowledge Centre for Sustainable Development (2019) has summarized the core principles of the 2030 Agenda for



sustainable development. The principles are anchored on universality, an all-encompassing call to all countries at all times, and the moral principle of leaving no one behind which considers the most vulnerable members in society. For this assessment, the following three other principles are key to the ensuing discourse:

1. interconnectedness and indivisibility, because they lay emphasis on a synergistic approach as opposed to addressing the 17 SDGs as disparate spheres;
2. inclusiveness and interdependence, because it calls for the participation of all the segments of society; and
3. multi-stakeholder partnerships, because it speaks to shared prosperity in terms of mobilizing and sharing knowledge, expertise, technology, and financial resources to support all countries in achieving sustainable development.

### **GeoDesign for Stakeholder Inclusion Through Visual Mapping**

GeoDesign was the leading concept guiding the study. Citizen science and GeoDesign are emerging strongly as potent game changers in empowering societies to be active partners with governments in policymaking and development. Global forces, in the spirit of inclusiveness as reflected in the SDGs, are shaping a new form of capitalism which must involve all stakeholders in all the spheres of the planet, hence “stakeholder capitalism.”

GeoDesign is an emergent and integrated methodological framework for visually facilitating multi-stakeholder inclusion at scale in the collaborative design and realization of the optimal solution for spatial challenges in the built and natural environments. Mapping and geo-visualization techniques were applied to ensure inclusive stakeholder representation during data capture. This is an essential tenet in, and a prerequisite for, supporting scalability in deriving actionable location-based intelligence. Though mapping is an old practice with significant

implications for development studies across spatial scales, its utility, particularly in its recent digital form and with its story-telling power, has yet to be fully exploited through active citizen engagement (Laaribi & Peters, 2019). GeoDesign is an emergent and integrated methodological framework for visually facilitating multi-stakeholder inclusion at scale and is the leading concept guiding this study. GeoDesign helps in collaborative design and in the realization of optimal solutions for spatial challenges in the built and natural environments. The conceptual framework was conceived to specify a suitable number of respondents to be representative of the variations across the study area. The respondent profile had to capture households, experts, and influencers of policy or community opinion. To facilitate scalability in GeoDesign, the data collection exercise had to be geocoded.

### **Conceptual Framework for GeoDesign**

**Sampling frame.** The field survey employed three types of data-collection tools to help optimize data variety: HH questionnaire, KII questionnaire, and a focus group discussion questionnaire. Slovin's Formula was used to estimate the sample size ( $n$ ) given the population size ( $N$ ) and a margin of error ( $e$ ), where  $n = N / (1 + Ne^2)$ . Assuming 95% confidence level, the margin of error is 5%. The estimated population of households was 5,000. The formula calculation is, therefore, as follows:

$$n = 5000 / ((1 + 5000 * (0.05)^2) = 370$$

Interviewing 370 households would, therefore, meet this requirement. Considering that there would be instances that would require redundancy for checking and some households might not fully cooperate comply, the sample size was raised to 500 households, making up a representative sample of 10% of the population of 5,000 households. Random stratified sampling was preferred, basing the stratification on the geographical spread of the households across

Manyatta. A two-tier stratified sampling allocated the samples in strata with 67% and 33% of the total sampled households of 500 from Manyatta A and Manyatta B, respectively. Further, stratified random sampling was employed within the subdivisions of Manyatta A and B with the resultant proportional allocations shown in Table 4.1.

Table 4.1

*Proportional Allocations of Household Samples in Manyatta A and Manyatta B*

Major Division	Minor divisions	Subtotal by major divisions	Proportions of HH interviews by major divisions	Number of interviews by minor divisions	Proportional allocation (%)
Manyatta A	Lower Magadi			36	10.7
	Flamingo Upper			35	10.4
	Flamingo Lower			35	10.4
	Gonda Lower			35	10.4
	Gonda Upper			30	9.0
	Upper Magadi	335	67.0%	29	8.7
	Kondele Lower			30	9.0
	Kondele Upper			35	10.4
	Metameta			35	10.4
	Kona Mbuta			35	10.4
	Manyatta A Subtotal:			335	100.0
Manyatta B	Kuoyo			50	30.3
	Upper Kanyakwar	165	33.0%	60	36.4
	Lower Kanyakwar			55	33.3
	Manyatta B Subtotal:			165	100.0
TOTAL:		500	100.0%		

**Spatial mapping framework.** High-resolution satellite imagery was used to guide the spatial distribution of the targeted 500 households. Every 100 meters was adopted as the rule of thumb but in other cases where this was not attainable due to settlements being wide apart, every 200 meters was sampled. Two handheld GPS/GNSS receivers (Garmin eTrex) were used to



capture the coordinates of the interview points as a measure of proof and check for geographical stratification of the sampling frame. This receiver has an optimal point positioning accuracy of up to 3 meters. For reliability, the points were to be recorded in the GPS only when the displayed point positioning accuracy was within 10 meters. The mapped points of interest would later facilitate scalability in manipulating and validating the data within a GIS.

**Multiattribute decision making tools.** To facilitate the identification of priority areas, a ranking scale was provided in the data collection tools and explained for ease of administration. To take care of divergent opinions expected during multi-stakeholder discussions, multiattribute decision tools were considered. Going by past successful cases in Kenya, pairwise comparison techniques were chosen to assist in prioritizing the identified needs during the focus group discussion. Table 4.2 shows a pairwise comparison example in a case where 8 issues are identified for ranking, hence the 8 x 8 matrix. It can be seen that Issue 6 has the highest frequency, taking precedence over the other issues in the series, hence emerging as the most important issue in this context. It is worth noting that this outranking technique is one of the most commonly applied methods for classical problems in multiple attribute decision making (MADM) to build preferences based on a definite number of choices. Table 4.5 reflects the actual issues discussed and the ranking for each.

Table 4.2

*Example of a Pairwise Outranking Matrix for Multi-Stakeholder Consensus*

Issue #	1	2	3	4	5	6	7	8	Frequency of score	Overall rank
1		2	1	4	1	6	7	1	3	4
2			3	2	2	6	7	2	4	3
3				4	3	6	3	3	4	3
4					4	6	4	4	5	2
5						6	7	8	0	5 (Least important)
6							6	6	7	1 (Most important)
7								7	4	3
8									1	5

**Key influencers engagement protocol.** Key stakeholders were considered from different groups of respondents to achieve diversity from all the three sectors: private sector/business, government, and civil society. Using a framework of maximum-variation purposive sampling, a qualitative research strategy which seeks to purposefully identify common patterns and core experiences with shared aspects (Emmel, 2014; Patton, 1990). The key informants were drawn from administrators (chiefs), religious leaders, community/business leaders, county government representatives (ward administrators), civil society (youth & women leaders), and a planning expert (county planner). In total, up to 10 key informants were to be interviewed with a keen observation of gender parity for each category as much as possible.

The planned FGD engaged, purposively, a selected group of participants to reach a solid consensus or informed divergence of opinions on sustainable solutions—which would need to be mutually owned for long-term impact. Sampled household heads representing the directly affected groups—“people of the place”—youth and women leaders, experts, and opinion leaders, were members of the proposed sampling frame. An experienced moderator was selected to

facilitate the session in the familiar language of the place, assisted by an experienced secretary to record the minutes at the suitable meeting venue hired in Kisumu, Kenya.

Table 4.3 shows the agreed composition of the KII set to run concurrently with the household interviews.

PAR, on the other hand, drew participants equally from the three initially proposed survey tools, that is, approximately three members from each of the groups of households, KII, and FGD respondents. As such, the PAR list would only be finalized after carrying out the FGD.

Table 4.3

*Focus Group Composition. (Similar to KII, but with Different Participants)*

No.	Category	Designation/ Name/ Gender
1.	National government administrator	Chief Manyatta A
2.	National government administrator	Chief Manyatta B
3.	County government representative	Ward rep Manyatta B
4.	Religious leader	Female
5.	Business leader	Millicent (Manyatta B)
6.	Community leader	
7.	Civil society	
8.	Persons with Disability (PWD)	
9.	Youth leaders	Male & Female
10.	Professional	Representative from County Planning Office

### **Conception of the Detailed GeoDesign Social Framework**

In the conception of the detailed GeoDesign framework, and after the successful completion of household surveys, key informant interviews, and a focus group discussion, the background was set for PAR to inform the GeoDesign of Manyatta to be undertaken. GeoDesign would entail a detailed situational analysis and sectoral analysis of the economic, socio-cultural, environmental, and political dimensions of Manyatta A and B.

*Social change planning* produced the rational distribution of activity areas in Manyatta. This kind of planning facilitated the neighborhood concept that ensured that every subunit was self-contained with commercial, health, industrial and educational facilities, patrol bases resulting in reduced traffic and dependency on Kisumu Central Business District for services. Additionally, the creation of commercial and industrial centers would greatly absorb the increase in youth unemployment and reduce the incidences of crime which is prevalent in Manyatta. Planning also resurrects community recreational points and facilities such as social halls, playgrounds and parks that would significantly reshape the social DNA of the community through increased social mobility and engagements. *Spatial design* distributes zoning of the residential subunits into hierarchies of densities of high, medium and low to enable the social inclusion of all levels of income earners. This harmonization of building densities is also meant to secure privacy of neighborhoods. The road design and the alignment of building structures along streets also enables safety, connectivity, and integration of each residential subunit within the entire Manyatta. The GeoDesign process flow was informed by the concept of integration and compatibility therefore the zoning of different land uses to clinically ensure that one activity does not interfere with the ability of a neighboring land use to operate.

**Social change through planning.** Social change was envisioned through a multi-stakeholder approach to planning, participation, and evaluation. The stakeholders were encouraged to discuss and agree on the long-term development goals and then map backward to identify the essential prerequisites. The concept was accompanied by comprehensive and illustrative spatial design and mapping for a visual appreciation of the prevailing situation and the proposed vector of transition into a sustainable community as envisioned by the Manyatta residents and key stakeholders. The problem tree approach was identified to be the suitable

method for identifying the core problem in Manyatta according to the residents and what were considered their root causes and manifest effects.

**Spatial design.** The spatial design proceeded in two tiers, namely, the site situational analysis and GeoDesign formulation. Accordingly, the situational analysis primarily informed the direction and scale of spatial design. The GeoDesign was to be the spatial translation of the aspirational future anticipated by the Manyatta Community. This requires functional efficiency, improved environmental conditions, ease of movement, community integration, and unique place branding (a place with its own identity).

**GeoDesign process flow.** The anticipated GeoDesign stages were formulated as follows:

1. *Site suitability analysis*

- 1.1 Natural systems analysis
- 1.2 Existing physical developments on site
- 1.3 Transportation and circulation analysis
- 1.4 Utility and services analysis
- 1.5 SWOT analysis of site conditions and evaluation of site suitability

2. *GeoDesign formulation*

- 2.1. Existing land use
- 2.2. Land use spatial budget
- 2.3. Land use structuring elements
- 2.4. Conceptual spatial design
  - 2.4.1 Design alternatives
    - i. Minimalist model
    - ii. Transport oriented development model
    - iii. Compact/densification model
    - iv. Integrated model
  - 2.4.2 GeoDesign Structure Plan
    - i. Proposed Residential Land Use Plan
    - ii. Proposed Industrial Land Use Plan

- iii. Proposed Educational Land Use Plan
- iv. Proposed Recreational Land Use Plan
- v. Proposed Public Purpose Land Use Plan
- vi. Proposed Commercial Land Use Plan
- vii. Proposed Public Utility Land Use Plan
- viii. Proposed Transportation Land Use Plan
- ix. Proposed Conservation Land Use Plan

## 2.5 Detailed GeoDesign formulation

### 2.5.1. Preferred Site Plan

### 2.5.2 Transport and Circulation Plan

### 2.5.3. Utilities and Services Plans

### 2.5.4 Manyatta A and B 3D prototype

## **Field Data Collection: Implementation Framework**

This section details the data collection procedures and the results obtained in the first phase of the fieldwork conducted in Manyatta, Kisumu, Kenya. As envisioned during the planning stage, the exercise was executed through HH surveys, KIIs, and focus group discussions. The goal was to interview a representative sample of households in the Manyatta slum settlements, experts and opinion leaders in the county, and stakeholder groups trusted with giving a balanced view of the “people of the place” on development matters.

Preceded by a day of training in effective ways of administering the survey tools and handling technical and logistical issues, a team of 10 research assistants, one mapping assistant, and one field supervisor successfully executed the first phase of the fieldwork. Community mobilizers drawn from Manyatta assisted the research team on the ground to penetrate the area effectively and equitably. A sample size of 500 households was targeted and fully achieved. The overall team leader of the exercise ensured quality control from conceptualization, recruitment and training, field implementation, reviews, data processing, up to the final reporting stage. The

implementation framework consisted of a carefully selected workforce, quality control and assurance measures, and administrative and logistical procedures.

**Workforce constitution.** The workforce was made up of a team of two quality assurance consultants, 10 field RAs and one professional field mapping assistant. The 10 RAs were officially engaged after interviews, training, and pretesting using the approved questionnaires. Each RA was given a unique identification code for identifying his/her questionnaires and expected to administer a minimum of five questionnaires daily for 10 consecutive days. The RAs were experienced university graduates who have been working on similar assignments and are also native speakers of the local language (Luo) spoken in Manyatta. For easier penetration of the slum community, trusted community mobilizers were engaged to take the RAs around.

**Training and pretesting.** Before deployment, the RAs underwent a one-day intensive and interactive training session to comprehend the contents of the questionnaires and the mapping protocol. The exercise culminated in a role play to expose the RAs to different viewpoints and challenges they would face when administering the questionnaires. The following day was reserved for pretesting in an actual environment similar to the study area. Obunga slum, within Kisumu, was the selected pretesting location.

**Quality control and assurance.** Quality control and assurance permeated the exercise from the planning stage to the final stage. Quality assurance was implemented at four main levels: training, fieldwork supervision, quality checks on the designed and completed interview instruments, and performance evaluation before and after data entry and processing. Interactive evening sessions between the supervisors and the RAs were used to review performance for timely redress. This measure ensured the accuracy and completeness of the data collected. The results from the three tools were also subjected to the stakeholder forum for validation during the

FGD. Spatial validation was achieved by superimposing the geocoded data collection points onto a digital map of Kisumu showing settlements, roads, and key landmarks. To ensure data-collection quality and cost-effectiveness, a scientific formula was applied to evaluate the individual performance of each RA. To ensure data-collection quality and cost-effectiveness, a scientific formula was developed and applied to evaluate the individual performance of each RA. This approach has been confirmed to be a potent booster of productivity, accuracy, and the motivation to excel and cooperate (Adero, 2019).

***Equation 1: Performance evaluation model (Adero's construct 2017)***

$$W = .35P + 0.40N + 0.05S + 0.20D$$

where scoring out of 100 points for each variable is as follows:

*P* = productivity or questionnaires completed per day;

*N* = quality score of delivery on the normal questionnaire load assigned;

*S* = quality score on special assignment or leadership; and

*D* = score on cooperation and discipline (5% tolerance)

*Figure 4.10.* Performance evaluation model developed in Kenya. Copyright 2019 by Nashon J. Adero. Used with permission.

**Data and field reporting.** Reporting was both discursive and written. The field supervisor was the main link between me and the RAs. Continuous compilation of separate field reports was used to consolidate a final written technical report on the entire data collection exercise.

**Administrative clearance and coordination.** The following points helped to ensure smooth running of the entire exercise:

- securing an introduction letter from Kisumu County,
- prior communication to opinion leaders, and



- a clear statement on how the opinion leaders and community mobilizers would be facilitated in conducting the exercise.

### Findings from Survey, Interviews, and Focus Group

In this section we will discuss the study findings from HH, KII, and FGD, in that order.

**Household survey results.** As intended, 500 households were interviewed, hence reaching the intended target of 100. Households were mapped for scalability and visualisation of the spatial spread. In addition to this, other points of interest such as water points were also mapped to make up a total of 513 mapped points. In Figure 4.16 is the map of the points which were sampled. The full household data captured is available separately as Excel and SPSS files. As shown in Figure 4.11, less than half (44.4%) of the Manyatta slum community displayed a total lack of information about the SDGs while a quarter (25.6%) had only a faint understanding of the same. Only a tenth of the population (10.6%) had clear information on the objectives of the SDGs, the targets against which to assess their performance, and the strategies in place for their implementation.

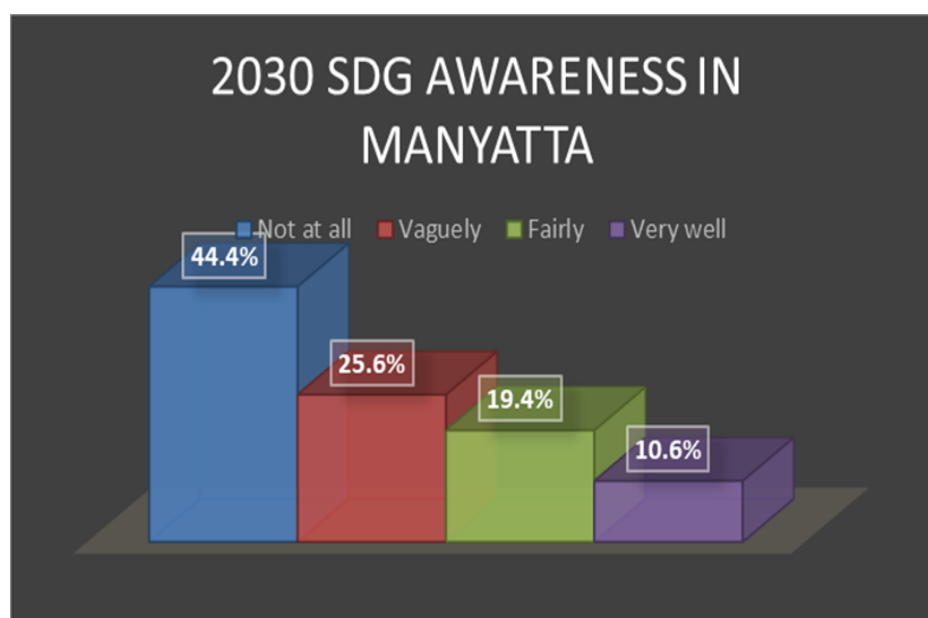


Figure 4.11. Summary of household survey results: SDG awareness.

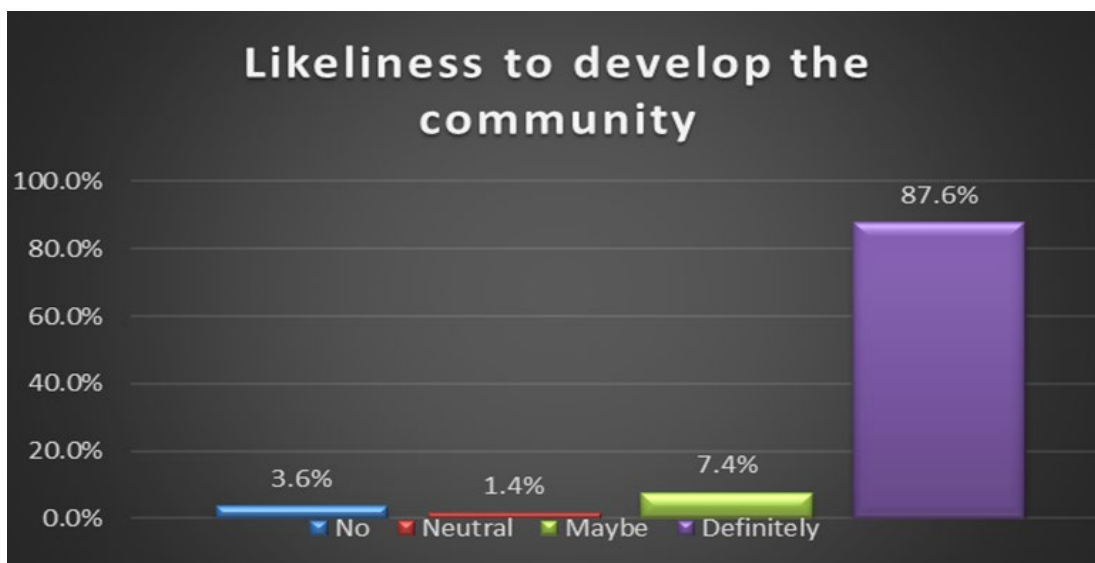


Figure 4.12. Summary of household survey results: Likeliness to develop community.



Figure 4.13. Summary of household survey results: Willingness to know more about maps.

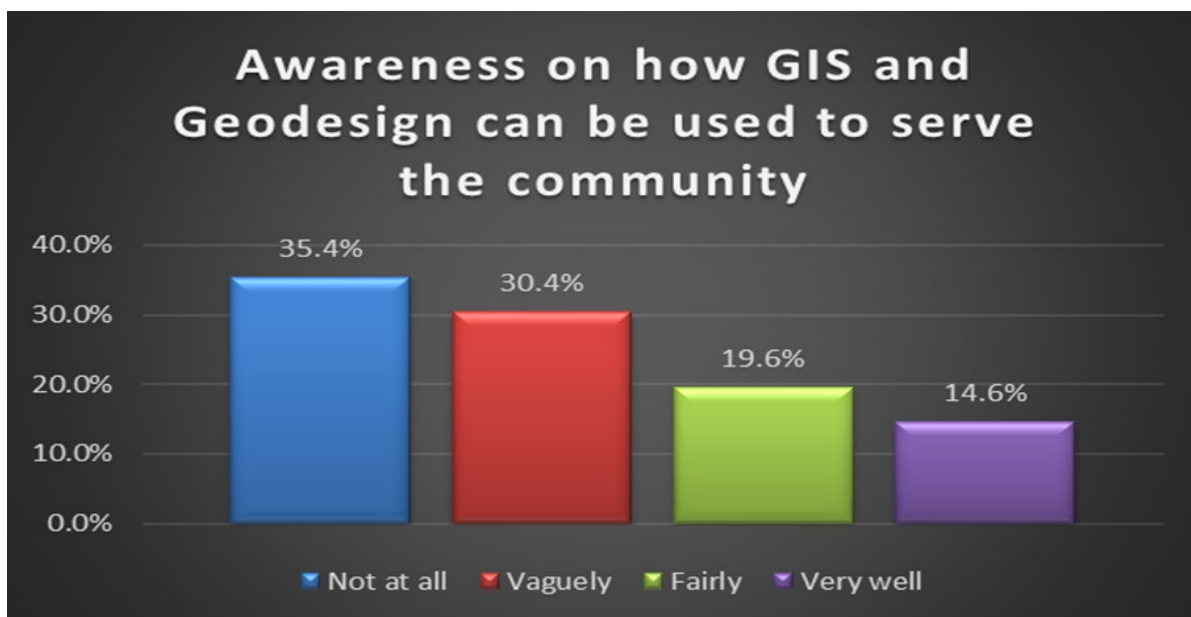


Figure 4.14. Summary of household survey results: Awareness of GIS and GeoDesign use for community.

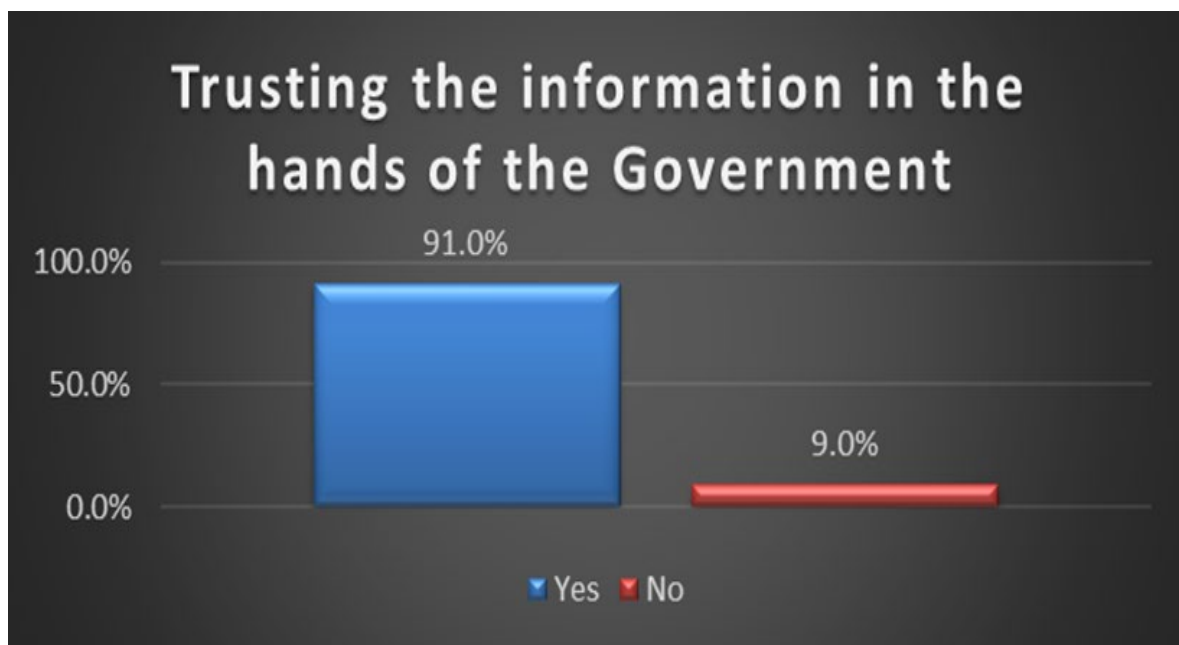
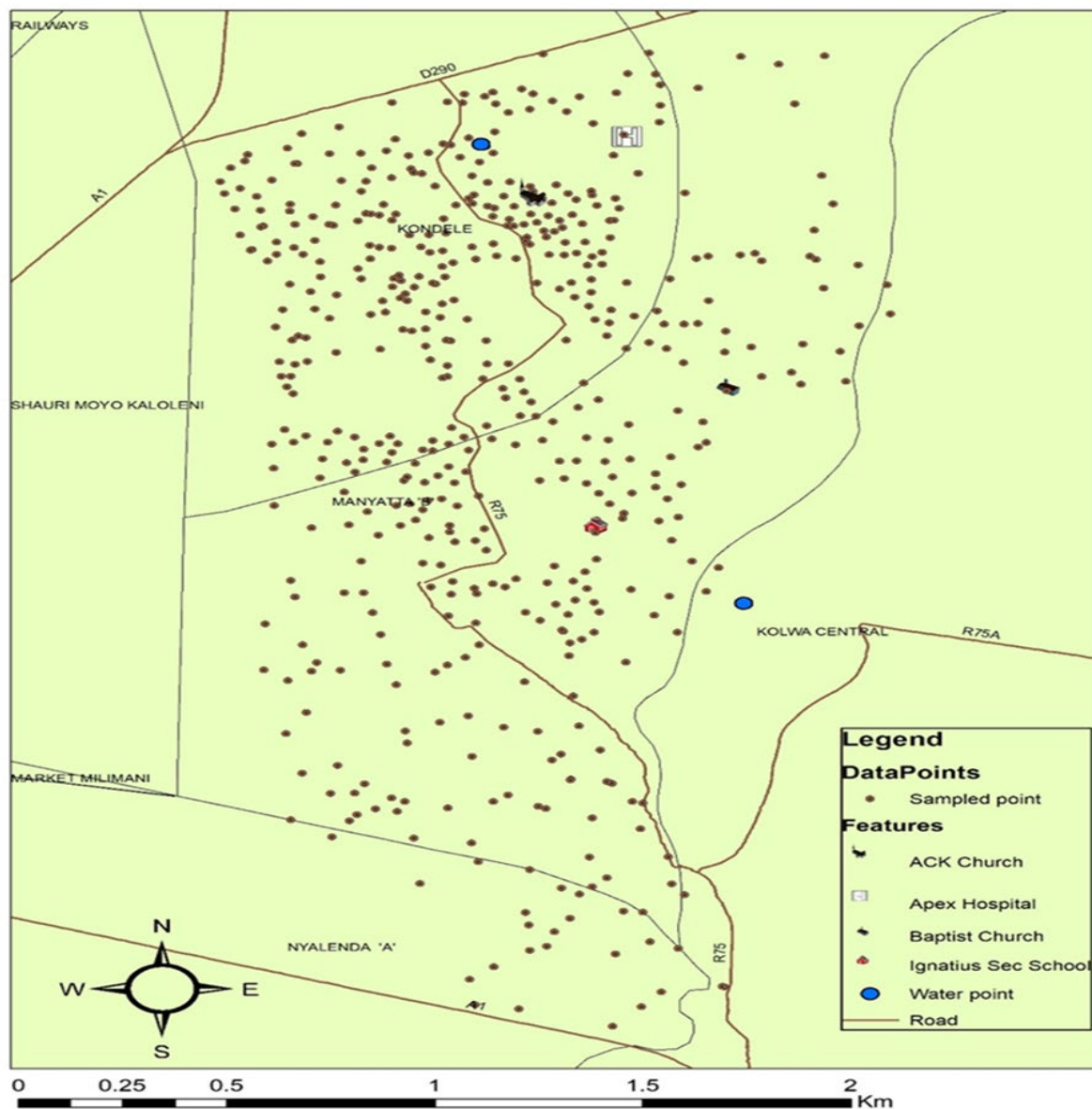


Figure 4.15. Summary of household surveys: Trusting information in hands of government.



*Figure 4.16.* Map showing the locations of the 513 points sampled in the study area during the household surveys in Manyatta, Kisumu, Kenya (500 HH and 13 formal and informal water points).

The HH questionnaire asked about problems the households faced followed by what they would want changed for a better Manyatta. When asked what problems they faced, the majority of the HH (87%) surveyed indicated poor sanitation and/ or poor waste management as their greatest concern. These findings were in line with those of the deliberations given by

stakeholders in both the FGD and PAR groups as presented in the pairwise comparison matrix in Table 4.5 and the problem tree analysis in Figure 4.19, respectively.

The results given by the households were consistent with those given by other stakeholders during the problem tree analysis when asked what they identify as the cause and other causes for the problems of poor sanitation and poor waste management. The problem, they agree, would be remedied by planning.

**Composition of KII and FGD participants.** The KII and FGD participants were chosen from the same general pool of the Manyatta community based on inclusivity of sectors or stakeholder groups, gender, and age. The sectors are composed of representation from the government at both national and county levels to ensure equal administrative representations; also included were the civil society, business community, persons with disabilities, the youth, women, religious groups, and so forth, for the purpose of getting diverse opinions. Gender as a factor was a primary consideration to ensure the need for inclusion of women in decision making as enshrined in the Kenya 2010 constitution. On the issue of age, it was important that the voices of the youth be included to have their views as they are the future targeted to give the economy the forward push it needs. The general pool of the Manyatta community in this study also included government employees who worked within Manyatta but resided elsewhere. It should be noted that the composition is the same for KII and FGD but different participants.

