Panda Maisha:

Building Resilience, Building Lives

A community-based intervention addressing resource scarcity and livelihood threats experienced by pastoralist communities in the face of climate change.

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Abstract

Drought and other negative impacts of global warming threaten to eradicate livelihood stability for pastoralist and agro pastoralist communities in Wajir County, Kenya. Traditional methods used to adapt to the growing disastrous effects of climate change are proving to be ineffective and unsustainable in the long-term. Current attempts by local organizations and government bodies to mitigate these changes are primarily reactive and focused on short-term relief, leaving communities without the support and knowledge to implement anticipatory solutions which address threats at their root cause.

To overcome this issue, we propose a two-level intervention which educates hard to reach communities on relevant climate-related changes and sustainable agricultural practices, and provides materials and guidance to orient traditional practices using forward-looking methodologies. Our solution is designed to integrate local leadership, stakeholders and indigenous practices to ensure an accessible and effective transition. By providing necessary knowledge and support, we hope to maximize local asset accumulation, stabilize livestock productivity and capital retention, allowing for a circular approach to rangeland management, and diversifying local economic activity through the creation of employment.

Our solution provides a necessary nonstructural supplement to current drought resilience solutions being explored in the region. We place local expertise and trust-relations at the heart of our design to promote implementation success, targeting vulnerable communities facing increased risk of losing entire livelihoods due to exponential climate change.

Meet the team

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Hani Ibrahim is a recent graduate of International Relations at the Johns Hopkins Paul Nitze School of Advanced International Studies, where she focused on Governance and Political Development in Sub-Saharan Africa. In the past year Hani worked with Digital Equity, a non-profit association working in the African digital transformation space focusing on digital identity, data privacy and protection. Currently, she teaches English in a program designed to assist adult refugees living in refugee camps in Greece transition to life in Europe. Prior to SAIS, Hani acquired experience in Kenya's public sector focusing on crisis management, as well as with various NGOs based in Kenya and Rwanda. Hani is from Kenya.

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Elaine Sausen is a recent graduate of International Relations at the Johns Hopkins Paul Nitze School of International Studies, where she focused on International Development and Conflict Management. For the past year Elaine has been an International Programs and Funding Intern at Konexio, a Paris-based NGO focused on providing digital-freelance livelihood opportunities for refugees in Malawi, Kenya, and Jordan. Before SAIS, Elaine worked as an undergraduate research assistant for the Johns Hopkins School of Education, and for several labs at the Johns Hopkins Medical Campus. Elaine is from the United States.

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Camille Farradas is a graduate student of International Relations at the Johns Hopkins Paul Nitze School of International Studies, where she is currently completing a Master's of Arts in International Affairs with a focus in Global Food Policy and Systems and Latin America and the Caribbean. She is currently interning at Colombia Risk Analysis, a political risk firm based in Bogotá, where she is preparing a special report on the recent elections. Prior to SAIS, she completed a Fulbright Fellowship in the Azores Archipelago, Portugal, and worked at the World Food Programme in Rome. Camille is Cuban-American and from the United States.

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1. Introduction

Poverty alleviation and climate change are the salient issues of this age threatening sustainable global development. Poor people are especially vulnerable in the face of climate related shocks, in particular floods and droughts. Cyclical and severe drought in the horn of africa (HOA) region causes immeasurable human suffering and has serious impacts on public health, agriculture, economies, energy and the environment. Water scarcity impacts about 40 percent of the world's population and as many as 700 million remain at risk of displacement as a result of drought by 2030 (UNCCD, 2022). Kenya is among the most vulnerable drought prone countries as 80 percent of the territory is arid and semi-arid lands (ASAL) where rainfall is fickle and periodic droughts are part of the climate system. Currently, the HOA is experiencing its worst drought since 1981, following three consecutively poor rains.

Livestock husbandry is essential to supporting the livelihoods of nearly all rural people in the region. Livestock maintenance is vital to poverty reduction, food security and sustainable agricultural development as livestock represents nearly 40 percent of the global value of agricultural output, and supports the livelihoods and nutrition security of nearly 1.3 billion people globally (World Bank, 2022). Therefore, increasingly severe and frequent droughts in the HOA threatens livestock production and represents the most significant challenge to livelihood security and eradication of poverty in the region. Droughts trigger substantial declines in livestock production, asset loss, acute food insecurity among vulnerable households, and places great strain on local economies. We recognize the magnitude of such shocks in causing and proliferating poverty and, for this reason, have chosen to focus our efforts on reducing the vulnerability of Wajir County, a region severely impacted by water insecurity, to worsening drought cycles.

1.1 Drought vulnerability and poverty:

Pastoral and agro-pastoral communities suffer different vulnerabilities during a drought, determined by their resource accessibility. Livestock producers are faced with increasing water scarcity, declining pastures, and increasing distances between water sources and grazing areas. Access to these essential inputs and markets are framed through a socio-political lens wherein external institutional settings determine how pastoralists move, the type of relations they build with farmers in areas with better

1.1 Drought vulnerability and poverty:

rainfall, and therefore their access to resources. In the Kenyan context the historical marginalization of the pastoralist community has seen very little investment in livestock development. Issues such as land tenure, management and access rights shape use of pastures while limited access to markets affect the profitability of livestock (Salpeteur et al., 2017). Pastoralists rely heavily on common pastures that are an important reserve for their animals in normal times and constitute refuge in times of drought. When these refuge areas wane, this places additional pressure on already scarce resources, causing the potential for asset loss and conflict to increase sharply. Furthermore, the quality of these life-giving resources are affected by rainfall variability, and while agricultural potential can be sustained through irrigation, the same cannot be said for the rangelands upon which pastoralists depend.

In areas such as Wajir in North Eastern Kenya where livestock is a major source of livelihood, drought shocks challenge traditional coping, adaptation and livelihood options. Livestock migration is the most common coping response to the threat of waning pastures and water sources. This movement typically occurs within the same county or even district where these measures are well defined with elaborate informal social agreements in place between communities. However, as the effects of drought intensify, pastoralists' traditional migratory patterns are forced to change, causing them to move further and further away - sometimes across international borders - in search of grazing lands. Increasing mobility represents a central pastoralist tradition in response to varying pasture quality. Yet as distances increase, weaker and smaller animals, who are not able to undertake such strenuous journeys, become more likely to die (NDMA, 2014). Due to global warming, droughts are becoming more frequent and intense with shorter recovery periods, causing these traditional coping methods to fail in safeguarding vital livestock resources.

