Building in Puma
An Outsider's Proposal for an Underdeveloped Community

by

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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Architecture

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

It is proven that sustainable development only occurs when ideas and resources are locally adapted; however, many conventional development approaches ignore local voices and treat them merely as passive consumers. Today, communication networks and technologies are decentralizing information. Citizens are empowered with unprecedented access to ideas, resources, and tools with which they may execute initiatives on their own terms. It is imperative that designers interested in working with the Global South face the implications of this contemporary terrain of interconnectivity: with new platforms for empowered community-led production, we must re-imagine our role as collaborative partners in development.

The thesis focuses on a previously isolated and underdeveloped village in central Tanzania called Puma. Newfound connectivity has provided them with valuable access to development resources, but also has overwhelmed them with its scope and capacity, placing them in sudden proximity to varied and unfamiliar communities. In this terrain where tradition must confront the foreign, the thesis proposes an intervention that will foster communication across lines of difference and stimulate a process of reciprocal learning to generate development initiatives specific to Puma's needs.

This thesis identifies how an outsider architect can insert herself into Puma and forge a relationship that can effectively make use of the local-global collaborative potential. The thesis proposes an architectural intervention to help foster a dialogue on this subject. Using a *building form* and the *building process*, architecture will act as a dialogic tool for the navigation and confrontation of the unfamiliar and the cultivation of an enduring local-global partnership.

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All photographs, drawings, diagrams, sketches, and maps by author unless otherwise indicated.

PROLOGUE

The initial motive that led me to Puma, a remote community in central Tanzania, stemmed from my desire to work in an underserved village using architecture to foster locally driven, tangible and enduring change. Research led me to an organization that builds basic social infrastructures such as schools, teacher's quarters, and dispensaries to provide better education and health services to Tanzania's rural population. Working as a volunteer with this not-for-profit organization provided the opportunity to live directly within the community and experience their way of life. During this visit, I noticed that while almost all the villagers lived without electricity and gathered water from wells, information technologies were an ubiquitous presence throughout. I wondered how villagers were leveraging their newfound connectivity to foster their own local development.

I befriended a group of villagers and we stayed in contact after my return to Canada. Through emails, I shared information resources I felt were applicable to their needs. They sent me news concerning a new organization they formed to empower local youths. I returned to Puma the following year to directly participate in their initiative. However, upon my arrival, I realized that rather than utilizing available information resources, the organization's main intent was to exploit their newfound connectivity to contact friends abroad and obtain foreign donations to run a food handout program. The organization had so far sustained itself using the members' own dwindling funds. While this initiative revealed their incredible generosity, their program was based on an unsustainable development model. Handout programs have been the primary and most recognizable form of aid in this village. In the villagers' quest to emulate a development practice, they implemented one without any skill in establishing a strategy that ensures sustainability, clarity of organization, and focus.

My experience affirms that while infrastructures and interfaces can connect villagers to reliable resources and ideas, successful collaboration between villagers and outsiders can only exist with the presence of true common understanding. Real development must be executed and sustained by those capable of critical reflection. My attempt to share sustainable principles and practices with the organization was a slow process, as it involved not only the introduction of new concepts, but also proof of their validity. My attempts were also driven by the belief that development must be implemented on the community's own terms: rather than simply *adopting* new ideas in a manner that imitates the Global North, communities need to *adapt* ideas in their own voice. Puma is a village where poverty and apathy are prevalent but co-exist with surprising generosity and untapped ingenuity. I felt that in order to foster real change, I needed to learn about their unique skills to identify where my specific expertise could be applied.
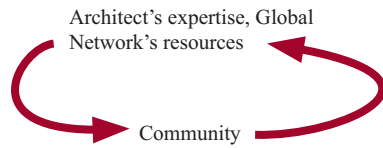
Fig. 0.1 Reciprocal Learning

These experiences raised the question for me of how an outsider architect can effectively insert herself into a foreign community to foster sustainable development. The thesis will question conventional architecture's top-down approach to ensure that the architect and the community are reciprocal partners in learning. This thesis explores principles of development and dynamics of interaction in order to fashion an appropriate design that fosters a new sort of genuine local-global collaboration.

INTRODUCTION

DEVELOPMENT IN PUMA: PAST AND PRESENT

The thesis site is situated in Puma, a small village located in central Tanzania and inhabited predominantly by subsistence farmers with a history of dependence on aid. Puma is a village in the region of Singida, characterized by its dry and dusty landscape and hot arid climate where agrarian based livelihoods are perpetually upset by the region's unstable climatic conditions. Recent developments in communications – the ubiquitous presence of mobile phones, the newly built tarmac road, and Internet access available in the city a half hour away - are providing new access to resources and also to potential collaborative partners with whom to develop tools that can mitigate agricultural instability. While these development opportunities are more accessible than ever before, its application is hindered by the community's mistrust stemming from decades of failed initiatives.

In the years immediately following Independence, Tanzania's first president Julius Nyerere implemented an initiative called "Ujamaa" - meaning "familyhood" in KiSwahili. This socialist initiative was based on traditional values of familyhood and was intended to consolidate the scattered rural population into villages where social services and infrastructures could be more easily implemented and distributed. Initiators needed to recognize that Tanzania had inherited colonial infrastructures that served to exploit resources rather than address community needs; it is also a country with varied landscapes that range from mountain to seacoast, desert to rainforest. Therefore the implementation of social services to these varied villages necessitated unique interventions reflecting their specific needs. Officials, however, disregarded these conditions and proceeded with rapid reorganization[1]. Communities with already underdeveloped infrastructures and land capacity found themselves further stressed by the increased population. Compounding these problems was the lack of adequate funding that resulted in the absence of promised social services. Tanzania became a country with imbalanced development and Puma was among the villages left isolated and underdeveloped.

Later, Tanzania became a major participant in the era of "big development". During this time, the development community championed large-scale top-down initiatives funded by wealthy countries. These initiatives intended to replicate success by targeting third world problems with first world solutions. Unfortunately, western expertise did not always account for the specific conditions of underdeveloped countries. The development community also showed disinterest in local vernacular techniques and regarded western methods as superior and more effective. This attitude resulted in the further disempowerment of Tanzanian citizens. In one example, a Canadian aid agency sponsored a large-scale wheat farming initiative that was meant to increase Tanzanian agricultural production. However, instead of enabling the locally based farmers with tools and methods with which to improve their own yields, large plots of land were organized for tractor-use production, displacing family-run farms. The tractors soon broke down and missing parts were impossible to replace because of Tanzania's underdeveloped infrastructure and market system[2]. These tractors now lie dormant in the fields and are a reminder of heavily funded but unsustainable aid contribution.

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Puma's Census

Drawn from interviews with village leaders

Population: 2500

Languages:
Local KiNyaturu dialect
National language: KiSwahili
Business language: English

Religion:
Muslim/Christian 50/50

Male/Female Ratio:
48/52

Education:
Primary: 90%
Secondary: 40%
Post Secondary: <1%

Singida Town
1/2hr drive away

Neighbouring Village: Utaho

Neighbouring Village:Musambu

Neighbouring Village: Wobia

Africa

Tanzania

Singida Town
Puma

Singida

Neighbouring Village: Nkuninkana

N
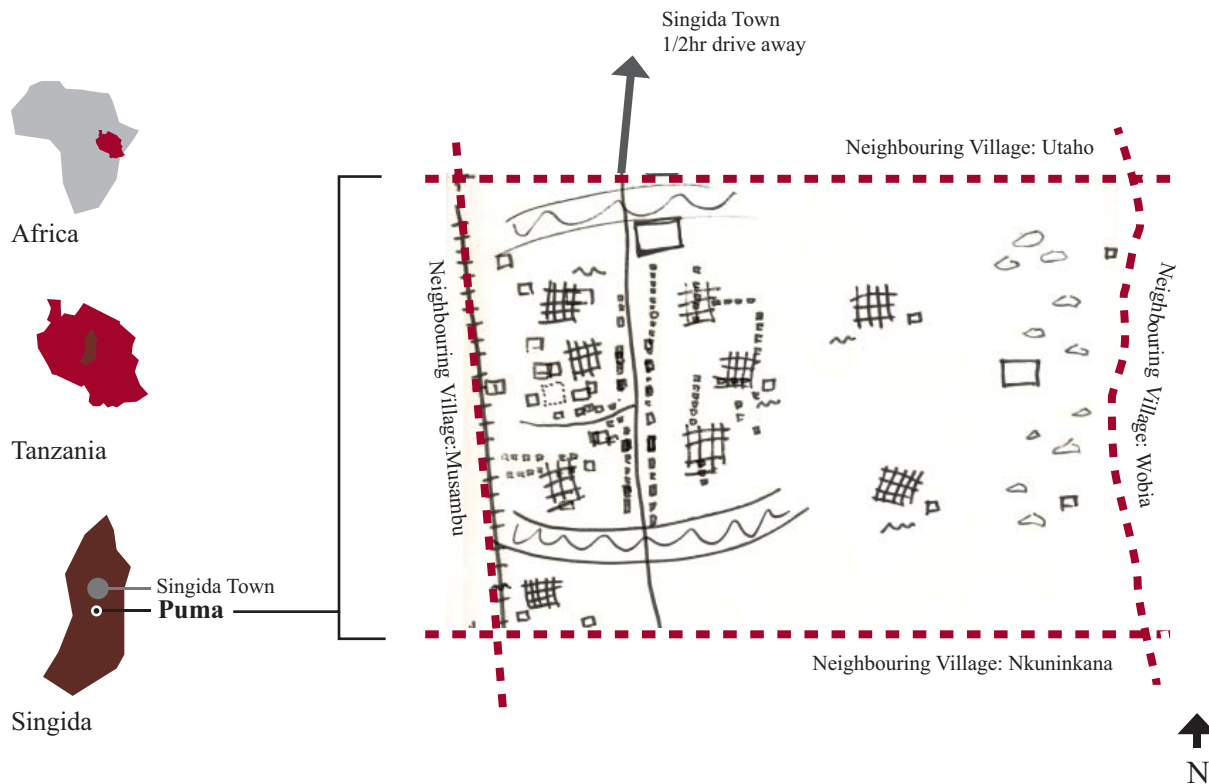
Fig. 0.2   Puma's boundaries are defined by natural rock features in the east, train tracks in the west, and political divisions in the north and south

What are proven to empower communities and foster sustainable development are infrastructures and social services that create reliable conditions within which communities can execute self-initiative. However, for decades, Puma was in a constant struggle to build these infrastructures and services. In the years in which Puma lacked access to a tarmac road, transporting materials and supplies to schools and health dispensaries was unreliable and fraught with delays, resulting in sub par education and health services. Real development depends on a community's capacity to nurture healthy, educated and productive citizens. While it is known that many talented people choose to work in rural communities, the majority of well-educated teachers prefer to work in more affluent and urban areas where they are ensured adequate housing and reliable payment. Rural schools often suffer from an imbalanced teacher to student ratio that results in an emphasis on rote learning rather than critical thinking[3]. In these underdeveloped villages, the educated and uneducated alike immigrate in droves to already overstressed urban centers in search of prosperity. Remittances[4] are sent home but skills continue to be employed in urban areas. As ex-U.S. President Bill Clinton has observed:

> *"Incapacity is a far bigger problem than corruption. There needs to be a predictable connection between effort and result. In a world of chaos, with no system, everything becomes a guerilla struggle"*[5].

Rural villages will continue to be incapacitated when its population lacks the opportunity for a critical education and when skills are implemented in cities but not at home.

An important factor that the thesis must address is the outsider's perception of an underdeveloped community. My first impression of Puma was its pervasive dependence on "God's Will". God was invoked in all matters of daily life. Villagers closed almost every statement with: "it will be so if it is God's Will". This attitude seemed to express that self-initiative, discipline, skill, and resourcefulness were less effective in development than a passive approach where blessings are bestowed by an external source. In casual conversations with several development workers, I was told that many villagers in the region of Singida are "lazy and wait for aid". However, time spent in Puma revealed that not only is this attitude a reflection of the community's deeply conservative and religious nature, it is mostly the result of the pervasive vulnerability that permeates every aspect of daily life. Villagers are entirely at the mercy of conditions beyond their control. For example, destructive weather can wipe out an entire family's savings, over-capacitated and dilapidated vehicles serve as their only (and dangerous) mode of transportation, and malaria is an unavoidable illness that constantly disrupts agricultural production.
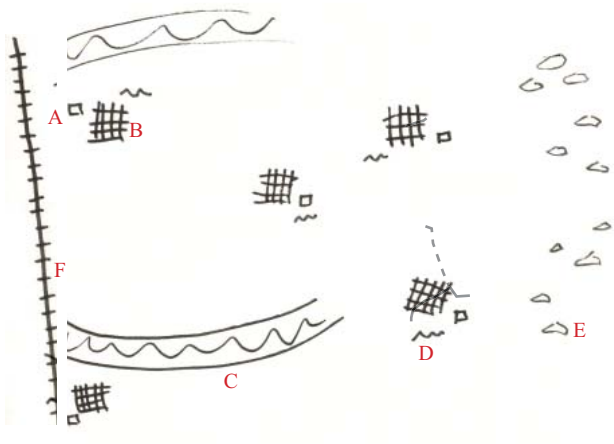
Fig. 0.3 Puma: Pre-Independence

Farmsteads settle near natural underground springs. In the late 1970s, train tracks were built to connect Singida to the national railway system

A - Home
B - Farm
C - Valley
D - Natural Stream Opening
E - Boulders
F - Railroad

Dirt Road to Singida Town
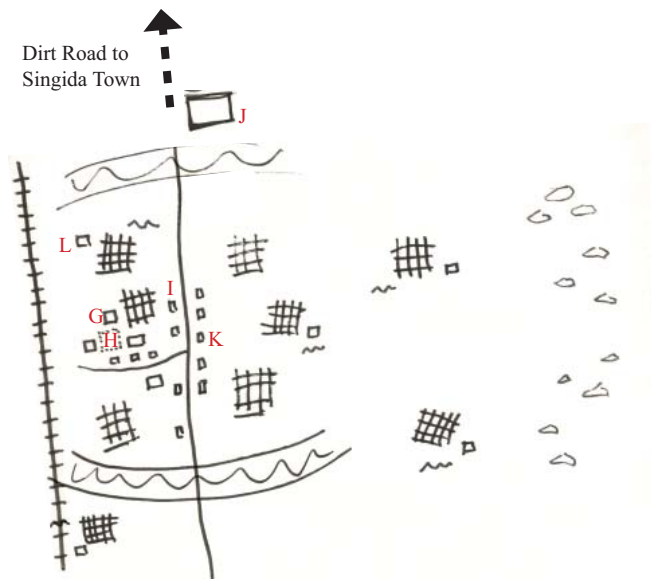
Fig. 0.4 Puma: Post Independence

Ujamaa increases population density. The primary caravan route that connects to Singida Town runs through central Puma.

G - Government Buildings
H - Market
I - School
J - Missionary Hospital
K - Shops and Homes
L - House of worship
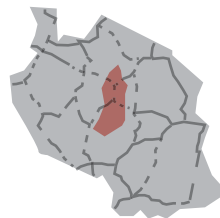
Fig. 0.5 Tanzania: Post Independence

Inter-regional buses transport Tanzanians throughout a network of paved and unpaved dirt roads. For safety, buses do not run at night. Singida Town, located in central Tanzania, becomes a stopover town for travellers on their way to other destinations.

Tarmac Road to
Singida Town
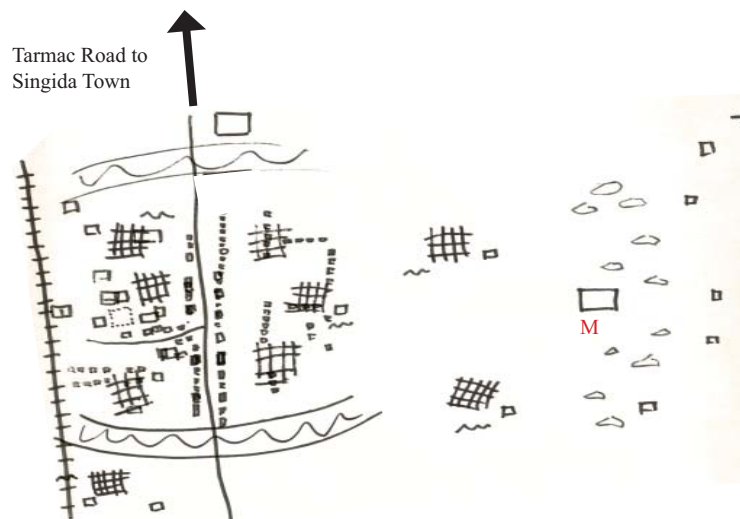
Fig. 0.6   Puma: Modern Day

Further increase in population density resulting from new farms being set up in unclaimed lands.
More shops and homes are built along the new tarmac road. A new secondary school and multiple
houses of worship are built to accommodate the increased population

M - Secondary School
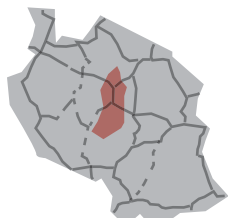
Fig. 0.7   Tanzania: Modern Day

Primary bus routes are almost all
paved with tarmac.

Fig. 0.8   Dirt vs. Tarmac Roads

Dirt Roads are annually flooded during the wet season,
necessitating frequent detours. Tarmac Roads cannot be washed
away, ensuring reliable transportation

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Fig. 0.9 to Fig. 0.14   Series of Puma Landscapes

Farms   "Dense" Residential District   Tarmac Roadside: Shops and Cafes   Market
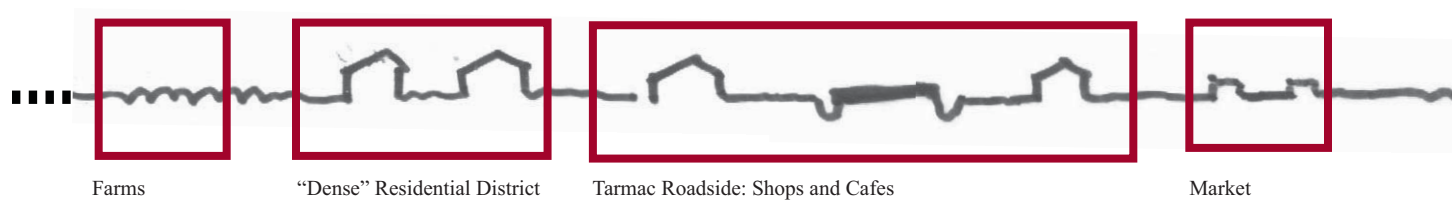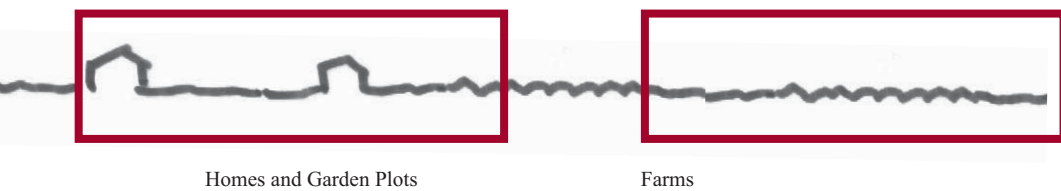
Homes and Garden Plots   Farms
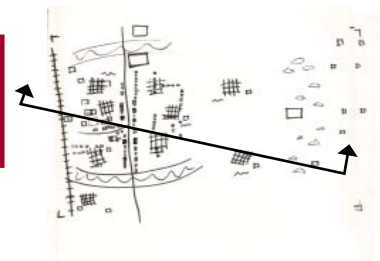
Fig. 0.16   Key Plan

Fig. 0.15   Transec Walk Cross Section

A Transec Walk is a straight walk across a village without the use of existing pathways. This method allows an outsider to understand the village's composition - beyond what occurs along major paths and attractions.

ESTABLISHING THE DESIGN INTENT

This thesis makes a claim for looking past initial impressions by removing one's own western lens and not ignoring, but rather confronting the community's deep-seated scars. The goal is to put an end to the image of an outsider as a purveyor of temporary funding and ineffective strategies. The outsider will instead become a supportive partner and student of local skill and values.

To achieve this, the architecture will serve as a tool for what Jacqueline Novogratz has called *patient listening*. Working in this manner means finding a way to ask questions. This means having the patience to directly engage the community in order to identify their inherent skills and values, which is especially difficult when villagers are not used to talking to outsiders. As Novogratz has written:

> *"Listening isn't just about patience. When a community has lived on charity for so long, it is hard for them to say what they really mean. They have never been asked, and they don't know if you want the truth. I've learned that listening is not just waiting, but knowing how to ask better questions"*[6].

An effective method to ask these questions is through the act of production: villagers' reactive adaptation of ideas, methods and resources can reveal inherent skills and values. This is called *prototype from within*[7] where the community does not just participate in development, but claims ownership to ideas and adapts them to their own specific needs. The architect must commit to consciously and continually encouraging community reaction and adaptation. The thesis intervention aims to engage Puma by activating their dormant ingenuity through a process of dialogue, reciprocal learning and collaborative production.

Development Positions

The thesis will confront the outdated models of aid that have become impediments to Puma's development. A design intervention will be proposed to foster a collaborative relationship that can leverage Puma's skills with the Global Network's wealth of resources. A careful calibration of this relationship is of particular importance in this current age of transformation, where tradition is in an ongoing collision with the new.

This transformation is driven by the interaction of complex interconnected conditions and is dependent upon the unpredictable way in which communities adapt to change. In this dynamic terrain, as Clay Shirky has described, "*anyone using a system, responding to it, interacting with it, feeding back into it – changes it*"[8]. Real development is an ongoing process of subtle and interconnected changes in a complex system. Large-scale conditions trickle down to affect everyday citizens such as the villagers of Puma: from bureaucratic decisions on education and health services, to global markets dictating food tariffs, to climate change affecting agricultural production. However, small-scale changes also occur when a few risk takers adapt new ideas. Their successes and failures slowly affect the entire community.

Fig. 0.17 Conventional Development Model in Puma

Decisions are made in the regional office and passed down through levels of government. Villagers can voice feedback to local village chairmen, but not to decision makers at the top.

Step One
Partnership: Outsider
Architect + Villagers

Step Two
Partnership: Outsider Architect +
Villagers + Global Network

Step Three
Partnership: Outsider Architect + Villagers + Global Network

Relationship with Top Down:
Villagers develop a voice that can leverage for change

Government, Non-profits, etc

Fig. 0.18 Introduce New Development Model

Catalyst   The proposed design intervention will act as a catalyst in stimulating Puma's local adaptation of new ideas and ability to respond to unpredictable conditions. The catalytic intervention will not need to wait for bureaucratic decisions or expensive changes to large-scale systems; it will be a modest initiative that stimulates small shifts in the community and can be implemented immediately by utilizing existing and available resources and skills. A catalytic approach is also effective because it does not rely on a need to project how the future will unfold. Instead of trying to control or impose systems from a distance, a catalytic approach embraces villager's adaptation and absorbs emergent conditions, thus ensuring continued relevancy and sustainability. A catalytic intervention champions reciprocal learning and initiates a sense of ownership where the villagers are in control of their own development

A catalyst is particularly relevant in Puma where historically development has been reliant on large-scale systems to feed community-driven initiatives. Large-scale development will never be implemented in that manner in invisible communities who do not have the voice to leverage for change. Development is an ongoing cycle where small-scale changes inform large-scale developments, which in turn create new opportunities for small-scale initiatives. My intervention is intended to work locally to empower Puma with the capacity for local development and activate their voice to leverage for large-scale change.