**Key informant interview results—Analysis and Interpretation.** There were 11 key informants—seven males (63.6%) and four females (36.4%), thereby meeting the one third gender rule representation as required on any engagement set by the Kenya 2010 constitution. The majority, 63.6% and 18.2% respectively, had worked with Manyatta informal settlements for between 11 and 20 years and over 20 years. Only one participant (9.1%) had lasted less than five

years working in the community. This by extension could be interpreted as most KII having extensive knowledge of the slum. All participants had acquired at least secondary school education, with five (45.0%) being at university level, and three at non-university tertiary education. Unlike the general population of the Manyatta slum, the leadership and stakeholders are well informed groups. They have a very good understanding of the United Nations SDGs and are aware of the implications of their proper implementation. A crosstabulation of awareness of SDG and education levels (Table 4.4) revealed levels of awareness positively related to education levels with only one person—the one at the lowest level of education (secondary)—giving a negative response. With respect to gender, there was no evidence showing any of the gender categories as having greater awareness of the SDGs.

Table 4.4

*Education Level of Respondents in Relation to Awareness of the UN SDGs*

Education of respondents	Are you aware of United Nations SDGs?		
	<u>Yes</u>	<u>No</u>	<u>Total</u>
Secondary	2	1	3
Tertiary (non-university)	3	0	3
University	5	0	5
Total	10	1	11

In terms of level of awareness, quality healthcare tops their list (at 45.5%) followed by zero hunger (food security), sanitation, quality education and gender equality all at 27.3%. This revelation of awareness is a plus in attempting to spread the news and strengthen the SDGs awareness amongst the members of the slum community. However, health and housing were the

two areas mostly cited (by 72.7% and 45.5% of the KII) as the key result areas that SDGs goals are expected to target in the slum as depicted by Figure 4.18.

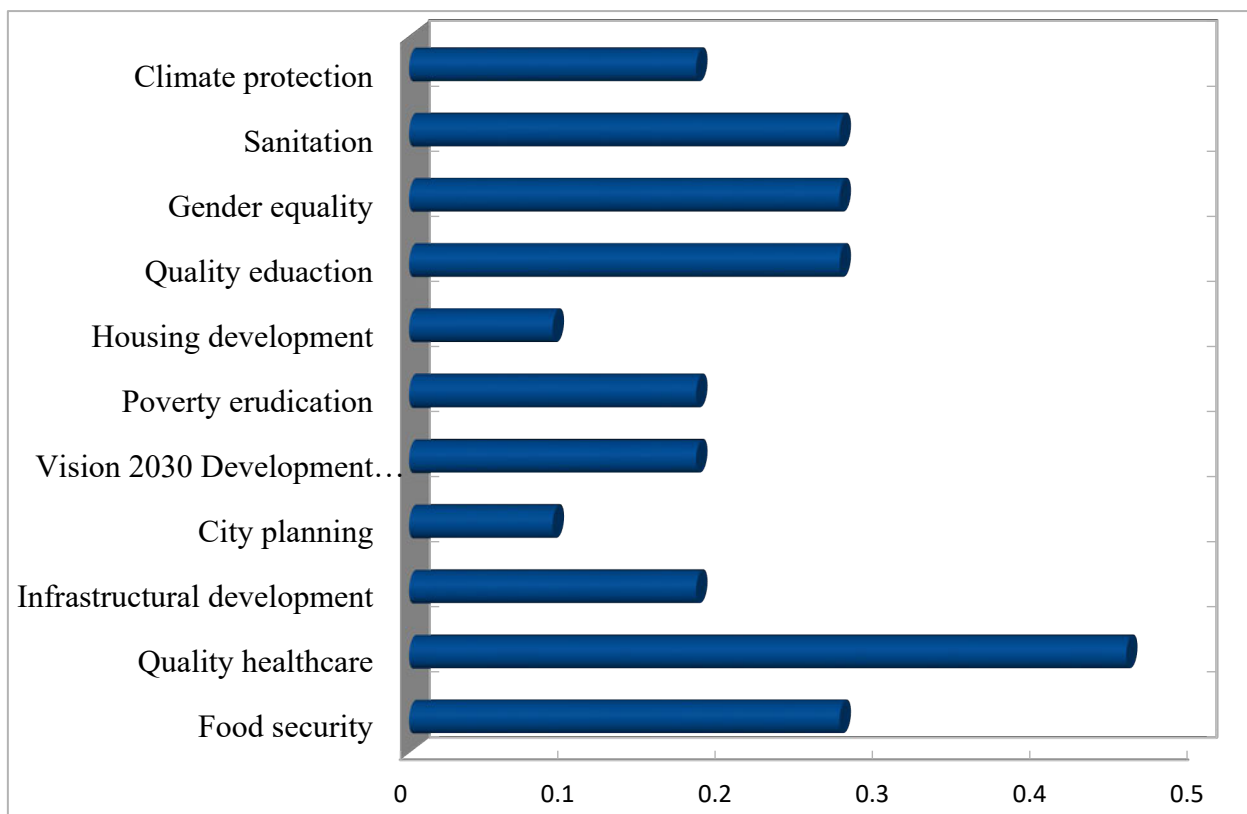


Figure 4.17. Awareness of SDG target areas among key informants.

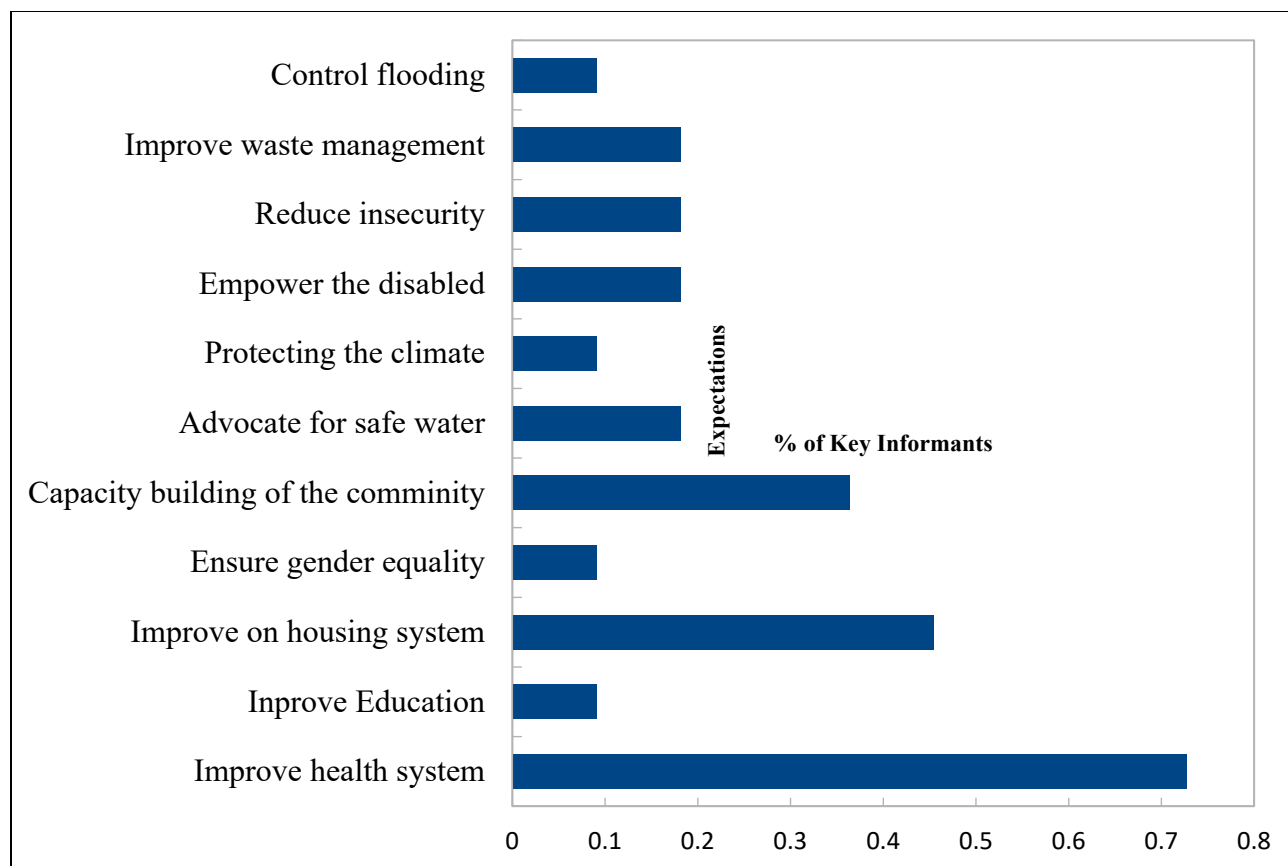


Figure 4.18. Key informants' expectations of the SDGs.

The stakeholders assertively envisioned a new Manyatta with the implementation of the SDGs which they believed must be initiated from the community itself but with only little help from their development partners. They foresaw Manyatta having an improved housing system, clean water, well equipped schools and health care centers, youth empowerment, and improved sanitation resulting from the expected adoption of modern waste management methods.

Information is power and stakeholders' high level of demonstrated awareness of geospatial information technology helped to simplify the process of the GeoDesign of Manyatta. Also, the community members and the stakeholders trusted the technology to help identify development gaps, correct the problems experienced in developing land tenures systems in Manyatta B and to ensure equitable distribution of resources in the slum. Their expectations of the



GeoDesign of Manyatta was evident in their unanimous positive reply to willingness to know more about geospatial information and the way the technology might help transform their community.

### **Focus Group Discussion Results**

Thirteen participants shared their opinions on how to improve the Manyatta community in a discussion setting (Figure 4.19). The discussion, which included a GIS demonstration, revealed a general agreement by the participants about the power of GIS and GeoDesign, mainly due to and in relation to concerns associated with livelihood opportunities as well as community development. The discussion yielded valuable insights into the underlying hopes of the people in Manyatta for improving development.



*Figure 4.19.* Focus group discussing Manyatta issues at Joventure Hotel in Kondele, Kisumu. Photograph by author.

The stakeholders spoke about the following matters:

- The feeling of how things operate in Manyatta and what could be done to address them effectively.
- The quality of life in the Manyatta settlement in terms of the planning and design of critical amenities.
- The settlement package foreseen for residents in Manyatta to build family houses, toilets, schools, healthcare facilities, and water supply on the allocated area; and
- Identifying the likely community-based support approaches to effective planning in Manyatta.

Most residents of Manyatta have lived in the place for more than 20 years and have served residents in different capacities such as church leaders, chiefs, youth leaders, among others.

**How life in Manyatta was described by participants.** Life in Manyatta settlement has been good, according to most of the members of the focus group, though several challenges were cited. The area was depicted to have improved in development, but some obstacles nullify the gains achieved over the years. Gender-based violence is rampant in the Manyatta area, and drug abuse among youth is a big problem. Manyatta residents suffer from inadequate services due to poor sanitation, and few health facilities, schools and recreational facilities. Shockingly, a population of 30,000 people have one public primary school and no public secondary school in the area. Manyatta A and B have one public health facility serving all 30,000 individuals that puts their health at risk. The other health facilities are private and are unaffordable to the lower income residents. Due to long distances to public schools, most girls are susceptible to *boda boda* riders who misuse them, with many early marriages resulting in the area. A *boda boda* is a bicycle or bike which provides “for hire” services for goods and passengers and serves a niche market and provides short service and off-road trips in high density, unplanned settlements where high capacity vehicles cannot pass (Mutiso & Behrens, 2011).

The participants of the focus group discussion (FGD) felt that the future of Manyatta is quite positive, though many policies must be implemented for such a promising future to be achieved. The civil society, County Government, and the international community should come up with strategies and programs that would aid the people to better their lives. The future Manyatta envisioned would have improved security with adequate streetlights, proper planning (location of schools, markets, health centres, and police stations and posts) and land for development.

Additionally, the members of the FGD felt the people needed to change their attitudes toward development. For instance, landowners tend to exploit the government by hyping land prices when land is required for development. It is advisable that they should be honest and avoid restricting the government from implementing its programs. The focus group participants felt that they could make a difference in how their future turns out, and they were positive in this area. Indeed, they see Manyatta as the best place in Kisumu because they possess critical assets in the area. It was agreed that structures should be put up in the right place to avoid commotion during the demolition of structures by different government authorities. The level of ignorance needs to be reduced by just adhering to government rules and regulations.

The focus group's message can be summarized in the following way: "The most conducive climate for real, organic, and sustainable transformation in Manyatta should nurture industrialization, empowerment through public education, civic engagement, public sensitization, livelihoods, social security, effective leadership and political goodwill, and environmental planning. This multidimensional climate should eventually mature these factors into critical drivers of sustainable development in Manyatta. The FGD participants viewed broader

sensitization and information campaigns on GeoDesign as key to achieving informed, co-owned, and sustainable development decisions.”

***Good governance appeal.*** All FGD participants did not feel they were getting the help they needed to live out their dreams because of poor governance and a lack of political goodwill. Demolition of illegal structures affects most of the residents, especially businesspeople, for example. Traders incur heavy losses after being sent away from their land because they bought pieces of land from land grabbers.

***Best compromise by democratic outranking.*** Furthermore, in a group process of ranking, the FGD participants responded that if given a chance to make a change, they would prioritize and address these areas as shown in Table 4.5:

1. education empowerment, sensitization, civic education, and consultative meeting;
2. health and sanitation;
3. social security;
4. agriculture and food security;
5. effective leadership and political goodwill; and
6. industrialization and unemployment.

The six items are shown in Table 4.5 and, to repeat, came from the participants who then categorized and ranked using a 6 x 6 pairwise outranking matrix as shown.

Table 4.5

*Focus Group Participants' Ranking of*

<b>Issues</b>	<b>Issue Code</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>Frequency of Score</b>	<b>Overall Rank</b>
Sensitization, civic education & consultative meetings	1		2	1	4	1	1	3	3
Health and sanitation	2			2	4	2	2	4	2
Social security	3				4	5	6	0	6
Agriculture and food security	4					4	4	5	1
Effective leadership and political goodwill	5						5	2	4
Industrialization and unemployment	6							1	5

After this ranking exercise, it was established that most participants would focus on agriculture and food security, which ranked first. The second position went to health and sanitation, followed by empowerment through public education, sensitization, civic education and consultative meetings in the third position. The fourth position was taken by effective leadership and political goodwill. The fifth position was about issues of industrialization and unemployment and the sixth (and last) position was taken by social security. The FGD revealed a consensus on the promising potential GeoDesign holds for improving the livelihood opportunities of the community. The discussion provided valuable insights into the underlying hopes of the people in Manyatta for improving development and correcting for past design and planning failures.

**From the Focus Group to PAR**

The focus group discussion confirmed the importance of building robust peaceful coexistence, policies and programs that are inclusive of the local community. The most conducive climate for real, organic, and sustainable transformation in Manyatta should nurture industrialization, empowerment through public education, civic engagement, public sensitization, livelihoods, social security, effective leadership and political goodwill, and environmental planning. This multidimensional climate should eventually mature these factors into critical drivers of sustainable development in Manyatta. The focus group participants viewed broader

sensitization and information campaigns on GeoDesign as key to achieving informed, co-owned, and sustainable development decisions. In general, all participants would be impressed and happy if their settlement was mapped out and designed to their liking. It would be great to improve planning of the Manyatta area to allow for further development. Residents need change and GeoDesign would be of great help if fully implemented. At least three participants from the focus group discussion together with three from the key informant interviews and from the Household surveys were invited to participate in PAR discussion for the design of the community.

### **Participatory Action Research Engagement in Kisumu**

The PAR engagement took place on October 7 and 8, 2019 in Kisumu with 19 participants as shown in Table 4.6. All the participants introduced themselves before the discussions. Thereafter, as researcher I addressed the participants, bringing out the main aim of the project so that all the participants could get the exact direction on the discussions. The GIS expert also had an opportunity to do an illustrative demonstration to ensure all the participants understand the meaning and the applications of GIS and GeoDesign in real life. The final part of the introduction covered explicit illustrations on the problem tree analysis approach further explained in the following section. The participants understood what the stem, root, and leaves implied in this approach from a simple tree illustration on the whiteboard.

Table 4.6

*PAR Participants in Manyatta, Kisumu*

<b>S/N</b>	<b>Name</b>	<b>Designation</b>
1	Sospeter Oduor	Village Elder
2	Paul Ego	Resident, Manyatta B
3	Silas Mauji	UN-HABITAT Sociologist
4	Andrew Odhiambo	City Planner
5	Joshua Ochieng	Ward Administrator
6	Collins Kodhek	Head of Programs Jamii CBO
7	Paul Otieno	Persons with Disability
8	Grace Wafula	Politician
9	Millicent Atieno	Kondele Business Chairlady
10	Angeline Okindo	Ward Administrator
11	J. Otieno Kabisai	Senior Chief of Manyatta B
12	Maxwell K. Otieno	Physical Planner
13	Philip Onyuna	Chief for Manyatta A
14	Stella Onamu <sup>a</sup>	Research Assistant
15	Benard Odhiambo <sup>a</sup>	Research Assistant
16	Antony Okundi <sup>a</sup>	Research Assistant
17	Kepher Otute <sup>a</sup>	Research Assistant
18	Beda Ogolla	Supervisor
19	Etta Jackson	Antioch University Researcher

<sup>a</sup> The RAs at the planning stage offered general assistance in facilitating the sessions and performed very well. Two RAs functioned as secretaries who supported each other in ensuring all responses were captured without overlooking anything. Another RA, who is a resident of Manyatta A, and an environmentalist, proved very helpful with his knowledge of the area; he was a guiding figure on boundaries during the sketches. Another RA and also the Urban Planner guided the PAR Group through the planned GeoDesign of Manyatta and in the development of the sketches they produced.

## **Problem Tree Discussions**

Through the use of problem tree analysis, a problem can be broken down into manageable and definable chunks (Dillon, 2019) that enables a clearer prioritization of factors and helps to focus objectives and shortens the period necessary for critical analysis of the problem. An experienced facilitator is helpful to guide the process who can detect when the participants are off track to guide them back especially when deciding on the core problem. The method is well supported by the pairwise comparison matrix (PCM), a technique used to tackle the subjective and objective judgments regarding qualitative and/or quantitative criteria is the multicriteria decision making (MCDM) that Kou, Ergu, Chen, and Lin (2016) applied in assessing the problems faced by the residents. The problem tree analysis technique was used very effectively in the Manyatta study especially in identifying the core problem, in large part due to the complimentary use of PCM applied prior to PAR during the focus group discussion.

**Identifying core problem.** To assist participants in identifying what they considered to be the core problem in the community, problem tree analysis was used to engage the group of enthusiastic participants. This problem and solution tree approach, as suggested by Snowdon, Schultz and Swinburn (2008), is used to work through layers of determinants and then develop potential interventions for a specific issue using available data and expertise. Participatory research is more of an orientation than a set of methods which emphasizes the importance of the knowledge and views of the community (Leung, Yen, & Minkler, 2004). This approach focuses on visualizations which are commonly used to assist the process (Cornwall & Jewkes, 1995; Rifkin, Lewando-Hunt, & Draper, 2000), and usually include mapping and diagrams.

The participants were guided through the problem tree approach and asked to identify the core problem in Manyatta as well as the causes and effects of that problem. In the process of



identifying what is referred to as the core problem, the participants made inventories of their core problem using pink stickers. A raw list from the inventories is shown in Table 4.7.

Table 4.7

*Participants Responses to Core Problems*

<b>S/N</b>	<b>Core problem responses</b>
1	Road networks and design
2	Lack of planning and poor sanitation
3	Sewerage
4	Inadequate space/land
5	Drainage system
6	Unemployment
7	Land tenure system
8	Poor drainage system
9	Poor waste management system
10	Lack of Toilets
11	Lack of Jobs for Youths

The participants restructured the raw list into a new list of nine core problems (Table 4.8).

Table 4.8

*Participants' Restructured Raw List of Core Problems*

<b>S/N</b>	<b>Restructured core problems</b>
1	Poor road networks
2	Poor sanitation
3	Poor sewerage system
4	Poor drainage system
5	Unemployment
6	Land tenure system
7	Poor waste management system
8	Lack of public toilets
9	Lack of jobs for youths

The participants were from two different administrative regions and could not agree on a core problem, so they formed two groups of Manyatta A and Manyatta B. The groups were reunited and with further discussions Manyatta A settled on poor sanitation as their core problem whereas Manyatta B settled on poor waste management as their core problem. The participants combined all these problems to be poor sanitation and poor waste management as the core problem. Identified problems that cut across Manyatta A and Manyatta B are shown in Table 4.9.

Table 4.9

*Participants' Agreed Core Problems for Both Groups*

<b>Problem</b>	<b>Manyatta A</b>	<b>Manyatta B</b>
Poor Sanitation	Exist	Exist
Poor waste management system	Exist	Exist
Unemployment	Exist	Exist

**The root cause and other causes of the core problem.** Participants made inventories of possible causes of poor sanitation and waste management using yellow stickers and the full list as shown in Table 4.10. They then identified the root cause of poor sanitation and waste management to be poor planning and the rest were other causes.

Table 4.10

*Participants' Reasons for Core Problem*

S/N	Causes of poor sanitation in Manyatta
1	Poor drainage system
2	Lack of proper sensitization on waste management
3	Lack of skips and waste disposal in marketplaces
4	Inadequate public toilets
5	Weak policy implementations by the authorities
6	Poor services from public health department
7	Uncoordinated government development programs
8	Poor planning
9	Poor participatory engagement and prioritization
10	Incompetent staffs in various offices
11	Corruption and governance issues
12	Unequal distribution of resources
13	Lack of enough sewer lines in the region
14	Poor maintenance of the existing sewer lines leading to the frequent leakages
15	Poor soil topology
16	Over reliance on donor funding
17	Lack of comprehensive waste management policies
18	Inadequate resources in the region

**Identifying the effects of the core problem.** The participants made inventories of the effects of poor sanitation and waste management using orange stickers and the final list is shown in Table 4.11.

Table 4.11

*Participants' List Effects of Poor Sanitation*

S/N	Effects of poor sanitation in Manyatta
1	Outbreak of diseases like cholera in the region
2	Poor living environment
3	Poor living standards of the residents
4	Flooding in the region
5	Bad neighborhood
6	Diminishing finances
7	Dependence on donor funding
8	Abuse of public places
9	Environmental pollution
10	Dirty markets, as a result of few skips and dumping points
11	Deaths resulting from collapsing buildings
12	Increased insecurity in the region
13	High cost of house construction in the region
14	Uncontrolled child mortality

Figure 4.20 shows the tree formed from the discussions of findings on the core problem.

Root causes are in pink, other causes, yellow, and finally the effects are in orange.



Figure 4.20. Tree formed from discussion on core problem.

The core problem, root cause, other causes, and the effects as represented on a tree are shown in Figure 4.21.

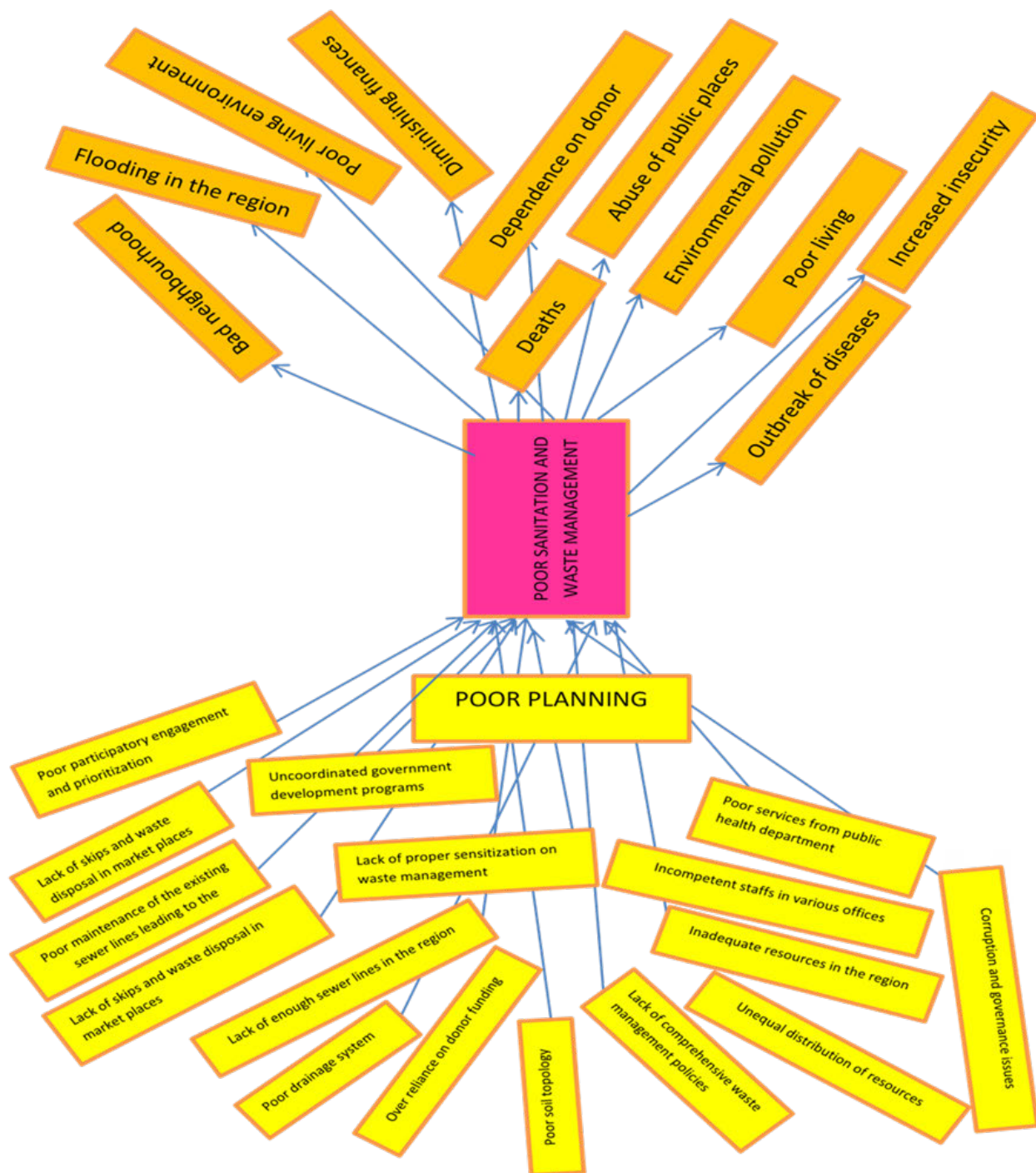


Figure 4.21. Core problem, root cause, other causes, and effects.

**Identifying the solutions to the core problem.** The participants provided the list of all possible solutions to the causes of the core problem (Table 4.12)

Table 4.12

*Solutions to Core Problems by PAR Participants*

S/N	Proposed Solutions to core problem
1	Change of mind set by the citizens
2	Proper civic education on environmental issues
3	Proper planning and effective implementations
4	Sector institutional reforms on health and environment
5	Capacity building
6	Increasing resource allocation
7	Effective monitoring and evaluation system
8	Transparency and accountability in implementation
9	A concrete GIS database to keep the community up to date

**Stakeholder analysis.** The next session in the PAR process was stakeholder analysis. The participants, the same as those who participated in the problem tree analysis, received full instructions on the stakeholder analysis to help them comprehend various opinions of the stakeholders in their community. Freeman (1984) described stakeholders as individuals who affect or may be affected by decisions and actions that fit with the organization's objectives. He proposed a framework of three levels for stakeholder analysis: rational, process and transactional. Freeman suggested that the level from which each stakeholder is operating should be identified.

Stakeholder analysis can be an effective tool to engage a group in systems thinking (Elias, 2017) with the goal of laying out the issues under consideration which the problem tree analysis brought to light. The process then involves identifying the major stakeholders or actors who would have an interest in these issues. This includes those who may be affected by these issues and those who could have an influence or power to affect change positively. And, to determine

and those who could have an influence or power to affect change positively. And, to determine the roles that each stakeholder would play based on each person's interest and power/influence by identifying their current roles, interests, and power positions.

Following the introduction and explanation of the stakeholder analysis approach, participants then provided the list of the stakeholders in Manyatta who they feel are integral to the transformation of Manyatta. Those stakeholders are listed in Table 4.13 below.

Table 4.13

*Manyatta Stakeholders and PAR Participants*

<b>S/N</b>	<b>Manyatta stakeholders provided by the PAR participants</b>
1	Residents
2	Opinion leaders
3	Local administration
4	County administration
5	Religious leaders
6	Civil society organizations (e.g., community based organizations, NGOs)
7	Business community
8	Politicians
9	Development partners
10	Academia (for instance universities, research bodies)
11	Professional bodies
12	Government Agencies and Regulators

The categories of participants chosen to participate in the PAR discussion are shown in

Table 4.14.

Table 4.14

*Manyatta PAR Responses to Stakeholder Analysis*

		<b>INTERESTS</b>	
		<b>Low</b>	<b>High</b>
<b>POWER</b>	<b>Low</b>	Religious leaders	Business communities
	<b>High</b>	Residents Local administration County administration Politicians Development partners Academia Professional bodies	Opinion leaders Civil society members Government agencies

The discussion for the first day ended at this point, that is, with the categorizing of stakeholders as shown in Table 4.14. The next meeting was held the following day, October 8, 2019, and proceeded with the same participants in the same number as on Day 1 (Table 4.15).

The second day was focussed on the situational analysis and GeoDesign. The RAs at the planning stage offered general assistance in facilitating the sessions and performed very well. Two RAs functioned as secretaries who supported each other in ensuring all responses were captured without overlooking anything. Another RA, who is a resident of Manyatta A, and an environmentalist, proved very helpful with his knowledge of the area; he was a guiding figure on boundaries during the sketches. Another RA and also the urban planner guided the PAR Group through the planned GeoDesign of Manyatta and in the development of the sketches they produced. All the participants from the first day meeting—as identified in Table 4.6—returned and participated in the stakeholder analysis.

The main area of interest was having the participants of each ward engage in a participatory mapping exercise to sketch the existing maps of Manyatta A and Manyatta B they



currently know and then sketch what future Manyatta A and Manyatta B should entail. The purpose of this exercise was to ensure that the design of the community reflected what the PAR participants wanted and knew were the changes most relevant to having the life they envisioned for themselves. They arrived at the conclusions with their existing maps (Figures 4.22 and 4.23).



*Figure 4.22.* Map of existing Manyatta A. Product of this research process.



*Figure 4.23.* The Manyatta A of the future. Product of this research process.

The existing map of Manyatta A in Figure 4.22 illustrates the present location of social amenities and infrastructures while the Future Map in Figure 4.23 illustrates a visual intelligence of where the future social amenities and infrastructures should be situated. Additionally, it is the

proposed development horizon drafted by the target community courtesy of the participatory action research. Table 4.15 lists views on proposed changes for Manyatta A.