Another adaptive response is livestock sale. Typically, pastoralists will only sell surplus male livestock. However, during periods of drought, sales may include breedable females, thereby diminishing households' core assets. Furthermore, drought affects the reliability of livestock supply to markets and disincentivises investments in livestock improvement. Livestock and grain markets work in contradiction to one another where livestock prices often decline with respect to grain prices during severe and widespread droughts. Drought time sales occur when livestock prices are at their lowest and the condition of the herd is deteriorating, thus pastoralists do not have the freedom to choose what or when they can sell. More drought-resistant species such as camels are much more expensive and have slower breeding cycles which makes their loss even more devastating. Poor pastoralists are disproportionately affected.

They are more exposed and vulnerable to the shocks associated with drought, have fewer resources, and receive less support from family, community, financial systems and social safety nets. Spikes in food prices mean that poorer pastoralists are forced into greater indebtedness in order to survive.

A critical government response to resource stress is water and pasture trucking. As the movement of pastoralists becomes more irregular and households break up with livestock moving further into the rangelands, the distance between pastures and watering points becomes longer, taking several days to trek between them. Weaker livestock are left behind closer to watering points where they receive special attention, water trucking and relief food supplements. When the effects of drought reach emergency levels, the county government is forced to procure more trucks in order to transport water and sometimes fodder to critical water-stressed population clusters. This process, while effective, is incredibly expensive; the poor road infrastructure in Wajir requires off-road enabled trucks to traverse the terrain using costly diesel fuel. This measure is practical only as a worst case scenario emergency response but can otherwise deplete local governments drought response funds.

1.2 Drought risk management:

While governments, non-governmental organizations and local institutions champion drought risk reduction discourse and efforts, many pastoral communities remain vulnerable to drought shocks. This is indicative of gaps in the promotion of context-specific drought risk interventions. Current mitigation practices largely focus on interventions after crises with little to no investment in strengthening the ability of communities to manage risks on their own. Drought contingency plans in the HOA and especially in Northern Kenya are often ad hoc and top down based on government perceptions of the community's needs. They rely on emergency drought relief - usually in the form of food aid, monetary aid and water and pasture trucking. While effective in the short term, such relief measures force pastoralists into relief-dependent lifestyles rather than emphasize risk reduction measures such as prevention, mitigation and preparedness. Furthermore, as droughts become endemic, efforts such as trucking become unsustainable as trucks have to travel over long distances in order to deliver life-giving resources (Wamugi and Muchemi, 2012).

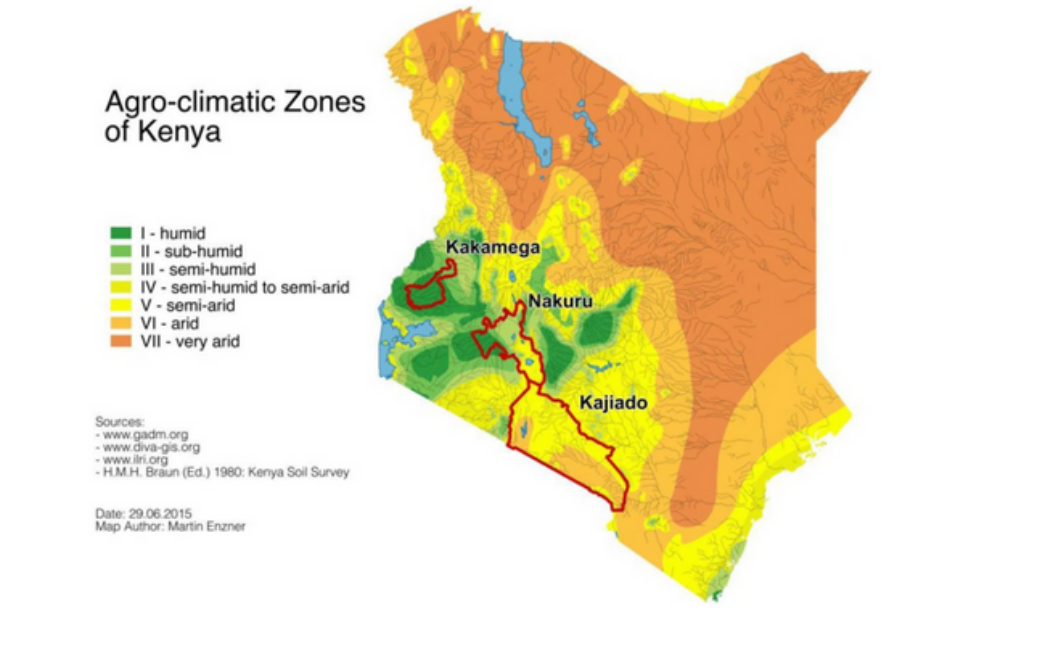
In order to stop resource mismanagement, improve ecosystem health, boost local livelihood and build local capacity, new and innovative interventions are required. Contingency plans must focus on local needs; by building up local capacity to avoid loss and secure economic, social and cultural assets, locals are better prepared to adapt and recover from crises. Such coping responses are shaped by both household labor and community-led efforts to protect livestock corridors, water points and pastures. As such, any sustainable poverty reduction strategy should involve both structural measures (new water storage and delivery services) as well as nonstructural measures (interventions that help communities meet their basic subsistence needs) (UNCCD, 2019). Both should work in tandem to reduce the scope of impact, the sequential responses and further economic losses, and increase resilience by improving pasture and water security during times of stress.

The problem this proposal addresses is the mismatch of pasture and water resource supply and demand, and the resulting threat to the livelihoods of pastoral and agro pastoral communities in the HOA. Increased demand for already scarce water and pasture leads to further resource degradation and impacts the ability of pastoral communities to accumulate the assets necessary to maintain secure livelihoods. Our Panda Maisha initiative is a nonstructural solution intended to build local resilience by reducing community exposure to the devastating effects of drought and strengthening local capacity to deal with negative climate impacts. Our two-part intervention seeks to educate pastoral communities on the importance of sustainable agro-pastoral processes and the importance of proper rangeland management, leading to long-term pasture supply enhancement, sustainable livelihood diversification processes, increased capital retention and increased community resilience in the face of future droughts.

While our proposal is focused only on Wajir, it is important to note that similar challenges are experienced by other pastoral communities globally. Our Panda Maisha intervention is adaptable to much of the extended HOA region which includes Somalia, Sudan, South Sudan, Ethiopia and Eritrea. Additionally, a similarly education-focused initiative can be launched in drought vulnerable countries in West Africa and South Asia with some adjustments to fit local contexts. There is a great potential for scale, particularly if our solution can be combined with structural measures that stabilize water supply, resulting in widespread livelihood security improvement and reduction of negative climate-related impacts.