Empowerment   The catalytic intervention must ensure that Puma is empowered to take ownership of ideas and make the necessary critical decisions that respond to emergent conditions. Puma's citizens need experience in strategy, execution, and reflection. Critical capacity is especially relevant today: they must be able to discern and identify applicable possibilities from the wealth of information and resources available to them. The intervention will confront Puma's sudden access to an overwhelming sea of resources by helping develop their capacity to synthesize information, frame their problems, and filter through applicable resources. The intervention will also address the issue of information transparency, which would allow the community to recognize conditions and make informed decisions for tangible change. Information transparency occurs when the context is designed to ensure and encourage accountability. Puma's empowered voice is a necessary foundation for genuine dialogue and reciprocal learning in the desired local –global collaborative partnership.

Bottom-Up   The catalytic intervention will work from the "bottom-up", addressing the tangible everyday conditions of the villager's lives. The villagers endure backbreaking responsibilities and development can only occur when these daily challenges for survival have been addressed. Working from the bottom-up can reveal a community's inherent abilities. For example, the operation of village-based businesses offers valuable lessons. Entrepreneurs talk directly with their customers and immediately adjust their services to respond to any emergent needs. Direct interactions with customers are excellent feedback mechanisms[9]. The intervention will therefore apply a small-scale bottom-up approach that bypasses the conventional hierarchical development process in which aid is filtered through levels of government.

Tend to Fields
Care and
maintain

Wet Season
Intermittent rain from
November to February.
Pouring rain till May

Prepare Fields

Lay out dry stalks and burn to
release nutrients into soil

Hoe channels to control rain
water

Jan

Dec   Feb

Nov   Mar

Oct   Apr

Sept   May

Aug   June

July

Hot

Cool

Harvest
Tomatoes,
peppers,
bananas,
papayas

Harvest
Maize, sorghum,
potatoes

Dry Season
Cool from May to August, hot
from October onwards

Threshing & Milling
Threshing as a group, mill by
hand or take to millshop

Fig. 0.19   Subsistence farming is dependant on annual rainfall

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Agriculture   Agricultural production being the foundation of the cycle of development in agrarian based Puma, it by necessity must be addressed in this intervention. Year round agricultural production would mean an economic stability from which other aspects of development can be fostered. Year-round farming has already proven to be feasible by the few farms in Puma who have inherited land with underground springs. These farms grow nutritious foods for consumption and generate income when sold at the local markets. The intervention will create a framework for sharing ideas for year-round agricultural production for all farms regardless of their access to underground streams. Such water-efficient farming methods are available from the opensource Global Network. This thesis will identify an intervention where an outsider can share these proven ideas in an arena where Puma can adapt them to the challenges of their specific context.

Immediate and Expandable   The catalytic intervention must be able to be implemented using and Puma's existing infrastructures, current skills, and access to tools and resources. Such an intervention must prove its effectiveness through the achievement of immediate results. Without these results, the intervention will be regarded as yet another unsustainable foreign initiative. The intervention must also be expandable in nature. The villagers who will be implementing them lack capital. They need inexpensive tools involving minimal investment that can create an immediate profit to recoup the cost of the initial investment. Cheap, breakable parts are better than expensive, durable ones when they can be easily repaired with available and accessible resources. Profits can then be invested back into the project in the form of maintenance and incremental expansion[10].
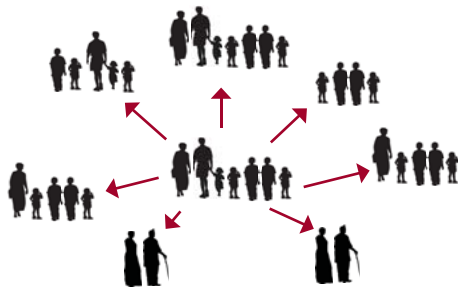
Use savings to support extended family members

Unable to grow optimum potential

Home destroyed by rainy season

Unable to prepare own fields for harvest

Contract Malaria

Unstable Climatic Conditions

Poor harvest

Seek immediate income by working for other farmers
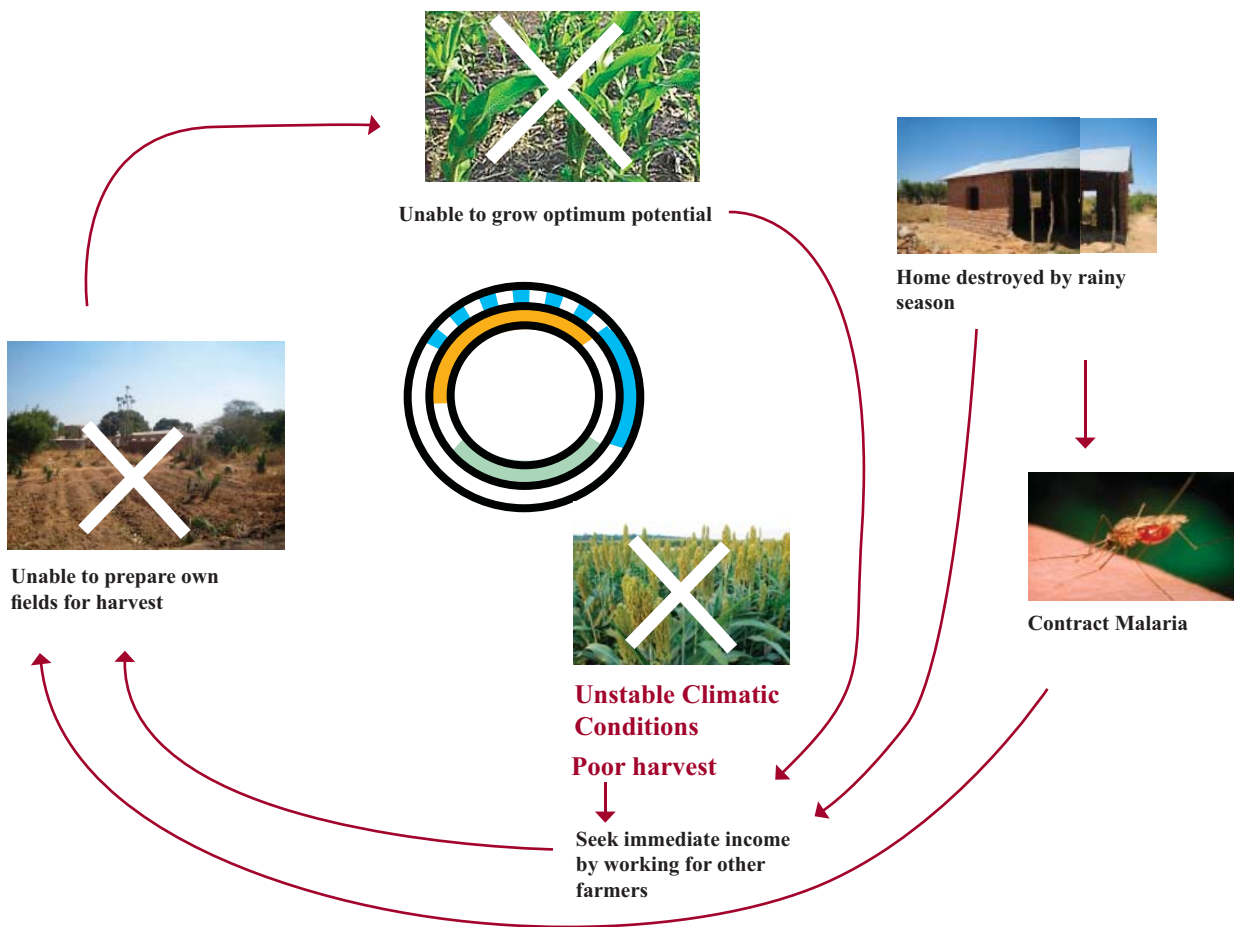
Fig. 0.20   Cycle of Poverty
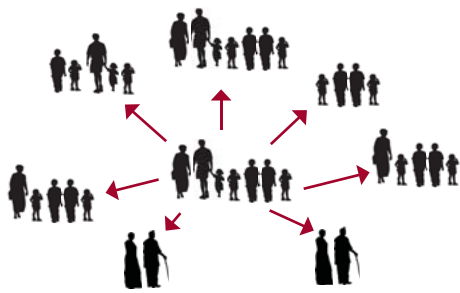
Share knowledge with family members
Extended family becomes self sufficient

Savings
Repair existing and save up to build
new sturdy home

Education
Earnings go towards
tuition and school
supplies

**Agricultural production
occurs despite poor
climatic conditions**

Afford Health Treatments
Use savings for medicines

Fig. 0.21   Improved Harvest is Catalytic to Development

DESIGN CHALLENGE FOR AN OUTSIDER

We are in an age where communications technologies are empowering individuals through an *emergence of a new information environment, one in which individuals are free to take a more active role than was possible in the industrial information economy of the twentieth century*[11]. Contemporary technologies are connecting us in unprecedented ways, making it possible to cultivate partnerships between people divided by great distances to collaborate on a global scale, and creating new possibilities for the execution of development initiatives. However, to exercise a collaborative effort, we need to consider how the past still informs a local-global partnership. While the contemporary development community now champions locally driven initiatives rather than abstract top-down foreign strategies, Puma's villagers lack the experience of real partnerships with outsiders. Scars of the past provoke initial assumptions of outsiders as purely a source of temporary aid. The thesis proposes an intervention that will embody the development positions addressed above and confront the long-standing assumptions of global aid by working with Puma's dormant voice and abilities.

The architectural challenge is to design an appropriate intervention that can foster a genuine collaborative partnership with a community radically different from our own. Recognizing that such a relationship can only emerge over time, the intervention aims to initiate a dialogue that can build the foundation for a committed long-term local-global partnership for ongoing development.

The thesis is divided into three sections. Sections One and Two will determine the conditions and dynamics in which local-global collaboration can occur. Section One explores Puma's social landscape through mappings derived from my own "patient listening" practice. The mappings are the result of a collaborative effort between the villagers and myself - the outsider architect. These drawings should not be viewed for their aesthetic quality, but for their use as a vehicle for dialogue. Section Two explores contemporary networks and interconnectivities in relation to Puma's skills and needs. Section Three will illustrate an architectural design that engages dialogue, reciprocal learning, and collaborative production. The design will be a framework from which development and collaborative effort can be initiated. This framework will adapt the social and spatial conditions unique to Puma and will inevitably embody the biases that arise through the process of working intimately with the villagers.

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Endnotes

1 Meredith, *Fate of Africa*, 253.

2 Stackhouse, *Out of Poverty and into Something More Comfortable*, 67.

3 Peter, *Teachers' Crash Course Plan Harmful, Government Told*, 5 Oct 2007.

4 A transfer of money by a foreign worker his or her home country.

5 Clinton, Bill. <http://www.ted.com/talks/bill_clinton_on_rebuilding_rwanda.html> (accessed 3 May 2007).

6 Novogratz, <http://www.ted.com/talks/jacqueline_novogratz_on_patient_capitalism.html> (accessed September 2007).

7 Fabricant, Robert. <http://www.core77.com/blog/featured_items/tools_of_engagement_the_new_practice_of_usercentered_design_by_robert_fabricant_13907.asp> (accessed 18 July 2009).

8 Shirky, <http://www.ted.com/talks/clay_shirky_on_institutions_versus_collaboration.html> (Accessed Aug 5 2008)

9 Novogratz, *The Blue Sweater*, 247

10 Fisher, *Design to Kickstart Incomes, Design for the other 90%*, 34.

11 Benkler, *Wealth of Nations*, 2.

SECTION 1: SOCIAL LANDSCAPE

1.1   DESIGN FOR COLLABORATION

In designing an intervention that proposes to initiate a local-global partnership, we must begin with identifying Puma's existing routines. Through a design that aligns to these routines, an architect can effectively engage dialogue, reciprocal learning and collaborative production with villagers who are mistrustful of outsider intervention. By applying what is familiar, the villagers are encouraged to adapt the design to reflect their own needs and values.

Social Capital   To this end it is important to investigate both the "Social Capital" of the local and global communities. Social capital is a culmination of intangible qualities that develop when a community builds common experience, knowledge, rapport, and trust over time; facilitated by the tangible conditions of connectivity and access to reliable systems and resources[1]. By examining social capital, we can look past superficial circumstances to identify sources of ingenuity. Social capital is a community's capacity to cultivate collaboration, drive sustainable development, and leverage existing systems and conditions.

Conviviality   The conditions that drive social capital are patterns of conviviality. Conviviality, as Ivan Ilich has put it, is the *autonomous and creative intercourse among persons; and the intercourse of persons with their environment[2]*. This reveals the underlying motivations of a community's adaptation to their transforming terrain, their genuine voice, and inherent skills. Patterns of conviviality can identify how Puma and the Global Network might engage in dialogue, reciprocal learning and collaborative production; which can then reveal local-global collaborative potential.

Patterns of conviviality occur in the dynamics of everyday interaction. Lefebvre suggests that the *departure point for this history of space is not to be found in geological descriptions of natural space but rather in the study of those rhythms and their inscription in space by means of human actions[3]*. I suggest mapping as a tool for investigating these patterns. Mapping is an architectural tool that can illustrate spatial relationships as well as the social dynamics that remain invisible, but play an underlying role in community development. Paul Seawright, in his publication *Invisible Cities* reflects:
> *A place is not found in geographical descriptions, but in how inhabitants move within it, something unseen that hums between the cracks[4].*

Mapping   Mapping is a powerful tool that can also initiate local-global collaboration. Janet Abrams and Peter Hall observe through their work in cartographies of network and territories:
> *Mapping is an increasingly vital activity, one that undergirds diverse disciplines and transcends the supposed physical/digital divide. It is the conceptual glue linking the tangible world of buildings, cities and landscapes with the intangible world of social networks and electronic communications. Mapping is also a core aspect of what designers do. To design is to invent strategies for visualizing information that make new interpretations possible[7].*

Mapping is proven to be an effective technique in stimulating dialogue. When combined with open-ended questioning, collective drawing, and usage of common and familiar materials[5], village stories can emerge. These stories can be more revealing than information gathered from objective censuses. In Puma, mapping is especially necessary as

information such as land maps are unavailable or simply do not exist[6]. Lastly, mapping is an act of engagement that introduces the outsider architect to an unfamiliar place in preparation for reciprocal learning. The practice of mapping allows an outsider and the villagers to slowly shed their biases: it can be an initial act of confrontation that leads to a collaborative re-imagination of possibilities.

1.2   IDENTIFYING SOCIAL CAPITAL IN PUMA

Puma's social capital can be observed in their transformation of dormant spaces into active communal places. Social capital is also manifested in the long-standing rituals of interaction and open sharing, which performs the role of an informal social security system in this village with limited means.

Puma is an open and hospitable community that is unique to Tanzania. After Independence in 1964, the first president Julius Nyerere was successful in unifying a country of more than 120 tribes into a peaceful and proud nation. During Puma's long history of underdevelopment, villagers have been able to cope with their challenges through the social ritual of resource sharing.

Daily life in Puma is often spent outdoors. Buildings are small and practical. The labour of construction is intensive; homes, health dispensaries, school buildings, shops, and government buildings are comprised of just one or two rooms. It is often in the outdoor spaces where convivial dialogue, reciprocal learning, and collaborative production occur. The following mappings will reveal how these spaces are formed and how they are used.

INDIVIDUAL ROUTINES

The investigation into Puma's convivial patterns begins with identifying the responsibilities of each demographic group. These responsibilities reveal the cyclical patterns of everyday routines and their corresponding spaces of engagement.
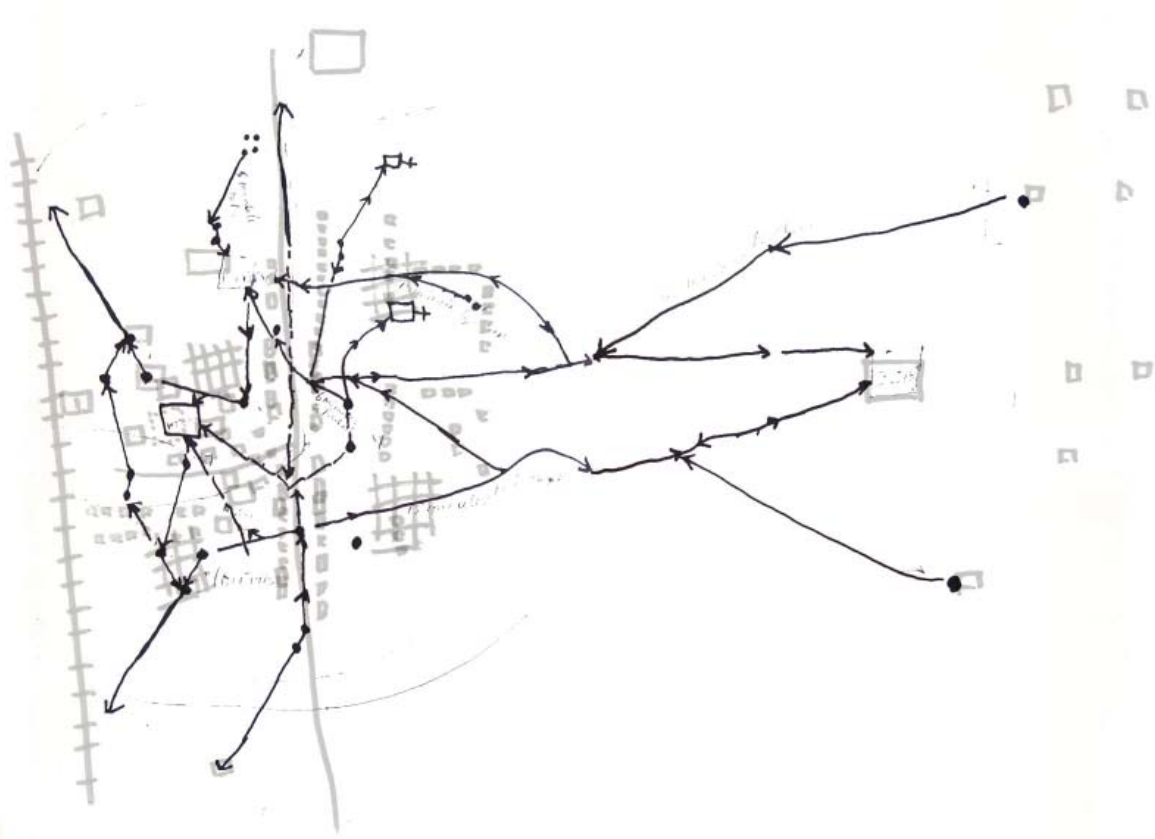
Fig. 1.1 Everyday Routines

Sundown
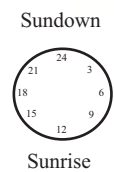
Sunrise

Fig. 1.2 Swahili Time

Swahili Time reflects daylight hours and begins six hours later compared to the international time system. First hour begins at sunrise, which occurs at Twelve O'clock Swahili time (6am international time) all year round.
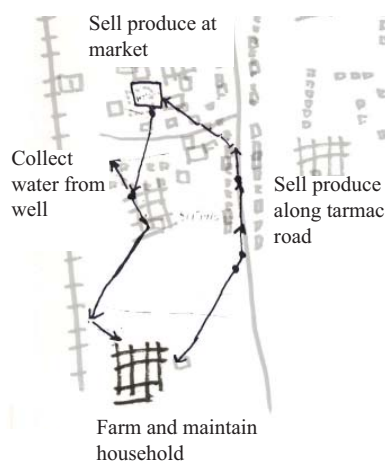
Fig. 1.3 Women's Responsibilities

Primary responsibility is to run the household. Women also go to markets to sell produce and work in the fields.

Sell produce at market

Collect water from well

Sell produce along tarmac road

Farm and maintain household

Fig. 1.4 Women's Daily Routine

5:30 Wash, cook, eat
6:30 Collect water, work in fields, feed and care for children. sell produce at markets
15:00 Collect water, pound and grind millet, cook dinner
19:00 Eat
20:00 Wash dishes and children
23:00 Sleep
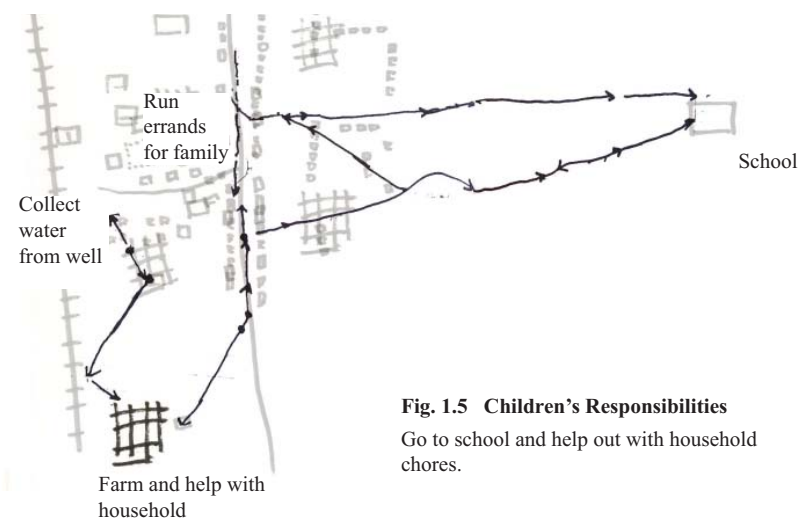
Fig. 1.5 Children's Responsibilities

Go to school and help out with household chores.

Run errands for family

Collect water from well

School

Farm and help with household

Fig. 1.6 Children's Daily Routine

5:30 Help cook, care for younger siblings, tend to livestock
7:00 Walk to school
8:00 School
13:00 Collect water, farmwork, housework, homework
19:00 Eat
20:00 Help wash dishes and children
21:00 Homework
23:00 Sleep

Duties According to Age
7: Care for chickens and ducks
8: Care for younger children, fetch water
9: Care for goats and cattle, cut fodder, help harvest
12: Hoe

Socialize at the market

Socialize at shops and cafes by tarmac road

Socialize at neighbour's homes

Farm
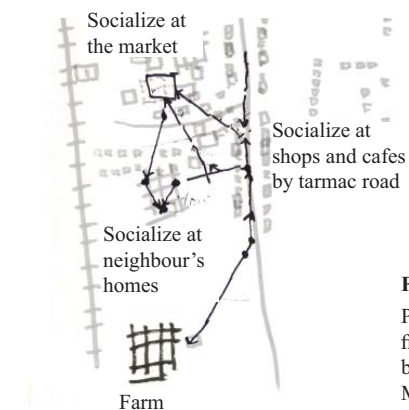
Fig. 1.7 Men's Responsibilities

Primary responsibility is their work in the fields. During the dry season, some run small businesses along the road for extra income. Men travel to markets and cafes to socialize.