Table 4.15

*Citizens' Proposed Changes for Manyatta A*

S/N	Proposed changes
1	Increased number of floodlights
2	Installation of garbage collection points in every market
3	Installation of recycling centers in the region
4	Having a secondary school in the Arina area
5	Creation of recreational centers
6	Having more rehabilitation centers
7	Having at least a vocational training center within the region
8	Having a police station within the region to enhance the security
9	Having the office in Gonda separated into two distinct parts

Figure 4.24 shows the existing map for Manyatta B, followed by Figure 4.25 showing the group's idea for Manyatta B of the future.



Figure 4.24. Map of existing Manyatta B. Product of this research process.



*Figure 4.25.* The Manyatta B of the future. Product of this research process.

As is the case of Manyatta A, the existing map of Manyatta B in Figure 4.22 illustrates the present location of social amenities and infrastructures while the Future Map in Figure 4.23 and are more specific to the needs of the Ward which is different in typology and topography to Manyatta A. This illustrates a visual intelligence of where the future social amenities and infrastructures should be situated. Additionally, it is the proposed development horizon drafted by the target community courtesy of the PAR. Table 4.16 lists views on proposed changes for Manyatta B.

Table 4.16

*Citizen Proposed Changes for Manyatta B*

<b>S/N</b>	<b>Proposed changes</b>
1	More feeder roads tarmacked
2	Modern markets in the regions
3	More dumping sites
4	Police post within yellow bridge
5	Floodlights within the centers
6	Floodlights within the centers

Before finalizing the participatory action research discussion, participants had an opportunity to identify various stakeholders within their respective communities to act on initiating these changes. They identified the areas and specific names of individuals in most cases, even though there were instances where they did not produce the names instantly and they agreed to hold a *baraza* (a Swahili term meaning to deliberate in a meeting held by a collective group of people of wisdom) to ensure equal distribution of roles within Manyatta A and Manyatta B.

Table 4.17 lists the roles and individuals with interest/power/influence they feel could be responsible for undertaking the implementation of the newly agreed on development plans. The proposed plans are meant to produce an organized community that reflects better and more appropriate land use and in which the design elements provide for a better, livable, compatible, harmonious, and sustainable living experience in Manyatta.

Table 4.17

*List of Stakeholders to Execute GeoDesign Plan*

S/N	Stakeholder/ Role	Proposed changes
1	<b>Local administration</b>	Angeline Okindo Joshua Ochieng Phillip Onyina John Kabisai
2	<b>Sensitization</b>	Collins Kodhek Collins Otieno
3	<b>Mobilization of all Resources</b>	Winnie Janet Ogot Doris Ombara
4	<b>Community representation</b>	Paul Ego
5	<b>Legislation, representation, and oversight</b>	Joachim Oketch Pamela Okinyi
6	<b>Youth leaders</b>	<i>To be selected from the slated meeting and should include:</i> <i>Youth from Manyatta A</i> <i>Youth from Manyatta B</i> <i>Person with disability from Manyatta A</i> <i>Person with disability from Manyatta B</i> <i>Women representative from Manyatta A</i> <i>Women representative from Manyatta B</i> <i>Faith-based representative</i>
7	<b>Business community representative</b>	Millicent Omollo
8	<b>Resident Association leader</b>	Grace Wafula Samuel Nyakundi

The identification of these stakeholders and selection of the specific individuals marked the end of the PAR conducted October 7 and 8, 2019, at Joventure Hotel in Kisumu.

**Situational analysis of Manyatta.** The concept of situation is key, argued Clarke (2005, p. 9) who was inspired by several scholars to include Thomas's (1923/1978) theorem from the 1920s which states that: "If situations are perceived as real, they are also real in their consequences." This theorem is at the heart of social constructionism and symbolic interactionism, which is foundational for situational analysis (SA), and citing others, Clarke concluded that the key point is that in SA, the situation itself becomes the fundamental unit of analysis.

Situational analysis is meant to "turn up the volume" on all the lesser but present discourses in any given situation (Clarke, 2005). The needs and goals of all those who are directly or indirectly impacted by the research was the aim of the study in Manyatta. The SA maps sought to be most inclusive to ensure that the SA maps reflect the hopes and aspirations aimed at making the life situation of the community better (Genat, 2009). The new root of situational analysis is reflected in Foucault's (1973) work on discourse around moving beyond "the knowing subject" to focusing on the social context in which the subject lives thus decentering the knowing subject and memo-ing to look at how order is made from the chaos of the world she/he inhabits. SA therefore moves beyond the knowing subject as the centered knower and decision-maker to also one engaged in the discourse and analysis of the situation that is at the center of inquiry.

Clarke (2005) clarified that the conditions of the situation are in the situation itself and there is no such thing as "context." That, the conditional elements of the situation need to be specified in the analysis of the situation itself as they constitute the situation. They are it. Situational analysis is able to make known the situation of any environment by all the actors, whether they are close by or afar, as with the diaspora, based on how the situation is being experienced. The situational analysis is inextricable from the data harvested from the household

surveys, key informant interviews, the focus group discussions, and participatory action research/ GeoDesign discussions. The analysis of the data gathered from the household surveys illustrated the current economic, cultural, environmental, and infrastructural realities in Manyatta. These prevailing phenomena informed the engagement with the key informants and were encapsulated in the questionnaires administered to them. The key informants, being relevant community authorities, regularly interact and solicit feedback from the public and act as channels through which community problems and needs get communicated to the relevant governmental bodies for development assistance. On the other hand, focus group discussions enabled specific problems identification from diverse groups in Manyatta. This paved the way for the participatory action research. The PAR sought to provide a comprehensive framework where the information from the households, key informants and focus group were converged in a common way to categorize their problems and explored ways to address them. It is from this active participation that the most spatial prescriptions were made hence the use of GeoDesign.

The geographic area and location of Manyatta is an informal settlement and a sublocality in the City of Kisumu. It is situated at - 0.0863 S latitude and 34.7824 E longitude and can be mapped to the closest address of Manyatta, Kisumu, Kenya. A situational analysis of this location finds a proud community living with many challenges as is the case in many or all informal settlements. The situation described by the members of the community who live there and have administrative responsibilities for the living conditions and functioning of the community. These include the government, civil society organizations, religious organizations, farmers, businesspeople, academia, et cetera.

**Geospatial data describing situation.** This study sought to support one of the premises of situational analysis made by Charmaz (2005) and Clarke et al. (2018); it explores the

relational ecologies between human and nonhuman actors with their environment together with the structural, institutional, social, socio-political, cultural, and historical worlds in which they live. The extensive household surveys conducted with the aid of GPS devices, coupled with recorded observation and description of the physical landscape allowed for the capturing of location data. The data provided import and information of the human and nonhuman situation in the location both from the perspective of the interviewer and the data provided by the interviewee. Key informant interviews provided data from a perspective of respected community leaders regarding the situation in Manyatta. The focus group discussion gave voice to the situation as they experienced it but additionally what is needed to change the situation.

The data gathered through problem tree analysis provided rich information about poor sanitation and waste management which contributed to many health issues to produce a troubling social, environmental, and economic situation for all. The participatory mapping activities included members of all previous groups and provided the opportunity to apply the nascent aspects of GeoDesign; to help make visible the physical situation in an interactionist approach (Genat, 2009) as part of the participatory action research approach meant to inform social policy decisions that would remedy the reality in the neighborhood. The situational data gathered is meant to change the geographic features on the landscape that have not served the community well and to create a future that more accurately reflects a vision of the community that is viable.



Table 4.18

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*Ordered Map Reflecting the Human and Nonhuman Elements in the Situation*

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***Individual Human Elements and Actors***

President of Kenya; Governor; Deputy Governor; County assembly officers; ward administrators; members of County Assembly; doctors; business leaders; professionals; ward chiefs; and persons with disability (PWD)

***Collective Human Elements***

Farmers Association; academia; NGOs; youth organizations; community organizers; professional organizations; key informants; households; focus groups; business organization; community-based organization (CBO); and religious organizations

***Discursive Construction Human Actors***

community organizer, professionals, head of household, key informants, focus groups, and PAR discussion group

***Nonhuman Elements and Actors***

The United Nations; UNDP; The 2030 Agenda; African Union; East African Community (EAC); RCMRD; Lake Victoria; National Government of Kenya; County Government; Location (Manyatta); Health System, Judicial System; County Planning Ministry; Treasury; Big Four 168 Initiative; Medium Term Plan (MTP); Country Integrated Development Plan (CIDP); poverty; rape; PAR mapping; official water points; informal water points; cholera; malaria; HIV-AIDS; poor sanitation; poor waste management; city planning; Kisumu Transportation —*tuk tuk* and *boda boda*; unemployment; participatory ward designs; education; youth; culture and social services; water, energy and natural resources department; commercial, economic and planning and development; and agriculture, livestock and fisheries

***Implicated Actors***

GIS; GeoDesign; World Wide Web; earth observation; the Cloud; cloud computing; aerial imagery

***Sociocultural/Symbolic Elements***

African; East African; Luo; Luo mother tongue; Swahili; and English

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Figure 4.26 is a messy situational map (Clarke, 2005) of the human and nonhuman elements and actors, collective human elements, discursive construction human actors, implicated actors and sociocultural/symbolic elements in the situation of Manyatta.



Figure 4.26. Messy situational map of human and nonhuman elements in Manyatta.

**Positions taken in Manyatta.** The stakeholder analysis exercise brought forward the individuals and positions both ascribed to them by the community and those they accepted toward the implementation of solutions to their described future. The positional map (Clarke, et al., 2018) is a key component of the situational analysis method and can be an innovative analytical tool for

better understanding relationships and the position each holds on key issues in the situation as in the study done in Manyatta.

These identified positions must be democratically arrived at and cannot be representative of any single individual or group but, instead, the well thought out and discussed positions around the issues themselves. It must be kept in mind, however, that individuals and groups can, in fact, hold multiple positions and even contradictory ones as Clarke (2005) described in her work. Waltner-Toews (2017) felt that stories and dialogue impact how political and public leaders make decisions which was confirmed in speaking with the leadership who participated in the discussions and who expressed a commitment to help solve the issues together in partnership. Boutain (2012), pointed out that injustices are usually outcomes of unjust conditions, and that structural dimension of justice are often minimized as justice is frequently described in the context of individual equality and fairness. Positional maps, therefore, can be used to help develop just futures by using them as a social justice tool. Figure 4.25 shows a positional map that reflects the positions taken and expressed by members of the informal settlement during the stakeholder analysis discussion. The positions indicate what individuals and institutions are positioned in the location to help solve the issues with which they are confronted.



Figure 4.27. Manyatta power/influence-interest positional map.

**Situational analysis considerations for the GeoDesign.** Various design elements were incorporated to ensure a better, livable, compatible, harmonious, and sustainable environment in Manyatta. They included but not limited to space and its definition, such as elements of form, urban functions (living, working, leisure, mobility, and administration), urban fabric, and environmental factors such as precipitation, temperatures, humidity, wind, and lighting. This was done to ensure that there was functional efficiency, improved environmental conditions, ease of movement, community integration and character (a place with its own identity).

The spatial design of Manyatta slum belt was also primarily informed by situational analysis of the social, economic, environmental, and infrastructural landscape. Some of the structuring elements that greatly contributed to the design included, but were not limited to,

existing developments, road networks, rivers, lagas, soils and terrain. Lagas, also called ephemeral streams, are shallow wet gullies that drain surface run-off within a target area (one exists in Manyatta B).

1. The design that was incorporated was cognizant of the existing developments and ensured no unnecessary demolition of existing structures that would negate the social, economic, and environmental facets of the town.
2. The existing local roads provide access to various land uses. The proposed access roads were pivotal in connecting missing links and, therefore, improved accessibility and development productivity.
3. The design ensured that plots and developments proximity to the river conformed to the lawful stipulations governing a riparian reserve i.e. 30m conservation buffer-15m buffer provision on both sides of the river.
4. The lagas were provided with a 10m buffer on both sides and classified as conservation areas. Moreover, the land use zones bordering the lagas had to conform to their shapes.
5. Slope analysis was undertaken to inform on the allocations of various land uses in the area. Additionally, the slope analysis informed the road networks design whose design supports proper storm water drainage, water reticulation networks and sewer reticulation lines.
6. The soil typology also determined the spatial distribution of building densities. Vast sections of Manyatta B were occupied by poor clay soils hence it could only accommodate low and medium density building densities.

Multiple development models defined by the area's development character were adopted to guide the logical design of the structure and detailed land use plans. The alternative development models incorporated in the design were zero model, transport-oriented development model and mixed-use model. For sustainability of development growth in Manyatta, the most preferred model selected was an integrated model. This model attempts to integrate all the advantages of the zero model, transit-oriented model, and mixed land use model to reproduce a comprehensive integrated development scenario that would steer development to a sustainable outcome. The significant qualities of the integrated model include, encouraging densification and urban renewal, energy efficiency developments through the adoption of mixed-use developments, protection of environmentally fragile areas through their protection and conservation, limiting urban expansion through compact developments and lowering the overall cost of infrastructure development.

**PAR data informs design.** Data collected involved: observation, HH surveys, FGDs, participatory mapping, problem tree analysis, stakeholder analysis, data points for health and education facilities, formal and informal water points, land use, etc. all these data inform the GeoDesign of Manyatta. The County GIS Department had no data points for the private health and education facilities nor for the informal water points in Manyatta. Given that they nor any of our partners had any of these data points, it necessitated sending a team of four researchers and GPS users to collect the data needed for mapping these basic facilities that already exist in Manyatta for the design of the community. This is an additional data collection process to the HH, KII, FGD and PAR undertaken earlier. Using the Big Data, we collected in Manyatta we are creating Big Planning constructed on a Big Platform (GIS). The term *Big Data* was coined by Laney (2001) to refer to data that is so large, fast, and/or complex that it would be difficult or

almost impossible to process traditionally. Additionally, the access and storage of such large amounts of data which became defined, initially, as the three Vs: volume, velocity, and variety became a challenge and for which a system like the GIS is most appropriate. These have now evolved to 5Vs: volume, velocity, variety, value, and veracity and even to 7Vs: volume, velocity, variety, value, veracity variability, and visualization and are the main characteristics that define Big Data. These data fusion techniques allow for vast amounts of heterogeneous data from multiple sources to be fused together to produce a more comprehensive view of data and its underlying relationships (Evans, Owda, Crockett, & Vilas, 2019).

This Big Data consists of an analysis of the data on the GeoDesign platform to enhance using data-visualization techniques to reveal hidden and complex nonspatial information. This data analysis and data communication stimulates the public passion for participation (Zhao and Yu (2014). The approach to land use policy is to allocate and manage land to achieve social, economic, and environmental objectives to improve the lives of citizens along the following principles:

1. *Continual learning* and adaptive management that is dynamic
2. *Common concern* as an entry point
3. *Multiple scales*—many systems of influence, feedbacks and constraints affecting management
4. *Multifunctionality*—Multiple use of landscapes have value in different ways to different stakeholders.
5. *Multiple stakeholders*—To ensure an equitable outcome in decision-making about land use, the process should be ethical and inclusive.

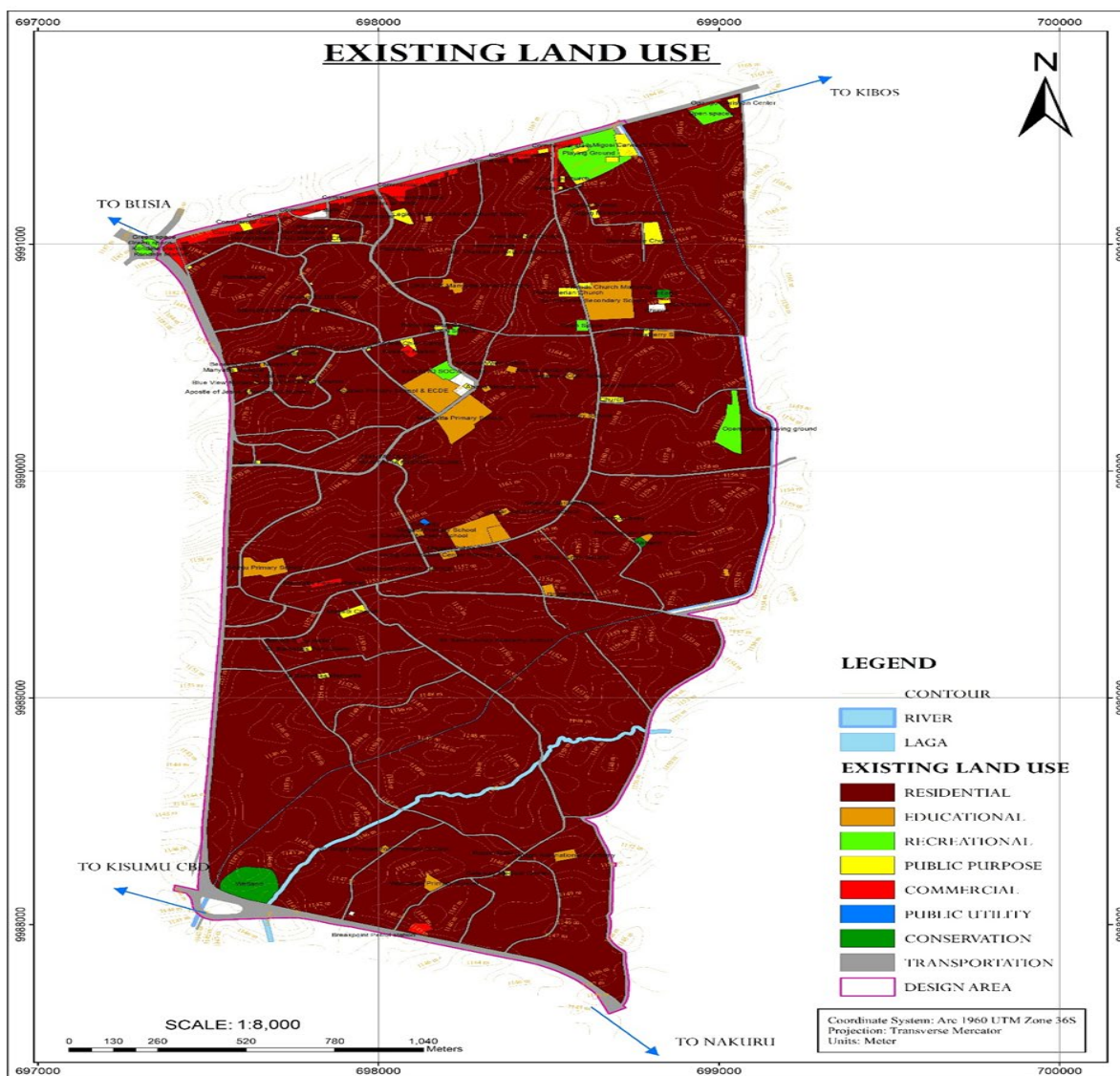
6. *Negotiated and Transparent*—There should be trust among stakeholders to avoid conflict
7. *Clarification of rights and responsibilities*—The rights and responsibilities of the different actors should so they can be better accepted by all stakeholders.
8. *Participatory and user-friendly monitoring*—A system that integrates different kinds of information should be in place.
9. *Resilience*—A system-level resilience to allow for threats and vulnerabilities.
10. *Strengthen stakeholder capacity*—The participation assumes certain skills and abilities such as social, cultural, financial (Sayer et al., 2013).

The three maps below were created by the planner among the RAs, Antony Okundi and show the following:

1. The existing land use map in Figure 4.28 is a visual representation of the current land use distribution in both Manyatta A and B and was informed by the GPS points that were picked, specifically the basic facilities of public and private education facilities and public health and private health facilities, and also include the formal and informal water points.
2. The map in Figure 4.29 is the Detailed Strategic Plan and spatial design of Manyatta informed by the maps drawn by the stakeholders present during the PAR meeting. It is also accompanied by the neighborhood concept of where the existing subunits are expected to be self-sustained.
3. Figure 4.30 shows a partial GeoDesign of Manyatta A and B. The three-dimensional model is a representation of the different land use prescribed in the Structured Plan in #2. The three-dimensional model is an expressed description of the spatial design



layout of Manyatta and may be categorized as both schematic and realistic models. The schematic model illustrates the zoning of the typology of buildings and their use or functionality whereas the realistic model projects a picture of the utopian future envisioned by the Manyatta community.



*Figure 4.28.* Current land use in Manyatta A and B. Created by Antony Okundi, Research Assistant and Planner. Copyright by author.





*Figure 4.30.* Partial 3D modeling of Manyatta A and B. Created by Antony Okundi, Research Assistant and Planner. Copyright by author.

### **Chapter Summary**

The research study in Manyatta A and B has helped to inform how data can and must inform design for human consumption and, also, how crucial partnerships are to the success of that endeavor. Laurini (2001) argued that information is the key element in any urban planning process. The results above clearly demonstrate that use of geospatial information along with the creation and implementation of a strong partnership are essential to the successful achievement of the 2030 Agenda for sustainable development. The study further makes clear how crucial the intermediate step of integrated, comprehensive, and holistic planning is to any successful



implementation that would eradicate poverty and leave no one behind, sustainably. A data-driven approach to a process, which brings all stakeholders to the table, was facilitated by the collaborative platforms that participatory geographic information systems and GeoDesign afforded.

The research findings and results of this study demonstrates “the how” for the implementation of global United Nations Agenda, the Macro Level Vision 2030 Agenda of the National Government of Kenya described in its Big Four Initiative, which is aimed at providing affordable housing, manufacturing, food security and universal healthcare for its people. It also meets the needs and aspirations of the 47 newly decentralized counties at the meso level and the citizens at micro level in the City of Kisumu. In that regard, Manyatta which is at the location level, now has the potential of informing development at the city, county, country, and global levels and as mandated by the United Nations 2030 Agenda. This can be a model for how integrated comprehensive implementation that is country-led, builds capacity, engages its citizens, and transfers knowledge can be achieved, and in partnership.

The study demonstrated the following in response to the initial and supporting questions:

1. The key groups in Manyatta, which included persons with disability, business, academia, government (city planner, chiefs of both wards, ward administrators) religious community, farmers, youth, women, and CBOs, were represented and made their voices heard and took appropriate positions in identifying the problems of the community and how and by whom they can be resolved through the problem tree analysis and stakeholder analysis processes.

2. Participatory GeoDesign and GIS and GPS technologies were proven to be essential in allowing for the collection and storage of Big Data, produced by the research, to be handled efficiently.
3. A situational analysis of the community based on data and lived experiences of the citizens allowed them to engage in a participatory GIS mapping and design of Manyatta to reflect the future they want.
4. The data collected made clear what is the core problem of the community and identified that SDG#6: Water and Sanitation might be the entry point to address the overarching goal SDG#1: Eradication of Extreme Poverty.
5. Poor sanitation and poor waste management in Manyatta contributed greatly to the social, economic, and environmental challenges which by extension contributed to the issues of employment, education, health, and many other issues.

## Chapter V: Discussion

We recognize that people are at the centre of sustainable development and, in this regard, we strive for a world that is just, equitable and inclusive, and we commit to work together to promote sustained and inclusive economic growth, social development and environmental protection and thereby to benefit all.

—United Nations (2012, p.2)

The research results and findings in this dissertation, using geospatial information in partnership with key stakeholders, offered a powerful approach with the potential to answer the United Nation's call outlined in the quote above. It is my hope that these findings are used to respond to the urgency of our time for the sake of people and planet. The chapter seeks to reflectively position the research work in Kenya in the context of the United Nations Development Agenda to focus on the dignity development can provide if it is socially, environmentally, and economically sustainable. The chapter is structured around the following key themes:

- Development for Sustainability
- Manyatta's Governance Structure Post-Devolution
- Phases of the Research Work
- Reflection on Phase 1
- Reflection on Phase 2
- Social, economic and Environmental Sustainability for Manyatta
- Financing the Design Plan for Manyatta
- Leadership and Technology for the 21st Century
- Limitations of the Study
- Contributions and Implications of the Study
- Some Lessons and Final Reflections

## **Development Planning for Sustainability**

Former United Nations Secretary-General Ban-Ki-Moon in *Road to Dignity* (2014) reiterated the core promise in the 1986 UN Declaration on the Right to Development (United Nations Human Rights Office of the High Commissioner, n.d.) in which the General Assembly called for an approach guaranteeing meaningful participation of everyone in development and the fair distribution of the benefits of that development. To this end, partnerships are central and can lead to the dignity of the citizens involved as they participate in the development of their own communities. The research conducted in Manyatta A and B in the Port City of Kisumu, Kenya, sought to do just that. The purpose of this study is to provide dignity to the citizens of this community through development planning using the collaborative technology platforms of GIS, GeoDesign and related technologies. The study used the participatory action research approach in partnership with the government, academia, business, civil society, and other stakeholders to demonstrate how this partnership framework together with the use of geospatial information can accelerate the implementation of the national and global development agendas at the local level. This chapter shows how the newly formed government structure, post devolution, provides a functional framework to assist, county and city governments to better determine and envision the future they want. This can be realized more rapidly through integrated planning to achieve poverty eradication and social, economic, and environmental sustainability, which are the three pillars of the 2030 Agenda for Sustainable Development. The citizens of informal settlements represent those who are farthest behind and who should be given priority. This study has the potential to show how development planning can help in restoring the dignity of those groups.

### **Manyatta's Governance Structure—Post Devolution**

This new government structure which gives more control at the local level is better able to address the needs of the community and was crucial to conducting a successful research study. Onyango and Agong (2018) spoke of the uniqueness of Kisumu in the context of Kenya's decentralization which they describe as among the most "rapid and ambitious" (p. 78) of any devolution processes happening in the world. The county governments are being developed from scratch which poses both governance challenges and opportunities. With this decentralization comes the responsibilities that come with subnational tiers of government as explained by both Feinstein (2015) and Ojambo (2012) who noted that from a political perspective, representatives are elected who are now able to make laws and regulations. Administratively, they have the responsibility for providing certain services and activities. From a fiscal perspective, the new government at the country level is responsible for the distribution of revenue between different tiers of government. The region now also has the power to raise revenue through taxation, charges, and surcharges.

Onyango and Agong (2018) see Kisumu as being unique among counties given it is the only city with a "rural county hinterland" (p. 78). This uniqueness, they argued, creates a challenge for the County Executive to both meet the expectations of the County while at the same time meet the expectations of the City in terms of governance. In addition to Kisumu's governance structure, spatial planning and finance are key aspects of interest they examined toward the County having effective city management and governance.



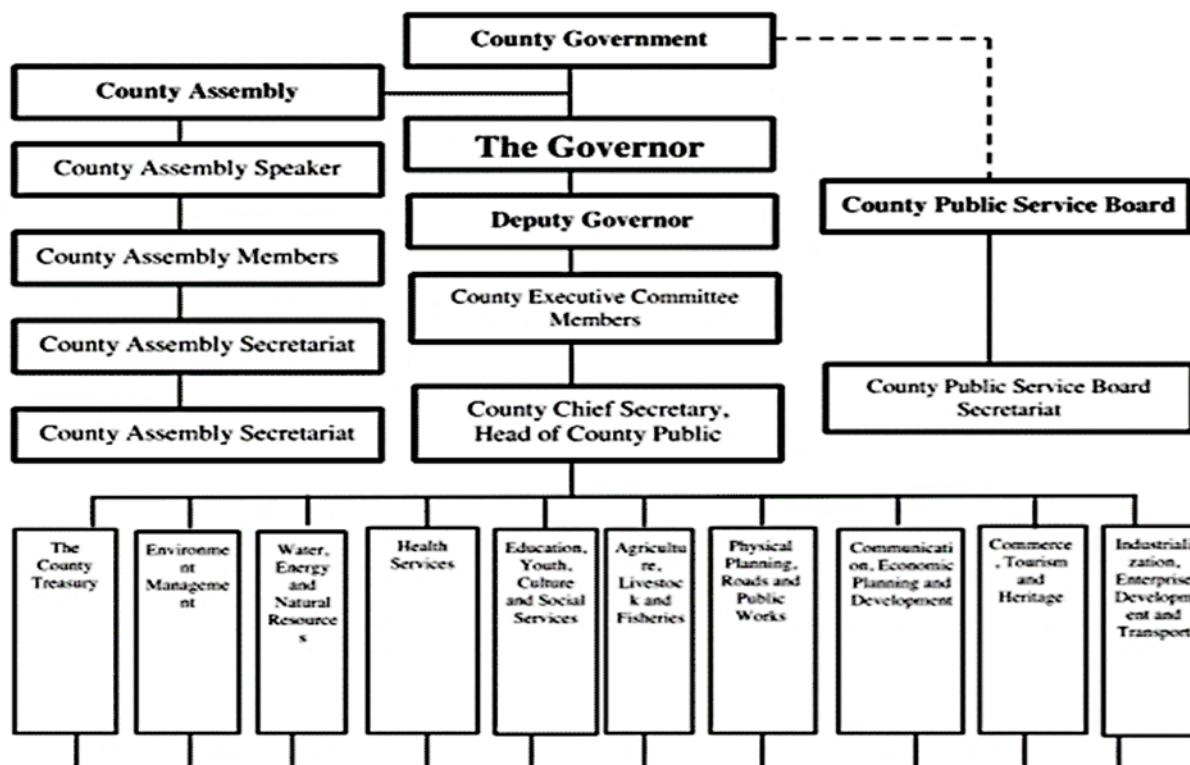


Figure 5.1. Kisumu County government structure. From “Governance of Cities in Devolved Government in Kenya: Experiences from Kisumu,” by G. M. Onyago and S. G. Agong, 2018, *Management Research & Practice*, 10(2), p. 84. Copyright 2018 by Management Research & Practice. Used with permission.

Kenya enjoys a two-tier system of government: national and county with both having a National Assembly and the County Assembly. Both the tiers have legislative wings and have representatives in each location. Manyatta A and B are described as Locations or Wards. These locations have a total of nine units: six units in Manyatta A—Metameta, Kondele (Upper and Lower), Flamingo (Upper and Lower), Gonda (Upper and Lower), Magadi, and Kona Mbuta—and three units making up Manyatta B—Okwoyo, Gesoko, and Kanyakwar (Upper and Lower). At the sublocation level at which Manyatta functions the structure is as follows:

1. *Chiefs of Manyatta A and B* are the National Government representatives at these locations. At the sublocation level, the Assistant Chief supports the Chief and at the Village level, the Village Elder. Their overall functions are as follows:

- Maintain law and order in the location.
- Act as a link between the people in the location and the government.
- Explain government policies to the people in the location.
- Encourage development projects in the location.
- Ensure that people coexist peacefully.
- Issue permits for both private and public functions within the location.
- Control the use of dangerous drugs like bhang.
- Settle minor disputes between people in the location.
- Chairperson of the locational development committee.
- Mobilize people to participate in public works.
- Monitor payment of taxes like coffee, cars, radio, and bicycles licenses.
- Convene *barazas* where people air their views on matters affecting their welfare.

2. *Ward administrators* are the representatives of the County in the locations of Manyatta

A and B. Their responsibilities are as follows:

- Coordinate, manage and supervise the general administrative functions in the ward unit.
- Develop policies and plans.
- Liaise with National Government staff at the Ward level.
- Ensure effective service delivery.
- Establish, implement, and monitor performance management systems.
- Coordinate developmental activities to empower the community.
- Provide and maintain infrastructure and facilities of public service.