2. Geographic Overview

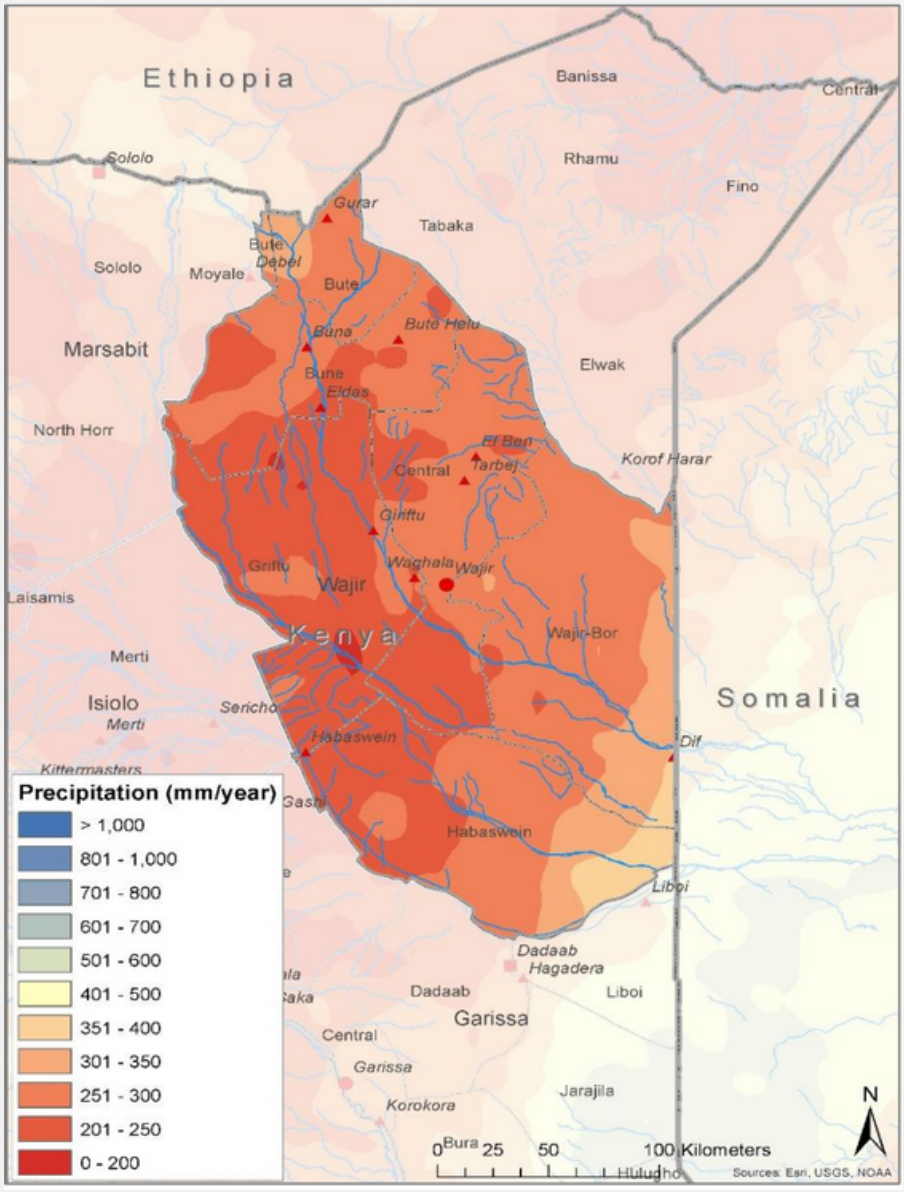
2.1 Kenya Country Context



Source: semanticsscholar.org

Kenya is a highly drought-prone country due to its eco-climatic conditions. It contains only a few pockets of high and regular rainfall (>2000mm), while arid and semi-arid lands cover 80 percent of its territory. In these areas, drought continues to severely affect local economic activity as October to December 2021 marked the third consecutive below-average rainfall season across Eastern and Northern Kenya. In pastoral areas, low pasture and water resources have resulted in atypical livestock migration, rapid declines in livestock productivity, and drastic increases in livestock deaths. These recent conditions follow the short-term closure of livestock markets in early 2020 due to the COVID-19 pandemic. With the intensification of climate change, food insecurity will continue to increase in scale in Kenya, with an estimated 3-4 million people expected to be in need of humanitarian food assistance by the end of 2022.

2.2 Wajir County Context



Source: Kenya rapid, 2015

i. Location and Size

Wajir County is the second largest county in the Republic of Kenya after Turkana County with a surface area of 56,501 sq km, approximately 10 percent of the country's land mass. It is located in the Northeastern region of Kenya bordering Somalia to the East, Ethiopia to the North, and the counties of Mandera to the Northeast, Marsabit to the West, Isiolo to the Southwest and Garissa to the South. The topography of Wajir County is primarily featureless and it lies between 150 meters and 460 meters above sea level (asl).

iii. Ecological Conditions

Wajir is semi-arid with an annual average temperature of 27.9 degrees celsius and humidity of 62 percent. The area experiences an average annual rainfall of approximately 270mm. Rainfall is usually irregular and short creating conditions unfavorable for vegetation growth. There are two rainy seasons, the short rains and the long rains. The short rains are experienced between October to December while the long rains run from March to May. This ecological zone has low trees, grass and shrubs with scattered taller trees. Crop activity takes place along the drainage lines in Bute and around the Lorian swamp. The types of crops grown in this area are sorghum, beans, and vegetables.

ii. Water Resources

The main sources of water are the seasonal Ewaso Ng'iro River and the Yahud groundwater reservoir near Wajir Town. The reservoir provides water for wildlife and quarry activities but is mainly saline and unsafe for drinking. The county also has over 14,000 shallow wells, 206 water pans, and over 100 boreholes used for storing water (Kenya rapid, 2015).

iv. Population

The population size of Wajir County was projected to have been 852,963 by 2020 according to the last Kenya National Population and Housing Census (2009) (WCIDP,2018). The county inter-censual growth rate is at 3.22 percent, higher than the national population growth rate of 3 percent. Women account for 45 percent of the population while men comprise 55 percent. Over 80 percent of the population is below the age of 35 which is a key consideration for county planning and development. Furthermore, more than half of the population is either between the ages of 0 and 14 or above the age of 65. This indicates that there is a very high dependency ratio which limits productivity growth in the county.

v. Livestock

This county practices nomadic pastoralism as their main livestock production system. Livestock production contributes to over 85 percent of household income for Wajir residents while rural self-employment accounts for 10 percent, and wage and urban self-employment contribute 1 percent and 4 percent respectively (NDMA, 2014). This system is currently facing severe challenges due to recurring droughts, livestock diseases, population increases, environmental degradation, lack of pasture land, poor infrastructure and inefficient terminal markets. The livestock species include cattle, camels, donkey, goat and sheep. The table below shows the estimated livestock population which fluctuates significantly according to the severity of droughts faced.