Fig. 1.8 Men's Daily Routine

6:00   Eat
7:30   Work in fields, socialize
19:00 Eat
20:00 Socialize
23:00 Sleep

FORMAL GROUP ACTIVITY

Daily routines are suspended during special events such as graduations, marriages, funerals, and religious holidays. Special events often include the entire village. In the absence of buildings that can accommodate large numbers of people, outdoor spaces are claimed and guests arrange themselves in the available shade. During smaller group gatherings, villagers claim unused sheltered space.

Special events are often full day affairs. Villagers make their way on foot to the event and meet up with other families also on route. Common paths become procession routes and formerly empty spaces are activated to become formal spaces for celebration or mourning.

Fig. 1.9 Formal Space
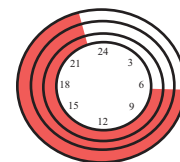
Fig. 1.10 Full Day Event

A. Common Paths

Fig. 1.11   Procession Route

B. Gathering Spaces

Fig. 1.12   Worship

Fig. 1.13   Churches and Mosques
Houses of worship have the distinction of being the only dedicated buildings constructed for formal assembly.

Fig. 1.14   Marriages and Funerals

Fig. 1.15   Home's Adjacent Open Space
The host's open field acts as a celebration or mourning space.

Fig. 1.16   Outdoor Yard
Fenced-in yard acts as an outdoor kitchen for large-scale food preparation to feed guests

Fig. 1.17   Assemblies

Fig. 1.18   School Compound
Cluster of school buildings create shaded space for school assemblies
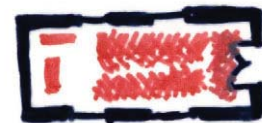
Fig. 1.19   Unused Classrooms
Sheltered classrooms are used for informal village meetings during weekends and school holidays

Fig. 1.20   Village Meetings

Fig. 1.21   Chairmen Office's Adjacent Open Space
Outdoor shaded space adjacent to government building acts as a forum for village meetings

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INFORMAL GROUP ACTIVITY

On typical days, villagers engage in daily routines defined by a cycle of repeating tasks. These tasks are performed by hand; villagers do not adhere to strict schedules since each day brings unique challenges. The flexibility of these everyday routines creates opportunities for spontaneous interaction in common spaces such as wells, markets, and cafes. When villagers encounter one another, they always pause to chat. Sites of spontaneous interaction become temporary social spaces.
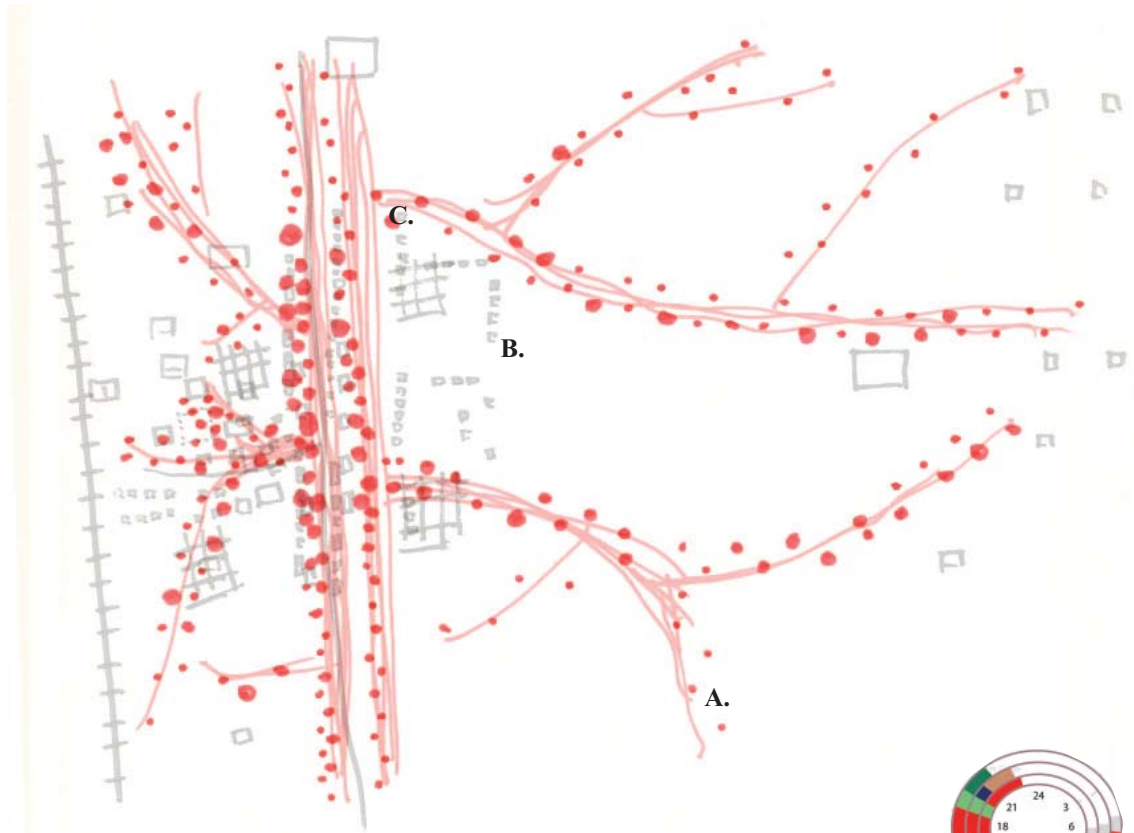
Fig. 1.22   Common Paths
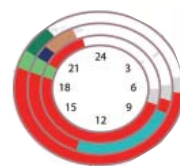
Fig. 1.23   Shared Daily Routines

Common Paths as Social Space
Common paths are primary places where convergent interaction occurs. It is along Puma's system of pathways where villagers intersect each other during their respective everyday routines. Villagers mostly travel on foot and those walking to similar destinations can enjoy one another's company for long stretches of time. Paths are fluid social spaces - fluid because they only occur at moving points of activity.

A. An Emerging Path
Villagers create short cuts by walking through fields. Frequent use create recognizable dirt road. If not continuously used, these paths are eroded over time

On Foot   Bicycle

B. An Established Path
Wide dirt roads are "paved" by daily use These roads connect important destinations such as schools, government buildings, and wells. These are collector roads of sustained use.

Development Agency SUVs   Wealthy villagers' pick-up trucks   On Foot   Bicycle   Grazing

C. A Permanent Path
Only a few years old, the tarmac road is the only path that is consistent year-round as it cannot be washed away by rain.

Inter-region buses   Development Agency SUVs   Wealthy villagers' pick-up trucks

Daladala (local buses)   Bicycle   On Foot

Fig. 1.24 Hierarchies of Paths and Corresponding Modes of Transportation
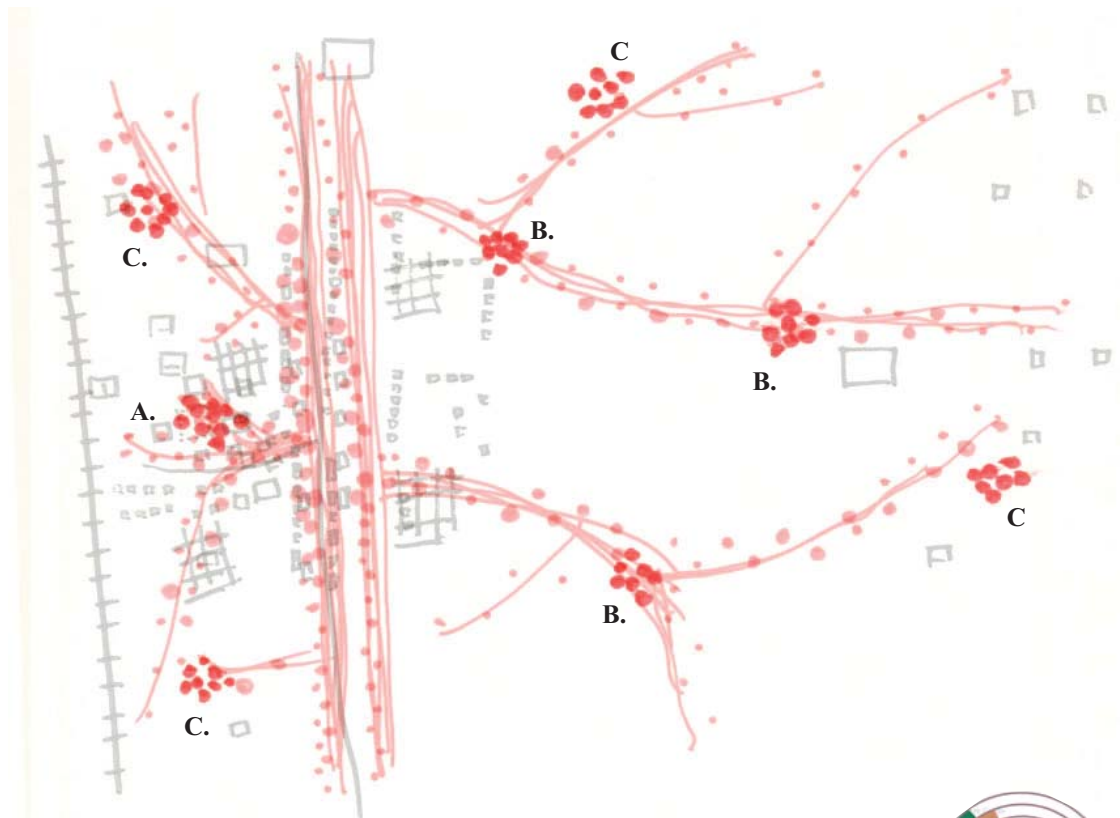
Fig. 1.25   Location of Everyday Amenities

**Fig. 1.26   Shared Daily
Routines**

Social Spaces Near Everyday Amenities

Villagers linger near everyday amenities to wait in line for resources and to stop and chat with others. During moments of interaction, villagers seek shaded spaces to rest. Social spaces emerge near amenities that can provide relief from the hot sun. One will often find a consistent rotation of villagers who use these spaces.

A. Market Stalls
Sell produce, meat, grains

Market - Blanket Stalls
Sell produce and grains
and random electronics
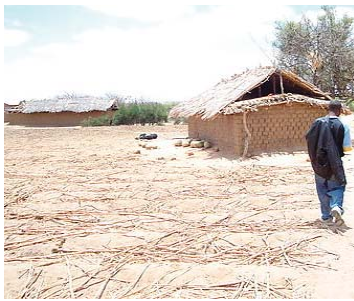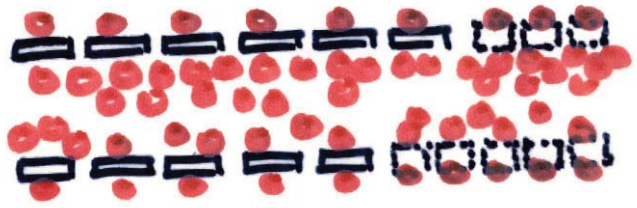
B. Interior Cafe
Sells snacks and beer and accommodates
loitering guests

C. Wells and Stream Openings
Wait in line to gather water
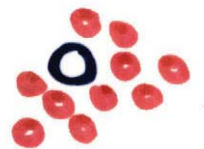
Fig. 1.27   Activity at Everyday Amenities
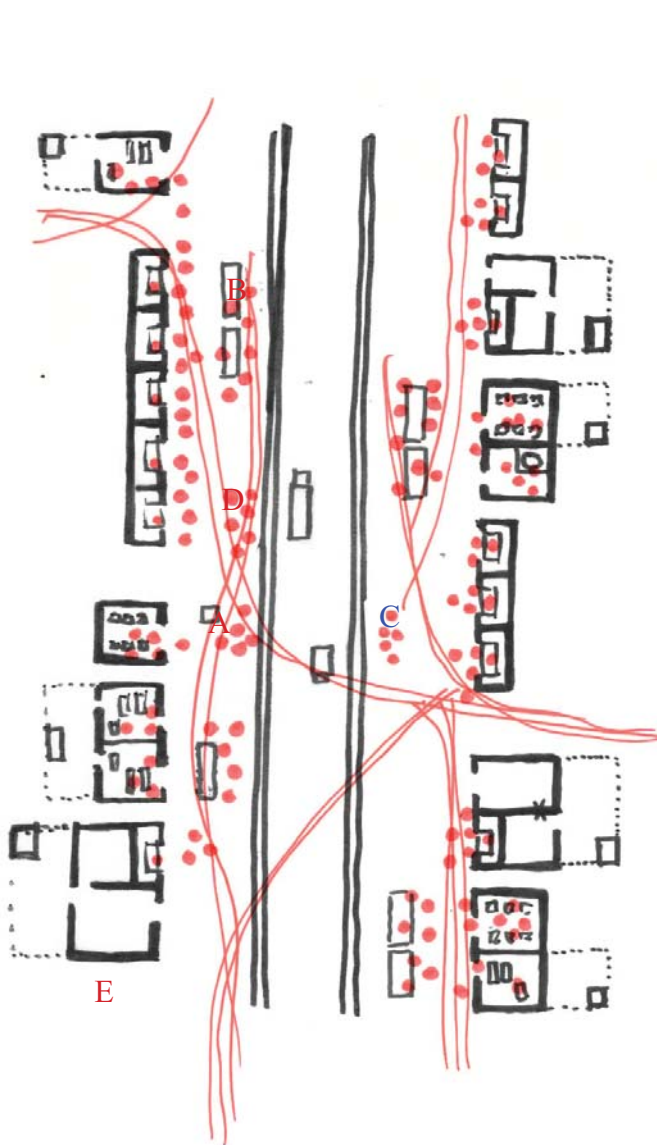
Fig. 1.28   Social Interaction at the Tarmac Road

Fig. 1.29   Various Routines

Tarmac Road as Social Space

The tarmac road is a social collector: it is a business hub, a transportation hub, and a major path that cuts through the center of the village. The tarmac road is a part of many villagers' everyday routines.

Businesses are attracted to the tarmac road for its centralized location, easy access to electrical power, and the density of potential customers. Small informal businesses set up temporary stalls and position themselves in strategic locations to target moving traffic. Villagers go from shop to shop to buy necessary supplies and stop to chat with others doing the same. Small pockets of social spaces emerge near the shops and stalls. The tarmac road is a marketplace with ever fluctuating clusters of villagers gathering in temporary social spaces.

A Mobile Phone Kiosk
Sells phone cards and cellphone charging for villagers without electricity

B Informal Stalls
Display clothes for sale, shaded patio extension of cafes

C DalaDala (Local Bus) Waiting Area
No predetermined schedule: bus leaves when it reaches maximum capacity

D Informal Streetside Market
Villagers sell crops to roadside traffic

E Shops and Roadside Cafes
Packaged goods shops, shoe shops, fabric shops, clothing shops, hair salons, millshop, and bike shop. Roadside Cafes sell quick meals, snacks, and drinks

Fig. 1.30 Amenities at the Tarmac Road
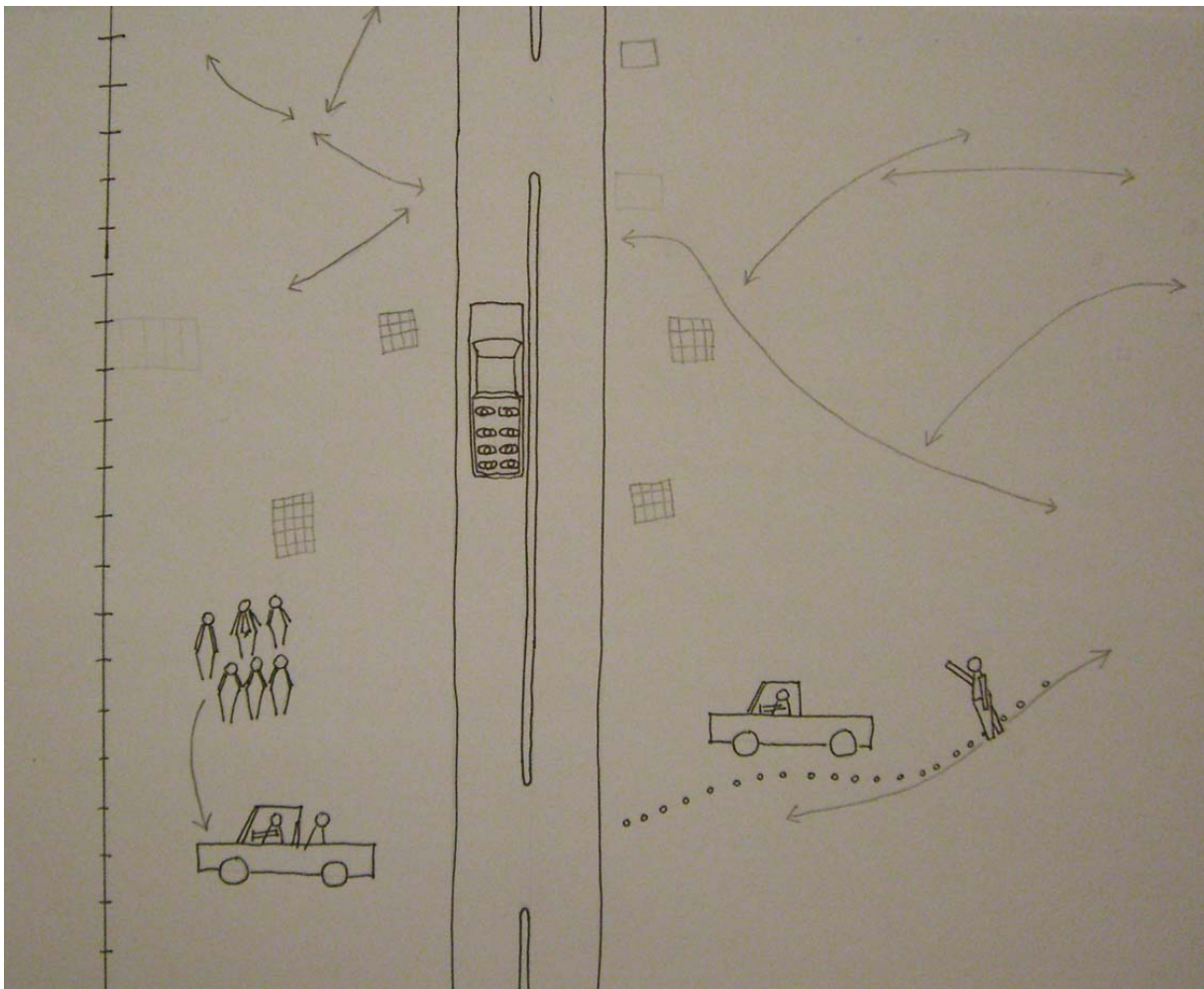
Fig. 1.31 Spontaneous Rideshare

Villagers on their way to Singida Town hitch a ride a with a passing vehicle

VERNACULAR DIALOGUE

Puma is a verbal-based community where information is distributed across the village through word of mouth. Written documentation is reserved for formal events that are important enough to use precious supplies of pens and paper. When villagers stop to chat with one another, they engage in a ritual that can be described as "imitation and elaboration". In this ritual, villagers begin their conversation with customary reciprocal inquiries into each other's health. This emphasis on well-being is a social lubricant that reinforces Puma's openness and built trust.

Imitation and elaboration is similarly practiced in formal events. Standard performances begin with speeches, followed by voices from the audience, and ending with a dialogue that reiterates what has taken place. This ritual provides villagers with a simple format to expand new ideas within a central framework and commit this information to memory through a practice of repetition. Kelly Askew writes of her investigation into Swahili music and cultural politics:

> Performance is a process actively engaged in by everyone in attendance as opposed to a product somehow owned by performers and transmitted for audience reception. Performance is a form of communication and a means to engage[8].

Choir sings chorus

Soloist: special rendition

Congregation imitate chorus

Individuals Sing

Congregation imitate chorus
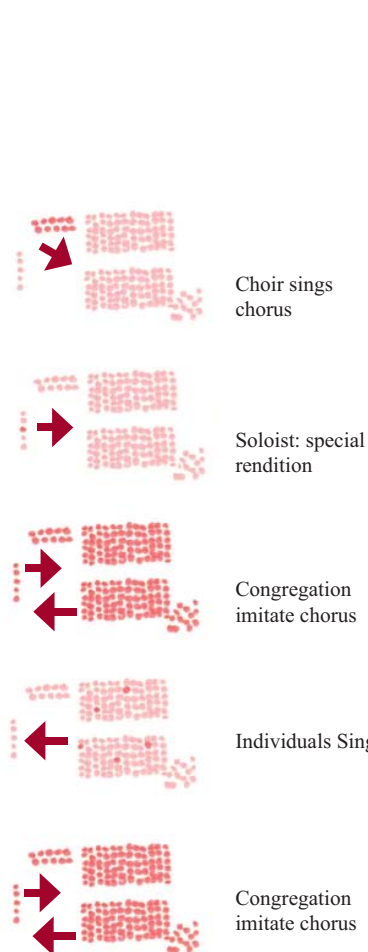
Fig. 1.32   Imitate and Elaborate: Chorus Song

Fig. 1.33   Imitate and Elaborate: Polite Banter
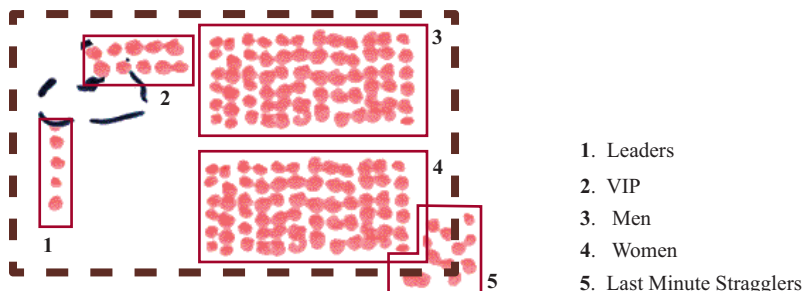
Fig. 1.34   Formal Congregation

1. Leaders
2. VIP
3. Men
4. Women
5. Last Minute Stragglers

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1.3   LESSONS FROM PUMA

Mapping enables an outsider architect to look at spatial and social patterns through new eyes. The mappings in this section were created with the help of community members who embraced my presence and allowed me to participate in their everyday routines. Direct engagement was truly necessary in my quest to understand this unfamiliar community with such different conceptions of space and social rituals.

The mappings reveal that social spaces are the products of activity: they are defined by the community's social rituals. In the west, architects are accustomed to static infrastructures and spaces that serve specific programs. In Puma, as in most rural communities, infrastructures and spaces swell and contract to accommodate different activities. This vernacular use of space is also witnessed in Puma's new tarmac road. Though it is a permanent artifact, villagers define and claim spaces around it through a mixture of formal and informal businesses and activities. To design an intervention that will empower and encourage Puma's active participation, the outsider architect must align to these social rituals and spatial dynamics. It is in these conditions where the villagers' voices can be heard.

The mappings also reveal that vernacular dialogue and collaboration is open and inclusive. This results from ages of close-knit co-operation and peaceful interaction. While each generation boasts its own unique characters and interaction is an ever-changing play of subtle nuances, "imitation and elaboration" plays an underlying role in all dialogue and collaboration. This dynamic can be applied to initiate a meaningful relationship between local Puma and interested global partners.