- Facilitate and coordinate citizen participation in the development of policies and delivery of services.
- Exercise any functions and powers delegated by the County Public Service Board any other Authority.

3. *Members of County Assembly (MCAs)* are elected at the Ward levels and sit in the headquarters at the County Assembly. Their functions are as follows:

- representation,
- legislator, and
- oversight.

The Chiefs who represent the National Government and the Ward Administrator who represent the County in the settlement are conduits for the delivery of information and services in both directions for better outcomes. The offices of planning and of the environment at the City level had detailed knowledge of the issues Manyatta was facing and had been formulating plans to address them. In the partnership relationship established, the research study assisted both citizens and government by giving structure to the solution efforts that geospatial information and GeoDesign brings through data and design under the leadership of the local government.

### **Phases of the Research Work**

The research conducted in Manyatta involved two phases. The first phase focused on building a strong effective partnership framework that would act as a container for the data collection to be conducted in the informal settlement. The research plan began with deciding that, in fact, Manyatta, in the city of Kisumu, would be the best study area for research. Phase 1 began by accepting the invitation from a friend of mine, Mrs. Mirriam Omala-Gauvin, who works with the African Union which has Observer Status at the United Nations in New York, and for whom

Kisumu is her home. She became the initial sponsor for my research work in Kenya and more specifically in Kisumu. The next link was with the Regional Centre for Mapping Resources for Development (RCMRD) in Nairobi. Over three years I had built a relationship with the RCMRD, a geospatially focused organization established in 1975 by the African Union (AU) and the United Nations Economic Commission for Africa (UNECA) with headquarters in Addis Ababa, Ethiopia. This organization provides geospatial assistance to 20 Member States in Eastern and Southern African. The focus of RCMRD shifted from that of remote sensing to development after the 2030 Agenda was developed. I have been a presenter on the role of GeoDesign in the implementation of the 2030 Agenda at their Annual Geospatial Conferences in years 2018 and 2019.

According to the ethics requirements of the IRB, research in any foreign country has to be under the sponsorship of an organization in that country; it was, therefore, fitting that I requested RCMRD to be the sponsoring organization for my field work in Kenya. The Director General, Dr. Emmanuel Nkurunziza, the Technical Director, Dr. John Kaylo Kiema, and Mr. Vincent Mtaroni, RCMRD's Principal GIS and Cartographic Officer, provided valuable support that helped to make the field work in Kisumu successful. Mrs. Mirriam Omala-Gauvin who had detailed knowledge of the work of ICGC and knew how important it would be to the development of her beloved Kenya, beginning with her County of Kisumu, was a champion in getting a pilot done there. To begin the in-country process, she introduced me to Ms. Evelyn Khaemba, a Data Specialist, with the African Union's office in Nairobi who became a key contact. It was she who began the search for partners in Kisumu who could facilitate the groundwork in Manyatta. Among the many potential partners, Ms. Janet Awino Ogot, a community activist became key to solidifying the needed partnership platform. This process began back in April 2019.

**Reflections on Phase 1.** The purpose of these multi-stakeholder relationships was to establish solid partnerships that would more easily facilitate the next phase of the research and ensure success; a partnership to include the government, civil society, academia and business and multi-stakeholder groups. Phase 1 of the in-country work, in part, began in August 2019, in Nairobi at the RCMRD Annual Conference with a meeting with Dr. Nashon Adero, a Lecturer of Taita Taveta Mining University in Kenya, and who is a research consultant and was a presenter at the conference. He is a native of Kisumu and speaker of both Swahili and the Luo mother tongue of Kisumu. An important first step was to develop a Work-Research Plan which we worked on and refined to include the questionnaires. It was important that the questions reflected more appropriately and effectively the kind of responses we wanted to elicit from the respondents of the Manyatta informal settlement. His assistance was invaluable given he had a knowledge and sensitivity of the culture and languages of the citizens. We spent many hours in the hotel lobby of the Weston Hotel in Nairobi fine tuning the Research Plan for Phase 2. It was at this meeting that Nashon introduced me to Beda Ogola, his very professional and able research associate and to Antony Okundi who would be one of the research assistants. Mr. Okundi also doubled as the GeoDesign specialist given his GIS and planning background.

After securing that partnership with Dr. Adero and feeling confident that the team of researchers he had trained would deliver, I took off for Kisumu to meet Mrs. Janet Ogot. I had the honor of having Ms. Evelyn Khaemba take a four-day leave of absence to accompany me to Kisumu from Nairobi and meet Winnie Janet Ogot. That same afternoon, we began planning the strategy for the meetings we would have with the key partners whom Janet felt were important to the success of the research study. She had made the initial contact with them about my planned research work and had requested their support and assistance in advance of my visit.

The visit included a meeting with Honorable Dickson Obungu, County Planner for the County of Kisumu, who gave his approval verbally for us to collect data in Manyatta A and B that would inform the GeoDesign of the settlement. He welcomed the research work to be conducted and expressed his desire to read the findings. He explained the comprehensive development plan for the City of Kisumu that was currently underway and being engaged in through a planning firm the City had contracted. The planning, however, would not address planning on as granular a level as the GeoDesign to be done in Manyatta A and B. And so, he felt my work would add significantly to the overall planning and at how to look at and plan the other informal settlements in Kisumu and by extension the country of Kenya. Of interest to me was whether or not the development plans under contract were going to actually be implemented. I was delighted to hear that the goal was to have the comprehensive plan implemented within the next two years to coincide with the next election cycle for the governor. The next stop was at the office of the City Planner, Mr. Stephen Sule who welcomed the effort I was about to initiate and expressed its timeliness given the comprehensive planning underway for the city. We also met his Assistant City Planner, Mr. Andrew Odiambo, who was directed to take us to meet the consultant working as a liaison between the City and the firm doing the planning. It was delightful to meet all the young people on his team who were professionals in GIS technology and planning, knowing they were taking an active role in the planning and development of their own city.

A visit to Wards A and B of Manyatta brought me face-to-face with what conditions look like in an informal settlement and I got a first-hand understanding of people being left behind and living in extreme poverty. We (Evelyn and I) were escorted through both settlements by Janet Ogot. In the process we met with and had a meaningful discussion with the Member of the County Assembly (MCA) for Manyatta B, Mrs. Pamela Akinyi Odiambo, who communicated

the needs of her Ward and the need for any help we could provide. A scheduled meeting with the Chief of Manyatta B did not take place but he called asking if we could meet later. We took the opportunity to see the community center and to speak with the support staff in the Chief's office. Our next stop was a visit to Chief Phillip Onyina of Manyatta A who welcomed the proposed research to be undertaken in his Ward for the betterment of his people and pledged his full support.

The next day took us to Maseno and to Maseno University which is 40 miles north of Kisumu. We met there with Dr. Boniface Oluoch Oindo, Head of Earth Science and Environmental Department, to discuss what geospatial data their GIS Department might possess that could assist us in the mapping and design of Manyatta. This was to mitigate duplication of both resources and efforts. We were informed that the GIS Department had been relocated to the City of Kisumu. That afternoon we met with Dr. Emmanuel Midheme, Lecturer of the Department of Planning and Architecture at Maseno University in downtown Kisumu who had worked with another informal settlement. Enthusiasm was expressed for a plan to partner but that did not materialize.

We left Kisumu for Nairobi August 23, 2019, followed by my departure back to the United States the next day. I left Kenya feeling very supported at all levels of the society: the government level, civil society, which includes the nine multi-stakeholder groups—NGOs, farmers, women, youth and children, science and technology, persons with disabilities, business and industry, workers union and local authorities (represented by Janet Ogot). All participated in the final discussions about the design of their Wards. The major groups and other stakeholders played a significant role in the formulation of the 2030 Agenda for Sustainable Development at

the United Nations in New York and each was represented in the Manyatta community and participated in the development planning.

It is expected by the UN that the success of the implementation in each country will greatly depend on the collaboration and partnerships between governments and nonstate actors at all levels, and at all stages of implementation, which include planning, consultations, monitoring, and reviews (UNDESA, 2015b), all key to national capacity building. To this end, the research study in Manyatta demonstrated how collaboration, strong partnerships and together with citizen engagement in a participatory manner was able to build capacity at the county, city, and location levels.

At the national level the community was represented by the Chiefs of Wards A and B, at the County Level by the County Minister of Planning and the Member of the County Assembly, and at the City Level by the City Planner and his Assistant. The setup for Phase 2, in which the collection of data would take place, was in place made so by this effective partnership framework which is essential to any success. The in-between time before my return to Kisumu in September 2019, required extensive planning and coordination with Janet Ogot our key partners on the ground in Kisumu and our research collaborators to put together the 10 research assistants, the two GPS experts, and mobilizers from the community of Manyatta who would guide the researchers to the head of households respondents by introducing them to the Research Assistants. The venues for training on the first day, and the venue for daily meetings with the research assistants as they went to and from the field were some of the logistics that were next to be decided. The training site for the training on day one was decided to be the St. Stephen's Church in Kisumu and the daily meetings took place at the Joventure Hotel in Manyatta. Phase 1 provided a foundation on which to build on Phase 2 and gave insight, in the case of Manyatta and the City



of Kisumu, of how receptive all segments of the community including the government can be to achieve their shared objectives. An element of this relationship is the respect that must be shown to the value the lived experiences and knowledge citizens bring to the discussion.

The partnership framework put in place in the research study to interface with the Kisumu County, City and Location of Manyatta A and B was consistent with the due diligence measures needed to manage risks before entering into partnerships as stated by (Beisheim and Simon, 2016). According to UN General Assembly resolutions A/RES/68/234 and A/RES/70/224, the recommendations for effective partnership outcomes are:

- Be coherent with national law and priorities.
- Respect international law, and be in line with agreed principles and values.
- Be transparent and accountable.
- Be new, provide an added value, and complement rather than substitute commitments made by governments.
- Be multi-stakeholder driven, with clear roles of the different partners.

The partnership framework put in place during this research study was sensitive to the culture and languages of Swahili and Luo that were different from mine. For this reason, it was essential to identify Ms. Winnie Janet Ogot, a key member of the community, and to establish the collaboration with the research team who are all natives of Kisumu and for whom Luo was their mother tongue. They were invaluable in introducing and helping me understand the protocols for communicating with the Chiefs, Ward Administrator, the County and City Government officials, mobilizers, and citizens in general. With training completed, each RA, armed with five questionnaires plus one, their mobilizers, and GPS expert, began the 500 household surveys for 10 consecutive days. It was important that the 500 households were evenly disturbed throughout

the 6 units in Manyatta A and 3 units in Manyatta for equal representation of ideas and engagement. Each afternoon they would return to the established meeting place, a conference room at the Joventure Hotel located in Manyatta A for review of each questionnaire for accuracy of responses and to allow each RA to report any difficulty he/she encountered and to give any additional input for the next day's survey administration. By the end of 10 days all 500 households and 11 KIIs were completed and it was time to go out and celebrate this significant milestone in the data collection process. To this end, we all went out to dinner together and danced afterwards at the Mamba Lounge to recognize the dedication, professionalism, and commitment the RAs brought to the process to ensure its success!

Next on our agenda was the focus group consisting of representatives of both communities in the following categories: The Chiefs of Manyatta A and B; religious leader, persons with disabilities, youth and children, ward administrators, business leader, and representatives of community-based organizations. These participants agreed to join the group based on prior communication with these opinion leaders.

**Reflections on Phase 2.** Phase 2 was underway with the establishment of the partnership framework and a research plan to survey 500 geo-referenced Households, 13 interviews of key decision makers, conduct focus group and PAR discussions together with situational analysis of Manyatta. The goal was to show how geospatial information and the effective partnership could be essential to a successful implementation of Agenda 2030. The second phase began with premeetings with the Research Collaborator, Winnie Janet Ogot and one of the RAs who is also a resident of Manyatta A, to discuss the agenda for the coming week and also the longer-term plans for the duration of the research to be conducted in Manyatta A and B. This included the PAR/situational analysis with GeoDesign, which was a later addition to the research protocol to

be used. This would require the facilitation of this fourth group discussion and the logistics had to be developed.

Our activities began with training of the 10 research assistants. It was decided that the languages in which the surveys would be conducted would be English, Swahili, and the Luo, the mother tongue, and that each respondent would be free to respond in any language in which they felt most comfortable. The Luo mother tongue is the language spoken by 100% of the natives of Kisumu and all the RAs also spoke Luo as their mother tongue.

The first research exercise was the household surveys. It was important that all respondents to the surveys be 18 years or older and that there be sensitivity to gender, marital status and work status be observed. RAs should not ask a respondent what is his or her gender but should come to that conclusion by observation and should very discretely and delicately ask about their marital status and should ask the question in either Swahili or Luo to determine if he or she is married, divorced or single. In a household where the parents are not working, the household would be defined not by who is the parent but who puts food on the table. This training included how to behave in conducting each interview in which the appropriateness of dress was emphasized to be not too formal and at the same time not too casual as to communicate the right message to the person being interviewed. The RAs were also told how to explain GIS and GeoDesign in Luo.

The RAs would introduce themselves as doing a research study for Antioch University that dealt with the United Nations SDGs and that this research work was intended to help their community. The RAs were instructed to help the respondents make a connection to the 2030 Agenda through their own National Vision 2030. The RAs were engaged in the development of an Alphanumeric Coding for each questionnaire. The code “M” would be used for the area of

research, Manyatta. Additionally, the 10 RAs would receive a code with one of the 10 letters from A-J. The 500 household surveys meant that each RA would conduct 50 surveys with the first survey numbered 001. The coding therefore would be as follows:

1. RA One: MA-001; MA-002; MA-003, etc.
2. RA Two: MB-001; MB-002; MB-003, etc.
3. RA Three: MC-001; MC-002; MC-003, etc.

In addition to RAs conducting a total of five plus household surveys each day for 10 consecutive days, each RA was also responsible for conducting one KII at any time over that 10-day period. The key informants were opinion leaders from both Manyatta A and B. However, we ended up interviewing 11 key informants. Every two RAs was accompanied by a mobilizer who is a resident of the informal settlement. Evidence indicates that having people who respondents are familiar with and trust significantly increase the percentage of surveys completed. It was important that each survey should also be conducted approximately 100 to 150 meters apart from each other to ensure that the spread is appropriate.

The next phase of the training involved having the RAs understand the GPS hand-held devices that would be used to determine the coordinates of each household from which the data was to be collected. Two GPS and quality assurance experts performed the task by accompanying the RAs into the field each day to record the location which was written on each questionnaire. The codes for each questionnaire were programmed into the GPS monitor. The points of each questionnaire done is based on satellite information which is then superimposed on the map of Manyatta. These two handheld GPS and Global Navigation Satellite System (GNSS) receivers were used to capture the coordinates of the interview points as a measure of proof of geographic sampling. The captured points of interest will also facilitate scalability in manipulating and

validating the data within a GIS. The training consisted of pretesting in an actual environment similar to the study area of Manyatta and was done in Obunga, another informal settlement in Kisumu. Ms. Ogot advised me and my research collaborator to conduct the focus group discussion in the Executive Boardroom of the Joventure Hotel. This is a venue known in Manyatta A where Heads of Governments including the Governor meet occasionally. The notion of the power of place (Relph, 2017) suggested that a place has the potential to influence behavior, attitudes, and beliefs; this intrinsic power of place, said Relph, is sometimes experienced by individuals and can be an aura that places acquire because of what happened there in the past.

We wanted to create an atmosphere that would communicate the importance we attached to the discussion and the value of their input about the changes they want to see in their community. Each participant received a token to cover transportation cost and lunch and was provided as motivation to participate according to existing norms. The discussion began around 10 a.m. and was expected to last for 90 minutes but actually lasted for over two hours, an indicator of the level of enthusiasm displayed. The participants expressed their gratitude for engaging them in conversation about how the greatly needed improvement to their community could be accomplished and showed their willingness to be a part of that change

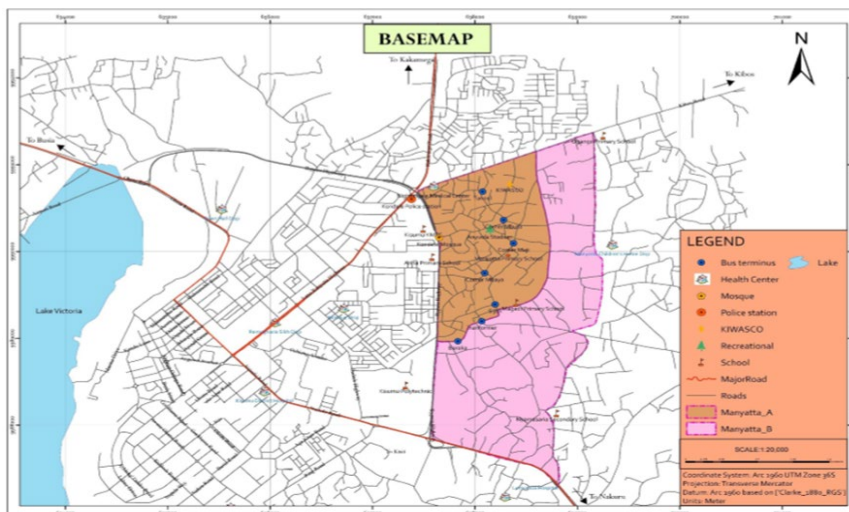
To solidify the PAR and situational analysis methodologies within the GeoDesign method, the process took us to the office of City Planner, Mr. Stephen Sule. It was surprising to learn that there is no official plan for the informal settlement of Manyatta A and B, and it signaled that planning partners who were recommended to us from that office needed to be contacted. In that regard, the PAR group expanded to include partners with both data and plans of Kisumu that would provide a place from which to build instead of starting from scratch or duplicating efforts. The number, therefore, grew from 9 to 13 eventual participants which gave for a wonderful

complement of young and old, all disciplines and interests represented by the nine Major Groups and other Stakeholders. An essential composition of the PAR group was the representation of at least 3 members of each of the household, KII and FGD groups and included the following members and are composed of representatives of the Multi-Stakeholder Group as listed in Chapter III:

- village elder,
- households of Manyatta A and B,
- Assistant City Planner,
- County Head of PWD,
- community mobilizer (Janet),
- business chairlady,
- Ward Administrator for Ward A,
- Ward Administrator for Ward B,
- Senior Chiefs of Manyatta A,
- Senior Chief of Manyatta B,
- physical planner (Grassroots),
- Head of Programs, and
- sociologist, UN-HABITAT.

The PAR discussion to inform the GeoDesign took place in the same VIP Executive Board Room at the Joventure Hotel. In *The Power of Place: Bringing Together Geographical and Sociological Imaginations*, Agnew and Duncan (1989) explained that their intention was to raise interest in the notion of place as a medium of political and economic power. The implication of this intention, they explained, is to communicate that power is created, given to, or ascribed to

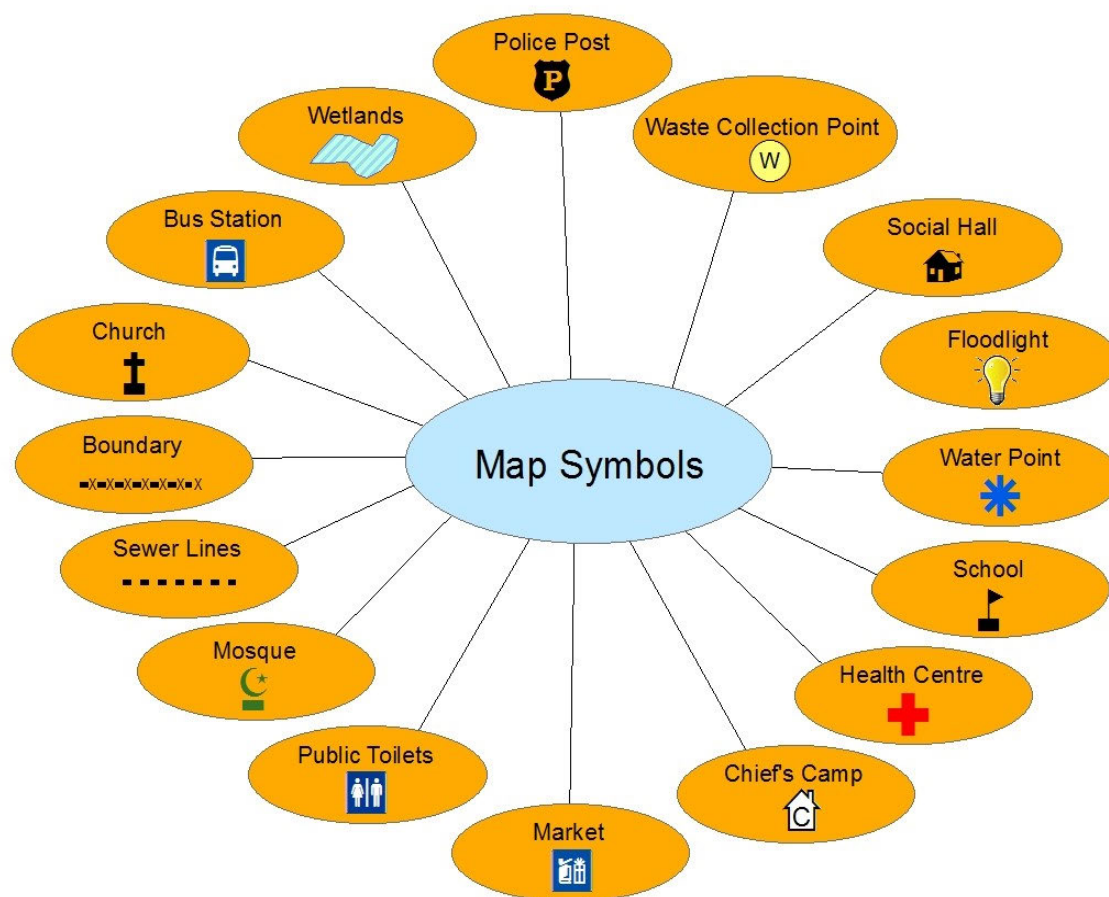
places because places are produced and not merely preordained locations. In the study, it was intentional to create this environment for key members of the community to gather to make this important decision about their community. My intention was to set the stage for the work to begin with the key members of Manyatta A and B creating the place in which they wanted to live.



*Figure 5.2.* Base map of Manyatta A and B. Copyright 2019 by Nashon J. Adero. Used with permission.

The goal of the PAR discussions was to engage the group in designing the future of the community they wanted over a two-day period and four sessions. The session began with a clarification of the purpose of the next two days' activities. To assist the participants, who by now were familiar with our work—given they participated in the household surveys, focus group discussions, and key informant interviews—a brief explanation was given of GIS as an approach that allows geographers to collate and analyze information far more readily than is possible with traditional research techniques (Foote & Lynch, 1997). This stressed that GIS be viewed as an integrating technology in as much as it draws upon and extends techniques that geographers have long used to analyze natural and social systems. GeoDesign, described as integrating geography and design, enhances traditional environmental planning and design activities with the power to leverage digital computing and communications technologies to foster information based design

and provide timely and even “real time” feedback. Together with on-demand simulations and impact analyses, GeoDesign provides more effective and more responsible integration of scientific knowledge and societal values into the design of alternative futures. GIS, GeoDesign and related technologies like GPS and GNSS as powerful technology tools were explained. To assist the group in doing so, a list of geographic features on the landscape in Manyatta with appropriate symbols was given to the group helping them better place the features they want in their community as they are at present and later in the community they would design. Figure 5.3 shows map symbols for a community comprising schools, health centers, roads, bus stations, markets, mosques, churches, water points, sewer lines, and so forth.



*Figure 5.3.* Map symbols for Manyatta community. Developed by Antony Okundi. Created by Kenneth Lohr. Copyright by author.



The group was divided into the two Wards of Manyatta A and B with residents of each Ward asked to design the community they live in at present and then the community they wanted next. They did that with commitment and enthusiasm. The research involved hearing the voices of 500 households, all geo-referenced, 11 key informant interviews, a focus group of 13 members, and the PAR/situational analysis and GeoDesign group of 13 members from both communities, who were representatives of each of the previous groups. This dearth of information provided substantial data to inform the situation as they experience it in their communities.

It became evident after looking at the household, key informant, and focus group responses, that additional methodological approaches that could identify the problems they had articulated on the surveys and in the interview were needed. So, it was decided that problem tree analysis and stakeholder analysis should be used. The problem tree analysis (Dillon, 2019) belongs to the family of participatory planning techniques, in which all the members of a community participate in identifying and analyzing together what they know to be the core problem(s), cause(s), and the effects. This exercise allows them to take ownership given they will be the beneficiaries of the solutions. The stakeholder analysis (Smith, 2000) describes stakeholders as individuals, groups, or organizations that have an interest in a project and can mobilize the resources to affect its outcome in some way. In this regard, stakeholder analysis aims to identify the stakeholders associated with the project and who have the interest, power, and influence to bring the project to a successful outcome. After two intense, fun, serious, and committed activities of designing the Manyatta they wanted, there was a great sense of community accomplishment. Before leaving on the final day, the Ward Administrator for Manyatta A commented, “I was invited; I participated, and, most importantly, *I felt.*” This

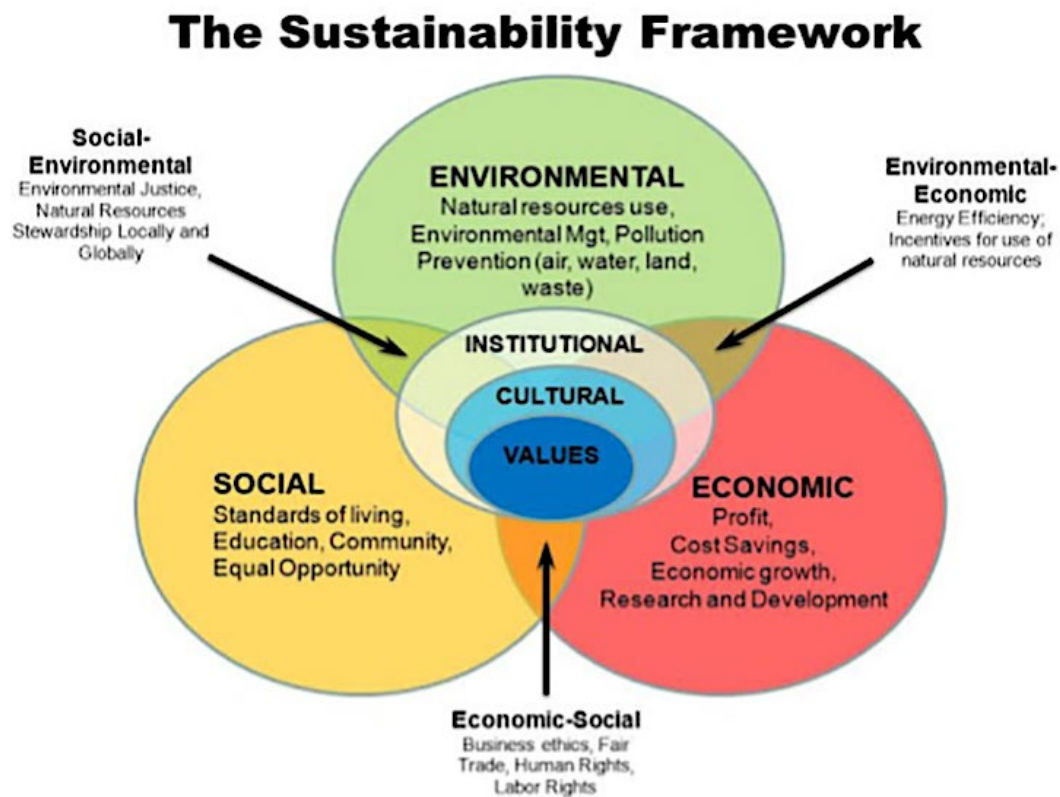
reflected the sentiment of the group. I also felt the impact of the time we spent laying out a vision for the community, and that this was a shared goal of working together. As we parted, I pledged to assist them in any way I could to achieve the aspirations for their community.

Another partnership quickly developed toward the end when it became evident that the additional data required for the GeoDesign of Manyatta A and B was needed. This awareness took the Ward Administrator for Manyatta A and I to the office of the head of the GIS Department in the County Building in Kisumu. The collaboration yielded much needed data point information regarding the public and private educational facilities, the public and private health facilities and the formal and informal water points in both Wards. In addition, Mr. Tom Ogollah, head of the GIS department, provided us the maps for all the official primary, secondary and health facilities and immediately contacted the Kisumu Water and Sanitation Company (KIWASCO) on our behalf to secure both the formal and informal data points for the two Wards.

Unfortunately, the GIS Department did not have the informal educational and health facilities in their possession. In that meeting, we agreed to work together; in this new collaboration, I would provide the county with the data we were then poised to collect on the private educational and health facilities and also the informal water points we had realized KIWASCO did not possess. The meeting also revealed that a partnership in which the GIS and GeoDesign work we would do in Manyatta could serve to assist him in informing members of the government on the vital importance of these technologies in the development process in Kenya. This development idea using GIS and GeoDesign was not only relevant for the new development planning and implementation agenda for Kisumu, but the larger Big Four Initiatives (Omolo & Owino, 2019) for the country in the context of the National Vision 2030 and the 2030 Agenda for Sustainable Development.

## Social, Economic, and Environmental Sustainability for Manyatta

The three pillars of the 2030 Agenda for Sustainable Development are social, economic, and environmental sustainability. To accomplish this, Tavanti (2019) suggests governance must look into the issues of institutions, culture, and values, in addition to the traditional triple bottom-line framework composed of economic, environmental, and social criteria that underpin sustainable development. Figure 5.4 shows how these considerations and factors intersect. Each interface carries important development issues, which relate to the current study.



*Figure 5.4.* The sustainability framework. From “The Integrated Frameworks and Pillars of Sustainability” [Blog post] by Marco Tavanti, 2010. Copyright 2010 by Marco Tavanti. Used with permission.

Tavanti (2010), explained that a holistic approach to sustainability requires that the world is seen as a system—one in which space, time, resources, economies, peoples, organizations, institutions, and values are connected. Tavanti depicted these as a concentric sustainability

framework (Figure 5.5). The concepts and practices of sustainability, therefore, are designed to maintain and improve the environmental, social, and economic resources to provide for the needs of present and future generations. The SDGs transcend the traditional triple pillars of people, planet, and prosperity to include peace and partnerships into the global sustainability framework (Elder, Bengtsson, & Akenji, 2016). The SDGs, therefore, bring into this work the important dimensions of ensuring a just transition across spatial scales in terms of policy responses at local, national, and global levels. It is important to note that scale has not always been given the weight and respect it deserves in political discourse. As Willis (2005) wrote in *Theories and Practices of Development*, the importance of scale and geometry in mapping the Earth's regions has critical implications for resource distribution debates and rationale. Spatial mapping was, therefore, considered an integral part of the equation for achieving both procedural and substantive rationality in the exercise. The GeoDesign of Manyatta demonstrated what can be achieved when the government and citizens come together in partnership to address a shared issue of concern. In this case the environmental challenge, the lens through which the economic and social issues were addressed, communicated the ability to scale up the work done in this study to a larger geographic area. The logical next step is to use the principles of inquiry and the participatory process that worked so well in Manyatta and replicate this development model at the county level.