Estimated Livestock Population		
No	Livestock Species	Number
1	Cattle	718,928
2	Sheep	1,177,500
3	Goats	1, 503, 730
4	Camels	717, 028
5	Donkeys	186. 044
6	Poultry	
8	Bee Hives	1,272

Source: Wajir County Drought Contingency Plan, p.3 (NDMA, 2014)

Total Livestock Units (TLU) per Household	
Species	Average TLU
Cattle	5
Sheep	10
Goat	10
Camel	5
Donkeys	3

Source: Wajir County Drought Contingency Plan, p.3 (NDMA, 2014)

3. Needs and Market Assessment

3.1 Literature Review

Agro-pastoralists and pastoralists in Kenya face increasingly difficult challenges to maintaining stable livelihoods, including lack of adequate feed, water, and livestock diseases. One cause which underlies these challenges are the negative effects of climate change. Drought, in particular, represents a prescient issue that has recently morphed from a seasonal threat to a more permanent and perilous one. Agro-pastoralists' traditional responses to drought are reactive, with reliance on exploitation of existing resources and common spaces. Poverty, limited access to markets, and inadequate skills and training constrain these communities from adapting to their new reality of a longer dry season with less rain. Since livestock is central in pastoralist systems, community reactions to drought often prioritize livestock health. This results in resilience against livestock divestment in favor of other agrisystems as a drought prevention tactic, with many pastoralists preferring livestock sales that result in a loss of long-term income and asset stability. To increase adaptability and resilience, agro-pastoralists need to adjust and enhance their current practices. This would allow them to enforce other adaptive methods such as extension services (agricultural advisory services to boost productivity, increase food security and improve rural livelihoods), pasture production, and higher levels of resource access (Speranza, 2010).

A major hurdle for these communities is drought management itself. Research on this topic has largely focused on crop production, with little investigation as to how it affects pastoralist systems. This represents a significant gap in research as many communities across Africa base their entire livelihoods on these methods. With little to no attention and development in this space, pastoralists have mostly relied on government plans for drought management. However, these plans are rooted in crisis-response that elicit dependency on State aid and support, failing to create resilient, sustainable solutions that would support pastoral systems in the long-term.

These plans often utilize non-adapted drought management which exacerbates the degradation of rangeland and pastures, leading to eventual reduction of livestock production and herders' income. To move away from this model, some communities are looking to early warning systems to help strengthen drought management efforts. Drought indices and remote sensing tools are some examples that mitigate the most destructive effects of drought. In a study by Karrou and Mourid, a potential drought risk management system for North African countries is proposed which integrates past studies done in the region and in Australia and New Zealand in agro-pastoralists communities. The proposed system includes early warning based on various indices including agro-ecological zoning, vulnerability mapping, drought mitigation techniques, policies and organizations that include livestock mortality-based index and weather-based index, task forces, and scientific and technical committees (Karrou and Mourid, 2008).

Indigenous drought-mitigation methods must be accounted for among early drought management as many pastoral communities in Kenya rely on these practices to mitigate, monitor, and adapt to drought. It is critical to integrate indigenous knowledge into new drought mitigation proposals to ensure communities can utilize techniques that are intuitive for them. This will make new methods more accessible and result in a higher likelihood that they will be maintained. Indigenous knowledge also touches upon the education aspect of drought management, as many of the techniques native to these communities lack sufficient intergenerational transfer to survive in the long-term. Integrating indigenous knowledge into local education systems and into climate adaptation research for these communities is critical in allowing these communities to be active in their adaptation to intense drought (Speranza et al., 2010).

Bringing attention to the increasingly dire reality of longer, intensified droughts is fundamental to the success of pastoralist livelihoods and communities. In arid and semi-arid sub-Saharan Africa, livestock and dry forests were the two most important components of household income, with dry forest accounting for roughly 36 percent of total household income and 46 percent of the total household cash income. For the most vulnerable households, dry forest incomes can account for as much as 63 percent of total income. Dry forest income allows 24 percent of households to remain above the poverty line while reducing income disparity by approximately 14 percent (Worku et al., 2014).

3.1 Literature Review

Without sustainable management of dry forest and rangelands for pastoralists and agro-pastoralists, these communities and households would fall into greater economic vulnerability with their poorest sectors falling into even more severe poverty. One of the most direct avenues through which these communities experience increased risks of poverty is through their food security status including food availability, access to food, food utilization, and food stability (Stavi et al., 2021.). Food insecurity is present at many places that have annual rainfall of 800 mm or less. With a clear link between drought and famine, measures to mitigate drought must also work to strengthen food systems within Kenya (Rufino et al., 2013). Ironically, most research that has focused on crop production overlooks how a failure within pastoralist systems dependent upon livestock production would have catastrophic economic outcomes and further undermine Kenya's food systems, resulting in widespread famine and food insecurity. Implementing assistance to help these communities adapt their livelihoods in the face of worsening drought is critical in maintaining the overall well-being of these societies.

Kenya is currently suffering the worst drought in 40 years with at least 4.2 million people in need of aid (Relief web, 2022). Drought and low rainfall has resulted in a variety of challenges for Wajir county in particular, including food insecurity and malnutrition, which is projected to only worsen as food stocks diminish and food prices increase. Water has also become a fraught issue as over 70 percent of water pans across Kenya have dried up with well water levels decreasing significantly (Islamic Relief Worldwide, 2021). Wajir county is composed of households that are majority pastoralists and agro-pastoralists who have traditionally faced drought seasons, but have in recent years faced increasingly worsening conditions. These communities need tangible assistance to help them stay out of poverty with secure food systems and resource access while maintaining their pastoralist livelihoods.

3.2 Our Solution, *Panda Maisha*

As mentioned prior, most traditional drought mitigation methods depend on crisis management and reactive parameters. More recent literature is beginning to look at early drought prevention; however, these are typically still in a long-projection format. Our solution fills the current void in these communities in a more immediate, concrete two-part method that aims to facilitate community-led development of long-term, sustainable drought management practices and knowledge. The educational component of our proposal targets the current lack of local participation in mitigating drought and protecting local livelihoods. Through the educational flash courses facilitated by village leaders and community members, our target population will be able to understand, utilize, and promote practices that enable early drought prevention, enlisting them to perpetuate community change. Through the practical part of our solution, communities will integrate new adaptive techniques and technologies to bolster drought mitigation practices, particularly pasture seeding and collection efforts. Communities can implement these new methods alongside improving their traditional infrastructure–such as concrete enforcement of water pans–to target various aspects of these systems to allow them to weather even the driest seasons.