Endnotes

1 Thackera, <http://www.doorsofperception.com/archives/2009/07/from_philanthro.php> (accessed 29 July, 2009).

2 Illich, I. *Tools for Conviviality*, 11.

3 Lefebvre, *The Production of Space*,1991.

4 Seawright, *Invisible Cities*, 100.

5 Chambers, *Robert, The Origins and Practice of Participatory Rural Appraisal*, 959-961.

6 During the course of the thesis, even satellite imaging was unavailable. Only in the recent months has an unpixilated image of Puma become available.

7 Abrams, *Elsewhere Mapping*, 12.

8 Askew, *Performing the nation*, 23.

SECTION 2: VIRTUAL LANDSCAPE

2.1   DESIGN FOR COLLABORATION

To design an intervention that can foster a partnership between Puma and the Global Networked Community, we must explore how relationships are cultivated in the Global Network. We must also identify Puma's use of network infrastructures to understand the realistic possibilities for local-global collaboration. This section will explore the conditions that facilitate global partnerships, Puma's adaptive use of network technologies, and the existing divides between Puma's villagers and the global community.

2.2   IDENTIFYING SOCIAL CAPITAL IN THE GLOBAL NETWORK

The Global Network's social capital is manifested in its collective productive potential: facilitated by opensource accessibility and connectivity and supported by an increasing number of empowered producers.

The Global Networked Community is an emergent social phenomenon, still in a stage of transition that contemporary thinkers are struggling to define. The network's productive capacities are without precedent. Larry Lessig, an authority on contemporary copyright and the founder of *Creative Commons*, states:

> "*Groups of individuals are successfully collaborating on large-scale projects by following a diverse cluster of motivational drives and social signals – rather than market prices of managerial commands*"[1].

People are producing and freely sharing content because they are driven by interest rather than profit. In these new productive communities, Lessig declares:

> "*The free sharing of information has nothing to do with altruism or a specific anti-authoritarian social vision. It is motivated by the fact that in a complex collaborative process, new creations are built on previous creations and provide inspiration for future ones. The ability to freely use and refine those previous creations increases the possibilities for future creativity*"[2].

In this spirit of collaboration, John Thackera founded the *Doors of Perception*, an organization that brings together a myriad of innovators such as grassroots activists, entrepreneurs, educators, and designers to imagine alternative futures and the design steps that can realize them. Thackera asserts that connectivity alone does not foster change; rather it is through the communities that emerge and evolve where true production lies.

> "*A network is not, per se, a community. A community embodies trust and social capital that develop through time as a result of embodied interaction between people. The Internet complements communities – it does not create them. Connections between people can be enabled by technology, but trust is dependent on the passage of time and the contiguity of bodies*"[3]

While there remain skeptics about the sustainability of opensource production - illustrated in the heated debates concerning how to manage creative ownership - collaborative online production is gaining momentum. When ordinary people are empowered with tools to become producers of media rather than simply passive consumers, a shift back to the original consumer mentality is impossible. The following investigation will explore this emergent phenomenon of production with a specific focus on the operations that foster and sustain collaborative communities.

GLOBAL NETWORK: A DECENTRALIZED INFORMATION CLOUD

Fig. 2.1 Valdis Krebs' Social Map superimposed with the social media available today

Production Tools

Networked production emerges from the combined efforts of individual contributors who have access to lowered cost of production tools and digital storage, accessibility of various digital production tools, as well as more pervasive network infrastructures – particularly through mobile and wireless technologies[4].

Fig. 2.2   Publishing Software and
          Digital Tools

Easy to use multimedia editors and cameras allow amateurs to upload content to become producers and content managers who can collaborate with others

Fig. 2.3   Smart Phones

Connection to online interface while on the go. Global Network is accessible from almost everywhere

Fig. 2.4   Mobile Phones

Individuals can send texts and images on-site. Sender generates real time information

PERSONALIZATION CREATES ORDER

Personalization allows individuals to target specific and relevant resources in the sea of information available to them in the decentralized Global Network. Individuals apply network technologies by accessing online tools to organize and contribute information specific to their interests and needs. Creating order in the Global Network's information cloud allows individuals to easily recognize applicable information and identify where their own contributions can be valued. The application of personalization tools is enabled through network literacy (one's familiarity with the online interface).
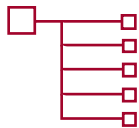
Fig. 2.5   Footprint

Footprint
Web browsers and online organizers are examples of tools that enable individuals to easily prioritize and organize information. These tools can be personalized to a user' individual taste and intuitive organizational method. Users create footprints that map visited and noteworthy sites and categorize them in a variety of ways. Some examples are: visual hierarchy, chronological order, subject folders, and frequency of visits.
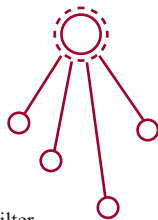
Fig. 2.6   Filter

Filter
Search Engines and Options Searches generate personalized results by filtering out extraneous information. The ability to filter is of utmost importance, as the Global Network's information cloud continues to grow exponentially. Users must have the ability to scan and recognize relevant data from their search. This is one component of network literacy that is gained through consistent practice and experience.
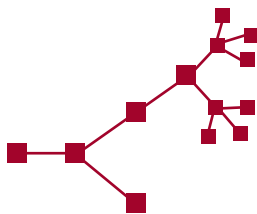
Fig. 2.7   Navigation

Navigation
Navigation involves the users' ability to recognize standard interfaces in various sites that boast different layouts and designs. Users must understand how to follow links, zoom, and identify forums where one can contribute text, photos, links, etc.

COLLABORATION IS REMIX PRODUCTION

Collaborative production occurs when individuals find others with similar interests and are able to create digital communities across vast distances. Individuals who possess network tools and literacy can engage in dialogue and reciprocal learning in online forums. Collaborative production in the Global Network can be described as remix production: where information is accessed, adapted, and then fed back into the network in an ongoing process.

> *Open source harnesses the distributive powers of the Internet, parcels the work out to thousands and uses their piecework to build a better whole[5].*

Producers participate in a variety of ways such as generating information, filtering content, designing distribution channels, and facilitating quality control.

The Global Network's online communities are powerful generators of information through what has been called *long tail and peer production*[6]. Long tail and peer production leverages the mass collaboration of thousands of people, composed mostly of single contributions. Clay Shirky, a prominent thinker on the social and economic effects of Internet technologies, has explained the "20-80" principle where 80 percent of contributions are single contributions from individuals driven by personal interest. This explains how certain niche communities possess such a powerful presence in the Global Network. Development and philanthropic communities can greatly benefit from ongoing peer production. The traditional image of development as one-way aid can be transformed into a dynamic community of unfolding collaboration[7].
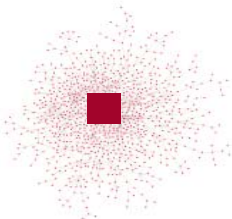
Fig. 2.8   Key Forum
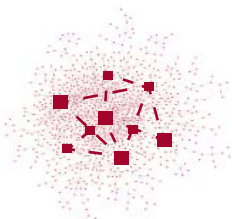
Remix production occurs in key forums and across similar-interest networks.

Key Forums

Key forums are sites that receive consistent online traffic and where visitors engage in remix production to create collaboratively generated content. Key forums emerge through natural selection. Visitors who enjoy the site, return often and recommend it to their friends. Sometimes, these forums reach a critical point where it becomes widely known throughout the Global Network. Many forums are opensource and their quality is maintained by a group of administrators. Opensource forums often utilize an organizational model that promotes administrators from a pool of regular contributors[8].

Fig. 2.9   Similar-Interest Network

Similar-Interest Networks

Similar-interest networks are comprised of many individual sites, linked across a variety of platforms, from personal blogs, to social networking accounts, to news articles, to online shops. Sites often embed content from other sources, taking part in a culture that encourages open sharing. Navigating across these networks can reveal a range of personal voices usually not covered by the mass media. Networks provide individuals with a global audience, creating the previously unheard possibilities for citizen-led journalism that range from book reviews in online marketplaces to on-site updates in disasters zones.

Examples of Global South Ingenuity

Fig. 2.10   Dual Sim hacks so that users can access multiple carriers and benefit from free carrier to carrier services.

Fig. 2.11   Mobile phone repairmen operate using a toothbrush and a wooden stool. They clean and combine working parts to build new cellphones.
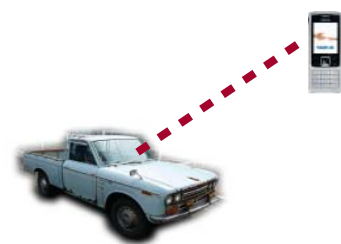
Fig. 2.12   18 year old self-taught inventor hacks a cell phone and a vehicles' electrical systems to create remote control of vehicle ignition and disablement.

2.3   LOCAL-GLOBAL COLLABORATIVE POTENTIAL

Puma's social capital is expressed in the dynamics of reciprocal learning, and open exchange that occurs in the spaces villagers claim through communal activity. In the Global Network, collaborative production occurs in forums and across similar-interest networks where individuals use production tools to access and generate content. Both Puma and the Global Network benefit from an environment of open inclusivity that results from a communal rapport built on trust and shared participatory ritual.

Fostering local-global collaboration involves empowering Puma with the capacity to participate in similar-interest networks and in engaging the global community to take part in a tangible development initiative specific to Puma's needs. Network-based collaborative potential is not what designers often fear, where shared vision dilutes or weakens the overall intent. Rather, collaborative potential enables individuals to adapt ideas to their own specific context from a large pool of resources, and then contribute their findings back to further enrich collective knowledge. This is the model by which Puma can become a partner in contemporary development: adaptations will be specific to context, interaction with outsiders will involve reciprocal learning, development will be defined by local voices, and villagers will be contributors to a global community.

The intervention to be illustrated in Part Three must leverage Puma's existing and emerging network technologies. Their inevitable participation in the Global Network calls for an initiation that fosters a genuine local-global partnership. Mazuko Ito, a cultural anthropologist who studies how digital media changes relationships, identities, and communities, states:

> *"Networked digital media is beginning to be taken for granted in everyday life. Although the nature of adoption varies widely by factors such as nation, region, class and gender, an increasing number of people are domesticating networked digital media for their ongoing business, for socialization and for cultural exchange"[9].*

The intervention must empower Puma with the ability to be critical practitioners. Local-Global potential can only be realized when the accessibility to tools and resources are combined with knowledgeable use, creating conditions where meaningful collaboration can occur. The following investigation will identify Puma's adaptation of new technologies to inform a thesis intervention that can activate the villagers' critical abilities.
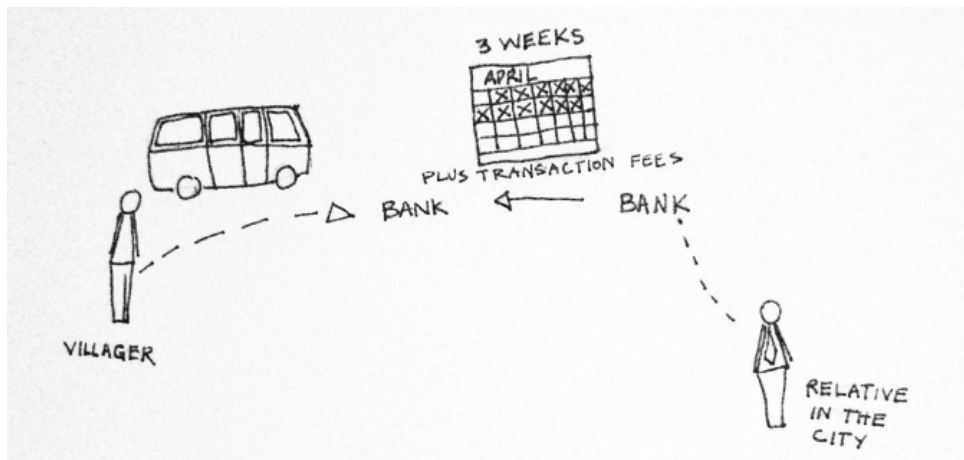
Previously

Now

Fig. 2.13 Remittances
Family members in city send money instantaneously to family members in village
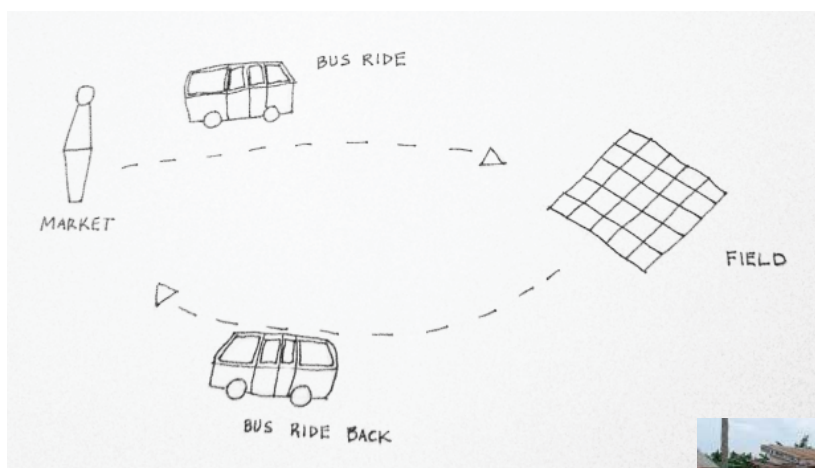

Previously

Now

Fig. 2.14 Market to Farm
Seller sends text home to farm to tell family members to bring more produce to sell in the city

Puma's Existing use of Network Technologies

In recent years, mobile phones have completely transformed the socioeconomic landscape of underdeveloped communities such as Puma. Mobile phones have permeated everyday routines: streamlining tasks and monetary applications. Affordable mobile services cater specifically to villagers with limited resources, creating new systems of exchange.

Villagers have adapted cheap text messaging and credit transfers that are instantaneously sent from phone to phone. They transformed these services into an informal banking system that use digital currency. The villagers are able to bypass the traditional banks that are located only in cities and requiring a minimum balance that many do not possess. The mobile phone industry has responded to their clients' adaptive use by enabling free credit transfers between users sharing the same provider. In turn, shops have responded by accepting mobile credits as payment.

This is an example of "leapfrogging", where contemporary technologies are implemented without the need to lay down the bulky infrastructures of the past[10]. Traditional phone lines required labor-intensive cable burying and have thus been historically expensive and unfeasible for geographically isolated villages. In contrast, cheap and portable mobile phones are durable and easy to transport. However, what emerges from leapfrogging – the adaptation of these new technologies – is unpredictable. Villagers claim ownership of technologies and adapt them to their own specific needs, whatever these needs may be. The contemporary approach in development is to take part in this bottom-up phenomenon: introduce accessible technologies to a community, watch it evolve in unexpected ways, and respond to emergent uses with more enabling services. The intervention must initiate this process through an insertion into Puma's everyday routine and await adaptation through ownership.

Fig. 2.15   Group Computer Use
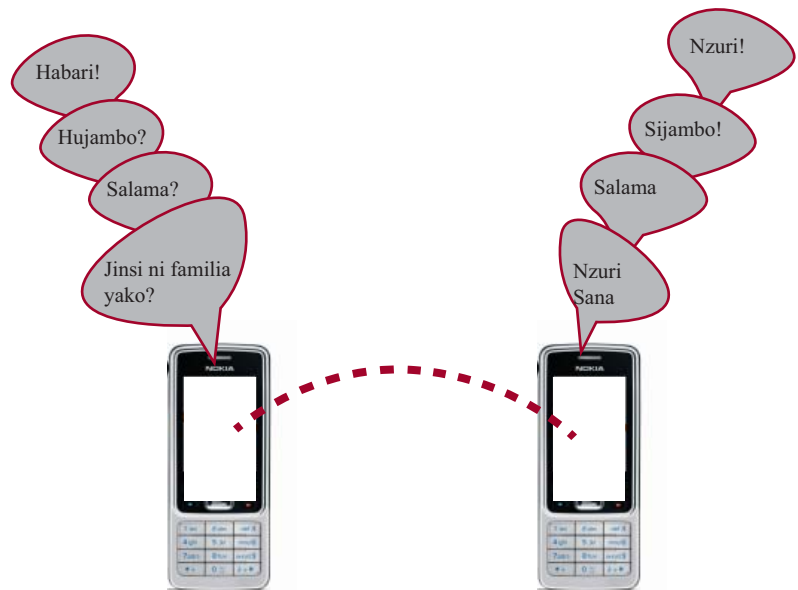
Fig. 2.16   Imitate and Elaborate

Puma's Contemporary Convivial Patterns

Puma has had a history of adapting new technologies as extensions of existing convivial patterns. Vernacular dialogue and reciprocal learning using "imitation and elaboration" is applied in back and forth text messaging. Short-hands are adapted to compress messages so that they contain less than 150 characters. What was once a primarily verbal based society has translated vernacular dialogue into simple and codified text.

In the case of Internet use, Puma's villagers often use computers in groups of three or four. In this way, villagers can comfortably gather around a single computer and benefit from the skills of the most experienced user. Working as a group also allows villagers to save money by sharing costs.

Puma's use of network technologies further proves that contemporary technologies will be adapted by communities in a way that aligns to existing cultural rituals. Shirky remarks:

> *"What matters here isn't technical capital, but social capital. These tools don't get socially interesting until they get technologically boring. It's not when shiny new tools emerge but when everybody is able to take them for granted. Because now the media is increasingly social, innovation can happen anywhere"*[11]

While there exists many impressive technological tools that claim to facilitate collaboration, the intervention will only apply the ones that villagers can easily adapt to their familiar social routines.

2.4   DISCONNECTED LOCAL-GLOBAL POTENTIAL

Puma's inaccessibility and network illiteracy are conditions that discourage potential local-global collaboration. Many outsiders are unaware of the limitations that prevent villagers from accessing Global Network resources. Puma's villagers are unable participate in online forums and outsiders are unable to identify Puma's needs and values. Online correspondence often suffers from inconsistent dialogue, caused by mistaken assumptions that continue to reinforce the lack of understanding between potential partners.

Inaccessibility

Participation in network collaboration is dependant on consistent access to web interfaces that facilitate the collaboration between like-minded individuals and communities. As villagers do not possess smartphones, Puma's access to these web interfaces lie only at Internet stations in Singida Town. Not only are these Internet stations unreliable, they are also out of the way of villagers' daily routines. Villagers have to make the extra effort to travel to Singida Town and wait in line at the cafes.

Singida's Internet cafes use old computers full of viruses that cause slow and unreliable service. Regular cleaning of computer systems require the presence of skilled staff, which many cafes lack. Singida Town often experiences electricity brownouts and overstressed internet infrastructures. Repairs to these infrastructures are million-dollar large-scale investments that have yet to be implemented. Computers often freeze or spontaneously reboot. As a result, villagers spend most of their time waiting for pages to load rather than accessing and generating information in forums or in similar-interest networks.

Network Illiteracy

Network illiteracy is the inability to orient oneself the Global Network's decentralized information cloud. Villagers do not have experience in identifying what is applicable, reliable, or proven. They lack practice in using personalization tools and have little time to communicate with network communities. Filtering and extracting feasible ideas requires practice, and inaccessibility continues to prevent villagers from gaining the necessary experience. Network literacy involves the ability to navigate the online interface; villagers have difficulty in familiarizing themselves with this new interface that is so vastly different from their physical world.

Unlike Puma's verbal-based society, network production is based on sophisticated documentation. Villagers are unaware of documentation standards. When attempting to try new ideas, villagers apply only what they remember. Printing documents is an expensive added cost and taking written notes is not a common practice. Villagers are thus unable to condense information from the Global Network in a productive manner. Likewise, when sharing personal opinions, villagers are unfamiliar with producing succinct and meaningful messages that can be informative to interested Global Network partners.

2.5   LESSONS FROM THE GLOBAL NETWORK

An exploration into the Global Network has revealed that collaboration is driven by empowered producers and facilitated by virtual spaces that accommodate collective exchange. The Global Network's collaborative spaces are reminiscent of Puma's temporary social spaces: they both emerge as a result of activity through informal and spontaneous interaction. These similarities suggest that creating an intersection for informal local and global activity can foster local-global collaboration.

There are a range of new tools and technologies that an outsider architect can implement to create a local-global interface. However, one must first consider the cultural differences that need to be addressed. Puma and the Global Network need to foster a relationship built on trust and common experience. Here, an outsider's point of view can be a valuable asset: she can identify familiar conditions and dynamics that are disregarded by local villagers but unique to global communities and leverage them to become catalysts for local-global dialogue, platforms for conflict resolution, and agents to build critical capacity.

Endnotes

1 Lessig, <http://www.ted.com/index.php/talks/larry_lessig_says_the_law_is_strangling_creativity.html> (accessed December 2007)

2 Ibid.

3 Thackera, 131

4 Ito, *Networked Publics*, 5.

5 Ibid.

6 Shirky, <http://www.ted.com/talks/clay_shirky_on_institutions_versus_collaboration.html> (accessed 5 August, 2009).

7 Fulton, <http://www.ted.com/talks/lang/eng/katherine_fulton_you_are_the_future_of_philanthropy.html> (accessed 25 June 2009).

8 Johnson, *Emergence*, 68.

9 Ito, 1.

10 *Worldchanging*, 292.

11 Shirky, <http://www.ted.com/talks/clay_shirky_how_cellphones_twitter_facebook_can_make_history.html> (accessed 19 June, 2009)

SECTION 3: INTERVENTION

3.1   ARCHITECTURE AS A TOOL FOR SOCIAL BUILDING

Sections One and Two have revealed that both Puma and the Global Network practice informal collaboration in spaces that absorb different practices and needs. The thesis intervention will align Puma's social and spatial patterns with the Global Network's productive potential to foster a partnership where each can exercise their unique abilities in a combined effort for development. The intervention will create an opportunity for these two communities to engage in reciprocal learning while building a relationship that can be leveraged in future initiatives.

Communities working in collaboration must possess a common understanding of each other to confront the incredible shifts that are taking place in today's contemporary age. Architecture can be the dialogic tool that negotiates emergent possibilities with existing traditions. Architect Giancarlo De Carlo writes:

> "*The main raison d'etre of human beings in this stage of their evolution is the destiny of making conscious transformations of their environment. It is precisely in dealing with the contradictions as these transformations develop that a role of architecture can emerge*"[1]

Dialogic architecture can foster a partnership between Puma and the Global Network through the use of a *building form* and the *building process.*

The *building form* can serve as a catalytic agent that stimulates collaborative interaction. The form can adapt vernacular architecture and introduce new ideas from the Global Network. A form that embodies local technologies and spatial use can empower the community with a confidence that their methods can be instruments for development. The introduction of feasible foreign building technologies can provide an opportunity for the outsider architect to gauge local reaction and learn from the villager's adaptations. Thackera summarizes this design approach:

> "*Rather than expect to design everything from scratch, we should search far and wide for tried and tested solutions that others have already created. We then need to reuse and recombine actors, ideas and organizations. We ought to create new combinations of knowledge, resources and capabilities. Putting old knowledge into a new context creates new knowledge*"[2]

The *building process* can be the means by which Puma and the Global Network confront their differences. The building process is inherently a practice that absorbs emergent conditions and resolves conflicting voices through the shared pursuit of a common goal. Participants engage in conversations that involve subtle nuances, gestures and inflections to build trust, shared experience, mutual respect, and common attitudes.