Tavanti (2010) further emphasized the role institutions, values, and culture in making sustainability possible. The institutional dimension of sustainable development, he says, requires the willingness, cooperation, and integration of sustainability into mainstream policy mechanisms to build capacity. Making the distinction between social and culture, he reminds us that culture, and cultural diversity in particular are necessary for humankind as biodiversity is for nature. The value and spirituality of individuals and communities, tavanit added, are the

driving forces for building organizational cultures and institutional policies that foster economic and environmental sustainability in societies. Values, he says, are at the root of development and should be understood not just in terms of economic growth, but also as “a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence” (p. 10).

### Concentric Sustainability Framework



*Figure 5.5.* Integrated Frameworks and Pillars of Sustainability. From “The Integrated Frameworks and Pillars of Sustainability” [Blog post] by Marco Tavanti, 2010. (<http://sustainabledepaul.blogspot.com/p/sustainability-frameworks.html>). Copyright 2010 by Marco Tavanti. Used with permission.

McKeown (2002) asserted that the primary element of sustainable development reveals three distinct components: the environment, society, and economy that are intertwined and cannot be separated. To achieve sustainable development, she states, requires a balanced relationship among the environment, society, and the economy in pursuit of development to improve the quality of life for citizens. The environmental issues of poor sanitation and poor waste management identified by the citizens of Manyatta through the problem tree analysis discussion

drew a direct connection to the compromised social and economic consequences of unemployment, illness and death caused by the environmental failures in the community. This was confirmed by the study. The members of the PAR discussion group understood clearly and articulated very soundly the interrelationship between the challenges faced socially and economically caused by the environmental poor sanitation and poor waste management. The frustration they suffered was not having a plan that clearly demonstrates how this could be remedied and in a sustainable manner. An unfortunate legacy of colonialism is a lack of government-led organized planning throughout the country and of which Kisumu is a beneficiary. This new and added value the study brought to the community was a great complement to the comprehensive city-wide development plan.

### **Financing the Manyatta GeoDesign Plan**

A common question that arises in discussions about the 2030 Agenda implementation is how it will be financed. This question was raised at the PAR/situational analysis/GeoDesign group discussion conducted for this dissertation. The Third International Conference on Financing for Development held in Addis Ababa in July 2019, where a compact for a global partnership was realized. A debate about “Financing for Development” ran concurrently with the 2030 Agenda for Sustainable Development. The idea behind this strategy was to ensure that, unlike the MDGs, financing for the Agenda’s implementation would be identified upfront and would come from a plethora of identified funding sources to be made available for the successful outcome of the SDGs. All contributions are meant to achieve the MDGs—which are essentially the first seven goals of the SDGs—and then move beyond to all 17 SDGs. However, in addition, they also stressed that Member States will need to fill key sustainable development gaps left by the goals, such as the multidimensional aspects of poverty, decent work for young people, social

protection and labor rights for all. To achieve these outcomes, the 2030 Agenda mandates inclusive and sustainable cities, infrastructure, and industrialization. This requires the strengthening of effective, accountable, participatory, and inclusive governance. These can only become reality if there is free expression of information and association, fair justice systems, peaceful societies, and personal security for everyone. Figure 5.6 outlines the sources of this financing.

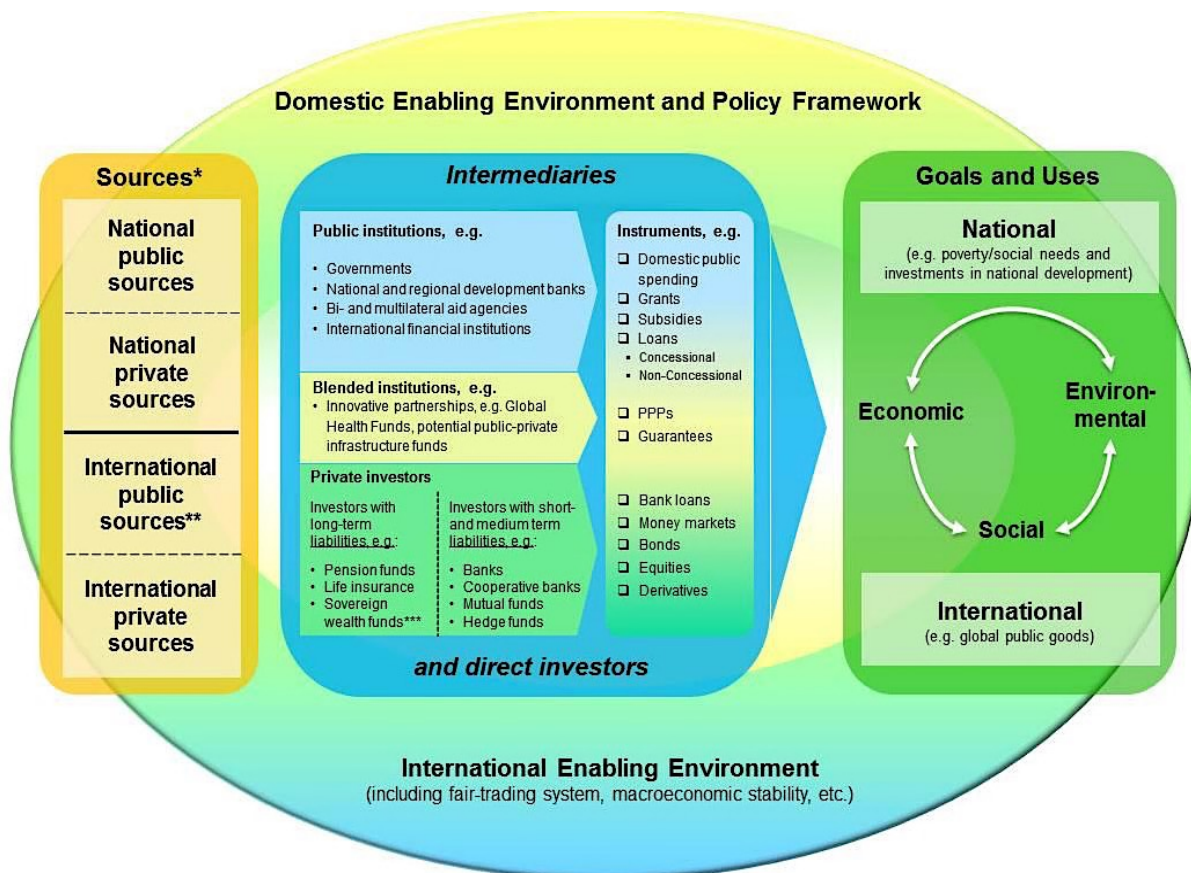


Figure 5.6. Flows of funds from international and national financing sources. From “Report of the Intergovernmental Committee of Experts on Sustainable Development Financing. Final Draft” 8 August 2014. © 2014 United Nations. Reprinted with permission of the United Nations.

Financing options include the following:

- *Domestic.* Use of domestic resources, which underscore the principle of national ownership.

- *Domestic and international private business and finance.* This includes private business activity, investment, and innovation as major drivers of productivity, inclusive economic growth, and job creation.
- *International development cooperation.* International public finance playing an important role in complementing the efforts of countries to mobilize public resources domestically, especially in the poorest and most vulnerable countries with limited domestic resources. Blended financing is part of a complementary option which combines public and private financing and is available to the over 1B people living in the LDCs who live on less than \$1.90/day (OECD/UNCDF, 2018).
- *International trade as an engine for development.* International trade is intended to be an engine for inclusive economic growth and poverty reduction.
- *Debt and debt sustainability.* Borrowing is an important tool for financing investment critical to achieving sustainable development, including the sustainable development goals.
- *Addressing systemic issues.* The first conference on International Financing for Development was held in Monterrey, Mexico in 2002. It emphasized the importance of continuing to improve global economic governance and to strengthen the United Nations leadership role in promoting development and to acknowledge the challenges in social, economic, and environmental challenges to development.
- *Science, technology, innovation, and capacity building.* There is the recognition that technology is essential to the realization of the SDGs especially information and communications technology to aid in connectivity to advance capacity building.



The goal and the uses of these finances as, Figure 5.7 illustrates, is the achievement of the three pillars of: social, economic, and environmental sustainability on which the 17 SDGs, their 169 targets and the 232 indicators rest, and which GIS is most able to integrate as mandated by the Agenda and to achieve Peace and Prosperity for People and Planet through Partnerships.



*Figure 5.7.* Five Ps of the Sustainable Development Goals. From 2030 “Agenda for #SustDev is officially adopted!! 4 People, Planet, Prosperity, Peace, Partnership!” by UNDESA (2015a). © 2014 United Nations. Reprinted with permission of the United Nations.

The achievement of Peace and Prosperity for People and Planet (the 5 Ps of the SDGs— (See Figure 5.7) requires the acknowledgement that we are one humanity and the resources of the planet belong to all and asserts that if the Agenda is implemented with dignity and justice, we will achieve the following:

- End Poverty and Hunger in all forms and ensure dignity and equality for all (People);
- Protect our planet’s natural resources and climate for future generations (Planet);

- Ensure prosperous and fulfilling lives in harmony with nature (Prosperity);
- Foster peaceful, just, and inclusive societies (Peace); and
- Implement the 2030 Agenda through a solid global partnership (Partnership).

All 193 Member States, business, civil Society, academia, and philanthropic organizations came together and agreed that in the shared interest of people and planet the achievement of the 5Ps of the SDGs cannot be achieved alone. The United Nations Office for Outer Space Affairs (UNOOSA) is playing a role in ensuring the 5Ps are achieved through its mandate to assist Member States to build capacity by providing science technology and their applications to achieve social, economic, and environmental sustainability (Werner, Balogh, St. Pierre, & Di Pippo, 2017). They say the success of the 2030 Agenda to realize peace and prosperity for people and planet through partnerships require implementing the 17 SDGs and their 169 targets and measured by the global indicators and is an example of goal-based planning that exemplifies a “shared normative framework that fosters collaboration among countries and mobilizes all stakeholders and inspire action.” (Werner et al., p. 385).

The current study, which focused on addressing the pressing water and sanitation problems, brought together a united government and citizens resolved to improve the quality of life for everyone. The study demonstrated how meaningful a role academia can play by offering different methodological approaches appropriate to clarifying the relevant issues a community faces. The team of research assistants from a wide range of academic disciplines worked together beautifully and were able to see the goal of the study through the lens of their individual discipline. This added to the tapestry of learning that contributed to the success of the study. They saw through the concrete application of research, data, and technology how academia can and should be an integral part of the implementation of the SDGs. Young adults are yearning to play a

part in the future development of their countries especially in the developing world. This research study provides a rich example of how different academic disciplines and professions such as architecture, urban planning, sociology, geography, political science, medicine, environmental science, and economics can partner to form development teams to work with government ministries and community groups to achieve each country's development aspirations. Teams can work together to gather all relevant data and plan out the future they envision for their respective communities. This gives them a sense of purpose, ownership, and investment in their futures. These initiatives can be a winning formula for everyone.

### **Leadership and Technology for the 21st Century**

**Leadership.** The challenges of Kenya and the continent of Africa are many, but the continent is rising led by the women and youth of the continent and will require a nimble adaptive leadership approach. In his article "Leadership at the Heart of the African Sustainable Development Agenda," Kingsley (2019) questioned the efficacy of the hero as leader and instead suggested that a more collaborative model might be more effective. He recommends one in which adaptive challenges require collaboration between various stakeholders whom each hold a different aspect of the reality and many of whom must themselves adapt and grow if the problem is to be solved and advocates for leadership that is collaborative. Kingsley cited Heifetz (1994), who stated that the complexity of the new environment increasingly presents adaptive challenges for which it is not possible for any one individual to know the solution or even define the problem. Heifetz, Grashow, and Linsky (2009) defined adaptive challenges as ones that can only be addressed through changes in the priorities, beliefs, habits, and loyalties of individuals. Adaptive leadership by nature is complex and can be ambiguous and unpredictable. Informal settlements present unique sets of challenges largely because areas in which people choose to

settle are unplanned and not set up for the delivery of basic services by the government, which are already limited in financial and personnel resources and reflect some of the challenges a City as Kisumu faces. The numbers by which populations in informal settlements increase sometimes daily can overwhelm the system and requires the governance structure to be both adaptive and flexible.

Govindarajan (2016) described adaptive leadership in these ways:

- Adaptive leaders are proactive.
- Adaptive leaders recognize and utilize others who think differently.
- Adaptive leaders bet small before betting big.
- Adaptive leaders practice planned opportunism.
- Adaptive leadership are courageous; standing up for what is right.
- Adaptive leaders view challenges as opportunities.

Adaptive leadership requires a distinction between leadership and authority (Heifetz, 1994). This is especially true for the continent of Africa where too many leaders have failed to hand over the reins of power to the younger generation of leaders, and where authority is the preferred mode of leadership. Kingsley (2019) stated that with the internet and social networking, “flattening hierarchies” (p. 10) and decentralizing control, leadership will be happening throughout the system, so development methods will have to follow it there, sooner rather than later. The case made is that change is volatile given it happens rapidly and with uncertainty, ambiguity, and complexity due to many factors and many causes and to which there are not many solutions as they happen rapidly and on such a large scale. Information in the system, said Kingsley, is highly ambiguous, incomplete, or indecipherable. Interactions among system elements are nonlinear and tightly coupled such that small changes can produce

disproportionately large effects in which solutions emerge from the dynamics within the system and cannot be imposed from outside with predictable results. This confluence of events might be happening in Kenya. The country is now working under a new system of governance made so by the decentralization of the government at the national level giving more autonomy and leadership to the 47 counties and local governments. This structure is new and can be disorienting but also present an opportunity for these leaders to feel empowered to do for their fellow citizens what they felt might have been outside their ability to do. As is the case in developing countries where financial resources are scarce, and the opportunity to be creative always exist and becomes necessary.

Yukl and Mahsud (2010) argued for both flexible and adaptive leadership which involves changing behavior in appropriate ways as the situation changes. This kind of leadership becomes essential in the face of increased globalization, new social networking, change in cultural values, a more diverse workplace, and more visibility of the actions of leaders. Authentic leadership, said Goffee and Jones (2016), is a relationship between the leader and the led and is not something we do to other people. It is situational, nonhierarchical and requires a social contract. To be effective, they say, leaders must both challenge and conform, while always adjusting enough to the existing situation and culture to gain the traction and leverage needed to be effective. A social distance should also be maintained to ensure the respect and support that is necessary to lead. Authentic leadership challenges leaders who must be adaptive and flexible in complex situations as is most often the unpredictable reality one is presented with in an informal settlement.

The many changes Kenya faces in the form of a new devolved government, a youth population that is well connected through the internet and a national and global agenda mandating significant changes, are challenges which only flexible, adaptive, and authentic leadership can

solve. When a sudden or unexpected event threatens to disrupt normal functioning or might have negative impact on citizens, a rapid and appropriate response is needed to minimize adverse effects. A leader who can handle such immediate crises demonstrates what is described as flexible and adaptive leadership. These global changes require leadership that is more nimble, agile, and versatile (Kaiser, Lindberg, & Craig, 2007) and add the extent to which a leader can balance competing values and opposite types of behavior. This kind of leadership must be executed in a way that is appropriate to the situation and becomes an indicator of flexible leadership. Adaptive and flexible leadership, said Mumford, Campion, and Morgeson (2007), requires a high level of cognitive skills to be a strategic leader and this individual must also have complexity and systems thinking abilities. This kind of leader must possess the ability to understand how the various parts of an organization or system relate to each other, and how changes in one part of the system will inevitably affect the other parts, and also how changes in the external environment will affect the organization or system. The successful adaptive and flexible leader is one who understands the demands and also the constraints of his/her position and is still able to find innovative ways to deal with new problems and opportunities (Stewart, 1982). And, must be able to make the kinds of decisions and take actions needed for effective leadership, which is not always consistent with traditional role expectations in an organization. All these skills and abilities in leadership will be needed especially in the developing world if the 2030 Agenda is to be achieved by 2030. My study engaged with a brilliant youth group that is rising and from among which I engaged for the research study in Kenya. Among this group of young people are many who have studied in North America and Europe and have been exposed to a more effective way of leading that does not now exist in their country of Kenya. They are eager to join the conversation about how their rich resources can be better leveraged to provide the economic and social changes their country

desperately needs. The government of Kenya is providing the space for such young leaders to emerge. The Obama Leadership Program is one such opportunity available to prepare the next generation of leaders who are flexible, adaptive, and authentic and is a departure from the autocratic posture of older leaders on the continent of Africa.

### **Technology.**

We live in a period of unprecedented technological innovation and change. New technologies are unlocking possibilities for sustainable development. The solutions that they can generate, and the levels of access that they can enable, will be crucial to our vision for the world beyond 2015. (Ki-Moon, 2014, p. 33)

The importance of GIS as an integrating dynamic technology seems appropriate to the times Kingsley (2019) described that bring different disciplines together such as: geography, cartography, photogrammetry, remote sensing, surveying, geodesy, civil engineering, statistics, computer science, operations research, artificial intelligence, and demography. In addition, these innovations support other branches in the social sciences, natural sciences, and engineering which have all contributed and supported better decision making. Some of the most interesting applications of GIS technology draw upon this interdisciplinary character and heritage. Geospatial information systems (GIS) technology has the most powerful integrating system which allows for an accelerated integrated comprehensive delivery of the SDGs.

The Research Assistant and Urban Planner, Antony Okundi, on the team commented at the last PAR session: “I have heard about how GIS and GeoDesign can help with development and now you have given me and the community the opportunity to understand how it really works!” GeoDesign as a participatory method contains four elements of geographic information science, information technology, design technology, and people of the place. The GeoDesign method proved to be a highly useful framework for engaging all stakeholders in envisioning

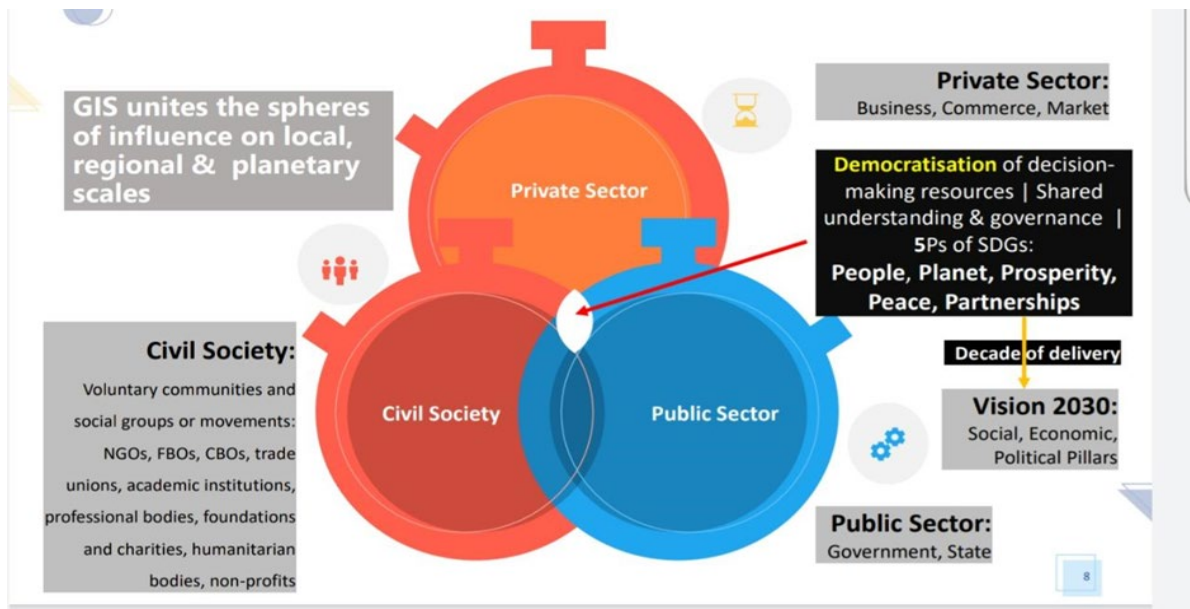
what Manyatta A and B could look like and become. It also helped that the community expressed in the PAR discussion that the thing they needed most was a plan for the community.

The 500 household georeferenced surveys conducted allowed for data by geography and the reporting by the citizens who live in each of the nine communities of Manyatta A and B (six in Manyatta A and three in Manyatta B). Through their responses they reported out their lived experience. Their general knowledge of GIS and GeoDesign allowed us to give concrete information on the use of the technology and their abilities to deliver the thing they wanted most, planning. GIS technology is “the science of where” (ESRI, n.d., article title ) and provides point-based location data that help decision makers, including citizens make better decisions. The idea is that everything that happens, happens somewhere. The power of GIS lies in the compilation and analysis of data in which layers of data can be overlaid and used to compute relationships and trends (United Nations General Assembly, 2106). In addition, large amounts of complex information can be easily contained and displayed in the geospatial system in the form of simple graphics and maps. The data and graphics can also be easily accessible online and changed in real time. The visual dimension of GIS is of great benefit in the engagement of citizens many of whom could be deterred by having to understand their community through tables, graphs, and charts. GeoDesign is described by Wilson (2015) as critical GIS that pushes geospatial information beyond its limits to create a fusion of technology and the science of geography. It seeks to understand and create the future, a future as a horizon with great potential. GeoDesign is a holistic bottom up method used in the planning of the built and natural environments to achieve sustainable outcomes especially when that outcome design is informed by all stakeholders who are the “People of the Place.” These technologies provide the appropriate response to an international agenda that has been described as the most comprehensive and complex ever



produced by the United Nations. The massive amounts of data that must be generated when considering the integrated and comprehensive way mandated for the implementation of the 17 SDGs, their 169 targets and 232 indicators and which should be data driven. GIS with its main 7Vs of characteristics—volume, velocity, variety, value, veracity variability, and visualization—provides the ideal answer to this challenge. These technologies of GIS, GeoDesign and related technologies, like GPS, ground penetrating radar (GPR), and the like, have the potential to greatly accelerate the implementation of the global agenda. Each country, especially Developing Countries and LDCs, equipped with trained teams working with the government of each municipality or community, as was assembled in this study in Kisumu, are able to engage citizens in Big Planning on a Big Platform that can reveal the hidden and complex non-spatial information needed to transform each community. On this platform, data analysis and effective data communication becomes possible and this in turn stimulates the public passion for participation (Zhao & Yu, 2014). In this regard, each country is able to conduct a visually integrated comprehensive development plan of the country and house it in the cloud for more accurate implementation by the year 2030. This next step can be very impactful psychologically in giving hope to the poor. Ms. Winnie Janet’s following words to me demonstrated the power of the technology at the final PAR session as she hoisted the 3 by 4 foot map of the Detailed Strategic Plan of Manyatta: “We can get the funding we need to develop our community because we now have a plan!”

The model in Figure 5.8 demonstrates how geospatial information, GeoDesign and related technologies together with effective partnerships can provide a blueprint for the implementation of each country’s local and national agendas that in turn impact the global agenda for creating the future they want.



*Figure 5.8.* GIS and Local, National, and Global Partnerships Model. Copyright 2019 by Nashon J. Adero. Used with permission.

**Citizen participation.** Rohse and Ross (1992) defined participation as expressing one's self at the proper time and in the proper forum and argued strongly for citizen engagement; most important is to express the right to have a voice in all matters of public policy which should include planning. Additionally, only citizens can provide the information and data needed to develop, maintain, and carry out an effective comprehensive development plan. To carry out this development plan, professional planners and local officials need the input and ideas from those who know the community best—the people who live and work there. Education about planning and land use is transferred through citizen engagement and creates an informed community and results in better planning. The citizens also have a greater ownership of the plan, are more invested and foster cooperation resulting in fewer litigations and conflicts.



*Figure 5.9.* Participatory planning by leadership and residents of Manyatta. Photograph by author.

**Geospatial data-informed planning.** Geospatial information has always been central to the workflows of urban planning and landscape architecture, said Mercurio (2019). This begins with the collection of geodata and also includes gathering drawings, collection of field data, digitizing analog data (data stored in VCRs, cassettes, etc.), collecting available digital data, and creating maps. Using spatial data usually involves using GIS software to organize, manage, and derive information, this is a phenomenon of the digital era. Mercurio added that regardless of scale and size of the project under consideration, geodata collection builds an information foundation to support decision-making. Mercurio further added that the design process which includes digital spatial data and geospatial analysis tools is what in recent years has come to be called GeoDesign.

## Limitations of the Study

There were certain limitations to the study which are endemic to most participative research in international settings. I highlight some of the key study challenges and limitations below:

1. Inaccessibility to the slum area and to the residents which necessitated the need to engage community mobilizers. This added considerably to the cost of the research work.
2. Poor documentation and access to the work already done in the county hindered access to the vital information needed as a guide for future work which resulted in duplication of efforts.
3. The need to maintain the momentum shown by stakeholders in the stakeholder analysis process to mobilize the resources needed to implement one or more of the recommendations identified in the problem tree analysis.
4. The GeoDesign produced through the PAR process required a time lapse to implement the design recommendations of the group and required sustained interest of months as the design is produced and refined over two or three iterations.
5. The two days and four sessions for the PAR process were not sufficient to produce the design outcome given the time needed to do the GeoDesign maps. To address this limitation, at least in part, multiple additional PAR sessions were organized where I participated virtually.
6. Virtual follow-up PAR processes with the community for input into the design were essential but not ideal as travel from the US to Kenya is cost prohibitive. However,

the strong partnership relationship and the strong commitment of the community made the follow-ups possible.

7. Lack of granular data at the level of Manyatta.

### **Contributions and Implications of the Study**

The research study done in Manyatta, Kisumu, Manyatta represents one of the only—if not the only—comprehensive attempt at showing how the 2030 Agenda can and should be implemented using participatory research and technology driven approaches such as geospatial information systems (GIS) and GeoDesign. Such integration of participatory and visual methods may facilitate meaningful citizen engagement. The on-the-ground elaborate work needed to engage a partnership with government, citizens—including all the major groups and other stakeholders—and to have them articulate their aspirations and the issues they experience firsthand in their communities, cannot be underscored. The participatory mapping and design exercises of Manyatta brought together leadership and all community representatives in a shared and respectful exchange of ideas to develop a shared vision of what is in the best interest of the city of Kisumu and in the location of Manyatta. This kind of partnership breaks down the barriers that might have existed and in partnership a transformed community and communal relationship emerged. This study, which will be published, can contribute to the body of knowledge available to the public to possibly lessen duplication of data and efforts in the future. This study also now provides a model for how the 2030 Agenda may be implemented to honor the mandate of the Agenda which states (UNDESA, 2015) that implementation should be country-led, integrated, comprehensive, data driven, build capacity, transfer knowledge, engage citizens, and all done through partnerships. The following were central to the success of the study:

- *Authentic partnerships:* This kind of partnership requires that the goals and expectations are shared and are clear. It is transparent and appreciates the different contributions each partner can make as well as the support each partner needs to participate as an equal. In this relationship there is a fair distribution of leadership, power, resources, risks, and recognition (Gulati-Partee & Potapchuk, 2017). There also needs to be intentionality around transparency and the power dynamics of the partnership without which has the potential of derailing the relationship.
- *Comprehensive participation:* Development is a participatory process says, Stiglitz (2002), arguing that consensus-building, open dialogue, and the promotion of an active civil society are the key ingredients to any long-term sustainable development. This kind of comprehensive participation in a democracy strengthens transparency and accountability among government, the corporate sector, citizens, and civil society.
- *Technology and data driven (GIS, GeoDesign).* One of the mandates of SDG#17: Means of Implementation is to enhance North/South, South/South and triangular, regional, and international cooperation regarding access to science, technology, and innovation. And, to enhance knowledge sharing on mutually agreed upon terms, including through improved coordination among existing mechanisms, especially at the United Nations level, and through a global technology facilitation mechanism (UN General Assembly, 2015b). The study's partnership with the Regional Centre for Mapping Resources for Development (RCMRD) who provides geospatial services to twenty countries in the Eastern and Southern countries in Africa is a key partner in facilitating the distribution of the knowledge gained in the study to the countries of

Eastern and Southern Africa and beyond. GeoDesign as a new method has been widely embraced as reflected by the responses to my presentations at the last two annual geospatial conferences held at RCMRD.

- *Integrated development approach.* An integrated development approach to the implementation of the 2030 Agenda provides the best chance of eradicating extreme poverty. Experience over the last two decades says (United Nations Department of Economic and Social Affairs, 2015) has demonstrated how inadequate silo-ed and sectoral based planning approaches can be. Especially when addressing such complex global, national, and local sustainable development challenges in which interdependencies and interlinkages must transcend individual agendas and national borders. In this regard, national governments are currently faced with developing and implementing strategies, plans and policies that target systemic transformation and sustainability. The study in Manyatta is an example of how this can be achieved using technology, citizen engagement, transfer of knowledge within authentic and effective partnerships.
- *Citizens at the center.* The lived experiences of the “People of the Place” are central to providing data to inform development. Developing country governments are often portrayed as hierarchical, centralized and “top down” (Andrews & Shah, 2003) and governments are typically portrayed as being insular, nonparticipatory, and lacking transparency (Blair, 2000). This research study in Kisumu exemplifies the positive outcomes possible through civic engagement and collaboration with government and stakeholders with citizens at the center.

- *Locally and nationally led.* The devolution of the central government in Kenya that gave more responsibility to the local government is a good example of how the national agenda can inform what happens at the local level and in a context that is more applicable to the needs and priorities. The Global Indicator Framework was meant to help governments frame the issues nationally and locally. The indicators are action oriented, global in nature and universally applicable but take into account different national realities, capacities and levels of development and respect national policies and priorities (United Nations Department of Economic and Social Affairs, 2016). The Big Four Initiative of Kenya within their National Vision 2030 Agenda is being implemented on the local City level of Kisumu to begin with their integrated comprehensive development plan for the city. The Manyatta study will be an important contribution to the integrated and comprehensive city plan.

This model can be replicated at the city, county, country, and global levels through the United Nations Development Programme (UNDP). A great example of government leadership was the leadership given by both the County and City Departments of planning for Kisumu, who created the space and participated in the research and enabled the research to be conducted with participation of the community. This contributed to the scientific and social understanding of the challenges and opportunities of the research by being immersed in the process with the potential of personal transformative experiences (UNDESA, 2019).

### **Some Lessons and Final Reflections**

Nothing could have prepared me for the impact this research study would have on my understanding of what it feels like to be in service. It was an honor to be both student and teacher in the shared experience to affect change together with the dignified community of Ancient



Nilotic People called the Luos in the Port City of Kisumu, Kenya using participatory action research, situational analysis, and geospatial information technologies.