3.3 Key Local and International Actors in Wajir County

Our proposal aims to collaborate with local community leadership and the local government, which are two of the most prominent groups in promoting drought mitigation. However, there are various organizations, particularly non-governmental organizations, that work throughout the HOA and in Kenya to assist pastoralists and agro-pastoralists communities to prosper in increasingly changing environments. Aldef Kenya is a community-based organization that focuses on disaster-response in regard to droughts. WASDA is another that focuses instead on improving access to water, a potential future partnership in reinforcing the parts of the pastoralist system that depend on water, such as the concrete-enforced water pans. Islamic Relief is another organization that does work across the spectrum of necessities of these communities including education and healthcare support, repairs of water supply systems, emergency food packages, livestock feed supplements and cash vouchers.

3.3 Key Local and International Actors in Wajir County

Including International organizations such as OXFAM and Save the Children, there are a plethora of organizations working in different facets of need to help communities withstand intensified drought conditions; however, it is important to note that their approaches are based primarily on structural and relief-based tactics. Dependency on relief aid subverts the communities traditional livelihoods encouraging the establishment of unplanned settlements.

Our solution provides a supplementary aspect of drought mitigation that is currently lacking in the traditional relief-based approach. Panda Maisha is invested in building local resilience to drought shocks and breaking the relief-based dependency cycle. It is based on education and practical methods that are aimed at improving community awareness and participation in preventative drought measures. Our solution can effectively work alongside newer structural drought interventions such as Warka Water Tower, which can collect 100 liters of water a day from water content in the air (Mishra,2018). Panda Maisha will be critical to guide and support communities as they adapt traditional methods in response to increasingly severe drought conditions.

Non-Governmental Organizations (NGOs) and Other Actors in Wajir County, Kenya	
Nutrition & Livelihood Programs	Save the Children-UK Islamic Relief-UK
Relief Food Services	Arid Land Development Focus (ALDEF) World Vision International Wajir South Development Association (WASDA)
Youth Groups involved with Small Business	Youth Enterprise Development Fund (YEDF)
Funding for Vulnerable Populations	Poverty Eradication Commission (loan scheme) Kenya Industrial Estate The Ministry of Trade (organized groups engaging in business)
Other Valuable NGOs in Wajir County	Kenya Red Cross Society Mercy Corps Oxfam Great Britain Veterinary Sans Frontiers (VSF) Rural Community Development Agency (RACIDA) MENTOR Catholic Relief Services District Pastoral Association

These NGOs mainly operate in the livestock, health and education sectors offering subsidized treatment and supporting the government in vaccination. The County has a total of 70 self-help groups, 50 community-based organizations (CBOs), 700 women groups, 900 youth groups and 146 farmer groups. Most of these groups are engaged in income generating activities. Women are typically engaged in selling groceries and foodstuff at kiosks.

4. Opportunities

As one of Kenya's largest counties, Wajir possesses much potential for growth but has been feeling the brunt of the devastating climatic conditions and consecutive seasons of prolonged drought. Local government intervention in the livestock production system, combined with stakeholder engagement would boost the capacity of Wajir County to address its economic challenges and improve its responsiveness to the harsh effects of climate change.

Our team proposes Panda Maisha, a bottom-up approach to drought management that would provide an immediate intervention to the disruptions in the livestock industry, provide opportunities in the short-term for employment generation and improve the local community's resilience to drought and other disasters which threaten water security and economic activity in the long term. We recognize the need for simplicity in approach to community-based interventions and so Panda Maisha presents an opportunity to strengthen already-existing cultural methods of drought management while creating space for innovation among the majority youth population of Wajir.

Panda Maisha uses a dual-approach providing both educational and practical engagement among local stakeholders such as youth, women, and other vulnerable groups. Through the educational aspect, Panda Maisha will increase the knowledge capacity of residents and encourage active participation in risk management. The practical aspect of our project will create jobs for youth and women which will help in diversifying economic activity and reducing dependence on livestock production in Wajir. This project will also allow livestock farmers to mitigate the effects of drought, deterring them from pursuing usual crisis response measures such as livestock sell-off and prevent large scale death of livestock, building their assets in the long-term.

Panda Maisha has the potential to provide long-term relief to drought-stricken agricultural and livestock communities both within East Africa and across the world as climate change continues to prolong these periods of drought. Panda Maisha can work hand in hand with other more technologically advanced drought management projects to increase water security and mitigate risk. In areas with similar ecological conditions as Wajir, Panda Maisha can play a major part in building self-sustained resilience among local communities.

5. Design Specifics

5.1 Intervention Overview

Panda Maisha will enable target populations to consciously engage in sustainable agro-pastoralist practices. Our intervention is designed to boost access to water and land resources while simultaneously decreasing less effective coping mechanisms and responses which might lead to further environmental degradation. By increasing the drought resilience in Wajir county, local communities will be able to better accumulate livestock over time and become more resistant to income shocks in the long-term.

This intervention contains two aspects: educational and practical. The educational part will take place in the form of community awareness workshops, or "flash courses." Beneficiaries will be taught about climate related issues, as well as relevant climate mitigation and adaptation techniques which can be implemented in the region. The involvement of community members in drought risk reduction activities, not as passive participants but as active participants, is vital to reduce their vulnerability and promote resilient livelihoods. The practical part of the intervention will begin with the distribution of sustainable agriculture materials. Step-by-step guidance will then be provided to allow beneficiaries to implement what they learned. Through Panda Maisha, local communities will simultaneously benefit from increased knowledge as well as access to resources which will ensure pasture security, promote livelihood diversification, and support circular rangeland management. This addresses the overarching goal to promote poverty alleviation as the challenge posed by global warming becomes increasingly salient over time.

5.2 Program Details

I. Education phase:

Panda Maisha's educational program will be organized through flash courses designed to bring awareness about human-caused climate change and how local communities can better prepare for and protect against extended periods of drought.

Introducing alternatives to traditional coping mechanisms is paramount in the face of climate change. Our program attempts to reduce practices which have either become ineffective, or exacerbate the progression of global warming. As an example, communities might burn wood in order to create charcoal to sell as an income supplement when livelihoods provided by livestock are not enough to survive. The goal of our program is to reduce the need for these coping mechanisms by bolstering local environments with drought resistant materials and practices. Should our sustainable agriculture practices be taken up, there will be less demand for damaging income supplements such as the sale of coal or livestock, and traditional adaptation practices such as increased mobility among pastoralists. In this way, Panda Maisha directly addresses threats to livelihood at their root, instead of just responding to their symptoms.