Shannon Criss, a practitioner of design-through-engagement, celebrates this approach:

> *"The very act of making something in this way places higher regard on the act itself. Learning to improvise and respond to the conditions and material at hand provides an important lesson. By slowing down and seeing the potential of a place and its people, we remake ourselves to fit the circumstances at hand; we approach our work in a different manner, and this can be enormously instructive"*[3]

| 1 | **Internet Station** | **Provides Puma with consistent access to the Internet**
- Opportunity to acquire network literacy, establish a critical online voice, and build a partnership with the Global Networked community. |
2	**Platform**	**Space for agricultural experimentation** - A place to practice critical adaptation, troubleshooting, reflection, planning, and expansion.
3	**Bulletin**	**Physical space to document building process** - A forum to document building costs to ensure project transparency. - A forum to document and share agricultural successes and failures. - A forum to record internet-use lessons, tips, and reminders.
4	**Project Webpage**	**Online space to document building process** - An online forum to document and share agricultural successes and failures - An online forum where the Global Networked Community can learn about Puma and share recommendations and suggestions - An online forum for local-global dialogue, reciprocal learning, and collaborative production - An online interface with which to practice network literacy that can be applied to other web tools and applications.
5	**Covered Roof**	**Protection and Human Comfort** - Protects computer equipment and villagers from wind and rain - Creates shade to encourage informal use of space.
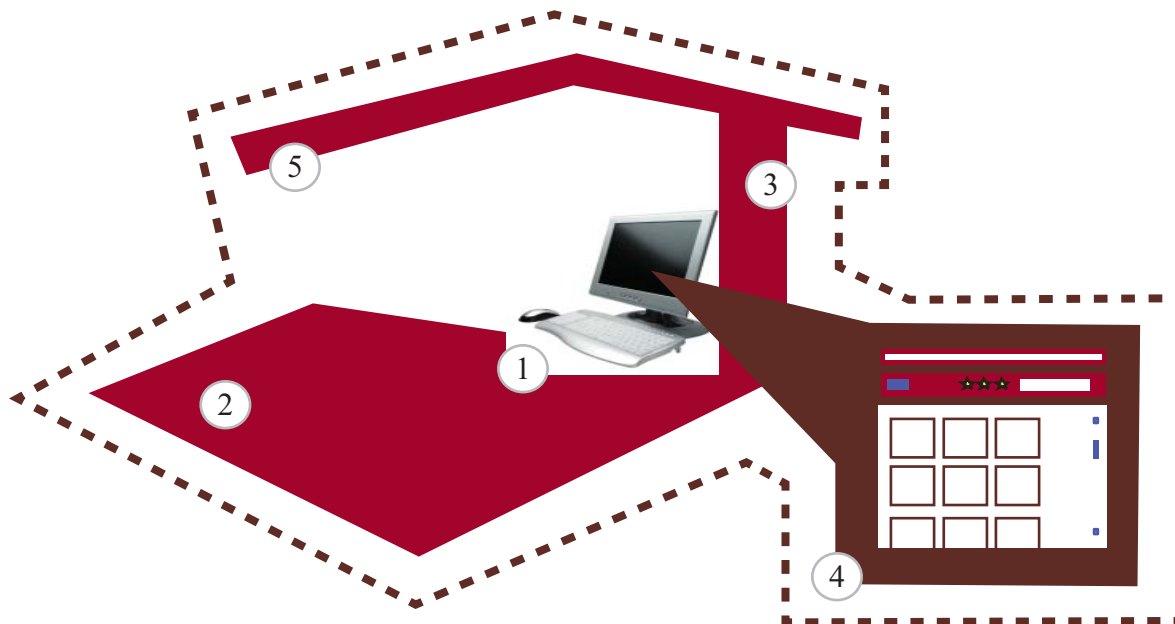
Fig. 3.1 Internet Station's components and their roles

3.2   DESIGN PROPOSAL: AN INTERNET STATION

The thesis proposes a design and a process of building an Internet Station which contains a platform for agricultural experimentation and interfaces for documentation. The process of constructing the Internet Station provides a clear purpose with a foreseeable tangible outcome, which will prevent participants from deviating from the main goal. New skills and resources that emerge from its completion can be applied in future development initiatives. The Internet Station will act as a common local-global space where villagers and the Global Network can engage in collaborative effort.

"It is within cooperative systems that personal fulfillment has the best chance of intersecting with broader social values and personal decision-making can achieve larger scale effects. It's groups, communities, and neighborhoods which have the capacity to investigate and invest in solutions."[4] – Robert Fabricant, 1 July 2009.

The intervention will focus on activating Puma's social capital, creating local Puma access to the Global Network, fostering the villager's network literacy, and producing agricultural experiments through local-global collaboration.

The Design

The design of the Internet Station acknowledges Ito's notion that *"technologies are embodiments of social and cultural structures that in turn get taken up in new ways by existing social groups and cultural categories"[5].* The design will encourage villager's adaptive use. The Internet Station will be inserted along a common path where villagers consistently congregate. New technologies will be implemented using Puma's existing infrastructures. A blackboard bulletin will act as a physical interface for local documentation. A Project Webpage will be a simple interface where villagers can practice local-global dialogue.

The design champions local skills, thus ensuring that Puma engages in local-global collaboration on their own terms. Muhammad Yunus, the grandfather of Mircocredit and an advocate for the empowerment of the poor, explains the need for enabling technologies:

"We need to design appropriate information technology devices and services for the poorest and most underprivileged members of society and make sure those devices and services get into the hands of those who need them. Information is power. If we guarantee that our most powerless citizens have access to wireless telephony, Internet service, global television and news services, and other emerging forms of information technology, we will quickly find these people becoming more effective advocates for their own rights and interests"[6].

3.3   ADAPTATIONS IN DESIGN

The thesis design is comprised of existing tools and processes that can be feasibly implemented in Puma. The following section will investigate these adaptations under the following categories: interfaces, agricultural techniques, and architectural precedents.

Adapt: Interfaces

Requirements:
1. To address Puma's limited accessibility to the global network, a physical interface must facilitate Internet access to be a part of the villagers' everyday routines.
2. To cultivate the villagers' network literacy. An online interface must contain standard tools with which villagers can practice and gain experience.
3. To encourage all villagers to participate in this development initiative, a physical interface must provide open access to ideas and the opportunity to contribute using familiar documentation tools.

These interfaces will align to Puma's existing infrastructures and skill set. They will be expandable or replaceable once new technologies and skills emerge.

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Failures of Other Systems

Rural Internet kiosks provide a variety of services to the poorest sections of society. However, due to limited electrical power, pervasive dust, mechanical wear-and-tear, and computer viruses, kiosk computers often fail, requiring frequent, expensive repairs. Similarly, network connectivity is often lost due to failures in the telephone system or loss of alignment of long-range wireless links. Faced with high costs and unreliable service delivery, customers quickly lose interest, and kiosk deployments are often found to be unsustainable in the long term (1).

Why KioskNet?

-Kiosk controllers are low-power and robust to power outages.

-The solution is rapidly deployable and easy to install.

-It is possible to remotely manage a kiosk, so a kiosk operator requires little or no IT expertise.

-KioskNet elements are protected from hackers and snooping kiosk owners.

-The system is low cost. System requires a capital expenditure of $100-$700/kiosk, depending on the configuration, and an operating expenditure of ~$70/kiosk/month. (includes the cost of field technicians and capital depreciation) This is four to ten times cheaper than other solutions.

-Only needs 250 ppl to use it per month (30 cents per month per person) to break even

-Using the same basic hardware, the system can be easily expanded to other villages
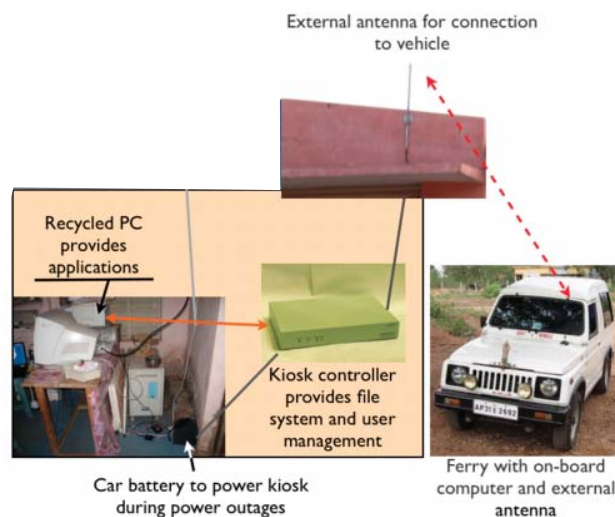


Fig. 3.2   How KioskNet works

Application in Puma
1. Business: Internet cafe owner in Singida Town invests in KioskNet. Existing daladalas become ferries. Internet Station in Puma becomes the Internet Cafe Owner's satelite shop. Puma villager is hired to run this satelite shop. Profits can be used to invest in additional computer equipment to set up another shop.
2. Maintenance: Purchase individual computer parts: monitor, CPU, keyboard, etc. Replace parts when they break down.
3. Service: Puma Internet Station can provide email, crop reports, medical info, and Project Webpage access


Singida Town
1/2hr daladala ride

Expansion
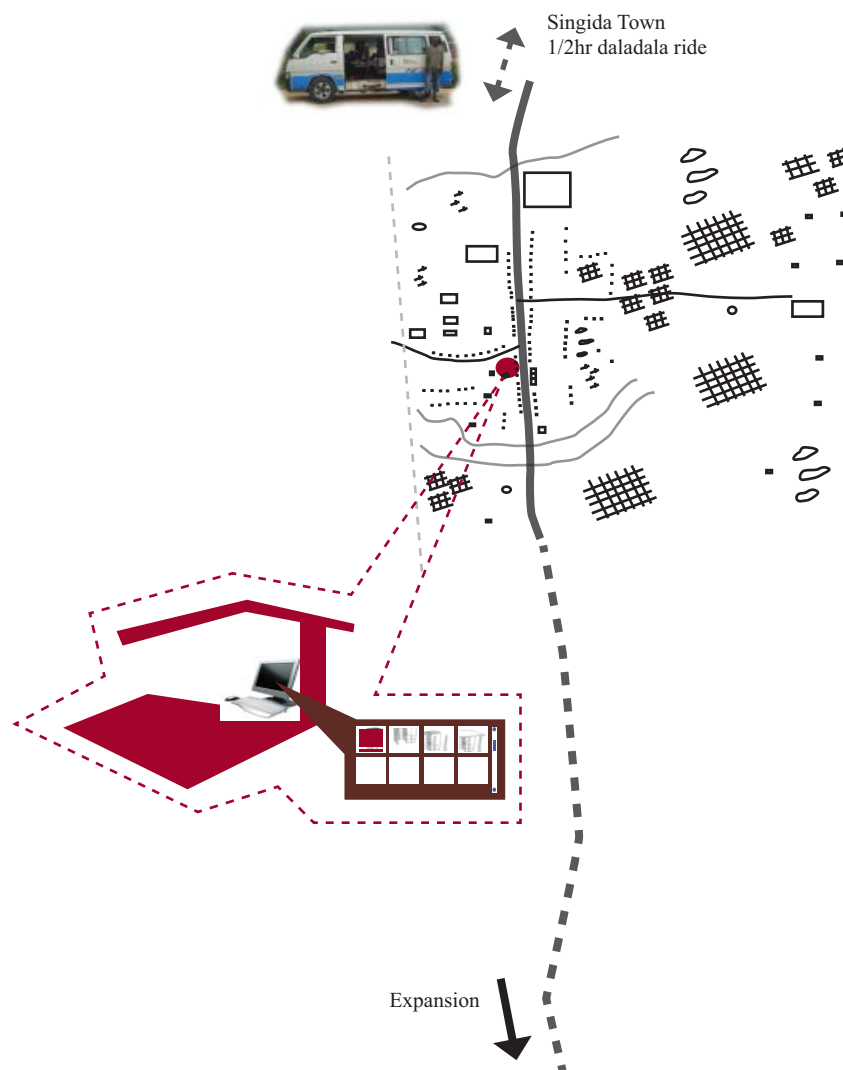
Fig. 3.3   Application of KioskNet in Puma

Purpose

Project Webpage will be a beginner's interface for villagers to learn basic network skills such as building a footprint, filtering and navigation. It is a page where villagers can document the process of construction to build a database of rural development information that can attract interested partners in the Global Networked Community.

Properties

Villagers can practice using an offline version of the Project Website that is stored on the computer's hard drive. Updates to the online Project Website are approximately every hour (depending on the daladala's frequency of visits to Singida Town).
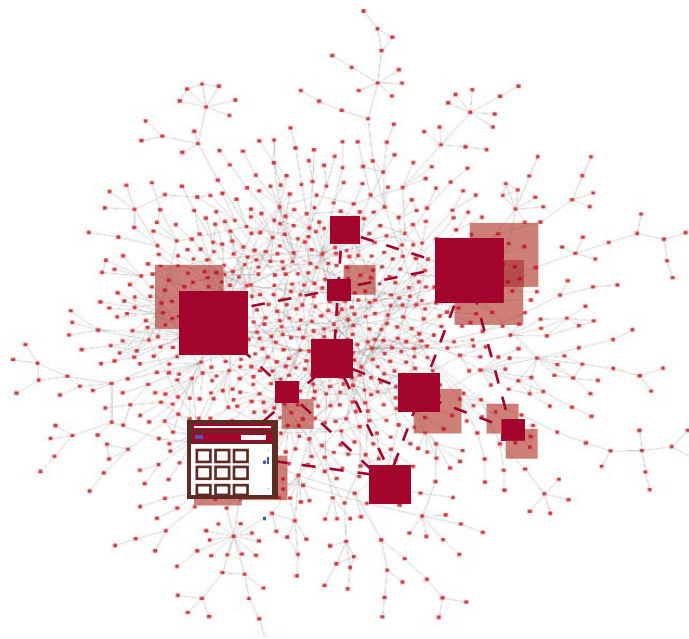

**Fig. 3.4   Puma's Webpage as part of a Similar-Interest Network**

1. Search and Ratings
Toolbar containing search fields, tags, ratings system, and links

2. Homepage
Main page is chronological matrix of entries

3. Entry
Each entry contains message thread of global queries and suggestions
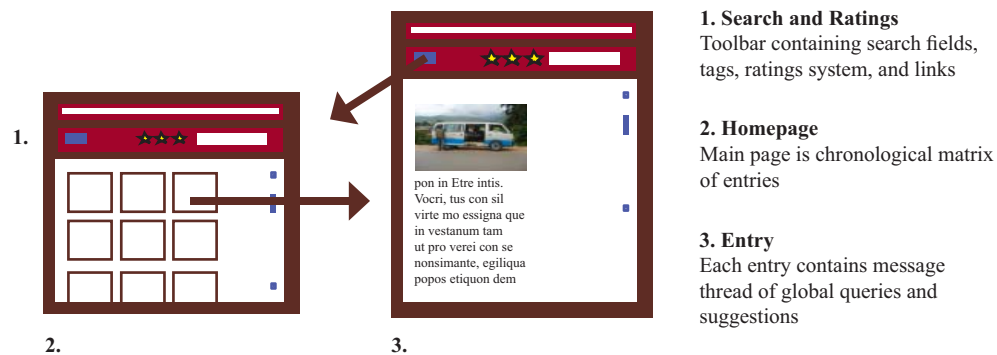
Fig. 3.5   Standard Tools

Purpose

Bulletins are visual markers of information and can encourage open accessibility when placed in a centralized location. Accessibility can not only ensure information transparency, but can also accommodate Puma's ritual of open and spontaneous resource sharing. Bulletins are interfaces where ideas can be contributed, visualized, and discussed in a communal setting. Villagers can practice using documentation as a tool for discourse and a develop a voice that can engage in dialogue with members of the Global Networked Community.
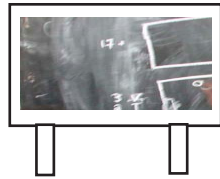
Fig. 3.6 Materials

1. Blackboard paint
2. Chalk
3. White Paint

These are materials that villagers are familiar with using. Cafes often update their menus on blackboards. Writing with chalk is a common practice that allows villagers to illustrate without needing to commit to permanent documentation. When there is a need to document consistent information, paint is used.

Habari!

Hujambo?

Salama?

Jinsi ni familia yako?

Nzuri!

Sijambo!

Salama

Nzuri Sana

Fig. 3.7 Method to Engage Reciprocal Learning

The thesis will apply Participatory Rural Appraisal (PRA) strategies. The outsider prepares a set of open-ended questions and invites villager response through drawing and storytelling. The outsider mediates to ensure that each villager has an opportunity to express his or her voice. The outsider also uses this process to empower community members by slowly stepping back to allow village leaderships to emerge.

Process of Reciprocal Learning

Fig. 3.8 Engagement

Draw using chalk

Fig. 3.9 Dialogue

Villagers add onto existing drawings: imitate and elaborate

Fig. 3.10 Critical Thinking

Hierarchy of ideas emerge

Fig. 3.11 Decision Making

Clear ideas are highlighted and made permanent in paint

Adapt: Agricultural Techniques

Requirements:
1. Proven sustainability in Puma's climate.
2. Can be implemented using Puma's limited infrastructures and resources.
3. Simple to construct, affordable, and expandable

The small garden is compact and thus easy to maintain to provide steady food source and income in communities with annual rainfalls and water collection from well. When the family finds success with the garden, can easily create more and adapt and improve from their own trial and errors

Simple to Use
"Most efficient use of land (comparing similar area plot)"
-the surrounding stones retain the rich soils and keep it safe from erosion
-the round shape retains moisture
- compact size, even small plots can be used for gardening
- raised beds enable the sick and elderly to help with the gardening work
- center in the middle is used for composting and reuse of greywater/nutrients

Fig. 3.12   Keyhole Garden

1.Attach a piece of string to the stake with a marker measured out and draw your inner circle.

2. Move the marker away from the stake along the piece of string and draw another circle on the ground. Mark out an access point to get into the centre of the garden

Outside Perimeter
the stones on the outside perimeter can start to be secured tightly, leaning a bit inward as the garden inside it gets higher.

Second and Third Level
Sticks, twigs and dry leaves. Less volatile compostable organic material can be added, or another level of the ash, aloe, and manure

First Level
Fill with kitchen scraps

First flat stones are piled randomly around the scraps to aerate the recycled meat and other organic material.

3. Build the raised bed. You could use rocks, bricks, sleepers or any other material that can retain the soil within the beds. The height required will be at least 1m (3' 3") so it will need to be constructed well enough to hold all that soil.

4. Top off with soil and plant leafy crops, root crops, vine crops, bulb crops . Trial and error has proven that in dry areas the section of onion crop works a good insect repellent. With the four-crop system rotation is key after each crop. Adding mulch is also a good recommendation.

Fig. 3.13   Keyhole Building Process

Effectively directs water to soil. Ability to collect water to fill the need, replacement and care of cheap parts

Studies show that drip irrigation reduces water use by 30-70% and increases yields by over 50%. There is improved crop quality, crop-per-drop efficiency for agricultural intensification, and cultivation of high-value marketable crops (1).

Development of a hanging plastic water storage bag further lowered the cost to about $5 for a household garden kit covering 215 square feet. In fact, any plot under one acre can benefit from these systems, but their modular design allows for expansion above that. They provide water savings of 30–70 percent, greatly reduce labor, and accurately deliver fertilizers. This makes cultivation during the dry season possible, with resulting yield increases of up to 30 percent. (2)

Fig. 3.14   Drip Irrigation System

Reservoir
Water flows from a reservoir (bucket, drum, or bag) to a pipe system at the required pressure

Control
Valves (taps) in the pipe system control the flow and the pressure

Emmitters/Drippers
these devices control the water flow from he laterals to the plants

Main line and laterals
These connect the reservoir to the emitters in the field. the lateral may be a porous pipe or have multiple outlet distributors (emitters)

Small drip systems have several characteristics in common: low pressure ranges from 0.5 to 4m; simple filters to prevent particles entering the laterals; and main and lateral pipes designed to be movable.

Although water must be brought and tipped into a bucket or drum, small quantities of water can irrigate a large area. Assuming a crop water requirement of 5mm/day, one 200 litre drum can irrigate an area of 100m2. It is possible to increase the area by using a number of buckets and drums.

**Fig. 3.15   Drip Irrigation Operation Diagram**

Effectively collects water from metal roof and enables people to manage their own water supply. This provides the luxury of "water without walking", relieving the burden of water carrying, particularly for women and children.

Roof rainwater is usually of good quality and does not require treatment before consumption. The most important thing to ensure water quality is a good lid, keeping out light and insects, and a filter, keeping out all kinds of dirt. (1)

Fig. 3.16   Expandable Cistern
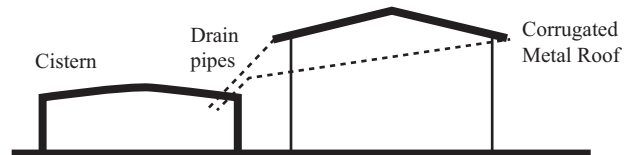
Fig. 3.22   Maintenance
Flush roof during first rain, filter tank, repair leaks

Possible Construction

Fig. 3.17   Villagers applying cement mixture to mesh

Fig. 3.18   Volunteers experimenting with cistern construction using plastic bottles in rural Oaxaca, Mexico

Ferrocement is a versatile construction technique that uses readily available and affordable materials to build structures such as water cisterns. Users form a wire mesh into a cylindrical shape and then cover the mesh with a mixture of cement & sand. Ferrocement water cisterns are much cheaper than pre-fabricated plastic tanks and the technique is easy to learn and replicate. Household water cisterns are designed to collect and store rainwater. (1)

The classical technique is to start with building a cage of steel reinforcement bars, covered with chicken wire mesh. An alternative is to start with an inner form of metal sheets, which is later removed. Or, for smaller tanks, a sack filled with sand is used. Once this structure is established, a cement mixture is applied. As ferrocement is much stronger than masonry, the thickness of the walls is in the range of 10-30mm. During curing (at least 10 days, although 30 is better) the cement is kept wet and wrapped in plastic sheet. (2)

Recycled Materials
An innovative construction technique that reuses plastic soda bottles as \"bricks\" for building up the cylindrical wall of a water cistern. The women and children in the community recovered over 4,000 used bottles, filled them up with sand, and then participated in the construction process. The cistern was designed to collect rainwater from the roof and can be built in 3 weeks (1)

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Adapt: Architectural Precedents

Requirements:
1. Champion vernacular building technique and forms.
2. Encourage villagers' informal use of space
3. Introduce new ideas that can be easily adapted into existing building practices.