Change is fun. Change is hard. Between those truths yawns a large gap that poses a challenge for would-be change makers. Yet by integrating two widely influential practices—design thinking and adaptive leadership—social innovators can manage transformative projects in a way that’s both creatively confident and relentlessly realistic. (Bernstein & Linsky, 2016, p. 1)

The informal settlement of Manyatta needed to see organization and structure come to their community. They yearned for some semblance of order so they could begin to take further steps to solve the pressing environmental issues they faced that would bring into view their social and economic aspirations. Point-based collected data together with GeoDesign brings that order through a series of brainstorming of ideas (Brown & Wyatt, 2010) made possible through the PAR process, problem tree analysis and situational analysis of the human and nonhuman elements in the settlement that allowed for sorting ideas and allowing the good ideas to rise to the top and the bad ones fall off (Kelley & Littman, 2005). Adaptive leadership, explained Heifetz (1994), brings pragmatism to the hopefulness of creative design by explaining that without the leadership framework that allows for design to bring about concrete change, needed change remains elusive. Heifetz insisted that it teaches that those who lead change must accept their world to be difficult, politically contentious, personally gut-wrenching, and risky. Heifetz, 1994) asserted that adaptive leadership requires one to challenge the expectations of authority which are designed to give direction, provide protection, and impose order. Leadership, however, requires the discomfort of application which undoubtedly involves leaving behind something that is cherished and assisting in managing the fear and loss that comes with change by first identifying it.

The defining challenge of our time, said Ban Ki-Moon (2014), is to close the gap between our determination to ensure a life of dignity for all and the reality of the persisting

poverty and gross inequality. To eradicate extreme poverty by 2030, which is the overarching objective of the sustainable development agenda, there must be a major change in political will and a sense that we live in one world and our challenges are interconnected. We can no longer live in a world of plenty and at a time of enormous scientific promise and, at the same time, be content to have hundreds of millions globally live in devastating deprivation.

The insight that comes from knowledge of dignity is the recognition of the internal power that comes with claiming our inherent value and worth. . . . Knowing that our dignity is in our hands, that we are in charge of it no matter what the circumstances, makes us resilient and able to stay connected to our worthiness. (Hicks, 2018, p. 3)

I am gratified to have worked with the citizens of the settlement of Manyatta and to interact more broadly with the people of Kisumu. I was able to facilitate the conversations that brought to the forefront what, to them, were core problems that impacted the social, economic, and environmental viability of the place they call home. I also learned of the ancient history of its proud people. My life has been forever changed by the experience. I learned so much from them especially about showing up with dignity and pride in spite of one's circumstance—and I hope they learned from me also. I will be forever connected to my sisters and brothers in that distant land which is also that of my fore-parents.

The research to ascertain the impact of geospatial information and effective partnerships included the development of a strong partnership with key stakeholders in Kenya and in the city of Kisumu where the informal settlement of Manyatta A and B is located. I am pleased to say that this was accomplished, and the citizens of both Wards were actively involved in the process of bringing to life the design of their community, something they had longed and hoped for.

Development planning is an important middle step between the local plans and any effective implementation of any agenda whether it is on the local or global level. Chadwick (1971) in

defining the problem, through a systems analysis, says planning seeks to solve as a goal plus the impediment to that goal which must be considered.

Chadwick (1971) advocates for a decision-support system which is one that is able to assist decision-makers analyze issues and propose solutions. GIS is an example of such a system. Doubriere (1979) explained planning as needing to make the city healthier, bigger, and nicer, while safeguarding and showing the city's heritage to the advantage of the city. Henderson (1997) argued that urban planning is best understood as a relationship between decision-makers, the territory they have to control and the decision-support system for urban planning and has the following four qualities:

- Planning is future-oriented.
- Evaluating alternative solutions.
- Planning is political.
- Planning has a special responsibility to represent the needs of minorities, the disabled, the poor, and other under-represented groups.

It was gratifying to learn from the City Planner that the GeoDesign done for Manyatta will be able to contribute at the location or ward level to the current integrated comprehensive development plan now underway for the City of Kisumu. The research study also provided strong evidence that when all key stakeholders come together in partnership and in a participatory way with a shared goal of creating change under courageous, adaptable, and flexible leadership, transformation is possible. The community of Manyatta saw the need to better understand geospatial information and GeoDesign to design their community as a challenge worth facing to improve their lives. They saw come to life for the first time a detailed strategic design of Manyatta and participated fully in revising the first draft to come up with a final draft that more

accurately reflected the Manyatta they wanted and is a clear vision of a better future where no one is left behind.

### **Concluding Remarks**

This study conducted at the local level has the added potential of informing and possibly accelerating the implementation of all agendas: the UN 2030 Agenda, the African Union Agenda 2063, the National Vision 2030 through the Big Four Initiative. And, that this can be accomplished through the integrated development planning now underway at the Kisumu County and City Levels and which the devolution is now making more possible and not likely in the pre-devolution era (Nyanjom, 2011). The willingness of the government of Kisumu to engage with respect and appreciation with all partnership actors was gratifying to experience. The research study revealed the value of the development idea especially at the local level and the implications for how the study may serve to inform the development of not only the other informal settlements in the County of Kisumu but also in all the counties in Kenya. The comprehensive and concrete nature of the study that applied the data to real development planning outcomes was greatly appreciated by both the government and citizens.

*There is an anxious and waiting public that looks to its governments and all those who would sense their need and have the will to respond!*

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**Appendixes**

## Appendix A: Household Questionnaire

### INTRODUCTION

This survey for Antioch University, USA, is meant to establish how geospatial information and effective partnership might better lives in Manyatta. The information gathered will be used by the Ministry of State for Planning, National Development and Vision 2030 as a benchmark on aspirations and priorities in formalizing the settlement to provide the basic services the residents need. The information you give us will be kept confidential.

### SECTION A: PRELIMINARY INFORMATION

<b>General information</b>
Enumerator/Questionnaire Code
Cell phone no. of interviewer
Date of interview
GPS coordinates

<b>Respondent's name and/or contact</b>
---

<b>Place of residence</b>
<b>Gender:</b> 1=Male            2=Female

<b>Respondent's occupation</b>
Marital Status
1= Married
2= Single
3= Widowed
4= Divorced
5= Other (specify)

<b>Age bracket of the respondent in years</b>
18–24
25–35
36–45
46–55
56–65
above 65

<b>Relationship to household head:</b>
1= Self
2= Spouse

3= Son/daughter
4= Parent
5= Worker
6= Other (specify)

<b>Education level of respondent</b>
1= Informal education
2= Primary
3= Secondary
4= Tertiary: non-university (level)
5= University (level)

<b>Monthly income estimate (Kenya shillings)</b>

## HOUSEHOLD QUESTIONNAIRE    Section 2

<b>Household characteristics</b>
----------------------------------

### SECTION B: AWARENESS OF SDGs, GEODESIGN, AND ENGAGEMENT

1. How aware are you of the 2030 Agenda for Sustainable Development?  
Rank: 1= Not at all; 2= Vaguely; 3= Fairly; 4= Very well
2. Would you like to help develop your community?  
Rank: 1= No; 2= Neutral; 3= Maybe; 4= Definitely yes
3. What do you know about maps and would you like to learn?
4. Did you know you can see how your community can be using technology like GIS and GeoDesign?  
Rank: 1= Not at all; 2= Vaguely; 3= Fairly; 4=Very well
5. How do you think GIS and GeoDesign could be applied to your life/ area/ needs?
6. What specific services and materials would improve your daily life?
7. Do you trust this information in the hands of the government?  
Rank: 1=Yes; 2= No
8. If No, please state why.

## **Appendix B: IRB Approved Focus Group Discussion Guide**

### INTRODUCTION

This survey for Antioch University, USA, is meant to establish how geospatial information and effective partnership might better lives in Manyatta. The information gathered will be used by the Ministry of State for Planning, National Development and Vision 2030 as a benchmark on aspirations and priorities in formalizing the settlement to provide the basic services the residents need. The information you give us will be kept confidential.

The following themes will guide the focus discussion.

The information gathered will be used for study and further NGO work with the United Nations. The purpose of this Focus Group is to gather as much information to assist you in improving the quality of life for you in Manyatta.

- 
- I. How long have you lived in Manyatta? (Get the range and average from the participants)
  - II. What has life been like for you in the settlement? (Record participants' collective evaluation)
  - III. Do you have children? How many? Ages? (Get the range and average from the answers)
  - IV. What do you see as a future for you here?
  - V. Do you feel you can make a difference in how your future turns out?
  - VI. Do you feel you are getting the help you need to live the life you would like to have?
  - VII. If you could change how things operate here, what would you do? (Get all the varieties from participants, then categorize and rank them by a pairwise outranking matrix)
  - VIII. How would you feel if your settlement was mapped out and designed to your liking.



## Appendix C: IRB Approved Key Informant Interview Questionnaire

### INTRODUCTION

This survey for Antioch University, USA, is meant to establish how geospatial information and effective partnership might better lives in Manyatta. The information gathered will be used by the Ministry of State for Planning, National Development and Vision 2030 as a benchmark on aspirations and priorities in formalizing the settlement to provide the basic services the residents need. The information you give us will be kept confidential.

#### General information

Enumerator/Questionnaire Code
Cell phone no. of interviewer
Date of interview

#### a) Stakeholder characteristics

Stakeholder's Group Affiliation
Stakeholder's Occupation
Stakeholder's Institution
Stakeholder's Name: Gender 1= Male 2= Female
Stakeholder's cell phone no

#### Education level of respondent

1= Informal education
2= Primary
3= Secondary

4= Tertiary: non-university (specify level)
5= University (specify level)

**b) Awareness of SDGs and engagement with the Manyatta community**

1. How long have you worked with the Manyatta Informal Settlement?
2. Are you aware of the United Nations Sustainable Development Goals? (1 = Yes; 2 = No)
3. If Yes, what do you know about the goals?
4. How do you think the goals could help Manyatta community?
5. Are you aware of GIS or geospatial information technology? (1 = Yes; 2 = No)
6. If yes, how do you think the technology could help Manyatta community?
7. Would you like to know more about geospatial information and how it might help transform Manyatta community? (1 = Yes; 2 = No)

**Thank you for your cooperation!**

## **Appendix D: IRB Informed Consent Form**

### **For Participatory Action Research (PAR)/Situational Analysis Group for GeoDesign**

**Name of Principle Investigator:** Etta D. Jackson

**Name of Organization:** Antioch University, PhD in Leadership and Change Program

**Name of Project:** Dissertation research on: What role may geospatial information and effective partnerships play in the implementation of the international agenda for sustainable development?

*You will be given a copy of the full Informed Consent Form.*

#### **Introduction**

I am Etta D. Jackson, a PhD student, enrolled in the Leadership and Change program at Antioch University. As partial fulfillment for the Ph. D. degree I am conducting research in Kisumu, Kenya.

I will provide you detailed information about the project and invite you to participate. You may talk to anyone you feel comfortable talking with about the project and take time to reflect on whether you want to participate or not. You may ask questions at any time.

**Study Purpose:** The purpose of this study will be to develop and deploy a robust partnership framework to assist leaders and citizens of the informal settlement of Manyatta to express their areas of concern. And, to communicate their knowledge of the new international agenda within the context of their own national development plans for sustainable development, and construct and design a development plan using geospatial information and GeoDesign technologies to imagine the future they want. This group will include members of the ministries of county and city planning. The goal is to also accomplish economic, social and environmentally sustainable objectives for the community. A challenge for the successful implementation of the Agenda is to do so in an integrated and comprehensive manner. This study will seek to show how the collaborative nature of geospatial information together with an engaged partnership team have the potential of achieving the desired outcomes.

**Procedure and Duration:** If you agree to participate, the participatory action research group for the GeoDesign of Manyatta will last for approximately 45-60 minutes. You will be asked questions about your experiences living in the Manyatta Community. The focus will be on benefits, challenges, and suggestions for improvement. With your permission, the interview will be transcribed. The interview will be conducted by me or my associate Mr. Beda Ogola.

**Potential Risks and Discomfort:** As with any study of this nature, there is always some risk that comes with participation. For example, with any group we state at the beginning that all comments will be confidential and should not be discussed outside of the group. However, there is no guarantee of this. Also, some of the questions may make you feel uncomfortable, but you are always free to not answer any question or stop participating at any time if you feel

uncomfortable. Though every precaution will be taken, there is a slight chance that you could be identified. The consequences of identification would likely be negligible. If you are not comfortable with being audio recorded, you will not be able to participate in this study.

**Incentives/Compensation:** None

**Anticipated Benefits to the Participants:** There will be no direct benefit to you. However, there may be indirect benefit in that you get to have your voice in the potential development of your community and which may contribute to the success and sustainability of the community. You may also get to know members of the community.

**Right to Refusal or Withdrawal of Participation:** You have the right to decline or discontinue your participation in this research study at any point. If you choose to participate in this PAR group, you do not have to answer any questions that you do not want to answer. Your refusal to participate or withdrawal will have no negative effects to you or the services you receive. And most importantly, refusal to participate or withdrawal from the study can be for any reason, real or perceived.

**Assurances of Privacy and Confidentiality:** We will do our utmost to protect your confidentiality by keeping the audiotaped transcription in password protected drives only accessible to the researcher and her associate. All transcriptions of the recording will not include your name, but we will use a pseudonym instead. No direct quotes will be used if such quotes have the slightest risk of revealing your identity. The recordings will be destroyed three years after the completion of the study.

### **Future Publication**

Documentation of the project will be shared internally with the Antioch University, PhD in Leadership and Change Program learning community and the dissertation will be published. The publication report comes from this research will contain no identifying information about you or any individuals who participated in this research. The researchers will not divulge any information about you. However, it is impossible for the researchers to control the behavior of the other participants in the PAR group. We ask that all participants respect the privacy of the others and recommend that no one mention information outside the group that they might find to be embarrassing or uncomfortable if it were to be made public.

**Who to Contact:** If you have any questions, you may ask them now or later. If you have questions later, you may contact Etta Delores Jackson, email: [REDACTED] If you have any ethical concerns about this study, please contact Dr. XXXXX, PhD, Chair, Institutional Review Board, Antioch University Ph.D. in DISSERTATION RESEARCH CONSENT FORM

**PARTICIPANT AGREEMENT/CONSENT**

I confirm I am volunteering freely to participate in this research project. I have read and fully understand the purpose of the research project and its risks and benefits. I have had the opportunity to read this document and discuss my concerns and questions. I fully understand what is expected for my involvement as a participant in the study and am aware of the minor risks and consequences. I understand that my signature is not required to participate to further protect my privacy. I will be provided a copy of the consent statement if I want it, which has information about how to contact the researchers after the interview.

Printed Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Please check here whether you agree to be audiotaped: \_\_\_ Yes or \_\_\_ No (please see the complete signed list of participants attached)

**RESEARCHER(S)/PERSON(S) OBTAINING CONSENT**

I have provided a copy of this document and reviewed with the participant the materials contained in this form and the participant has provided consent to participate.

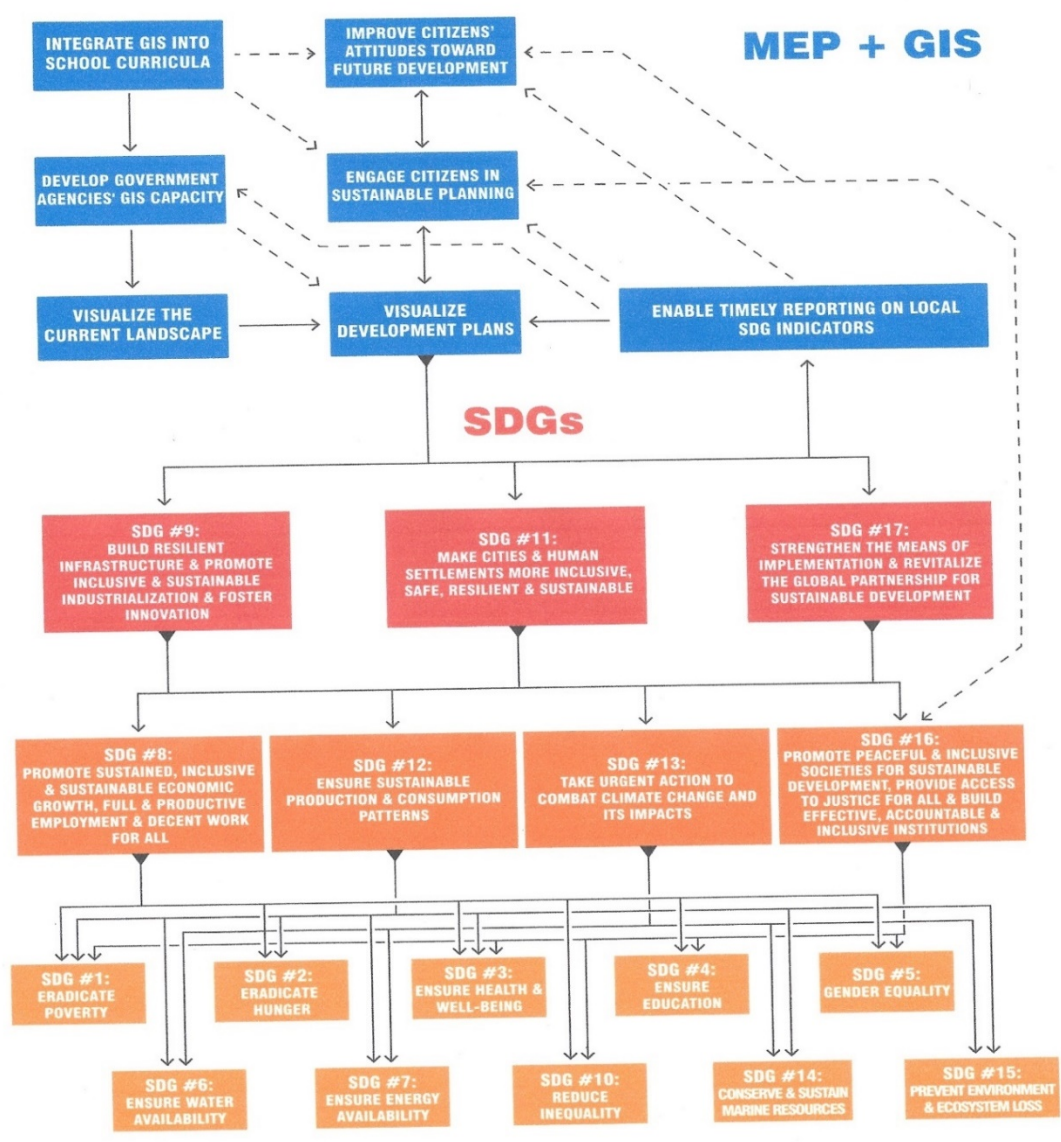
Printed Name of Researcher: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_



### Appendix E: Flowchart of MEP and SDGs



**Appendix F: ICGC's Millennium Earth Project (MEP) Proposal**

**The Millennium Earth Project (MEP)  
Proposal**

by  
The Institute for Conscious Global Change (ICGC)

**'Putting Equality on the Map!'**





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## Executive Summary

The Institute for Conscious Global Change (ICGC) has built a diverse experience record and maintains a staff that includes planners, architectural designers, systems programmers, Geographic Information Systems (GIS) specialists, as well as technical writers and administrative support. The multidisciplinary team strategy employed by ICGC utilizes the latest 3D analysis and visualization practices with GIS and design applications, resulting in a product that is unique in the international development community.

ICGC will deliver the most technologically advanced, spatially enabled visualizations and data infrastructures appropriate to the needs of each country in the achievement of the 2030 Agenda for Sustainable Development. Our understanding of GIS and Information Technology (IT) allows us direct access to the latest in software upgrades and customer support. This knowledge ensures responsiveness to technical GIS and IT questions and flexibility during implementation for the creation of unique web mapping applications for data visualization and analysis that best assist in any country's projects and planning. The Institute for Conscious Global Change (ICGC) delivers technical excellence.

ICGC would like to introduce The Millennium Earth Project (MEP), a "how to" solution to the "what" of the 2030 Agenda and to assist governments and citizens to look at a more comprehensive and holistic approach to the planning for development that can transform each country to eradicate extreme poverty and leave no one behind. MEP uses Geographic Information Systems (GIS) technology, GeoDesign and related technologies to show how this can be achieved.

To accomplish this transformative agenda we believe that it is essential to first integrate the 17 goals, 169 targets and 230 indicators. The agenda should be one that fosters a bottom-up approach, build capacity and transfer the technical knowledge needed for the country to become sustainable.

With this project, we propose to work with governments through their Ministry of Planning to bring all the Ministries, citizen representatives and other Stakeholders to the decision-making table to envision the future of the community in which they live. The goal is to have the citizens together with the government become invested in the social, economic and environmental sustainability of each community and by extension, their country.

Through MEP we will assist countries with:

1. Developing methods and means of collecting data related to the challenges laid out in the SDGs, using geographic information systems (GIS)
2. Building the capacity of governments so they can manage and maintain a data collection system moving forward
3. Facilitating cooperation and involvement from interested parties at all levels from government, to citizens and all in between
4. Constructing a framework for moving towards reaching the high bar set by the 2030 Agenda

This GIS will allow the international community to visually explore localized SDG data for use in planning sustainable solutions and policies with the technical knowledge and a cost-effective method to collect, maintain and quickly disseminate updated SDG indicator to a global audience.

This ambitious agenda presents both challenges and opportunities. ICGC acknowledges that each country is at a different stage of its development and so also is the knowledge of this innovative



technology, Geographic information Systems and its related technologies. Therefore, one of the first steps will be to make an evaluation of the current situation. The support to be provided will be based on these findings and the agreements made will be based on the needs of the country and on the economic, social and political reality of the country and their national and sustainable development goals.

MEP offers the best opportunity for planning and envisioning a different future. Upon successfully completing a pilot project, we will demonstrate that GIS and Geodesign should be utilized as a means of implementation of the Sustainable Development Goals and their related targets.

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### **Phase I - Pilot**

The project will be launched with an initial pilot phase of 12 months. Upon acceptance of this proposal ICGC will provide additional documents containing a detailed scope of work tailored to the project area and project implementation strategy.

### **Phase II - Data Collection**

This phase will be tailored to the study area in which we are working. We will begin by compiling existing sets of data to use in creating base city maps and models in order to prepare for the geodesign process. During this phase we will reach out to all interested parties for input and assistance; local governments, NGOs, educational institutions, citizens, etc.

### **Phase III - Data Collection**

The focus of this phase will be collecting data relating to the 2030 Agenda, and streamlining collection methods to allow cost effective maintenance of data. Focus is on developing data collection criteria and methods. We will continue to streamline workflows using webmaps to increase the efficiency of participatory data collection and field data collection using mobile devices.

### **Phase IV - Sustainable Solutions**

During this phase, we will work with our partners to identify and develop sustainable proposals that will help move these communities toward meeting the Sustainable Development Goals and Targets. By working with local governments, NGOs, design and planning professionals, and others, with citizen input and oversight, we will begin to design for sustainable growth.

---

## At a Glance

**Project Title:** The Millennium Earth Project (MEP)

**Lead Organization:** The Institute for Conscious Global Change (ICGC)

**Potential Partners:** Governments: National, Regional and Local; The African Union; CARICOM; ASEAN; EU; Local and International NGOs; Universities; Businesses; Philanthropic Orgs; Citizens

**Primary Objective:** To Introduce Geographic Information Systems (GIS) and GeoDesign as Means of Implementation for achieving the United Nations 2030 Agenda for Sustainable Development. To create virtual--- development plans displayed on the electronic GIS platform showing tangible solutions to the development needs of each community.

**Beneficiaries:** Citizens of each country and by extension the world

**Budget Estimate:** To be determined after selecting a project location

**Estimated Duration:** 2-4 years (dependent on study area parameters)

## 1.0 Objectives

### 1.1 Main Objectives

The main objectives of MEP are to provide a visual and intuitive map to engage all stakeholders to envision the future they want in a concrete way. To encourage national, regional and local governments to use modern innovative technology, information/data to streamline processes to make transparent, balanced development decisions that will facilitate economic growth and resiliency. Member States can greatly benefit from the use of geographic information data to strengthen and empower government entities and its citizens to discover, share collaborate, integrate data. See appendices for more information on GIS and geodesign.

### 1.2 Phase Specific Objectives

#### Phase I

##### Objectives:

- Prepare geodesign and implementation plans and refine the scope of work, budget and timeline for additional phases
- Work with and strengthen the technical capacity of National Planning Agencies, National Mapping Agencies, local governments, Statistical Offices and other parties

#### Phase II

##### Objectives:

- Collect and compile data to create initial maps showing the current landscape, assets, and resources and statistical data to get a better sense of site-specific challenges and issues

- Visualize the study area landscape using maps and models showing pre-existing data
- Engage citizens and other involved parties with data compilation

### Phase III

#### Objectives:

- Determine site-specific parameters and methods for collection of SDG related data
- Develop and implement an on-the-ground canvassing strategy to collect data relevant to specific issues relating to the SDGs
- Develop cost efficient workflows allowing government agencies to report high priority SDG data quickly; and familiarize government agencies with the geodesign process

### Phase IV

#### Objectives:

- Provide a plan to collect and report remaining and on-going SDG data
- Visualize and propose sustainable development plans/proposals with partners
- Work with all parties to create a robust and transparent roadmap for future growth and development

---

## 2.0 Background and Justification

In the most inclusive process of the 70 year history of the United Nations, 193 Member States, Civil Society, Businesses, Academia and Philanthropic organizations came together as mandated by the Rio+20 Outcome Document. Under the supervision of the General Assembly they produced "Transforming Our World: the 2030 Agenda for Sustainable Development" an Outcome Document in August of 2015 and later signed by Member States on September 25th 2015 giving to the world the most transformative agenda for eradicating extreme poverty for everyone everywhere by the year 2030.

The Institute for Conscious Global Change (ICGC) aligns itself with the goal of the United Nations and is committed to help fundamentally change the way humanity lives in and creates its environment. To accomplish these objectives, ICGC will work with each member state of the United Nations and its citizens to show how with the integration of the goals, their related targets and indicators we can collect the relevant data to each goal, analyze, plan and design the future we want that leaves no one behind.

---

## 3.0 Project Description

### 3.1 Phase Descriptions & Deliverables

**Phase I:** Begins with a kickoff meeting with government employees to demonstrate geographic information systems (GIS) and its applications as related to the Sustainable Development Goals (SDG) and typical government operations. During this phase we will conduct a needs assessment to determine needs for GIS data, staff, software, and hardware and use this to create as the base for a GIS Strategic Plan. The project will identify those goals and targets applicable for the country's needs. Once



they are selected, an assessment of the factors that can influence on the different issues indicators will be necessary, e.g., if poverty is to be addressed, factors such as the level of education, unemployment rates, or the access to job epicenters should be considered in the study. Therefore, this plan will include methods for collecting and organizing data, as well as how it will be made readily available through online web mapping services. Additionally the Strategic Plan will allow us to refine the scope, budget, and timeline for additional phases. Technical workshops will be conducted periodically during this phase to allow government employees to start using GIS and global positioning systems (GPS) hardware and software while giving them a better understanding of how each works.

**Deliverables:**

1. Needs Assessment
2. GIS Strategic Plan
3. GIS/GPS technical training materials.

**Phase II:** Focuses on collecting raw GIS data at the local level, organizing it and making it quick and easy to access. Our data will be hosted online so very shortly after, if not as soon as it's collected, it will be online and available to the public. We will start by collecting comprehensive sets of infrastructure and utility data to use in creating city models and prepare for the geodesign process. This data will provide spatially accurate maps and 3D models to visualize the pilot city's current landscape. During this phase public workshops will be held to allow citizens to participate in collecting certain data.

**Deliverables:**

1. Assistance procuring and installing GIS and GPS software
2. Data from United Nations, International, Federal, State/Province, and City/County agencies
3. Infrastructure and utility data for pilot city collected in the field
4. Infrastructure and utility project files
5. Access to infrastructure and utility GIS services hosted on the web
6. Access to city models hosted on the web
7. Configured webmaps for field data collection using mobile devices
8. Digital and hard copy, preconfigured maps

**Phase III:** Focuses on collecting high priority SDG data at a local level. This can be taken from either existing datasets or streamlining collection methods to allow cost effective maintenance of data. During this phase we will encourage our partner organizations to begin developing sustainable solutions that will help move these communities toward meeting the SDG. Advanced workshops in geodesign and analysis will be conducted using collected project data allowing citizens and government employees to begin thinking about how to make their community more sustainable.

**Deliverables:**

1. SDG specific GIS data for pilot city created from various sources
2. Access to SDG GIS services hosted on the web
3. Digital and hard copy, preconfigured maps
4. Analysis maps that will aid all parties in identifying the needs of an area
5. Training and educational materials for GIS, geodesign and analysis

**Phase IV:** Focuses on developing collection methods for remaining SDG data not addressed in Phase III. We will continue to streamline workflows using webmaps to increase the efficiency of participatory data collection and field data collection using mobile devices.

**Deliverables:**

1. Access to GIS services hosted on the web
-

2. Access to sustainable development models hosted on the web
3. Configured webmaps for field data collection using mobile devices

### 3.2 Methodology

**Multi-sectoral involvement:** All activities in each country will be done under the supervision and direction of the Ministry of Planning, or the closest associated agency, in the government. Everyone can play a role in creating a sustainable future so our project seeks to engage citizens, businesses, schools, and government agencies within the project area. This will be done through public training workshops, academic internships, and allowing anyone to collect and submit data using mobile devices.

**Capacity building:** From the beginning we will work alongside employees of government agencies to allow their participation in all stages of the project. Hands on technical training will ensure the GIS system will continue to develop even after our project is delivered.

**Participatory GIS:** Participatory GIS (PGIS) is an innovative approach increasingly being used by governments to support its data collection and management operations and will be introduced for consideration, evaluation and adoption. Given that some governments lack the resources to collect the data required to support operations, some data sets do exist in the private sector and with citizens and with all parties working together to the mutual benefit of the sustainable development of the country. PPGIS reduces the workload of governments while empowering citizens and communities. This technique promotes interactive participation of stakeholders integrating and managing spatial information and uses information about specific landscapes to facilitate broadly-based decision making processes that support communication and community advocacy.

**Participatory Geodesign:** By involving all parties with a stake in the sustainable development and growth of an area we can insure that everyone's voices are heard and all have a hand in the design and construction of the future. The combination of expertise and voices involved in Geodesign ensure a holistic process. The four essential categories of Geodesign are Information Technologies (GIS, 3d and 2d design programs, etc.), Geographic Sciences (geology, hydrology, etc) Design Professionals (architects, urban planners & designers, etc) and the People of the Place (local citizens and governments).

**Open source/standards:** Open Source promotes universal access and redistribution via low or no-cost licensing for software to accomplish routine, distributed tasks within the workflow. This avoids massive costs associated with licensing advanced commercial software to every workstation where GIS tasks are carried out. Open standards promote portability of data and context from one organization to another by way of pre-established structures; both within the country and with other nations. Open standards can be used as a springboard for the development of national data standards. We will work with governments to integrate open source software into their workflows wherever appropriate and follow open data standards when creating and publishing resources to ensure our work is universally accessible.