The curriculum will be organized as follows:

Unit 1	Topics
Climate Change Overview	• Effects of man made climate change • World outlook • Immediate and long-term outlooks • Effects on agriculture • Importance of diversity
Unit 2	**Topics**
Threats to Wajir County	• Drought • Nutrition • Pasture scarcity

Unit 3

Resource Scarcity

Topics

- Importance of rangelands
- Water sources
- Pasture Management

Unit 4

Sustainable Agricultural Practices

Topics

- Drought resistant food crops and plants suitable to nutritional needs
- Stop unregulated wood cutting
- Avoid unnecessary burning
- Avoid hauling animals across the country in search of pasture (negative coping mechanisms)
- Avoid selling charcoal as an income supplement
- Encouraging rehabilitation practices
- Soil restructuring
  - Seeding and planting during long rains/short rains (March to May)
  - Black soil mixed with sandy soil to improve microfibers and reduce evaporation
- Collecting/ drying pasture for hay to ensure storage access
- Building storage around water pans
- Creating groups/ forums for discussion on new ideas for future drought mitigation

Unit 5

Short and Long-term Benefits

Topics

- Short-term:
  - land restoration and reducing the communities exposure to drought.
  - Encourages the community to practice more sustainable water and pasture management thereby reducing the pressure on these precious resources.
- Long-term:
  - asset accumulation, drought resilience, poverty reduction

Unit 6

Theory to Practice

Topics

- Where to get drought resistant materials
- Practice how to restructure soil
- Creating pasture farms
- Emphasizing new coping mechanisms

Our curriculum anticipates that our target population will have varying knowledge of climate change related issues, and seeks to introduce climate mitigation and adaptation practices at a level which will be effectively retained. Our flash courses are intended to explore the intersection of climate change and poverty reduction to emphasize how preparing for the future will help community members create more sustainable livelihoods throughout time.

We have chosen flash courses as our method of outreach to promote accessibility within communities which are traditionally harder to engage. These courses will be organized alongside village leaders and local community members to utilize pre-established connections of trust, and maximize likelihood that old and less climate-friendly coping mechanisms will be phased out.

II. Practical phase:

For our program's practical phase, we will provide sustainable agriculture materials to be distributed to target beneficiaries. Panda Maisha will work with local organizations and providers to source materials and create a lasting connection to resources for our target beneficiaries. Materials will include seeds, black soil, irrigation kits, shade nets, water pan rehabilitation materials, and storage sheds. Our target population will be trained on how to implement these solutions, with in-class, step-by-step descriptions and demonstrations to ensure success after the flash course has ended.

Material	Use
Seeds	• Provides crops that are both nutritious and more drought resilient.
Black Soil	• To be mixed with sandy soil to improve water retention and microfibers
Irrigation Kits	• To more efficiently irrigate pastures

Material	Use
Water Pan Rehabilitation Materials	• To boost pre-existing wells and sources of water
Storage Sheds	• To boost capacity through the dry seasons

The goal of this practical section is to supplement the educational phase and bring a more holistic approach to effectively initiate Panda Maisha's drought intervention.

The timing of Panda Maisha's implementation is paramount. The planting process will take place twice a year in tandem with the rainy seasons, therefore our educational programs must take place during dry seasons to anticipate this need. Outside of the rainy seasons and during periods of poor rainfall, irrigation techniques, soil restructuring, and shade nets will be necessary to ensure the survival of seedlings.

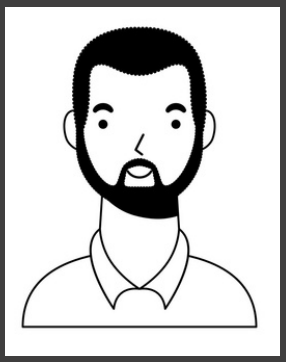
Panda Maisha will also facilitate the creation of a community group to oversee the management of these "pasture farms" made up of locals and overseen by the chiefs of areas of focus. They will receive remuneration for their work through a monthly stipend, which will ensure that the pasture farms are maintained. To meet seasonal labor demands (i.e. cutting, drying, and storing fodder and hay for agriculture production), weekly stipends will be offered to those who volunteer to work.

We will build fodder banks by the water pans to store the dried pasture and it is exclusively for use during the drier months when rangeland pasture variety is at its lowest. The management group is responsible for the distribution of this hay to pastoralists coming in search of water. This will serve to fulfill the needs of at-risk pastoralists without requiring them to travel long distances in search of pasture.

5.2 Panda Maisha Case Study

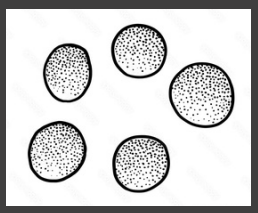
We will build fodder banks by the water pans to store the dried pasture and it is exclusively for use during the drier months when rangeland pasture variety is at its lowest. The management group is responsible for the distribution of this hay to pastoralists coming in search of water. This will serve to fulfill the needs of at-risk pastoralists without requiring them to travel long distances in search of pasture.

Mohamed is a poor herder, he has 3 cattle, 2 calves, 2 camels, and 5 goats. During the drought he is forced to travel 30 km away from the water pan in search of pasture, prior to our intervention he would have lost both calves, maybe be forced to sell off his bull and leave his 5 goats with a family member in hopes of their survival as they are unable to make the trip.



Panda Maisha would teach Mohamed about sustainable agricultural and pastoral processes and how to best adapt to the worsening drought situation. He would be taught how to best utilize accessible pastures and rangelands as well as the best approaches that would ensure the recovery of his herd.

Mohamed would be encouraged to have other family members involved in our pasture seeding and collection activities as a means to ensure the stability of their livestock numbers during a drought.



He would also be trained on the importance of proper rangeland management, and provided with seed to distribute while he moves his livestock around during the rainy season. These efforts ensure proper utilization of rangeland pastures and encourage reforestation efforts.

After our intervention most of Mohamed's herd survive and over the next two years he is able to invest in the health of his herd and sees the birth of more calves (both camel and cattle). When he sells his livestock now he can do so at a fair price and at his leisure. All this allows Mohamed to cushion himself and his family from creeping poverty.

Panda Maisha has thus supported Mohamed and his family's access to information and skills required for improved livelihoods as well developed and embedded climate-smart adaptive measures to be practiced by Mohamed and his family. This has strengthened Mohamed's capacity to withstand harsh drought cycles and allowed for the accumulation of his assets over time.