Materials drop off alongside road

Earth from building site to be used in construction
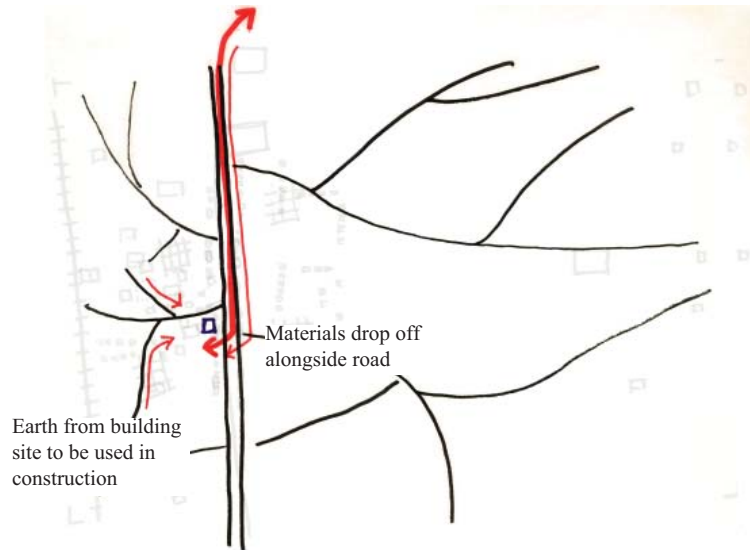
Fig. 3.19   Delivery and Drop Off

Cement

Rebar

Corrugated sheeting

Wooden Planks

Wood panels

Fig. 3.20   Building material available in Singida town

Fig. 3.21   Daladala Transport

Large materials strapped to dadadala's roof. Compact materials wedged under seats and between passengers.
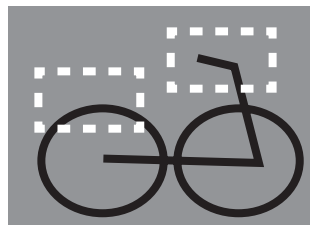
Fig. 3.22   Bicycle Transport

Materials slung over handlebars and strapped to rack

Fig. 3.23   Human Transport

Materials carried on top of head

Fig. 3.24   Temporary Stalls

Simple Assembly and Maintenance. Materials can be recycled into a new build
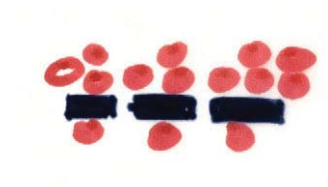
Fig. 3.25   Immediate Social Activity

Temporary structures are a quick and effective way to stimulate villager interaction and create temporary social spaces.

cement bags　　spare cement bricks　　corrugated sheeting　　wooden struts　　wood panels

Fig. 3.26   Use cheap and accessible materials

Fig. 3.27   Traditional Home

Step 1: Village men come together to collect and dig the foundation piles and erect the main support.
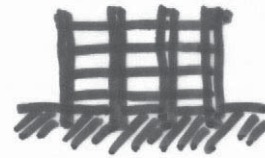
Step 2: Male youths collect the secondary members and strut them to the main structure

Stage 1: one room house and yard

Stage 2: family grows and additional room is built adjacent or parallel
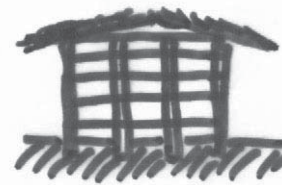
Step 3: Thatch and mud fills the walls and forms the roof

Stage 3: family grows and additional room is built around to form courtyard

During Build: women work together to prepare food and drink

Fig. 3.28   Traditional Home uses an expandable model
Typology is a result of accessible resources, labor capacity and performance requirements. Precious logs are cut from nearby trees. Walls are filled with thatch and mud to create a cool dark space that keeps out the intense heat. The flat or slightly pitched roof is used to spread out cereals to dry. An enclosed yard is used an outdoor cooking space and to contain livestock at night

Build Concludes: community wide celebration with food and drink and grains gifted to the new homeowners

Fig. 3.29 Building Process

ADAPT: MODERN BUILDING PROCESS & STANDARD FUNDI BUILDING TYPOLOGY

ARCHITECTURAL PRECEDENT

Fig. 3.30 Modern building in process of construction

Fundi Incremental Building Process

Fundi's are local professional builders who apprentice with experienced builders and learn a standard set of building typologies

Standard fundi buildings are desired because they are more durable than traditional mud and thatch buildings. However, they cost more. Villagers build each stage as income allows. Many unfinished structures sit idle awaiting adequate funding. Often, villagers save money by forming their own bricks and erecting their own walls. They hire fundi's to do more difficult tasks such as foundation pouring and roof construction.
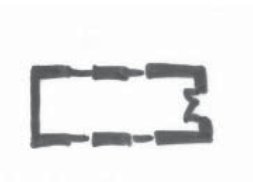
Fig. 3.31
House of worship: long building to accomodate two aisles and an alter

Fig 3.32
School buildings: arranged around a courtyard

Fig. 3.33
Health dispensaries: two separate entrances, one for sickness, the other for maternity

Standard Forms

Standard forms allow fundi's to build without needing to consult drawings. Based on the increment of the standard cement brick, fundi's acquire a building repetoire of these standard forms during apprenticeship.

Step 1: dig foundation

Step 2: cement bricks are formed

Step 3: build the walls

Step 4: large stones are broken into smaller pieces to be used in concrete lintel

Step 5: concrete is poured into wooden forms and rebars are inserted

Step 6: wooden truss system is formed

Step 7: corrugated tiles are installed

Fig. 3.34 Building Process

Accessed from Opensource Open Architecture Network's
"Burkina Faso Primary School Project"

New roofing technology can expand
Fundi's building repertoire. The rebar
roof structure provides another option for
roof framing: rebar is more easy to access
and transport than wooden trusses. Rebar
construction also facilitates long spans.
Rebar roof follows vernacular fundi
building technique in which frame is built
into place without the use of cranes.

Fig. 3.35   Burkina Faso Primary School

Fig. 3.36   Rebar Structure close-up

Fig. 3.37   Welding rebars in place

Fig. 3.38   Installing Corrugated Roof

Accessed from Opensource Open Architecture Network
"Ugandan Rural Classroom"

False ceiling can provide thermal
comfort and can also be applied to act
as a light shelf. False roof can be fitted
onto existing buildings, all of which
use corrugated metal roofing material.
False roof uses passive energy and sound
dampening materials to eliminate noise
and heat usually associating with metal
roofing.
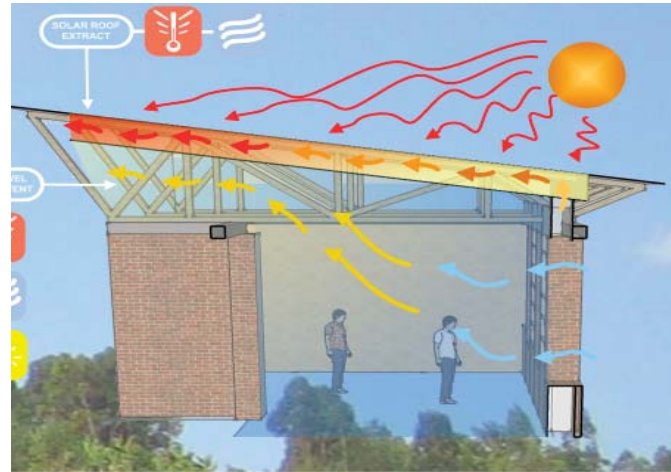
Fig. 3.39   Passive Energy
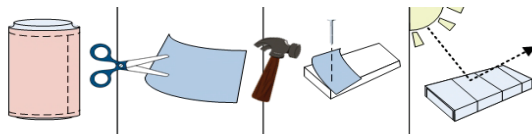
Fig. 3.40   Materials
Everyday materials such as aluminum cans, hammer,
maize husks, banana leaves
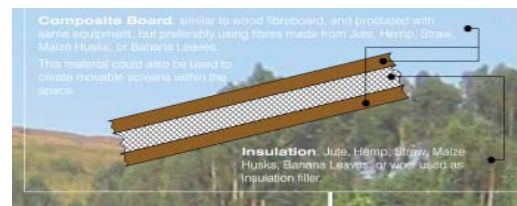
Fig. 3.41   Construction
Easy construction means that villagers can learn to
construct and install and apply in own homes

Puma's buildings are comprised of four elements: a raised platform that creates protection flooding during the rainy season, steps that provide access to platform, a roof to keep out the rain, and walls that keep the interior cool. Villagers adapt these simple building elements to create human comfort during moments of social interaction.

Fig. 3.42   Platform and Steps
Acts an podium seating. A comfortable place to commune

Fig. 3.43   Roof
Any available sheltered space. Valued for its ability to keep out the glaring sun
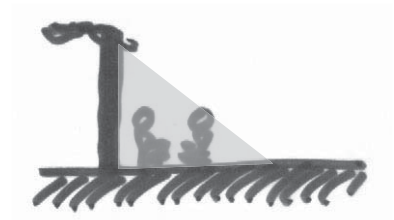
Fig. 3.44   Wall
Villagers re-orient their position when doing outdoor chores. Work in shade

Social gathering occurs in informal spaces in small groups. These groups are formed by the spontaneous convergence of villagers engaging in similar tasks and the number of people that a space can comfortably accommodate. Small groups allow each villager to properly represent themselves in a dialogue. When there more than fifteen people in an informal gathering, weaker voices are drowned out.

Fig. 3.45 Homestead: 3-5 women work together to do household chores in their yard

Fig. 3.46 Health Dispensary: 3-5 individuals wait outside for nurse

Fig. 3.47 Walking Paths: 3-5 people walk together to amenities

Fig. 3.48 Cafes: 10-15 people congregate outside cafes, 7-10 people can fit inside cafe
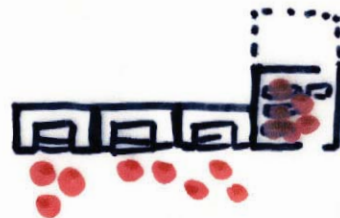
Fig. 3.49 Shops: 3-5 people can congregate near shop seller at one time. 5-10 people can fit inside larger stores at one time
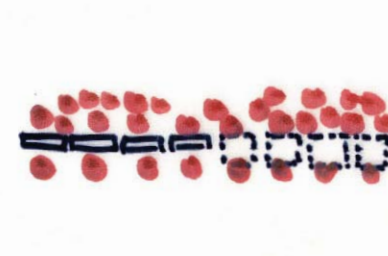
Fig. 3.50 Market: 3-5 people can congregate near a seller at one time. Number of people at market depends on quality and quantity of products that day

1970 Tarmac Road is Planned
In an established dirt caravan route

1990 Electricity Reaches Puma
Homes along cafe and roadsides gain easy access to new electrical line

2005 Ditches are Dug and Setbacks are Established
Ditches will act as drainage system. Setback for buildings ensures safety during road construction

2005 "Bridges" are built
Wooden planks serve as make-shift bridges and are the only way to cross the ditches

2008 Informal Structures Emerge and Tarmac Road is Complete
Temporary structures and informal stalls are set up in front of shops to capitalize on human traffic

2009 Build Concrete Bridges
Safe and secure crossing of drainage ditch

2010 Proposal:
Build Internet Station

Fig. 3.51 Evolution of the Tarmac Road

BUILDING STRATEGY

Purpose   Use the process of building an Internet Station to engage villagers, the outsider architect, and the Global Networked Community in dialogue, reciprocal learning, collaborative production. Use the building process to create the foundation for a local-global partnership that can be leveraged in future development initiatives.

Strategy   1. A four stage building process during the six months of Puma's dry season
    a. Contrary to conventional building practices where a site is dormant during the months of construction, the intervention will activate the site and engage community participation from the start
    b. Each successive stage will build upon and reinforce what is learned from the one before it.
    c. Collaborative agricultural experimentation will become a direct extension of building construction.
2. Document building process and update bulletins and Project Webpage
    a. Engage villagers using "imitation and elaboration" to teach documentation and network literacy skills
    b. Maintain the bulletins and the Project Webpage during the initial stages of the intervention. Slowly remove oneself from the managerial role and encourage local leadership to take up the responsibilities
    c. Mediate the Global Networked Community's online contributions to ensure that suggestions are feasible and applicable to Puma. Work with villagers to help explain Puma's limitations and emergent possibilities to the online community.

Expected Outcomes   1. Villagers and outsider architect will incrementally acquire new skills from each other, develop trust, and share common experiences.
2. Villagers will gain confidence in expressing their own personal voices
3. Villagers will gain experience in engaging local-global dialogue.
The Global Network will gain a deeper understanding of development possibilities in Puma

Deliverables   1. A physical building that can facilitate local collaborative effort and local-global reciprocal learning.
2. Successful adaptation of agricultural ideas specific to Puma's needs

Indicators of Success 1. Villager interest and participation
2. Collaborative problem solving of emergent challenges

Intervention Site

The intervention will be inserted next to a mobile phone kiosk located along the tarmac road, utilizing existing resources and engaging the many villagers who congregate there on a daily basis. The intervention will initiate the next chapter in the evolution of Puma's enabling infrastructures.

STAGE 1: INSERT TEMPORARY KIOSK

This first stage will establish Internet access as part of the villagers' everyday routines. A temporary Internet kiosk will be inserted next to the mobile phone kiosk, which villagers regularly visit to charge their phones and purchase phone credits. The kiosk will be designed to not only protect computer equipment from wind and dust, but to also activate the site as a place for consistent local-global dialogue and collaboration.
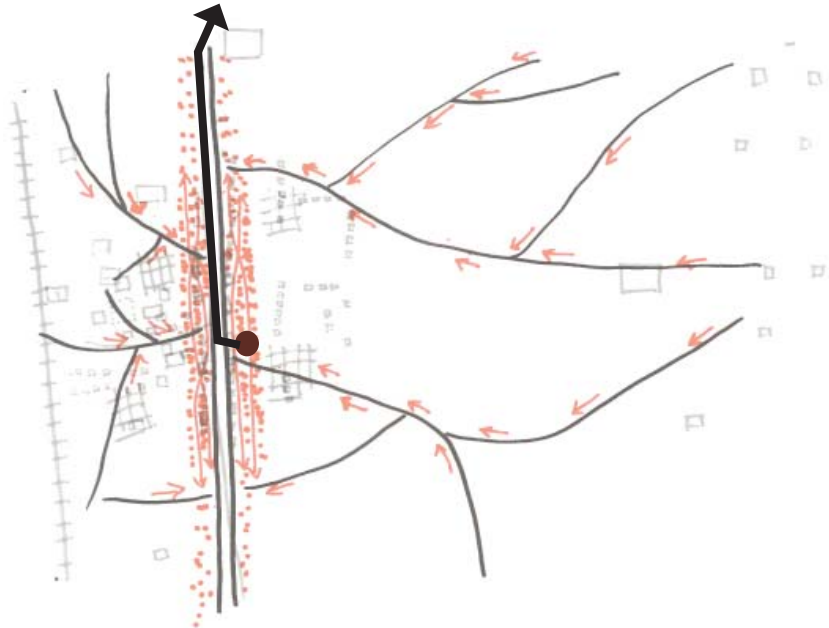
Fig. 3.52   Existing Internet Access
Villagers must invest time and money to travel to Singida Town's Internet cafes
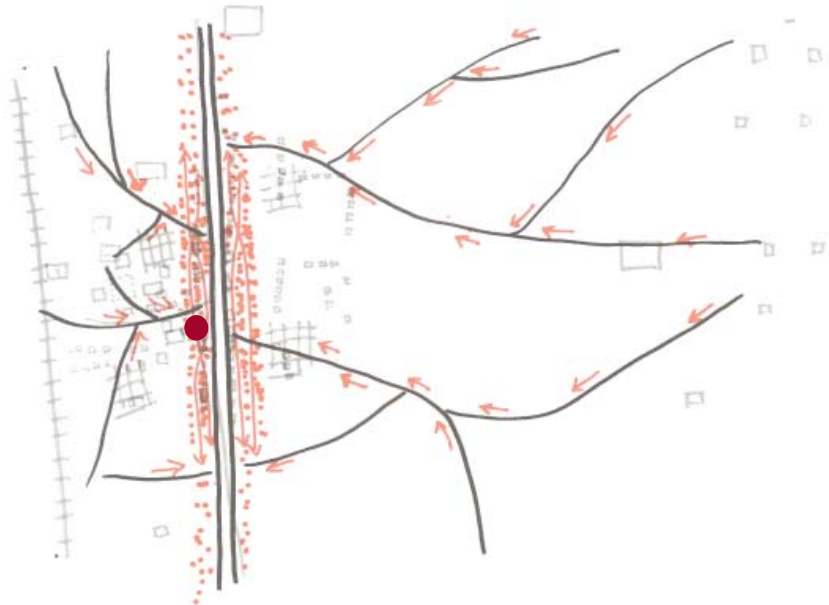
Fig. 3.53   Inserting a Temporary Internet Kiosk
The Temporary Kiosk creates a consistent Internet access within Puma

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The design of the Temporary Kiosk is an adaptation of existing temporary stalls that can be quickly constructed in a single day. The Temporary Kiosk will be an add-on to the mobile phone kiosk and utilize its electrical infrastructure. The mobile kiosk operator who is a local villager will run the Internet kiosk, increasing his potential for earnings and ensuring the security of the computer equipment by taking it home at night.

The Temporary Kiosk will be built in partnership between the kiosk operator and the outsider architect. The kiosk operator will recognize the familiar design and will be able to teach the architect how to improve the construction based on his experience of comfort and his knowledge of vernacular building technique.
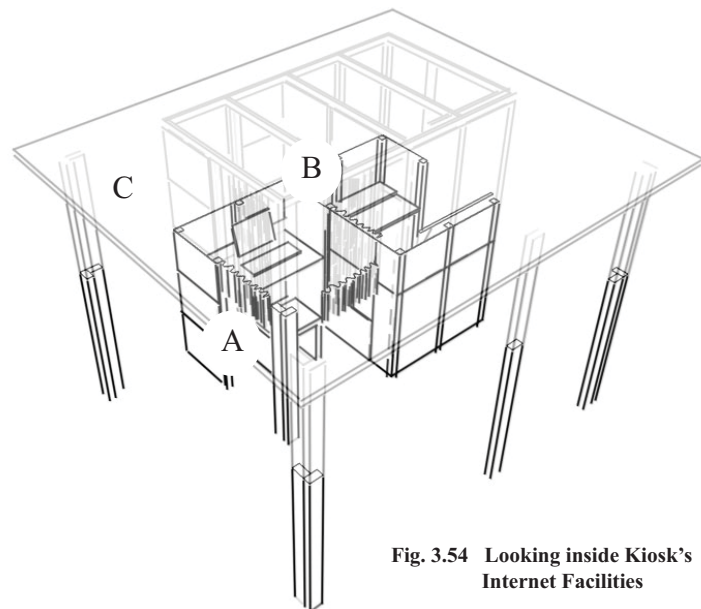
**Fig. 3.54   Looking inside Kiosk's
Internet Facilities**

Design

A.   **Curtains.** Close curtains for
     Private internet use. Open curtains for
     group interent use
B   **CPU** in a locked box to prevent theft
C   **Covered space** to shade curious
     onlookers and eliminate monitor glare
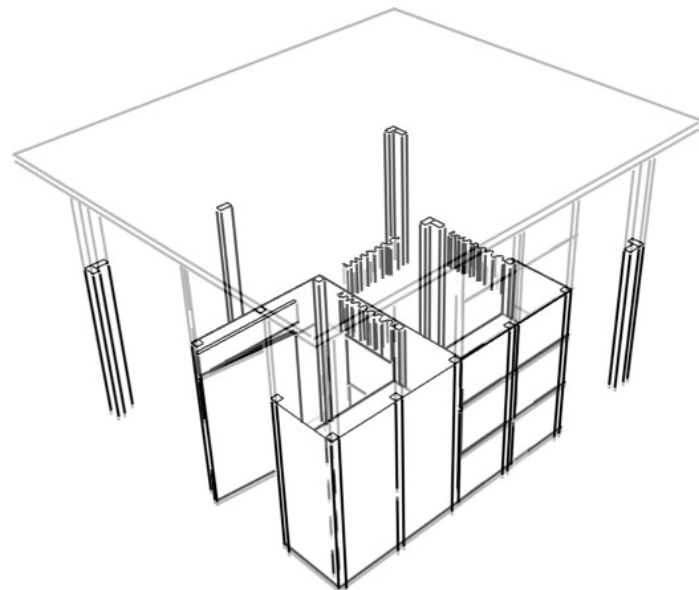
**Fig. 3.55   Looking at Kiosk's
Bulletin Wall**
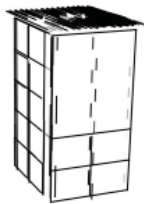
Step 1: Tear boards off one wall
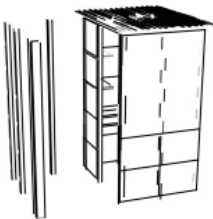
Step 2: Mark out location and stake 2x4s into ground

Step 3: Nail in wood panels
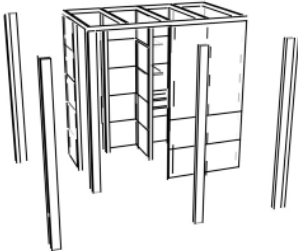
Step 4: Mark out location and stake 2x4s into ground and reinforce
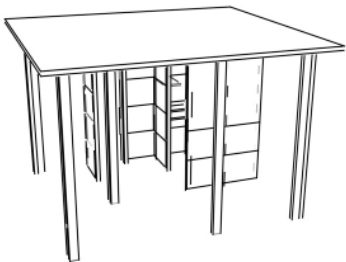
Step 5:Frame roof and install corrugated sheeting
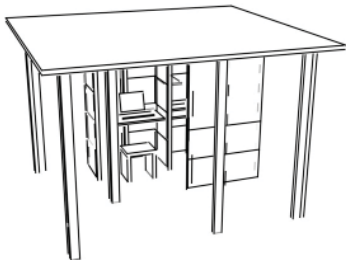
Step 6: Install curtains made from cement bags, Install desk and lock box, plug in computer to existing electrical outlet in mobile phone kiosk
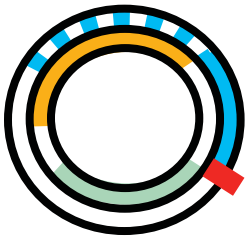
Fig. 3.56   Building Timeline
Build during the beginning of the dry season

Fig. 3.57   Building Process

The building process will engage the kiosk operator, the outsider architect, curious villagers, and interested individuals in the Global Network. Villagers will witness how an outsider willingly desires to learn from a member of their own community. Modifications to the kiosk design will help the outsider understand local values. As part of the reciprocal learning process, the outsider architect will show the kiosk operator how to document the construction process in a way that is succinct, revealing, and informative to members of the Global Networked Community. The outsider architect will also show the kiosk operator how to upload his documentation to the Project Website. This website will become an online forum where villagers can showcase their skills and values in the Global Network.