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Geodesign is a method that brings geographic analysis into a collaborative process allowing citizens, designers, planners, geographers and civil engineers to find and design resilient solutions to 21st Century challenges. Some of these challenges include population growth, decreasing resources, disaster mitigation, climate change and many more. See Appendix B for more information on geodesign.

"Geodesign's mission is to imagine a different future for a place - based on thoughtful, creative change"



### 3.3 Organizational Principles

The Institute for Conscious Global Change (ICGC) is an international not-for-profit, non-governmental organization incorporated under the laws of New York State in the United States of America. ICGC has been in Special Consultative Status with the Economic and Social Council (ECOSOC) of the United Nations since July 2012. The purpose of the Institute is to build a visual framework to meet the United Nations' Agenda 2030 for Sustainable Development.

Our mission is to visualize, analyze, explain, and disseminate data to make sustainable development plans universally accessible. Using Geographic Information Systems (GIS), GeoDesign and related technologies through the lens of the 17 Sustainable Development Goals, their related 169 targets and 230 indicators, we will provide visual but tangible solutions to eradicate extreme poverty on our planet through development. By so doing we believe we can "fundamentally change the way humanity lives in and creates its environment."

We believe that the world is one and its sufferings are one. We further believe that humanity is one, created equal, with equal rights to all resources and opportunities, which must be made available to everyone. We further believe that when organizations operate as a team with shared vision, shared goals and shared sacrifice, success is assured. Respect and courtesy for each other internally must be a reflection of the work we are attempting to do externally.

---

#### Geographic Information Systems (GIS):

A collection of interacting and interdependent geographic components used to describe the earth. It integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. See Appendix A for more information on the benefits of GIS.

"GIS reveals patterns, trends, and new relationships not otherwise known"

---

### 4.0 Expected Accomplishments and Indicators of Achievement

#### 1. Expected Accomplishment:

- Enable timely reporting of localized SDG indicators

##### Indicators of Achievement

- The extent to which SDG indicator data can be appropriately localized to a study area
- Speed with which SDG indicators can be consistently reported on an ongoing basis
- How often and efficiently indicator data can be updated

#### 2. Expected Accomplishment:

- Engage citizens in sustainable planning

##### Indicators of Achievement

- How often citizens engage with published plans for their community on MEP maps, models and message boards



- Number of sustainable development plans submitted and reviewed by governments, organizations, the private sector and citizens
- Attendance at SDG related gatherings, meetings and workshops
- How many users are accessing web applications per month
- The ease of use of relevant technologies and how effectively they can be understood and disseminated

3. Expected Accomplishment:

- Visualizing the current landscape

Indicators of Achievement

- The extent of existing conditions data that can be found and compiled
- Comprehensiveness of city models and web scenes
- Ratio of users that do/do not feel maps and city models reveal local conditions

4. Expected Accomplishment:

- Visualize current landscape Identifying and visualizing defined challenges related to SDGs

Indicators of Achievement

- The extent to which SDG "challenge" data can be appropriately tailored to a study area
- The efficiency of collecting SDG related "challenge" data
- The relevance and usefulness of collected SDG "challenge" data

5. Expected Accomplishment:

- Visualizing development plans

Indicators of Achievement

- Ratio of users that do/do not understand how development plans will change their current landscape
- How complete Completeness of development models and web scenes
- Measure of impact of sustainable development projects

6. Expected Accomplishment:

- Integrate geospatial technology into schools curricula

Indicators of Accomplishment

- Participation rate in GIS courses and workshops
- Number of primary and secondary schools, and universities offering GIS and/or development based courses

7. Expected Accomplishment:

- Developing government agencies' capacity to maintain their GIS databases

Indicators of Accomplishment

- Number of government agencies using GIS
- Prevalence of GIS use in government agencies to make informed development decisions
- Number of GIS jobs created each year
- The overall ease with which governments can collect, visualize and report SDG data

## 8. Expected Accomplishment:

- Improve citizens' attitudes about future development plans

### Indicators of Accomplishment

- Ratio of citizens who are/are not hopeful for the future growth of their community
- Ratio of citizens who agree/disagree with, and feel involved in, proposed development plans for their community

## 5.0 Actions Needed by Phase

### Phase I

#### Action Objectives:

- Assess needs for GIS data, staff, software, hardware;
- Familiarize government agencies with the uses of GIS and its benefits;
- Provide hands on technical training;
- Collect pilot GIS data;
- Create GIS Strategic Plan for building and implementing a centralized Geographic Information System (GIS) with data from local to national scale;
- Refine scope, budget, and timeline for additional phases;

### Phase II

#### Action Objectives

- Collect infrastructure/utility data;
- Facilitate crowd-sourced participatory GIS data collection and surveys;
- Assist with data acquisition from vendors and government agencies;
- Create file and folder structures to organize data;
- Provide centralized data storage on ICGC servers;
- Create web mapping services (WMS) for infrastructure/utility data;
- Configure infrastructure/utility project maps and web maps;
- Create 3D City Model and web scenes;
- Develop strategy for collecting SDGs data;
- Facilitate the establishment of national and regional GIS coordinating councils;

### Phase III

#### Action Objectives

- Collect high priority, localized SDG data;
- Conduct workshops for geodesign and analysis;
- Create WMS for SDG data;
- Configure SDG project maps and web maps;
- Create detailed models of culturally significant buildings/infrastructure and landmarks;
- Provide recommendations for policies to help achieve UN SDG;

### Phase IV

#### Action Objectives

- Create maps and models of proposed sustainable development plans;
- Continue advanced workshops for geodesign and analysis;
- Plan for the collection of remaining SDGs related statistics;

\*Note: ICGC will not be involved with implementing projects



## 6.0 Conclusion

ICGC brings together staff members with many years of experience working with governments, universities, and businesses across the globe and offers solutions specifically tailored to put countries on track to achieve UN Sustainable Development Goals. By building the capacity of national, provincial, and local governments to collect, maintain, and analyze SDG indicator data, communities within these countries will be able to make informed decisions regarding sustainable development.

Why you should leverage GIS:

- Identify new insights through spatial analysis that would otherwise remain unknown
- Use visualization as a key to understanding data
- Improve your communications with stakeholders
- Facilitate a more open, transparent and collaborative government
- Improve management of resources and organization
- Help communities plan and respond to crises.

---

## Building Sustainable Communities

### Visualizing the Change

Visualizing development plans gives power to the voice of the marginalized or under-represented, including poor communities, resource users and women who are otherwise excluded from decision-making processes. Our visual approach eliminates educational and language barriers and allows everyone a chance to join the conversation.

Creating 3D spatial models of development plans allows Millennium Earth Project (MEP) to be used as a tool to increase transparency and accountability. These cataloged plans will show development projects as promised to the community and can be compared to what was actually built.



## Appendices

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### Appendix A: Geographic Information Systems (GIS)

**Definition:** A collection of interacting and interdependent geographic components used to describe the earth. It integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

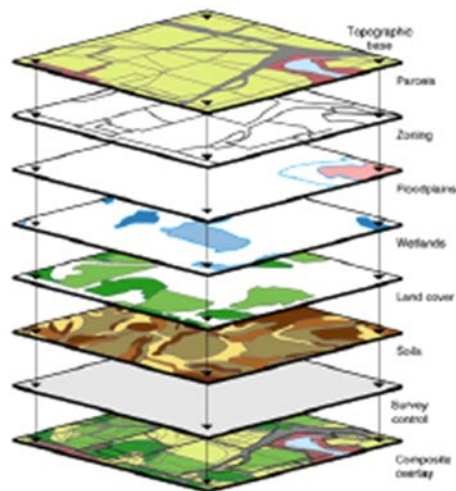
**Main purpose:**

1. Planning and Analysis
2. Asset/Data Management
3. Operational Awareness
4. Field Workforce

**Benefits:**

- **Reveal patterns, trends, and new relationships otherwise not known:**
  - Through spatial analysis, government leaders can take a holistic view of a policy, program, or process to understand how to improve their decisions based on a multitude of factors. To make a proper decision, agencies must look at a variety of regulations, existing programs, and policies in order to make a decision. In many cases, this information is difficult to understand in isolation, and the data needs to be looked at through a variety of factors. GIS can simplify complex data, integrate a variety of sources of information, and summarize complex information when viewed spatially.
- **Improved communications during a crisis**
  - GIS can help communities plan and respond to a crisis. With GIS, communities can define emergency routes, know location and status of critical buildings during a crisis, and allocate the proper resources for response. With GIS, organizations can prepare, respond and recover from crisis more efficiently than ever before.
- **Improved allocation of resources and planning**
  - By viewing data spatially, government agencies can easily track and view underserved communities and use this information to allocate resources more efficiently, reform policies, or spot distressing trends about communities and offer remediation strategies.
- **Instantaneous collaboration through the cloud:**
  - Through the cloud, organizations can share maps, data and pertinent information to improve collaboration efforts. In today's world, collaboration and capitalizing on resources is essential to improving how the public sector delivers services.
- **Improved transparency for citizen engagement:**
  - GIS provides increased transparency and accountability for citizens. With the combination of the cloud, sharing of data, maps, and pertinent information, GIS is allowing increased engagement with citizens and more succinctly showing trends in the community visually, which enables a more constructive conversation for government employees.






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## Appendix B: Geodesign

**Definition:** A method that brings geographic analysis into a collaborative process allowing designers, planners, geographers and civil engineers to find resilient solutions to 21st century urban conditions such as population growth, decreasing resources, disaster mitigation and climate change.

Geodesign is design in a geographic space. The essential aspect of geodesign is the process of designing, creating or modifying some portion or aspect of the environment, be it natural or man-made - occurs within the context of geographic space.

### Main purpose:

As a design and planning method, geodesign tightly couples the creation of design proposals with impact simulations informed by geographic contexts. The purpose of geodesign is to facilitate life in geographic space.

### Benefits

The referential link between the entity being designed and its geographic context provides the tangible basis for doing both science-based and value-based design. Additionally, it has the ability to provide operational linkages to a wide variety of domain-specific information and, in so doing, provides the multidisciplinary platform for doing integral design (i.e. holistic design).

### Visualization tools:

- Screen displays, map viewers, video viewers, and tools for displaying reports are one of the most important components of the geodesign system. These tools provide greater depth of understanding and improve communication.

### Scenario management tools:

- A scenario management tool is beneficial to land-use planning and design projects because you can look at different scenarios and analyze how the plans or designs will influence those projects. e.g., a planner may decide to change the zoning of an area to increase business

development; utilizing scenario management tools, he can see how this rezoning might influence traffic in the area.

**Improved collaboration:**

- Geodesign is looking to pick the brain of the individual stakeholders and bring to the surface the less tangible assets they have. This usually involves round table style discussions and brainstorming sessions between the different stakeholders, i.e., practitioners of geographic sciences, IT, design, and citizenry (those that live in and know all the nuances of the space/location). This open discussion allows the team to apply these less tangible assets to assess the current conditions of the space/location, as well as how those conditions affect the creation of something new.



### Multiscalar Design

Local ← ————— → Regional

Design	Urban Design	Community Planning	Urban Planning	Regional Planning	Mega-Regional Planning
building + block scale	neighborhood scale	multi-neighborhood scale	city scale	localized region scale	wider region scale (state, country, etc)



## General Assembly

Distr.: General  
14 December 2016

Original: English

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Seventy-first session  
Second Committee  
Agenda item 16  
Information and communications technologies for development

### Letter dated 18 November 2016 from the Permanent Representative of Jamaica to the United Nations addressed to the Secretary-General

I have the honour to transmit herewith a proposal entitled “The Millennium Earth Project”, which was drafted by an international non-governmental organization, the Institute for Conscious Global Change.<sup>1</sup>

On 25 September 2015, the General Assembly adopted its resolution 70/1, entitled “Transforming our world: the 2030 Agenda for Sustainable Development”.

In this context, we would like to highlight some key elements of the Millennium Earth Project:

(a) Technology: uses geographic information systems, GeoDesign and related technologies to integrate the 17 Sustainable Development Goals, their related 169 targets and 230 indicators based on different data of all kinds and from all sources;

(b) Representation: visualizing development plans gives power to the voice of the marginalized or underrepresented, including poor communities, resource users and women, who are otherwise excluded from decision-making processes. A visual approach eliminates educational and language barriers and allows everyone to have a chance to join the conversation;

(c) Capacity-building: geospatial education and training via informal (educational games) as well as formal programmes (workshops) for a wide range of target audiences. This allows communities to begin collecting and analysing their own data for planning and development purposes;

(d) Innovation: opportunity for persons to learn how new innovations and the implementation of technology can help communities develop solutions to best meet their needs;

---

<sup>1</sup> Available from [http://www.consciousglobalchange.org/doclib/Millennium%20Earth%20Project%20Proposal\\_161123.pdf](http://www.consciousglobalchange.org/doclib/Millennium%20Earth%20Project%20Proposal_161123.pdf).



A/C.2/71/4

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(e) Advocating: tracking development targets at the local level allows the raising of awareness of societal issues and challenges and advocacy for change on a range of sustainable development, environmental and social issues;

(f) Social monitoring: creating 3-D spatial models of development plans allows the Millennium Earth Project to be used as a tool to increase transparency and accountability. These catalogued plans show development projects as promised to the community and can be compared to what was actually built.

We consider the Millennium Earth Project proposal to be an effective and helpful instrument in the deliberative process for the implementation of the 17 Sustainable Development Goals, 169 associated targets and 230 indicators.

Therefore, I request that you have the present letter circulated as a document of the Second Committee of the General Assembly, under agenda item 16.

(Signed) E. Courtenay Rattray  
Ambassador  
Permanent Representative  
Permanent Mission of Jamaica to the United Nations

---



## Appendix G: Sponsorship Letter from RCMRD for Research in Kenya



Regional Centre for  
Mapping of Resources  
for Development

RCMRD

CSSM/2/AQ

8<sup>th</sup> July 2019

The International Review Board  
Antioch University  
900 Dayton St, Yellow Springs  
OH 45387, USA

Dear Sir/Madam

**RE: SPONSORSHIP LETTER FOR ETTA D. JACKSON**

Please be advised that on behalf of the Regional Centre for Mapping Resources for Development (RCMRD) in Nairobi, Kenya, I am happy to support the research work of **Ms. Etta D. Jackson** in Kenya as a student of Antioch University who is pursuing a Ph.D. in Leadership and Change. I understand that her research work will inquire into: "*What role may geospatial information and effective partnerships play in the implementation of the international agenda for sustainable development?*"

RCMRD agrees to host Ms. Jackson in country for the purposes of the proposed research and recognize that the research is for her dissertation and that said research will be published. RCMRD will work with Ms. Jackson to identify the key individuals and stakeholders whose input is relevant for her research. RCMRD will also support her to gain access to the relevant stakeholders and sites as appropriate in accordance with the local norms and regulations.

Yours faithfully



**Dr. Emmanuel Nkurunziza**  
DIRECTOR GENERAL



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P.O Box 632-00618 Roysambu Kasarani, Nairobi, Kenya || Phone: Tel: +254 20 268 0722 / 268 0748  
Mobile: +254 723 786161 / 735 981098 || E-mail: [rcmrd@rcmrd.org](mailto:rcmrd@rcmrd.org) || [www.rcmrd.org](http://www.rcmrd.org)

### Appendix H: Research Assistants and Field Codes

<i>S/N</i>	<i>Research Assistant</i>	<i>Gender</i>	<i>Field Code</i>	<i>Qualification</i>
1	Cecilia Adhiambo	F	MA	B.A.(Sociology)
2	Billford Otieno	M	MB	B.A. (Arts)
3	Stella Onamu	F	MC	B.A. (Communication)
4	Linnet Awiti	F	MD	M.B.A (IT)
5	Victor Odada	M	ME	B. Sc (Fisheries & Aquatic Sciences)
6	Antony Okundi	M	MF	B.A. (Urban Planning)
7	Kepher Otute	M	MG	B.Sc. (Agricultural Economics)
8	Benard Odhiambo	M	MH	B.Sc. (Environmental Science)
9	Rashid Obado	M	MI	B.Ed. (Literature)
10	Lucy Onyango	F	MJ	B.A. (Development Studies)
11	Christopher Odhiambo	M	Mapping Assistant	B.Sc. (Mining and Mineral Processing Engineering)

## Appendix I: Summary of Copyright Permissions Granted

Figure 1.1 Global Distribution of Poverty. Copyright 2015 World Bank Group.

Figure 2.1 Sustainable development and multi-stakeholder partnership at the United Nations. Copyright 2016 Marianne Beisheim and Nils Simon.

Figure 2.2 Regional Numbers of National Development Banks. From Studart and. Gallagher, (2016), p. 4. Copyright 2016 Kevin Gallagher.

Figure 2.4 Components of the GeoDesign Method. Copyright Carl Steinitz (2012). p.4.

Figure 2.5 GeoDesign Framework of Development of Models and Roles., p. 25 Copyright 2012 Carl Steinitz.

Figure 2.6 GeoDesign Workflow. Copyright 2009 ESRI.

Figure 2.7 Multiscalar GeoDesign Scale Developed by Gregory LeMaire. Copyright 2017 Institute for Conscious Global Change (ICGC).

Figure 3.1 Percentage of Population Living Below the Poverty Line in Districts of Kisumu City. From Kisumu Millennium Development Goals Multisector Household Survey by M. Maoulidi, 2012, p. 15. Copyright 2014 Mounie Maoulidi.

Figure 3.2 Kisumu Municipality With 25 Sublocations. From Kisumu Millennium Development Goals Multisector Household Survey by M. Maoulidi, 2012, p. 4. Copyright 2014 Mounie Maoulidi.

Figure 3.3 Population Characteristics for Kisumu, Kenya, 2009. Copyright, 2012 Earth Science Institute Columbia University

Figure 3.4 Aerial view of Manyatta, an Informal Settlement. Copyright 2014 Maria-Paola Sutto.

Figure 3.5 Participatory Geospatial Mapping in Kisumu, Kenya. Source: From “Kisumu Kuoyo Manyatta Participatory Mapping Clip 2010.avi,” by Regional Centre for Mapping of Resources for Development. Copyright 2010 RCMRD.

Figure 3.7 The Action Research Cycle. Copyright 1998 M. Grady, Kolk, M. Kolk and Creative Educator.

Figure 4.1 Kenya’s Big Four Agenda. From *Kenya’s 2019/20 Budget and the Big Four Agenda: A Pro Poor Analysis*, by Miriam Omolo with Boniface Owino, 2019, p. 8. Copyright 2019 Development Initiatives.

Figure 4.2 Poverty incidence in Kenya (%) by Kenya Integrated Household Budget Survey, 2015/162. From *Kenya’s 2019/20 Budget and the Big Four Agenda: A Pro Poor Analysis*, by Miriam Omolo with Boniface Owino, 2019, p. 5. Copyright 2019 Development Initiatives.

Figure 4.4 Water infrastructures in Manyatta, Kisumu, Kenya Manyatta B, lower layout. Aerial photographs used courtesy of County Government of Kisumu. Copyright 2019 County Government of Kisumu.

Figure 4.5 Water infrastructures in Manyatta, Kisumu, Kenya, Manyatta B, upper layout. Aerial photographs used courtesy of County Government of Kisumu. Copyright 2019 County Government of Kisumu.

Figure 4.6 Water infrastructures in Manyatta, Kisumu, Kenya, Manyatta A layout. Aerial photographs used courtesy of County Government of Kisumu. Copyright 2019 County Government of Kisumu.

Figure 4.7 A merge of the three maps. Created by Antony Okundi. Copyright 2019 County Government of Kisumu.

Figure 4.10 Performance Evaluation Model Developed in Kenya. Copyright 2019 Nashon J. Adero.

Figure 5.1 Kisumu County Government Structure. Copyright 2018 Management Research and Practice.

Figure 5.2 Base Map of Manyatta A and B. Copyright 2019 Nashon J. Adero.

Figure 5.4 Sustainability Framework. From “The integrated frameworks and pillars of sustainability” [Blog post] by Marco Tavanti, 2010. Copyright 2010 Marco Tavanti.

Figure 5.5 Integrated Frameworks and Pillars of Sustainable Development. From “The Integrated Frameworks and Pillars of Sustainability” [Blog post] by Marco Tavanti, 2010. Copyright 2010 Marco Tavanti.

Figure 5.6 Flows of Funds from International and National Financing Sources for SDGs.

Figure 5.7 Five Ps of the 2030 Agenda for Sustainable Development. Copyright 2014 UNDESA, 2014.

Figure 5.8 GIS and Local, National and Global Partnerships Model. Copyright 2019 Nashon J. Adero.

## Appendix J: Copyright Permission for Figure 1.1

Dear World Bank Group Web Permission Department:

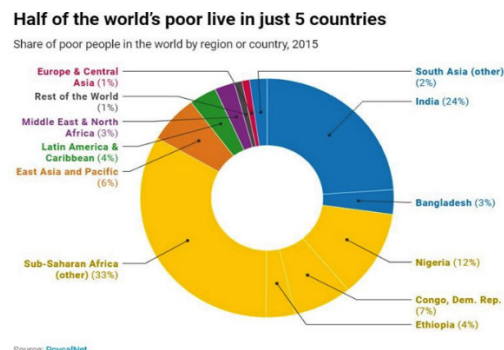
I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below: *Figure 1.1: Global Distribution of Poverty* in my dissertation which will go into the following:

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Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



## Permission Granted for Request Above

Tue, Feb 25, 11:54 AM to Pubrights, me, Srimathi, Jasmin

Dear Etta, you have our permission to use the charge with source credited as you mentioned.

Good luck with your dissertation!

Bassam Sebti,

Global Editor of [www.worldbank.org](http://www.worldbank.org)

## Appendix K: Copyright Permission for Figure 2.1

Dear Dr. Marianne Beisheim:

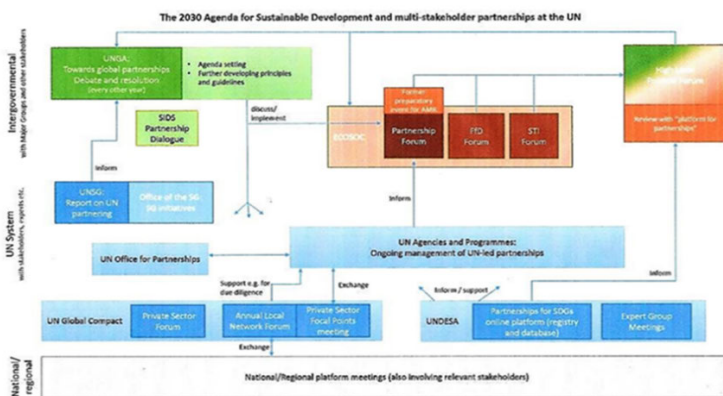
I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below: *Figure 2.1: Sustainable Development and Multi-Stakeholder Partnership at the United Nations* in my dissertation which will go into the following:

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Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



**Permission for Request re Fig. 2.1**

(Text of response dated Sep. 29, 2019 at 8:28 AM)

From: **Beisheim, Marianne** > [REDACTED]  
Date: Sat, Sep 28, 2019 at 8:28 AM  
Subject: Re: Requesting permission to use in dissertation  
To: Etta Jackson <[REDACTED]>  
Cc: Nils Simon <[REDACTED]>

Dear Etta,

Great to hear that you will publish your dissertation!  
Of course you may use the image.  
Nils and I would ask you to please reference as follows:

*Source: Beisheim, Marianne and Nils Simon 2016: Multi-stakeholder partnerships for implementing the 2030 Agenda: Improving accountability and transparency. Independent Analytical Paper for the 2016 ECOSOC Partnership Forum, New York (<https://www.un.org/ecosoc/sites/www.un.org.ecosoc/files/files/en/2016doc/partnership-forum-beisheim-simon.pdf>).*

Thanks! All the best, Marianne

---

**Dr. Marianne Beisheim**  
Forschungsgruppe Globale Fragen | Global Issues Division  
Wissenschaftlerin | Senior Associate  
Tel. [REDACTED]  
[REDACTED]

**Stiftung Wissenschaft und Politik (SWP)**  
**German Institute for International and Security Affairs**  
Ludwigkirchplatz 3-4, 10719 Berlin

**Appendix L: Copyright Permission for Figure 2.2**

Dear Dr. Kevin Gallagher:

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below: *Figure 2.1: Regional Numbers of National Development Banks* in my dissertation which will go into the following:

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Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



---

**Permission Granted for Request Above**

Gallagher, Kevin [REDACTED]

Tue, Dec 3, 2019, 5:33 PM

to me

All yours



**Appendix M: Copyright Permission for Figures 2.3 and 2.6**

Dear ESRI:

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below, which in the dissertation is Figure 2.6.

*GeoDesign Workflow*. On completion the dissertation will be free and to be downloaded from:

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Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



Copyright Permission from ESRI



October 31, 2019

**Requestor:**  
**Etta Delores Jackson**  
**Antioch University**  
**900 Dayton Street**  
**Yellow Springs, OH 45387**  
**Email: [ejackson3@antioch.edu](mailto:ejackson3@antioch.edu)**

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 Environmental Systems Research Institute, Inc. (Esri) grants Antioch University a personal, nonexclusive, non-transferable, royalty-free, license and permission to use, copy, reproduce, and publicly display the Esri materials (hereinafter the "Image") as set forth:

- Image taken from Esri Press textbook *"An Introduction to GIS"* (Exhibit 1); Esri adapted image depicting [GeoDesign](#) (Exhibit 3)
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Rhesha Moreau, IP Administrator  
 Contracts and Legal Department

## Appendix N: Copyright Permission Figures 2.4 and 2.5

Dear Dr. Carl Steinitz:

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below: *Figures 2.4 and 2.5 Components of the GeoDesign Method and GeoDesign Framework of Development of Models and Roles*, respectively in my dissertation which will go into the following:

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Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



**Figure 2.4: Components of the GeoDesign Method**

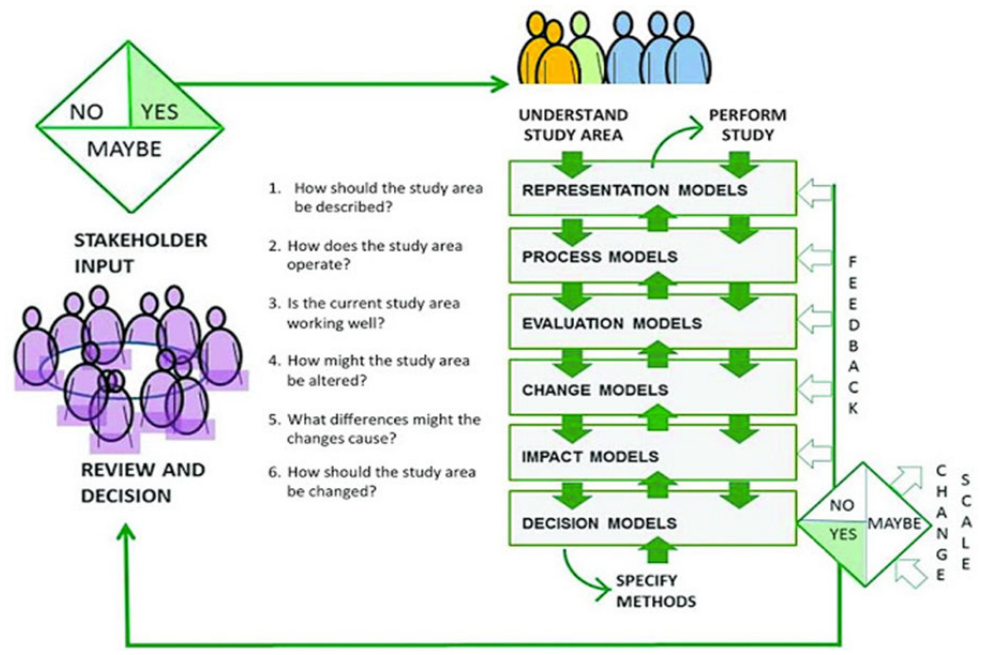


Figure 2.5: GeoDesign Framework of Development of Models and Roles

Permission to use the images above

Steinitz, Carl [REDACTED]

Sep 5, 2019, 12:06 PM

to me

Etta,

If Arthur does not respond soon, contact Lawrence Esho, Department of Spatial Planning and Design, The Technical University of Kenya...also IGC.

The last two images are mine and you may use them. The last seems distorted.

The first three are likely from Esri Press, Redlands CA, USA. I don't know the source.

Regards,

Carl

## Appendix O: Copyright Permission Letter for Figure 2.7

Dear Board of Institute for Conscious Global Change (ICGC):

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below: Figures 2.7: Multiscalar GeoDesign Scale and Stakeholder Engagement Framework 3.6 in my dissertation which will go into the following:

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- b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- c. AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



Figure 2.7. Multiscalar GeoDesign Scale adapted by Gregory LeMaire for ICGC

Dear Etta Jackson, Ph.D. Candidate at Antioch University, Yellow Springs OH.

The ICGC Board of Directors has voted in the affirmative to allow you to use Figure 2,7 image in your dissertation,

*(signed in original)*

Jeanne-Marie Col

Vice-Chair, Institute for Conscious Global Change (ICGC)



## Appendix P: Copyright Permission for Figures 3.1 and 3.2

On April 13, 2020 at 10:11 PM Moumie Maoulidi <[REDACTED]> wrote:

Hi Eta

Thank you for your email below. I hereby agree that you can use two maps.

Best regards

Moumié Maoulidi, PhD

Dear Dr.Maoulidi:

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the images below in my dissertation. They will go into the following:

- ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



## Appendix Q: Copyright Permission for Figure 3.3

Norman Dale <[REDACTED]>  
to [REDACTED]

Apr 22, 2020, 12:00 PM ☆ ↶ ⋮

Dear Ms. Miller,

I am writing to you on behalf of a doctoral candidate, Etta Jackson at Antioch University's Faculty of Leadership and Change. I am her editor. Etta is nearing completion and approval of her dissertation titled, "The Role of Geospatial Information and Effective Partnerships in the Implementation of the International Agenda for Sustainable Development." Her work involved close collaboration with the communities of Kisumu in Kenya and others who have worked there. She would like to have permission to copy and reproduce an image from the Millennium Cities Project that was undertaken by the Columbia University Earth institute (copy of this below - Retrieved from <http://mci.ei.columbia.edu/research-publications/population-data/kisumu-population-data/> ). She has been in touch with several of the people who were deeply involved in that project but seems likely that the Earth Institute continues to have copyright in regard to images that are still on its website. The census data tables would be one of these. See

Once completed, Etta's dissertation will be made freely available at three clearinghouses:

- Proquest Dissertations and Theses Database at <http://www.proquest.com/products-services/pqdt.html>
- Ohiolink Electronic Theses and Dissertations Center, an open access archive at <https://etd.ohiolink.edu/>
- AURA: Antioch University Repository and Archive. AURA is also an open access archive. <http://aura.antioch.edu/>

What is needed for her to use the image of the tables is a person at Earth Institute to reply to this email indicating that permission to do so is granted. Naturally, the figure will include full attribution to the Millennium Project and the Earth Institute.