6. Intended Outcomes

Panda Maisha's drought intervention approach is intended to disrupt the destructive and cyclical effects of severe droughts on the agro-pastoralist communities of Wajir county. Specifically, our intervention reduces the potential for loss of livelihoods and livestock, an important economic, social and cultural asset.

i. Enable Target Population to maximize utility of output and asset accumulation

Through our pasture seeding and collection initiative, Panda Maisha hopes to reduce the vulnerabilities experienced by pastoralists and increase community and asset resilience to drought. This initiative is intended to ensure pasture security, promote sustainable livelihood diversification processes and support community led rangeland restoration. The target population can take advantage of supplementary feeding options provided by Panda Maisha to minimize the loss of livestock which is central to securing their livelihoods. This intervention is both anticipatory in that communities are prepared to face the threat of diminishing pastures and immediate as a response to drought crisis; both the pasture and water do not require transportation as is the case with water and pasture trucking efforts. Late drought responses can be blamed for the high levels of asset loss experienced by vulnerable groups. During a drought Panda Maisha's pasture reserves and efforts to improve water accessibility should be able to sustain the lives and livelihoods of the target population until the next rains with minimal losses. This initiative ensures that there is no major disruption to livelihoods and allows for asset retention. Once livestock survive the drought period through to the recovery period, asset accumulation becomes a reality for even the poorest of herders, as they are the ones who suffer most from livestock death.

ii. Stabilizing livestock productivity and capital retention

The Panda Maisha initiative ensures pro-poor livestock development through our educational and practical initiative designed to help poor pastoralists stabilize livestock productivity during drought and to retain capital by reducing livestock mortality. Livestock production remains an important source of livelihood for many people in Wajir in addition to trading and small-scale agriculture. However, there are many challenges facing livestock producers including; water scarcity, declining pastures and the distance between water sources and grazing areas.

Panda Maisha tackles these challenges by developing and maintaining pasture inventories near existing water pans, thereby providing supplementary feeding options for livestock during crises. This will have the direct impact of limiting long distance livestock migration in search for pasture and subsequent livestock deaths thereby stabilizing the productive capacity of livestock - especially milk production which is crucial to child nutrition - during periods of drought. Through the simple effort of enhancing livestock feed availability especially for core breeding herds (lactating cows and calves) substantial productivity can be maintained and economic losses avoided. Efforts such as these to enhance livestock production systems have the long term effect of limiting asset stripping i.e. distress sale of livestock and allow for asset protection and creation, shortening the recovery period.

iii. Allows for Circular Approach to Rangeland Management

Rangeland degradation remains a serious threat to pastoral livelihoods. Reductions in the quantity and nutritional quality of vegetation for grazing, expansion of localized deserts and barren areas driven by climate change and human factors pose a great threat to the livelihoods of livestock producers. Cyclical droughts place incredible stress on already fragile and degraded rangelands with limited grazing areas and diminishing water sources. Besides these environmental challenges drought induced economic pressures has seen poorer households (especially female led households) move toward exploitative and unregulated wood harvesting for firewood and charcoal production to make ends meet. Female led households are among the target populations of Panda Maisha's initiative which provides them with alternative means of employment thus preventing further damage to rangelands.

Pastoralists have indigenous knowledge on plant species and their utilization. Panda Maisha integrates this indigenous knowledge with modern rangeland management strategies to support community based rangeland rehabilitation and coping strategies. Panda Maisha's strategic pasture development intervention can have significant impacts on improving range utilization efforts. Our initiative encourages reseeding and tree planting efforts in order to sustain range ecology and agro-pastoral livelihoods, thus limiting the practice of exploitative and destructive economic activities such as charcoal production.

iv. Allows for diversification of economic activity through the creation of ecologically sustainable income opportunities

The compounding effects of human factors and climate change put enormous stress on already limited natural resources, putting the livelihoods of agro pastoral and pastoral communities at even greater risk. In response to these threats pastoral people develop a wide variety of strategies to cope with the fluctuations in vegetation availability. Among these adaptive strategies are livestock mobility, marketing and livelihood diversification. Many pastoral communities have historically sought a wide variety of income generating opportunities ranging from waged labor to arabic gum collection and charcoal production.

These adaptive measures are usually short term but as severe droughts put excessive pressures onto pastoral activities it is the wealthier pastoralists who are able to participate in longer term livelihood diversification processes. Poorer pastoralists are pushed into an existence where they are reliant on relief or forced to live on the fringes of agricultural and urban communities. It is this particular group that Panda Maisha engages and supports, our pasture seeding and collection initiative helps vulnerable groups diversify their income sources in a more ecologically sustainable way. Through these efforts Panda Maisha builds local capacity and increases opportunities for longer term sustainable livelihood diversification. In the long run these efforts may increase drought resilience and reduce dependency on diversification methods that are dependent on rangeland manipulation.

Monitoring and Evaluation Framework:

Our monitoring and evaluation framework would allow us to identify and follow our theory of change. We have designed this framework such that our pilot project will be observed over a full cycle period of two (2) years from September 2022 to August 2024. The first phase of project implementation should begin in September just before the onset of the short rains. There, we will begin the distribution of drought-resistant seeds, black soil, irrigation kits, shade nets, storage sheds, and the materials needed for the rehabilitation process for the water pans. The project will be monitored throughout the growth, collection and storage periods. This project is dependent on a successful short rains season which would allow for the development of enough pasture to jumpstart the collection and storage process.

Panda Maisha takes a dual-pronged approach which will be broken down into two aspects in the process of implementation. The educational aspect involves the community education and involvement initiative which will target local stakeholders in order to improve drought resilience strategy. We will facilitate the roll-out of flash courses across the county necessary to provide the knowledge and skill prerequisites for the practical aspect of this project. The practical aspect of our project will begin with the pasture seeding process wherein community residents will be hired to start clearing and planting fodder as well as erecting storage units for hay. Additional labor will be recruited in the process of collection and storage of pasture in units. The next step will be to monitor the anticipated crisis period where the dried pasture would be utilized. At the end of this period, we will conclude with the impact evaluation of drought management measures implemented.

Success will be measured by using various indicators: the number of livestock sold during the next drought cycle (retention rate of livestock), the movement of livestock through towns in search of pasture (travel time of livestock), the amount of dried pasture harvested at the end of the first rainy season, the number of children staying in schools year-round (retention rate of students) and the number of non-farming jobs created at the end of the pilot project cycle. All of these measures will be taken into account when determining how the efforts to promote sustainable pastoralism and drought management will improve the livelihoods of vulnerable groups in Wajir.

7. Feasibility and Implementation

Panda Maisha recognises that there are gaps both in the research and promotion of context-specific drought risk interventions and sustainable agro-pastoral processes. Despite these challenges, there is huge agricultural potential in the region, plenty of space to carry out climate-smart adaptive agriculture, and willing stakeholders. Certain structural materials are already in-place and ready for use, such as water pans and shallow wells across the county. We intend to build upon this existing capacity to pilot our pasture seeding and collection initiative. Panda Maisha promotes the building and utilization of fodder banks, and there is plenty of space in Wajir County around water pans to build fodder banks. Currently, poor pastoralists who have been pushed out of livestock keeping due to asset destruction have begun practicing farming as an alternative source of livelihood, indicating a willingness to engage in hybrid agricultural and pastoral solutions. With direct community engagement, our initiatives promoting survival and sustainability will be assured.