Outsider
Architect
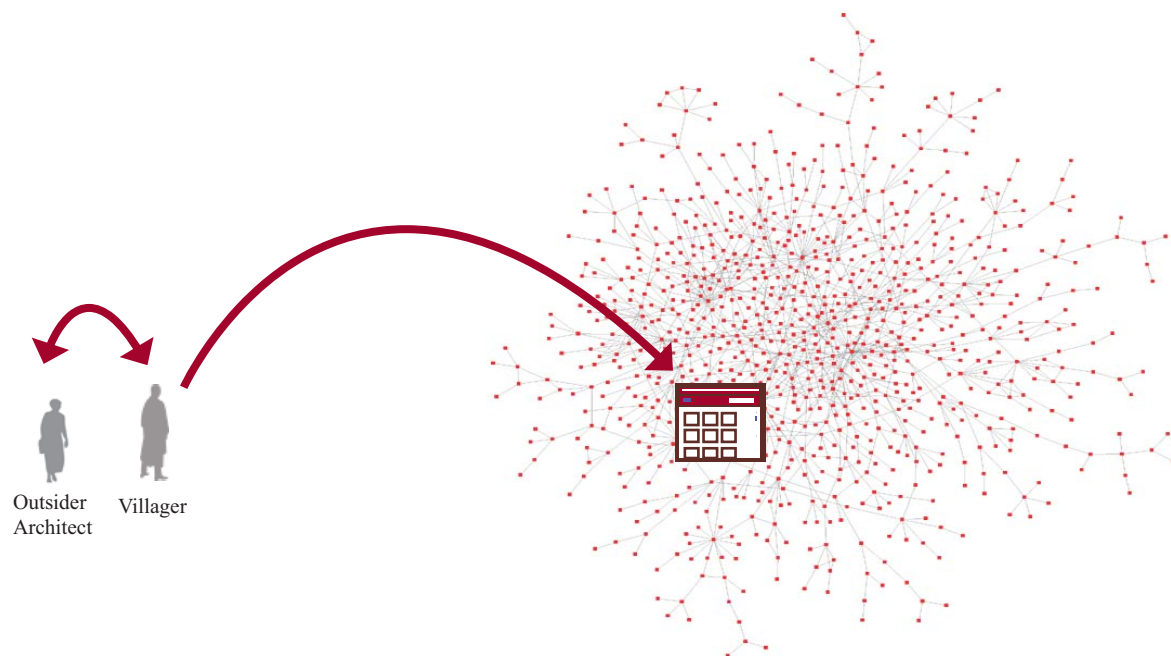
Villager

Fig. 3.58   Initial Interaction

The design of the Temporary Kiosk is informed by an understanding of local Internet use. Villagers like to use the Internet as a group and need visual guides to help them navigate the virtual interface. The Temporary Kiosk is designed with roof that can comfortably shade group computer users and encourage curious onlookers to take a peak. The walls of the kiosk are covered in blackboard paint, which allows the outsider architect to diagram answers to reoccurring questions of Intenet use. The Temporary Kiosk will become an social space where villagers gather for Internet access and lessons in network literacy.
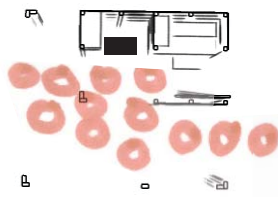
Fig. 3.59   Spatial Activation
Villagers congregate around computer and blackboards
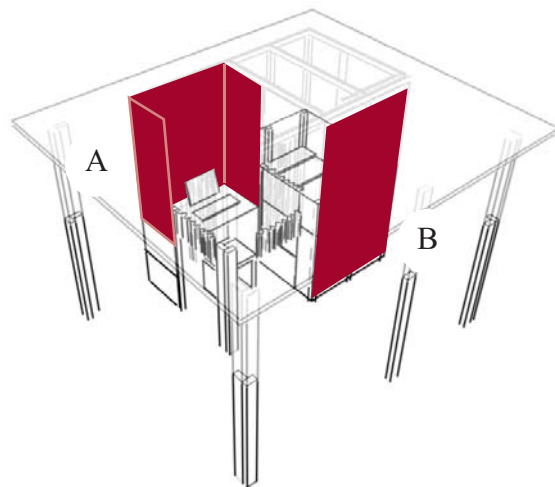
Fig. 3.60   Bulletins for Internet Lessons

STAGE 2: INSERT PERMANENT INTERNET STATION

Stage 2 will leverage the existing social activity and interest around the Temporary Kiosk by building a Permanent Kiosk that can be used all year-round. The Permanent Kiosk will need to provide additional space for the increasing number of interested villagers and protect the computer equipment from rain. The Permanent Kiosk will be placed adjacent to the temporary one so that Internet use remains uninterrupted during construction.
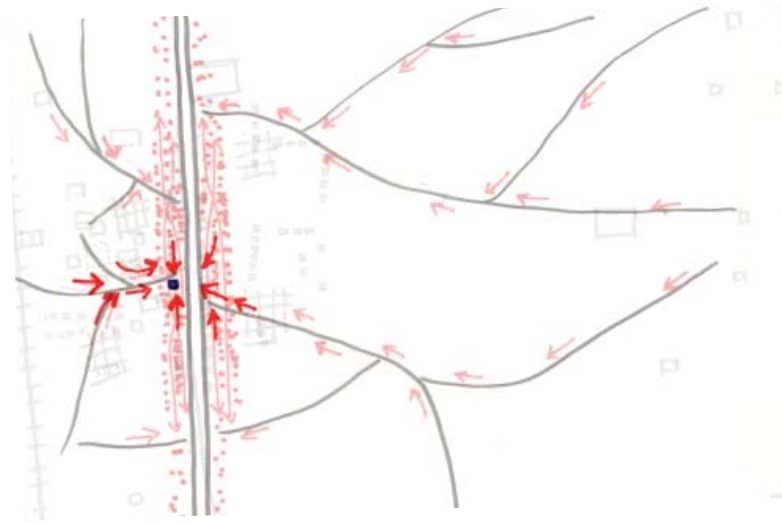
Fig 3.61   Puma's Consistent Internet Access Point

Fig. 3.62   Permanent Internet Station to be placed adjacent to the Temporary Kiosk

The design of the Permanent Internet Station is adapted from standard Fundi building forms and introduces new roofing technologies that can expand Puma's building vocabulary. Part of the design replicates the Temporary Kiosk layout in brick, the rest boasts an extended space that encourages informal social interaction.

The Permanent Internet Station will be built by villagers who possess various skills. Similar to housing construction, less experienced villagers will be hired to do simple tasks such as brick making and wall construction. Professional Fundi will be hired to oversee construction, lay the foundation, and build the roof. The outsider architect will take part in the construction alongside the villagers. Based on their knowledge and experience, Fundi can recommend variations in the dimensions of the design to improve efficiency in construction.
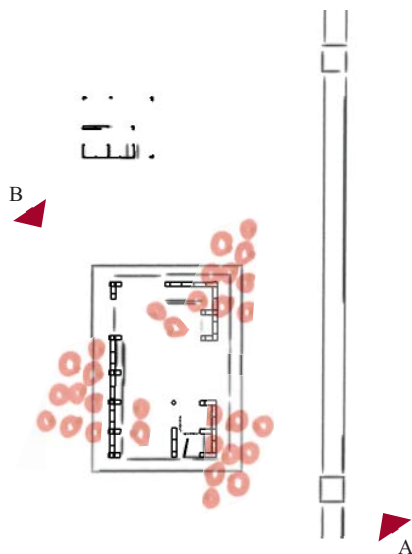
Fig. 3.64   View A

**Fig. 3.63   Design encourages
informal communal
interaction**

Design

1. **Seats**
2. **Steps** for villagers to use as informal seating
3. **Blackboard**

Fig. 3.65   View B

Step 7: Install False Ceiling underneath

Step 6: Tile Corrugated Sheeting

Step 5: Install Rebar Roof Structure

Step 4: Install Lintels

Step 3: Erect Walls

Step 2: Pour Concrete Pad

Step 1: Dig Foundation
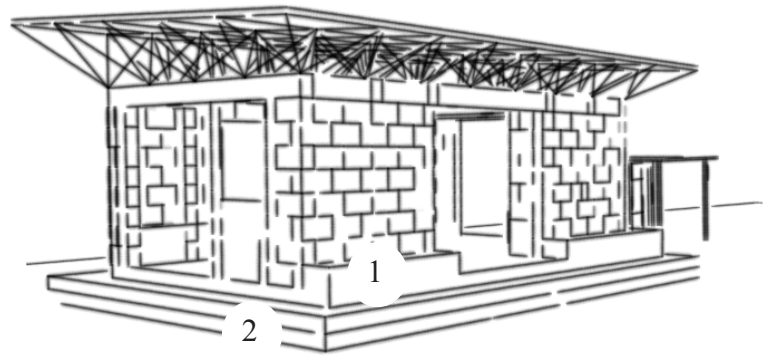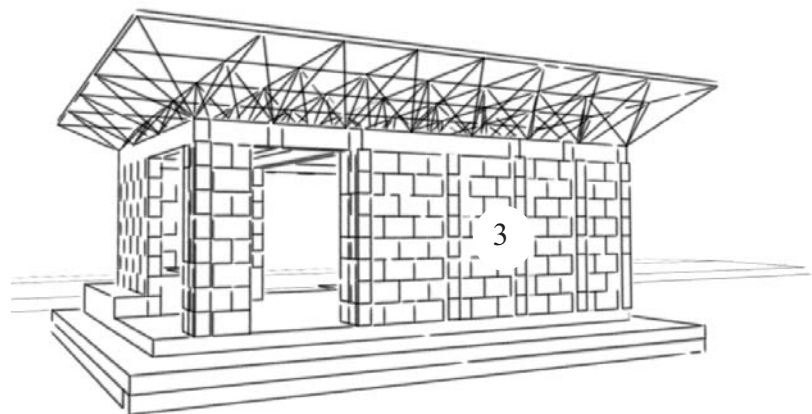
Fig. 3.66 Building Timeline
Three Month Building Process
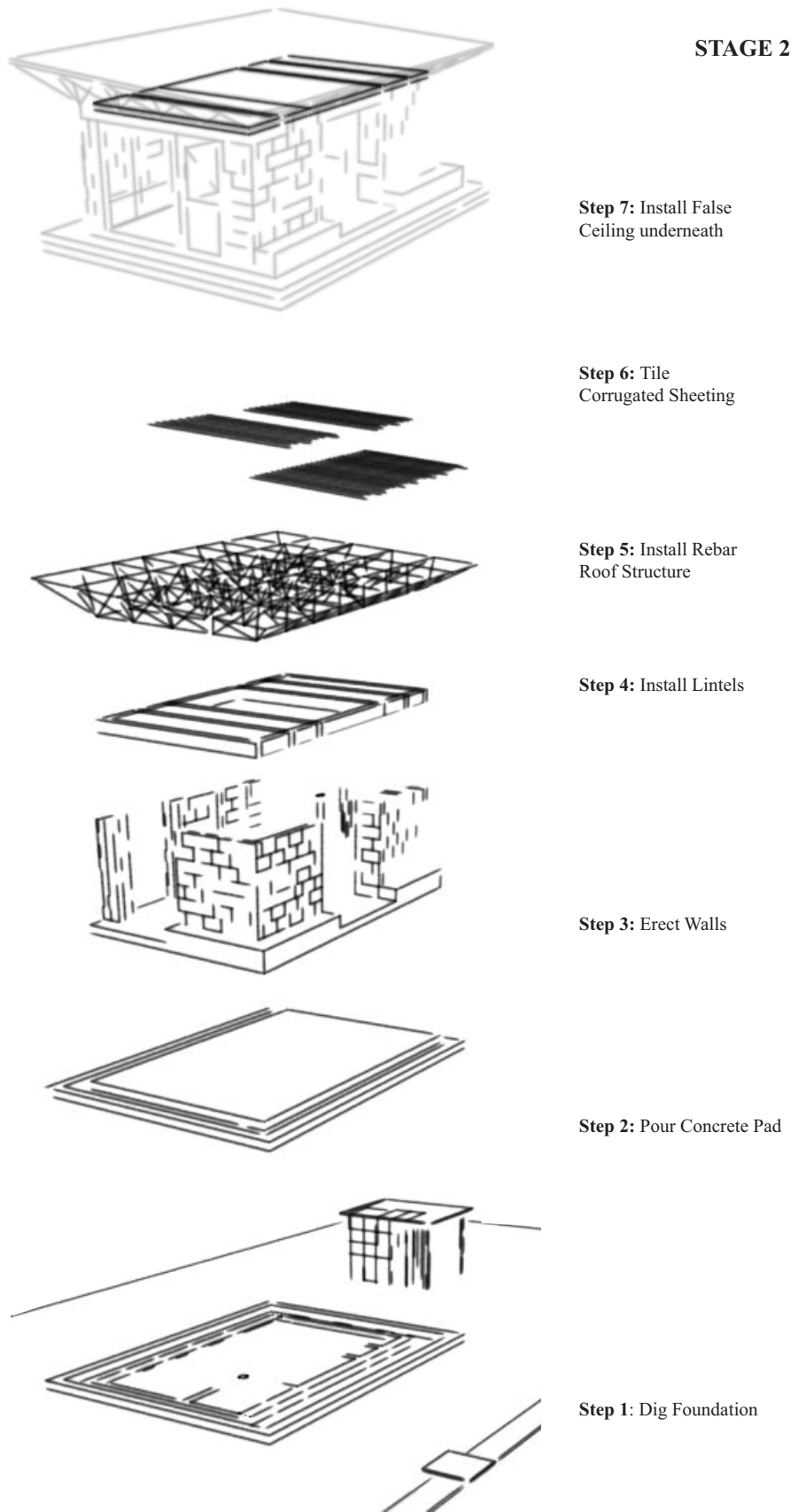
Fig. 3.67 Building Process

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The building process will engage hired village builders, the outsider architect, curious villagers, and interested individuals in the Global Network. During the three months of construction, the villagers will work alongside an outsider who is interested in learning and applying local skills. The outsider architect and the kiosk operator will show villagers how to document the building process and upload the documentation onto the Project Website. In the afternoon, when it is too hot to work in construction, the outsider architect will continue to teach basic computer skills in the Temporary Kiosk. Over time, villagers will develop network literacy and familiarity with documentation.

Through the series of the villagers' documentations, the global community will gain a further understanding of Puma's strengths, potentials, and weaknesses. This may lead to the contribution of helpful links, resources, and contacts. Interested individuals can recommend the Project Website to friends to increase Puma's web presence.
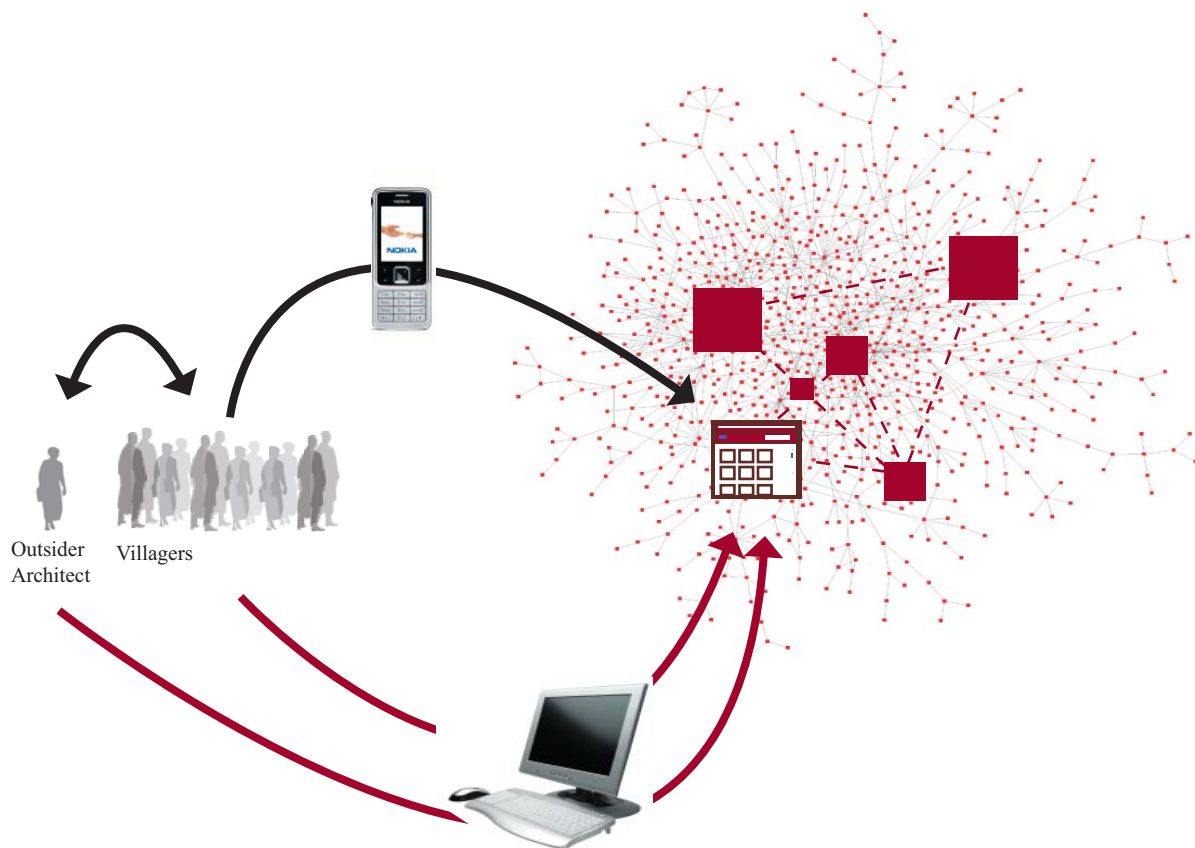
Fig. 3.68 Emerging Local-Global Interaction

The design of the Permanent Kiosk is derived from an understanding that the zones flanking the tarmac road are used for both circulation and temporary spaces for gathering. The design facilitates both pathways and informal gathering, creating shaded spaces that provide relief from the hot sun.

The outsider architect and the villagers will record project costs and timeline on the wall of the temporary kiosk facing the building site, creating an information point for curious onlookers. The entire site will become consistent space where one can engage in collaborative building and access reliable information.

Alignment to Existing Circulation
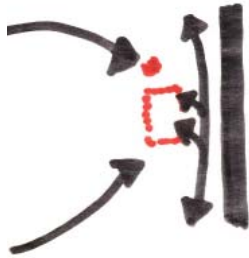
Fig. 3.69   Informal communal resting space

Fig. 3.70   Continuous path along tarmac road

Fig. 3.71   Continuous path across the bridges

Bulletin keeps transparent records of building costs

Building site

Materials drop off location and brick making station
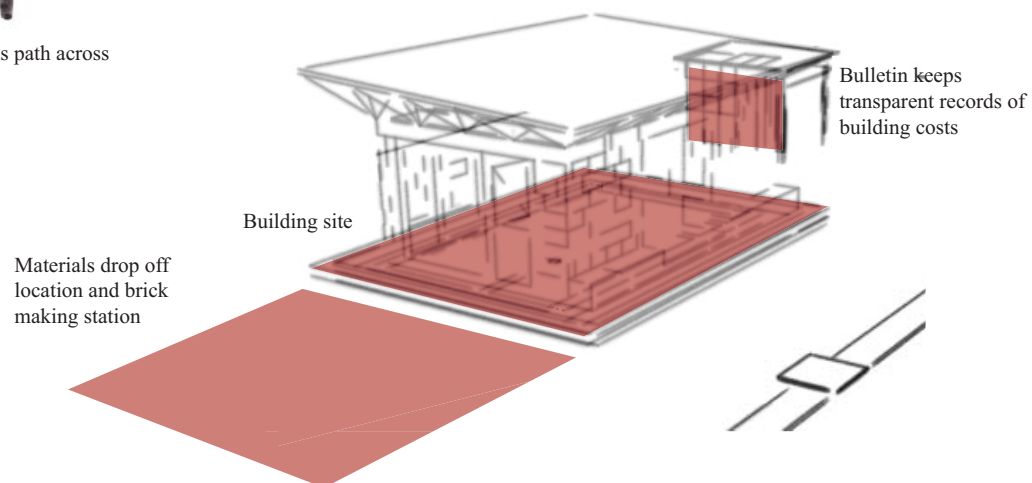
Fig. 3.72   Active Space
Building site becomes social space

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STAGE 3: INSERT AGRICULTURAL EXPERIMENTS

This stage will build upon the established everyday routine where villagers come to the tarmac road to use the Internet, participate in a collaborative development effort, and access reliable information. With the completion of the Internet Station, the adjacent site can be used for agricultural experiments. The outsider architect and villagers can build these experiments using leftover materials and continue the tradition of collaborative building along the tarmac road.
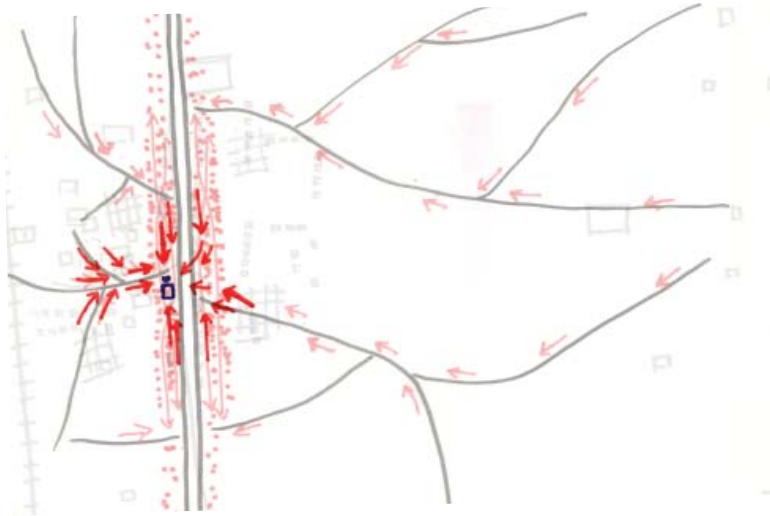
Fig. 3.73   Consistent Congregation Space
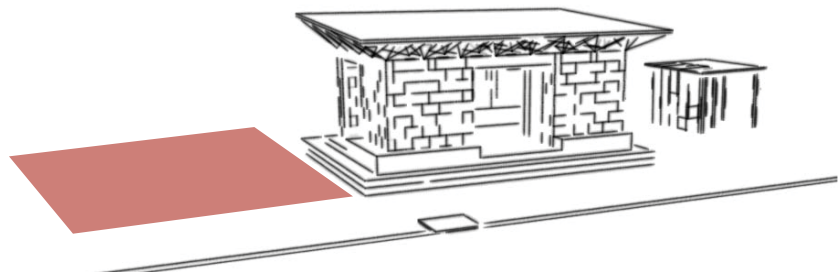
Fig. 3.74   Insert agricultural experiments in brick making space
Move internet station from Temporary Kiosk to Permanent Kiosk. Adapt Temporary Kiosk structure for another purpose, perhaps to store agricultural supplies