If you have authority to grant such permission or can refer this query to whomever you believe is the right person to respond, it would be very deeply appreciated.

Thanks

Norman Dale

Editor,  
[REDACTED]

### Kisumu 2009 Census

Age Cohorts	Males	Females	Total
0-4	30,481	30,697	61,178
5-9	24,110	24,690	48,800
10-14	21,894	23,144	45,038
15-19	20,531	24,042	44,573
20-24	23,194	28,225	51,419
25-29	22,235	20,163	42,398
30-34	15,705	12,398	28,103
35-39	10,715	8,613	19,328
40-44	7,371	6,293	13,664
45-49	5,871	5,290	11,161
50-54	4,308	3,638	7,946
55-59	2,909	2,431	5,340
60-64	2,022	1,867	3,889
65+	3,239	4,088	7,327
<b>Total Population</b>	<b>194,888</b>	<b>195,579</b>	<b>390,464</b>

Source: National Bureau of Statistics (KNBS) 2009	
Doubling Time	25 years
Population Density	1,052 people per sq. km

Demographic Groups	Percentage of Population
Children Under 5	16%
Children of Schooling Age (3-17*)	36%
Population Under 25	60%
Women of Reproductive Age (15-44**)	51%
Labour Force (15-64)	59%
Urban Population Over 60	3%

\* Definition of "Schooling Age" from data.unicef.org

\*\* Definition of "Reproductive Age" from WHO Fact Sheet No 334



---

Response:

**Alison Miller** [REDACTED]

Fri, May 1, 6:23 AM



to me, [REDACTED]

Hi Norman – Yes, this is fine.

Best,  
Alison

**Alison Miller**

Deputy Director for Management

The Earth Institute | Columbia University | Tel: [REDACTED]

[REDACTED]  
[www.earth.columbia.edu](http://www.earth.columbia.edu)



### Appendix R: Copyright Permission for Figure 3.4

Dear Dr. Maria Paola Sutto (Urban Development Lab- Columbia University)

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use Figure 3.4: Aerial view of Manyatta in the image below in my dissertation which will go into the following:

a. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher

<http://www.proquest.com/products-services/pqdt.html>

b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>

c. AURA: Antioch University Repository and Archive. AURA is an open access archive.

<http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



*Figure 3.4.* Aerial view of Manyatta, an informal settlement in Kisumu, Kenya. Courtesy of the Urban Design Lab at the Earth Institute, Columbia University.

---

### Permission to use Figure 3.4

From: **Maria-Paola Sutto** <[REDACTED]>  
Date: Tue, Mar 31, 2020 at 12:22 PM  
Subject: Re: Seeking copyright permission  
To: Etta Jackson <[REDACTED]>  
Cc: Richard Plunz <[REDACTED]>

Dear Etta:

I lost track of you, with the intensity of these last days.

As for the image that you need - *Figure 3.4. Aerial view of Manyatta, an informal settlement* - we give you the reproduction permission for your dissertation, with the recommendation to acknowledge the source in the caption, and in the bibliography.

With best wishes of quite working time. Take care.

Mariapaola

### Appendix S: Copyright Permission for Figure 3.5

**From:** Dr Emmanuel Nkurunziza [REDACTED]  
**Sent:** Friday, April 3, 2020 2:15 PM  
**To:** Etta Jackson [REDACTED]  
**Subject:** Re: Copyright permission request

Dear Etta;

Very sorry indeed for not getting back to you sooner. I trust you are keeping in safe during these troubled Covid-19 times.

On behalf of RCMRD, it is my pleasure to grant you the requested permission to use the Kisumu participatory Mapping image in your dissertation and other associated publications.

Kindest regards

On Friday, April 3, 2020, Etta Jackson [REDACTED] wrote:

Dear Emmanuel:

I am writing to ask open-ended permission to use the image below:

*Figure 3.5.* Participatory geospatial mapping in Kisumu, Kenya. Source:  
<https://drive.google.com/file/d/1XYTU3SnRogHo4QaMzL-TKBgBLZS7m15V/view>

It will go into my dissertation which will go into the following:

- a. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- c. AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,  
 Etta D. Jackson



### Appendix T: Copyright Permission for Figure 3.7

Dear Melinda:

I am Etta D. Jackson, a Ph.D. Candidate at Antioch University, Yellow Springs OH. I am writing to ask open-ended permission to use the image below: Figures 3.7: The Action Research Cycle in my dissertation which will go into the following:

- a. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- c. AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Doctoral Candidate

Antioch University, Graduate School of Leadership and Change



Figure 3.7. The Action Research Cycle. Copyright M. Grady, Kolk, M. Kolk and Creative Educator, 1998.

**Permission to use image (Fig 3.7)**

(Emails from Melinda Kolk Oct 31, 2019)

Melinda Kolk <[REDACTED]>

Thu, Oct 31, 2019, 4:07 PM

Hello Etta,

Creative Educator owns the copyright to this image. If you used the attached file which attributes Creative Educator, you may use this image in your thesis at no charge.

Melinda Kolk

Editor, Creative Educator

Melinda Kolk <[REDACTED]>

Oct 31, 2019, 5:17 PM

The graphic is a representation of his (M. Grady) ideas (and mine), so I would include him in your references.

Yes, we understand you will distribute your thesis freely and rights are still granted to include the image with the Creative Educator attribution.

Melinda

## Appendix U: Copyright Permission for Figures 4.1 and 4. 2

Dear Mr. James Harle:

I am writing to ask open-ended permission to use the three images attached:

1. Figure 4.1: Kenya's Big Four Agenda.
2. Figure 4.2. Poverty incidence in Kenya

They will go into my dissertation which will go into the following:

- a. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher  
<http://www.proquest.com/products-services/pqdt.html>
- b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- c. AURA: Antioch University Repository and Archive. AURA is an open access archive.  
<http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Ph. D. (Candidate)

Antioch University, Graduate School of Leadership and Change

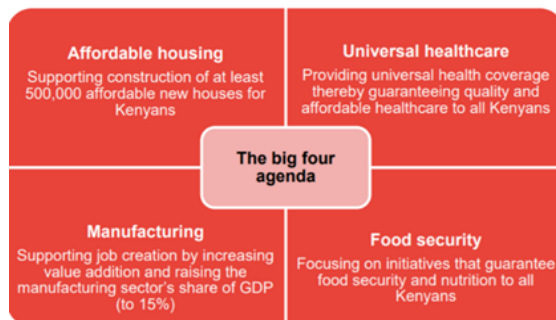


Figure 4.1: Kenya's Big Four Agenda. From *Kenya's 2019/20 Budget and the Big Four Agenda*

Poverty measure	2005/06	2015/16
Extreme poverty	9.1	8.6
Overall poverty	45.9	36.1
Food poverty	45.8	32.0
Gini Index (income inequality)	47.6	39.5

Source: Kenya Integrated Household Budget Survey, 2015/16<sup>2</sup>

Figure 4.2. Poverty incidence in Kenya (%) by Kenya Integrated Household Budget Survey, 2015/16<sup>2</sup>.

### Permission for use of Figures 4.1 & 4.2

James Harle <[REDACTED]>

Fri, Oct 25, 2019, 5:41 AM

to Connie, Publications, me

Dear Etta,

Thanks for your email, and for your patience – I'm sorry I haven't replied sooner.

We'd be glad for you to reproduce these figures in your dissertation. Having confirmed with my colleagues in the publications team, it looks from your screenshots as though you might be working with a presentation? You may find it easier to cite the figures in the full report, which you can find here. In this case, the citation in MLA format (and of course you can adapt this to suit your own format) would be: Owino, Boniface. Kenya's 2019/20 budget and the big four agenda: a pro poor analysis. Development Initiatives: Bristol, 2019. <http://devinit.org/post/kenyas-201920-budget-and-the-big-four-agenda-a-pro-poor-analysis/>

I'll let the author know about the citation, and if you get a chance, we'd be really glad to see your dissertation when it's published. Thanks again for reaching out to us, and best of luck with your work.

Best,

James Harle

James Harle I Communications Officer

Development Initiatives, North Quay House, Quay Side, Temple Back, Bristol, BS1 6FL, UK

T: [REDACTED] I Skype: [REDACTED]

---

Apologies Etta, a slight oversight on my part – the work was actually dual authors, so the citation should begin: Omolo, Miriam and Owino, Boniface.

Best,

James

### Appendix V: Copyright Permission for Figures 4.4, 4.5, 4.6, and 4.7

Dear Mr. Thomas Ogondo: KIWASCO:

I am writing to ask open-ended permission to use the map images below:

1. Figure 4.4: Settlement density in Manyatta, Kisumu, Kenya Manyatta B, lower layout.
2. Figure 4.5: Settlement density in Manyatta, Kisumu, Kenya, Manyatta B, upper layout.
3. Figure 4.6: Settlement density in Manyatta, Kisumu, Kenya, Manyatta A layout

They will go into my dissertation which will go into the following:

- a. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher  
<http://www.proquest.com/products-services/pqdt.html>
- b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- c. AURA: Antioch University Repository and Archive. AURA is an open access archive.  
<http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Ph. D. (Candidate)

Antioch University, Graduate School of Leadership and Change

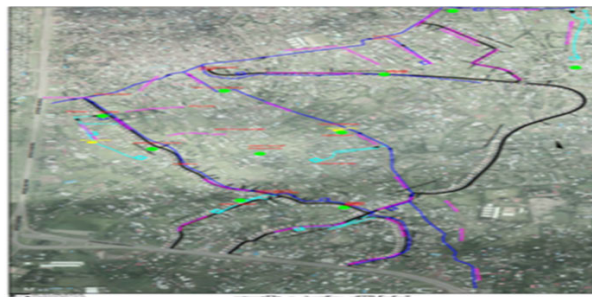
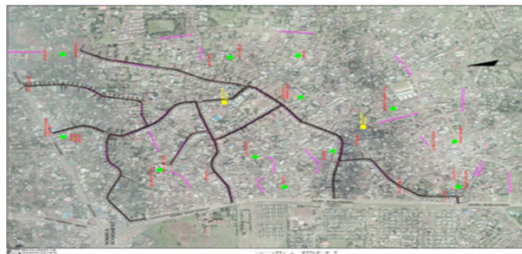


Figure 4.4. Water infrastructures in Manyatta, Kisumu, Kenya Manyatta B, lower layout.





*Figure 4. 5. Water infrastructures in Manyatta, Kisumu, Kenya, Manyatta B, upper layout.*



*Figure 4.6. Water infrastructures in Manyatta, Kisumu, Kenya, Manyatta A layout.*

#### **Permission for use Figures 4.4–4.6**

Dear Etta,

We request that we get access to your dissertation/thesis and that the disclaimer must be drawn stating that the information was true as at the time of data collection and will not be used for any other purpose other than for research for the specific study.

In a nutshell, you can proceed on condition that the disclaimer stated above will be incorporated within your dissertation.

Regards,

Evelyne Opiyo  
 Human Resources & Administration Manager  
 Kisumu Water and Sanitation Company Limited  
 Nafaka House, Oginga Odinga Street  
 P.O Box 3210 - 40100 Kisumu, Kenya  
 Telephone: + [REDACTED]  
 Fax: + [REDACTED]  
 Mobile Number: + [REDACTED]  
 Email: [REDACTED]  
 Website: [www.kiwasco.co.ke](http://www.kiwasco.co.ke)

### Permission to Use Figure 4.7 (merged images of 4.4, 4.5 and 4.6)

Dear Evelyne,

Hoping all is well with you and family at this time of COVID-19 crisis in Kisumu. I am pleased to say that I successfully defended my dissertation on May 14th and now proceed to have it published. I am writing to you on a technical matter. Thank you again for approving the three images. Our planner merged the three to produce a fourth map so as to show a more comprehensive view of the whole of Manyatta's water and infrastructure. Attached are all four maps: 4.4, 4.5, 4.6 and 4.7 (merged map). I am writing to ask if I need to seek additional permission to represent the three previous maps in 4.7. And if so, would you please consider this as a request for permission to do so.

Thank you in advance for your response.

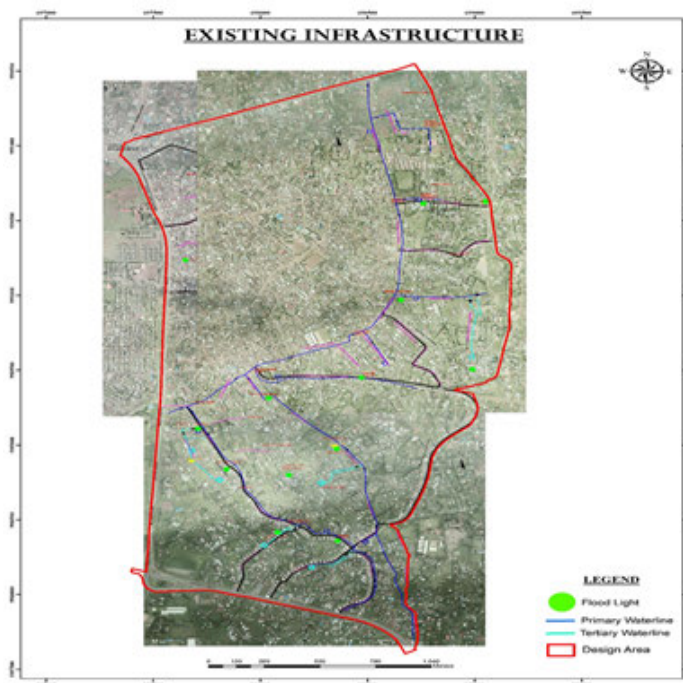
With kind regards,

Etta --

Etta D. Jackson, Ph. D.

Antioch University

Graduate School of Leadership and Change



*Figure 4.7.* Density, roads and water infrastructures in Manyatta, Kisumu, Kenya, Manyatta A and B layout. (merge of 4.4, 4.5 and 4.7)

**Permission to Use Figure 4.7**

From: Everlyne Opiyo <[REDACTED]>

Date: Mon, Jun 8, 2020, 11:39 PM

Subject: Re: COPYRIGHT PERMISSION TO USE IMAGES ATTACHED

To: Etta Jackson <[REDACTED]>

Dear Etta,

Congratulations for defending your dissertation successfully. We have granted you permission to use the new image in your studies.

Regards,

Eve

## Appendix W: Copyright Permission for Figures 4.10, 5.2, and 5.8

Dear Nashon,

I am writing to ask open-ended permission to use the three images attached:

1. Figure 4.10. Performance Evaluation Model Developed in Kenya. Copyright, Nashon J. Adero, 2019.
2. Figure 5.2. Basemap of Manyatta A and B. Copyright Nashon J. Adero, 2019.
3. Figure 5.8. GIS and Local, National and Global Partnerships Model. Copyright Nashon J. Adero, 2019.

They will go into my dissertation which will go into the following:

- a. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- b. OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- c. AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Ph. D. (Candidate)

Antioch University, Graduate School of Leadership and Change

*Equation 1: Performance evaluation model (Adero's construct, 2017)*

$$W = 0.35P + 0.40N + 0.05S + 0.20D$$

where scoring **out of 100 points** for each variable is as follows:

- |          |   |   |
|----------|---|---|
| <i>P</i> | = | <i>productivity or questionnaires completed per day;</i>                    |
| <i>N</i> | = | <i>quality score of delivery on the normal questionnaire load assigned;</i> |
| <i>S</i> | = | <i>quality score on special assignment or leadership; and</i>               |
| <i>D</i> | = | <i>score on cooperation and discipline (5% tolerance)</i>                   |

Figure 4.10. Performance Evaluation Model Developed in Kenya. Copyright, Nashon J. Adero, 2019.

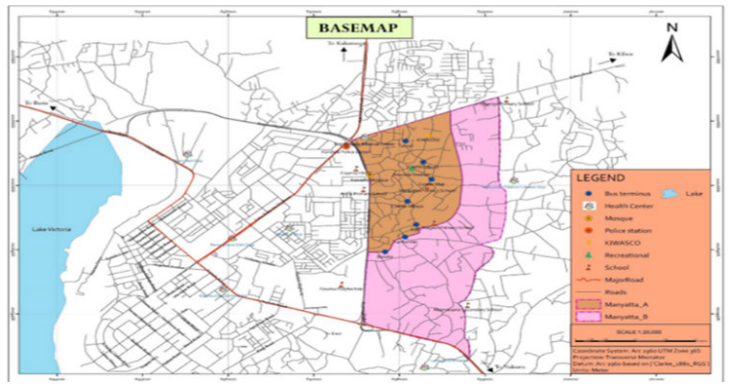


Figure 5.2.

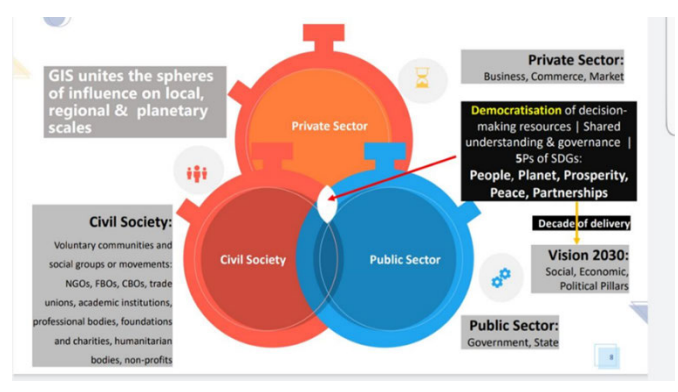


Figure 5.8.

**Permission to use images in Figures 4.10, 5. 2, and 5.8**

From: **Nashon Adero** <[redacted]>  
Date: Thu, Mar 12, 2020 at 6:06 PM  
Subject: Re: Copyright permission request  
To: Etta Jackson <[redacted]>

Dear Etta,

The request has been granted. Thanks.

## Appendix X: Copyright Permission for Figure 5.1

Dear Sir/Madam,

Greetings,

I am finalizing a dissertation with Antioch University in Ohio and would like permission from the County Government of Kisumu to use the image of the county's organizational structure attached from the article by Drs. George Onyango and Stephen Agong: "Kisumu County Government Structure. Governance of cities in devolved government in Kenya: Experiences from Kisumu in the 2018 article "Management Research & Practice, 10(2), 78-91." My dissertation is titled "The Role of Geospatial Information and Effective Partnerships in the Implementation of the International Agenda for Sustainable Development " A major focus of my work was in a pilot project in Kisumu last year.

Once approved my dissertation will be uploaded to the following databases and be available at no charge to anyone who wishes to download from:

Antioch University Repository and Archive, <http://aura.antioch.edu/>

OhioLINK ETD Center, <https://etd.ohiolink.edu/>.

UMI (University Microfilms International/Proquest] (Ann Arbor Michigan).

For clarity, I will not receive any remuneration for use of my dissertation once it is completed. I will be glad to use any language you would prefer in attribution and to let you know when the finished dissertation can be accessed.

Thank you in advance for your assistance.

With kind regards,

Etta D. Jackson, Ph. D. (Candidate)

Antioch University, Graduate School of Leadership and Change

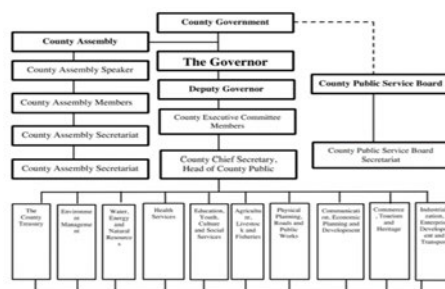


Figure 5.1. Kisumu County Government Structure.

### Permission for use of Fig 5.1

From: Management Research and Practice <[REDACTED]>

Date: Wed, Jun 10, 2020 at 8:16 AM

Subject: Re: Permission to Use Image of County Government Organizational Structure

To: Etta Jackson <[REDACTED]>

Yes, we agree.

## Appendix Y: Copyright Permission Letter for Figures 5.4 and 5.5

Dear Dr. Marco Tavanti:

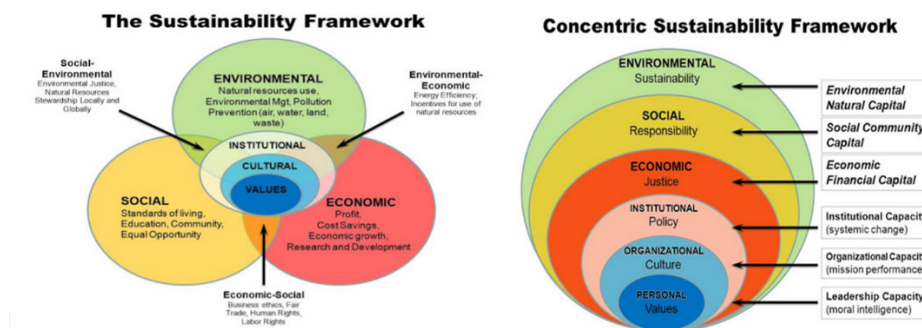
I am writing to ask open-ended permission to use the Figures 5.3: The sustainability framework and 5.4: Integrated Frameworks and Pillars of Sustainability below which will go into my dissertation which will go into the following:

- ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Ph. D. (Candidate)

Antioch University, Graduate School of Leadership and Change



### Permission for use of images above

Marco Tavanti <[REDACTED]>

Wed, Nov 13, 2019, 10:51 AM

to me

Dear Etta,

You have my permission to use this illustration. Good luck with your dissertation.

I assume you have retrieved this image and will attribute its source from here

<http://sustainabledepaul.blogspot.com/p/sustainability-frameworks.html>

Thanks,

Marco

Marco Tavanti, Ph.D.

President and CEO, Sustainable Capacity International Institute SDG-S

## Appendix Z: Copyright Permission Letter for Figures 5.6 and 5.7.

Dear Gordana Filipic:

I am writing to ask open-ended permission to use the Figures 5.6: Flows of funds from international and national financing sources and Figure 5.7. Five Ps of the SDGs below which will go into my dissertation which will go into the following:

- ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

Sincerely,

Etta D. Jackson, Ph. D. (Candidate)

Antioch University, Graduate School of Leadership and Change



Figure 5.6. Flows of funds from international and national financing sources





Figure 5.7. Five Ps of the SDGs.

**Permission to use images above**

DGC-Permissions &lt; [REDACTED] &gt;

Tue, Oct 22, 2019, 4:49 PM

to me

Dear Etta,

Thank you for your interest in United Nations content. We are pleased to inform you that permission is granted, as per the details in your email and the attachment. Free of charge for non-exclusive print and electronic copyrights. Proper credits required.

In all cases, we request that the following standard credit line format be used:

"From (full title of the publication you are using), by (author(s)/editor(s)/department name), ©(copyright year) United Nations. Reprinted with the permission of the United Nations."

If you have any questions, please do not hesitate to let us know how else we can help.

Kind regards,

Gordana Filipic

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**Appendix AA: PAR Process Evaluation Questionnaire and Responses**

**Name of Participant:** \_\_\_\_\_

1. What were your expectations of the process?
2. How do you feel about the process of working together as a group?
3. How effective do you feel the process was for getting the information and decision making about the community?
4. Do you feel the process was efficient?

**After change recommendations**

5. How satisfied are you with the output/plan so far?
6. Please provide any information you would like to share.

### Evaluation Responses of PAR Process

The tables below represent the decoded data from the evaluation of the Manyatta PAR Process by the stakeholders. The counts here indicate the number of respondents who gave the specific reason/response to the questionnaire.

	<b>Responses</b>	<b>Count (Total=12)</b>
Qn. 1: What were your expectation of the process?	1. To realize a community centered and led development process	1
	2. Expected a comprehensive and interactive sessions reporting and giving overviews/ periodic feedbacks while taking into account all the ideas shared	5
	3. An influence of Leadership Professional Development Plan (LPDP) process and budgeting	1
	4. To make a well-planned design that will make the community access public utilities with ease	1
	5. To have a feel of Manyatta community's needs and future thought in matters of planning	1
	6. Expected a heated debate and deliberations	1
	7. 'Irrelevant Response'	2

	<b>Responses</b>	<b>Count (Total=12)</b>
Qn. 2: How do you feel about the process of working together as a group?	1. This was a lifetime opportunity and a clear pointer to what public participation and engagement can deliver.	1
	2. Group work is important and great in getting resolutions and at the same time members learn from each other.	3
	3. Excellent and I felt great working as a team	3
	4. Group work was so helpful as we shared ideas and discussed together	1
	5. Very healthy as we receive different opinions and results	1
	6. Participatory planning is a wonderful approach	1
	7. 'Irrelevant Response'	2

	<b>Responses</b>	<b>Count (Total=12)</b>
Qn. 3: How effective do you feel the process was for getting the information and decision about the community?	1. Very effective	5
	2. Effective	4
	3. Missing value/ Blank	1
	4. 'Irrelevant Response'	2

---

	<b>Responses</b>	<b>Count (Total=12)</b>
<b>Qn. 4:</b> Do you feel the process was efficient?	1. Yes	12
	2. No	0

---

	<b>Responses</b>	<b>Reasons</b>	<b>Count (Total=12)</b>
<b>Qn. 5:</b> How satisfied are you with the output/ plan so far?	1. Very satisfied	<ul style="list-style-type: none"> <li>• It reflects the true discussion since our 1<sup>st</sup> meeting</li> <li>• We already have a quality document for posterity</li> <li>• The plan has taken care of most elements both currently in the settlement and the proposed</li> </ul>	7
	2. Satisfied	<ul style="list-style-type: none"> <li>• The plan is compelling except for a few necessary adjustments; the parking lots for Manyatta A not yet captured.</li> </ul>	3
	3. "Irrelevant Response"		2

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	<b>Responses</b>	<b>Count (Total=12)</b>
<b>Qn. 6:</b> Please provide any information you would like to share	<ol style="list-style-type: none"> <li>1. Request for a community policing office and a playground within the slum.</li> <li>2. Much focus should be given to matters of hygiene and sanitation, street lighting and social places should be enhanced.</li> <li>3. More consultations necessary with other stakeholders in the ward.</li> <li>4. markets should be linked to transport system</li> <li>5. Ample time necessary for an exhaustive discussion</li> <li>6. The process should involve more of the indigenous community members.</li> <li>7. The plan should inscribe to the ongoing preparation of the city's Leadership Professional Development Plan (LPDP).</li> <li>8. I would yearn for a long-term future engagement with the stakeholders in implementing the plan</li> </ol>	

**Appendix AB: Permission for Names of Research Participants to Be Used in Print**

Please be aware that by affixing your signature to this consent form, you give Antioch University and Etta D. Jackson, Researcher, the permission to have your name appear in print and your photos used in her dissertation which will be also be published and will go into the following:

- A. ProQuest Dissertations and Theses Database. ProQuest is a Print on Demand Publisher <http://www.proquest.com/products-services/pqdt.html>
- . OhioLink Electronic Theses and Dissertations Center and that OhioLink. ETD Center is an open access archive <https://etd.ohiolink.edu/>
- C. AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

---

**Names and Signatures of Manyatta Research Participants**

1. **Name of Participant:** Sospeter Oduor

Signature  \_\_\_\_\_

2. **Name of Participant:** Paul Ego

Signature  \_\_\_\_\_

3. **Name of Participant:** Silas Mauji

Signature  \_\_\_\_\_

4. **Name of Participant:** Andrew Odhiambo

Signature:  \_\_\_\_\_

5. **Name of Participant:** Joshua Ochieng

Signature:  \_\_\_\_\_

(List continues)

6. Name of Participant: Collins Kodhek

Signature: \_\_\_\_\_

7. Name of Participant: Paul Otieno

Signature: \_\_\_\_\_

8. Name of Participant: Grace Wafula

Signature: \_\_\_\_\_

9. Name of Participant: Millicent Atieno

Signature: \_\_\_\_\_

10. Name of Participant: Angeline Okindo

Signature: \_\_\_\_\_

11. Name of Participant: John Otieno Kabisai

Signature: \_\_\_\_\_

12. Name of Participant: Maxwell K. Otieno

Signature: \_\_\_\_\_

13. Name of Participant: Philip Onyina

Signature: \_\_\_\_\_

14. Name of Participant: Janet Awino Ogot

Signature: \_\_\_\_\_

15. Name of Participant: Doris Ombara

Signature: *See email after signature page for authorization for D. Ombara*

16. Name of Participant: Collins Otieno

Signature: \_\_\_\_\_

List continues



17. Name of Participant: Joachim Oketch

Signature: \_\_\_\_\_

18. Name of Participant: Pamela Okinyi

Signature: \_\_\_\_\_

19. Name of Participant: Millicent Omollo

Signature: \_\_\_\_\_

20. Name of Participant: Samuel Nyakundi

Signature: \_\_\_\_\_

From: Doris Ombara <[REDACTED]>  
Date: Mon, Jun 15, 2020, 1:15 PM  
Subject: YOUR DISSERTATION  
To: [REDACTED]

Dear Etta,

Thanks for your message and congratulations for the research work you have done. It is okay to use my name and group photo in your dissertation. I look forward to reading the dissertation. Best regards,

Doris C. Ombara,  
CITY MANAGER,  
KISUMU, KENYA.

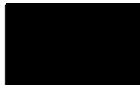
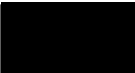


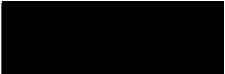
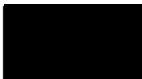
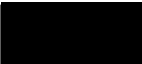
### Appendix AC: Permission for Names and Photos of Research Team to Be Used in Print

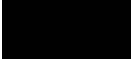


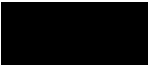
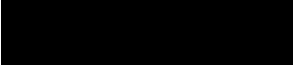
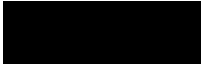
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- C. AURA: Antioch University Repository and Archive. AURA is an open access archive. <http://aura.antioch.edu/>

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#### Names and Signatures of Research Assistants

1. <b>Name:</b> Cecilia Adhiambo <b>Signature</b> 
2. <b>Name:</b> Billford Otieno <b>Signature:</b> 
3. <b>Name:</b> Stella Onamu <b>Signature:</b> 
4. <b>Name:</b> Linet Awiti <b>Signature:</b> 
5. <b>Name:</b> Victor Odada <b>Signature:</b> 
6. <b>Name:</b> Antony Okundi (RA and Planner) <b>Signature:</b> 
7. <b>Name:</b> Kepher Otute <b>Signature:</b> 

<p><b>8. Name:</b> Benard Odhiambo</p> <p><b>Signature:</b> </p>
<p><b>9. Name:</b> Rashid Obado</p> <p><b>Signature:</b> </p>
<p><b>10. Name:</b> Lucy Onyango</p> <p><b>Signature:</b> </p>
<p><b>11. Name:</b> Christopher Odhiambo (GPS Expert)</p> <p><b>Signature:</b> </p>
<p><b>12. Name:</b> Nashon Adero (Research Consultant)</p> <p><b>Signature:</b> </p>
<p><b>13. Name:</b> Beda Odhiambo Ogola (Research Supervisor)</p> <p><b>Signature:</b> </p>