We envision this initiative to be primarily reliant upon grant funding. Panda Maisha intends to explore the multitude of funding opportunities available to support economic development, poverty reduction, and climate action in Sub Saharan Africa. We anticipate funders to be a mix of charitable organizations and local governments.

8. Conclusion

Climate change is continuing to disproportionately impact the world's poorest communities. Prolonged and intensified droughts are depleting food supply and drying up water resources in countries where livelihoods are dependent on agriculture and livestock production. In Kenya, worsening cyclical droughts are having an immense impact on the economy and well being of poor people, increasing the instances of food insecurity and water scarcity.

Wajir is a predominantly pastoralist county in Kenya whose residents have experienced increased suffering following consecutive severe droughts the last few years. Livestock production is currently under threat with increased livestock diseases, high death tolls among species, and increasing travel distances to access water and pasture. These conditions are reducing the viability of traditional coping mechanisms and methods of adaptation during times of crisis. Farmers are now finding it increasingly difficult to maintain stable livestock assets and sources of livelihood. Even with a plethora of drought management programs implemented through the government, NGOs, and local communities, there remains a gap to be filled in targeting context-specific drought risk interventions. Current practices focus mainly on post-crisis management and represent a top-down approach.

Panda Maisha offers an opportunity to fill this gap by identifying a bottom-up community-based option to strengthen the capacity of Wajir county residents to reduce the severity of drought impact. Our solution is self-sustained and community-driven. Its efforts are focused on educating the local community on more sustainable drought risk management practices which facilitate innovation and adaptation of already existing traditional drought management tactics. The project will also ensure that these communities are also equipped with the necessary tools and materials to begin the process of transition to these more sustainable systems.

Panda Maisha combines the local community's indigenous knowledge on plant species and livestock keeping to improve overall pasture security. It supports community-led improvements of strategic water and pasture sources. Focusing on capacity building and emphasizing risk reduction, we see the potential for greater community-driven collaboration that emphasize prevention, mitigation and preparedness including investment in the improvement of strategic water sources.

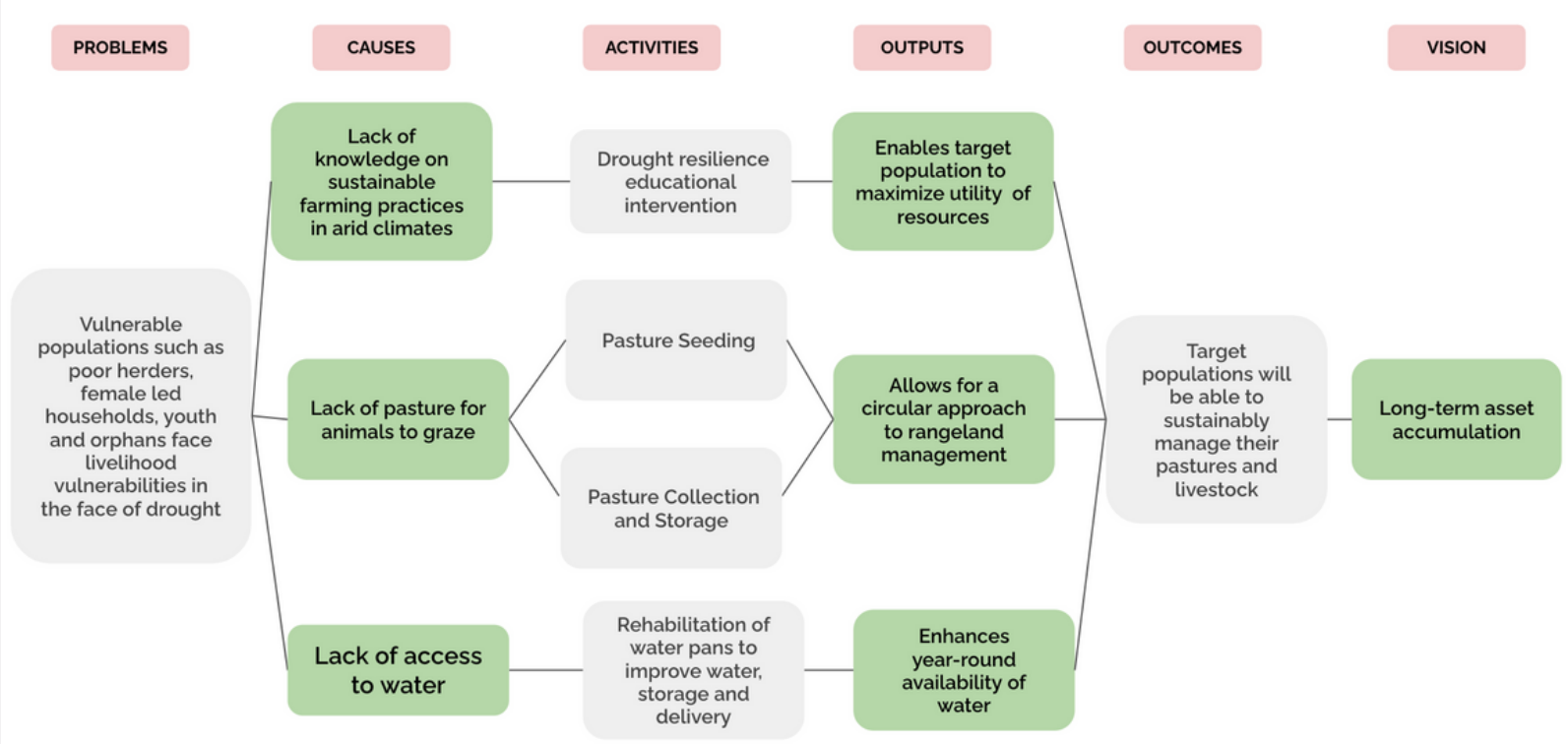
8. Conclusion

Panda Maisha's value is underlined by its simplicity in approach. It is particularly designed to present a practical solution with very little technicality in implementation. This would allow for the maximization of success in engaging local stakeholders as well as ensuring continuity and scalability throughout Kenya, the HOA and other affected regions.

Our team envisions a more resilient Wajir in the long-term and a community that can withstand the anticipated climate changes. Panda Maisha will allow livestock producers in Wajir to be able to maintain sustainable livelihoods and to produce innovative solutions to ensuring continued productivity, even during times of drought.

9. Appendix

Panda Maisha's theory of change



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