The agricultural experimentations will continue to engage the villagers, the outsider architect, and the Global Network. Villagers will go on practicing documenting and acquiring network literacy: this time to record and share the successes and failures of the agricultural experiments. The Global Networked community can start to introduce suggestions and villagers can respond with the results of their applications. Local-global dialogue will become a process founded on experimentation and reflection. Overtime, villagers will adapt critical awareness, allowing them to recognize what is applicable and filter out what is extraneous. They will also gain experience in troubleshooting, decision making, and planning. The Project Website will become a record of Puma's education, becoming a valuable source of information on bottom-up rural development.
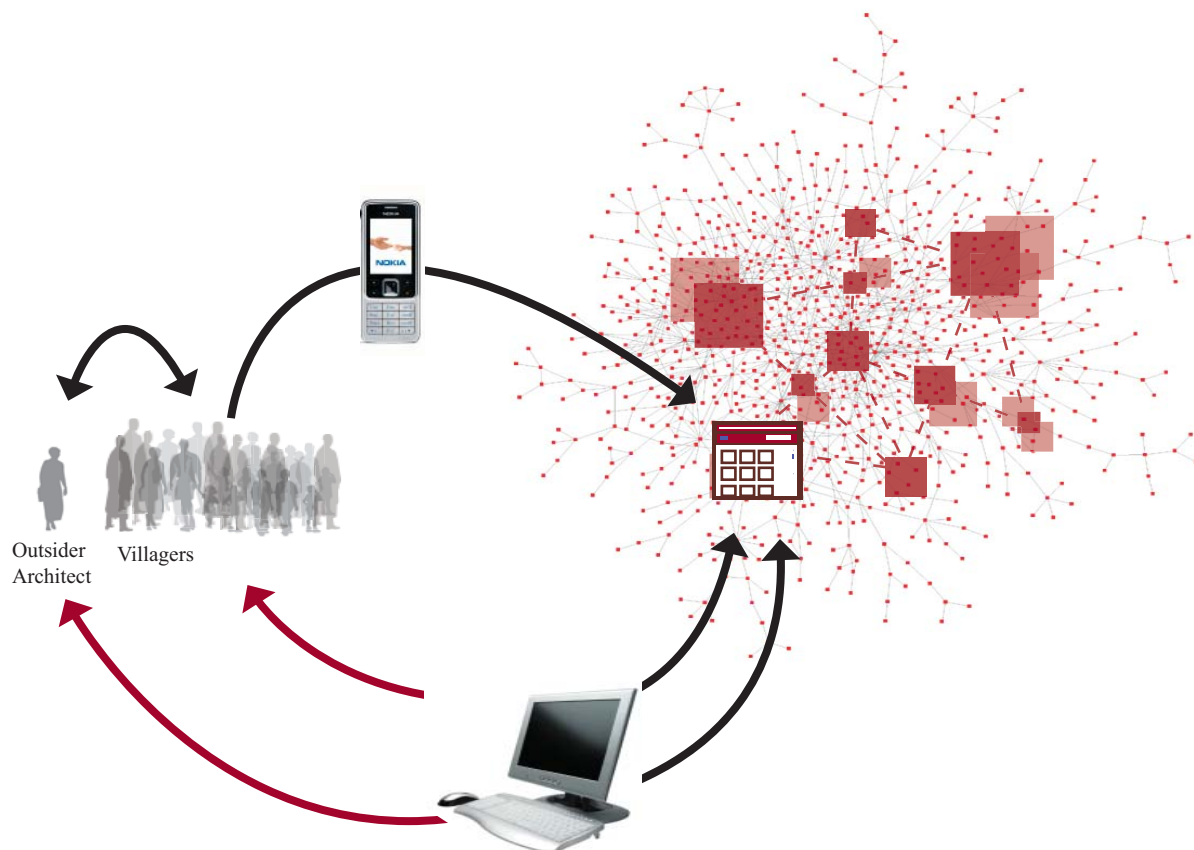
Fig. 3.75   Emerging Local-Global Interaction

The Internet Station is a form that facilitates local collaboration and local-global dialogue. Experimentation and documentation occur in adjacent spaces, allowing villagers to reference both simultaneously. These spaces are also openly accessible to all villagers, allowing participants and onlookers alike to learn about new agricultural possibilities.
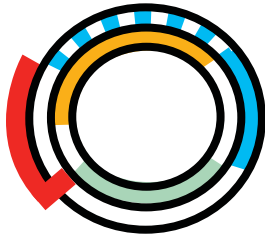
Fig. 3.76   Three Month Experiments
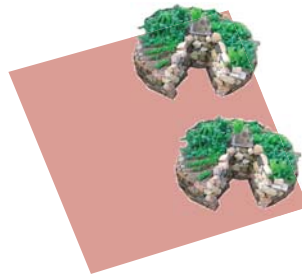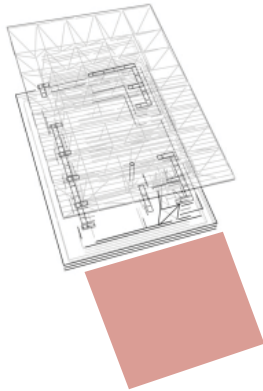
Fig 3.77, Fig. 3.78   Villagers test agricultural experimentation. Successes and failures emerge
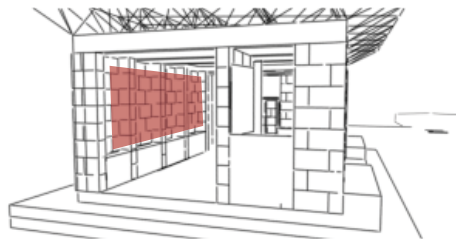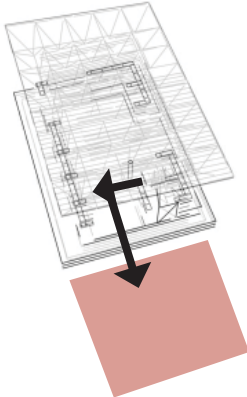
Fig. 3.79, Fig. 3.80   Villagers draw suggestions from the Global Networked Community on the interior bulletin, discuss which ones to implement, and test suggestions in the building site
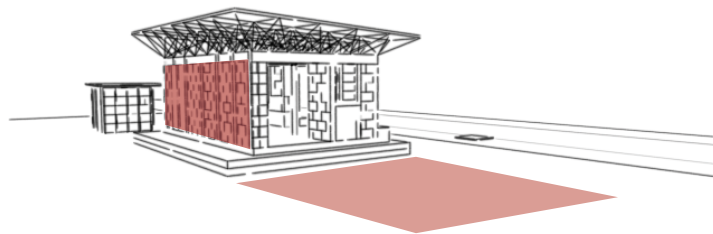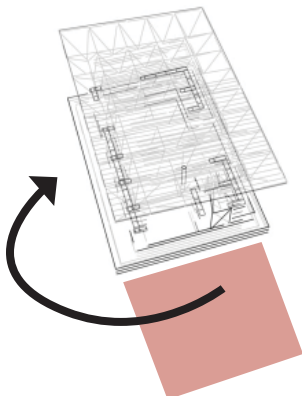
Fig. 3.81, Fig 3.82   Villagers document successes and failures on the external blackboard. Important notes are made permanent in paint.

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The Internet Station encourages the informal use of its shaded spaces. Villagers who sell produce along the tarmac road can use the front steps for seating, villagers who are waiting for the daladala can spend their time using the Internet or learning about the agricultural experiments, and villagers who are shopping nearby can simply use the space to rest and socialize. These possible informal adaptations of space create opportunities for villagers to learn network skills and agricultural techniques during moments in their everyday routines. The Internet Station becomes a space for social interaction and reciprocal learning.
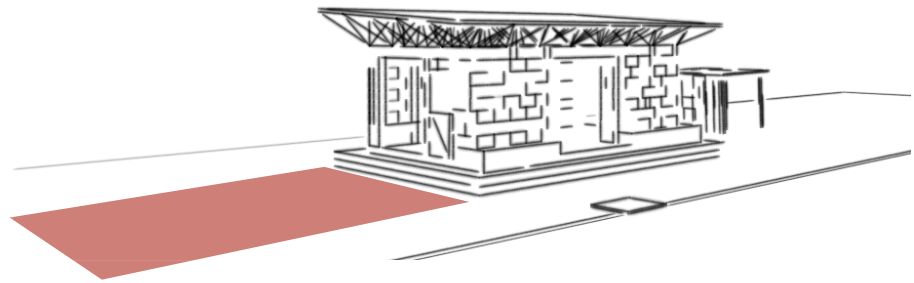
Fig. 3.83   View A
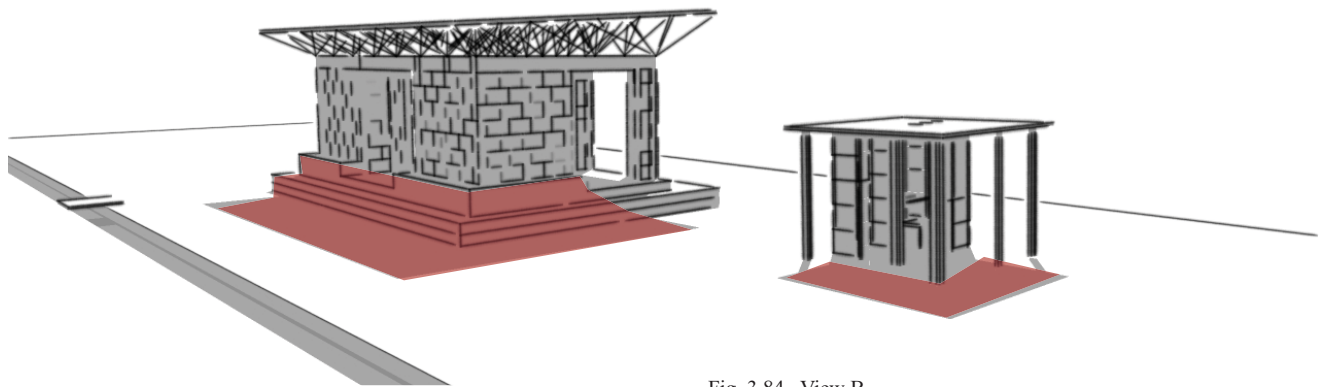
Fig. 3.84   View B
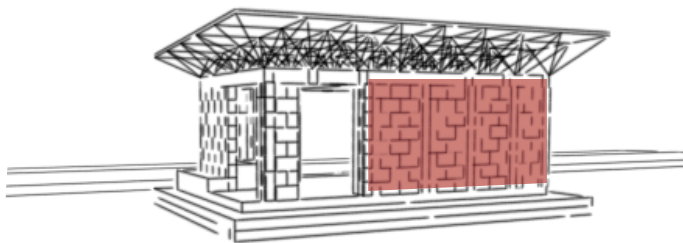
Fig. 3.85   View C
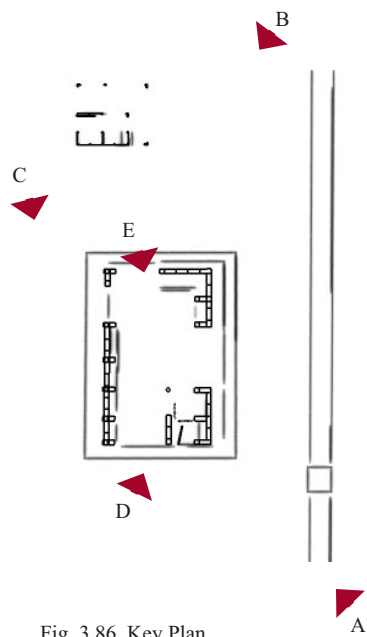
Fig. 3.86 Key Plan
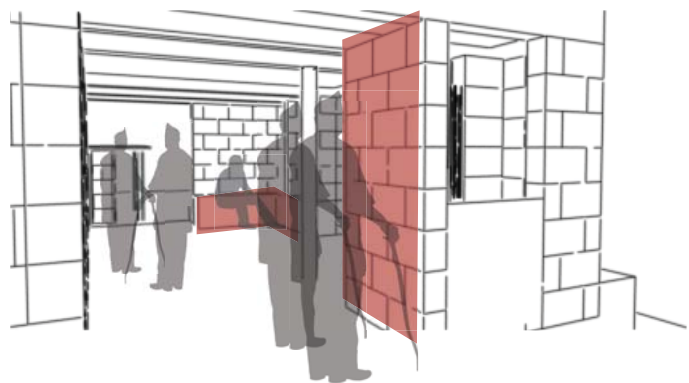
Fig. 3.87   View D
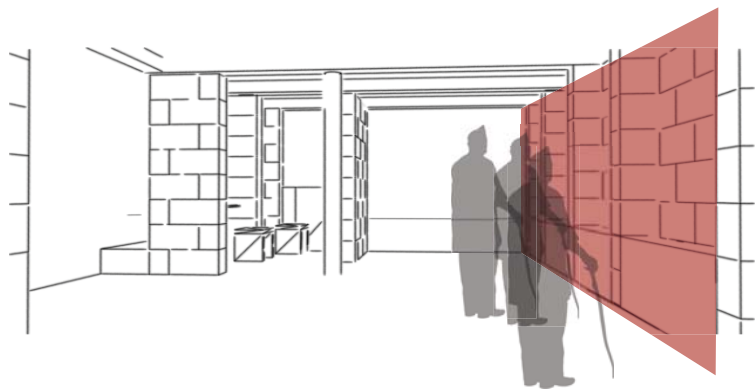
Fig. 3.88   View E

Fig. 3.89 Exchange
Experiments and updates are
shared through word of mouth in
common spaces
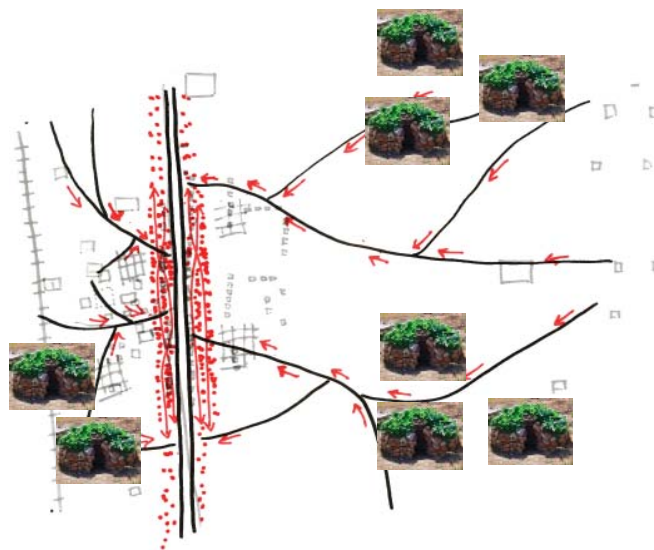
Fig. 3.90 Village wide adaptation
Proven results are implemented at home

STAGE 4: CELEBRATION AND APPLICATION

The Internet Station project concludes after three months of agricultural experimentation and the end of the dry season. In a manner similar to the traditional building process and the social dynamics of formal events, a celebration takes place in which all villagers are invited to attend. This celebration is not only an occasion to recognize the successes, failures, and new relationships that have been fostered, it is also a time during which villagers can truly claim the Internet Station as their own.

With the lessons learnt, villagers can apply the agricultural experiments in their own homes. Common spaces such as paths, wells, and cafes can become places where villagers discuss their own experiments and openly share suggestions for improvement. Self-initiative and locally based development becomes a reality.
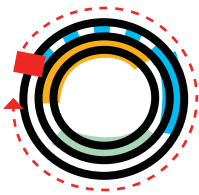
Fig. 3.91   Celebration and Adaptation
Villagers celebrate at the end of the dry season. Villagers take what they learn and adapt it in their own homes in the ensuing year
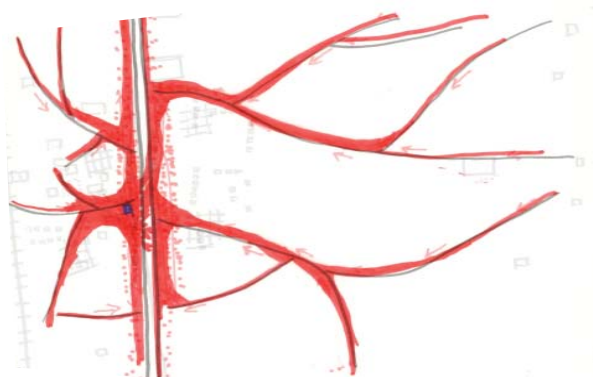

Fig. 3.92   Village wide celebration
Villagers come together to celebrate and share in the bounty of the successfully grown food
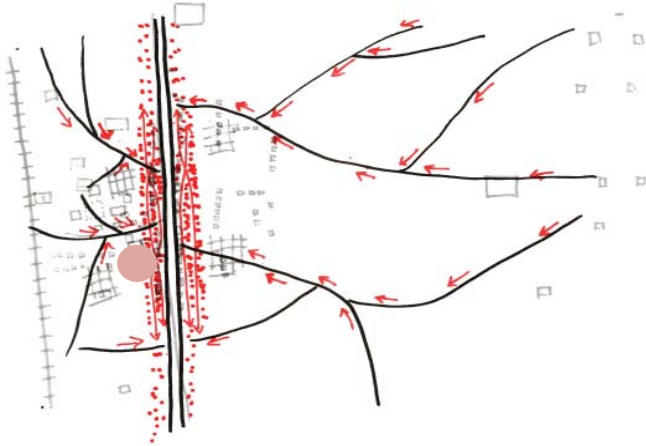
Fig. 3.93 Internet Station as a part of everyday routines
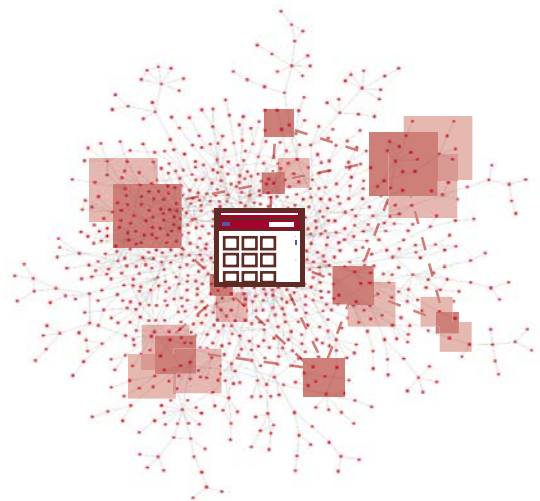
Fig. 3.94 Puma's growing presence in the Global Network

Successful experiments

Existing Internet Station
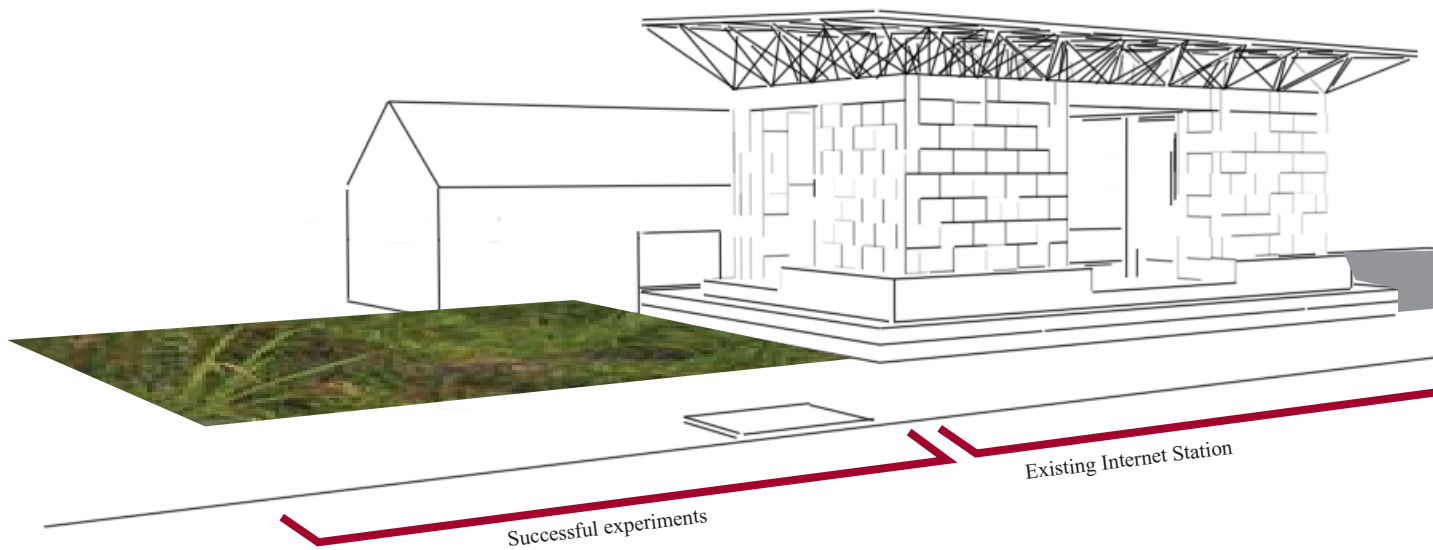
Fig. 3.95 Possible Expansion Along the Tarmac Road
Technological showcase celebrating local development initatives and flexible spaces that encourage informal use

3.5   PROJECTION

The design intervention is a four stage process of collaborative building that fosters local skills and local-global partnerships. Villagers gain experience in working directly with an outsider while also establishing a presence in the Global Networked Community. Villagers can no longer regard themselves as simply recipients of aid; they are now producers of change and respected voices in the global community. Future opportunities and challenges can be addressed by applying these new skills and partnerships. The Internet Station and the agricultural experiments will serve as a visible reminder of the successful result of local-global reciprocal learning and collaborative effort.

The design of the Internet Station specifically aims to ensure that villagers become key decision makers of their own development. The Internet Station will accommodate emergent futures by facilitating the continued practice of spontaneous open sharing and collaboration - Puma's longstanding approach to leveraging opportunities and addressing challenges. The design references Puma's traditional buildings that form themselves around social spaces. The design is also replicable in a manner similar to Puma's modern buildings. Should there be a need to expand the Internet facilities, the Internet Station building can be repeated along the tarmac road, and simultaneously create a series of spaces that encourage informal use and interaction.

Shaded Space for Informal Activity

Physical Expansion

New Experiments
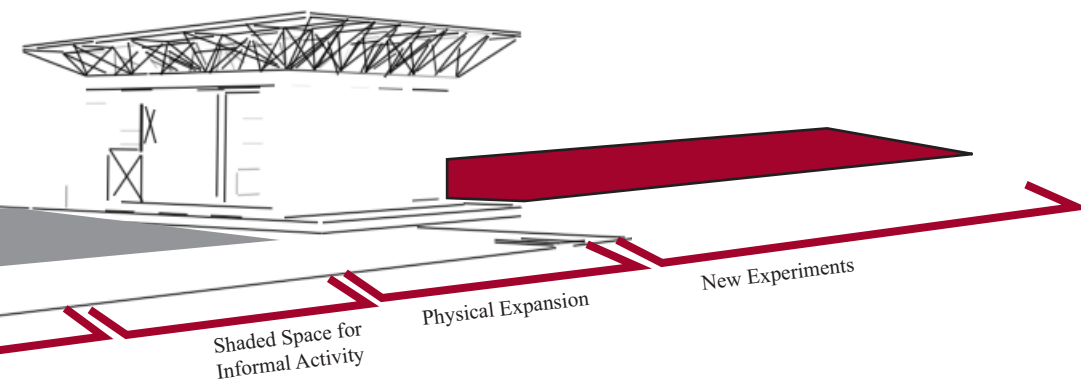
Endnotes

1 DeCarlo, *Architecture and Participation*, 13.

2 Thackara, 218.

3 Criss, Shannon. *Small Town Center, Good Deeds Good Design*, 215.

4 Fabricant, Robert. <http://www.core77.com/blog/featured_items/tools_of_engagement_the_new_practice_of_usercentered_design_by_robert_fabricant_13907.asp> (accessed July 16, 2009)

5 Ito, *Networked Publics*, 4.

6 Yunus, <http://www.thedailybeast.com/blogs-and-sotires/2009-01-23/how-to-save-the-poor/2/2> (accessed 25 January 2009).

7 <http://blizzard.cs.uwaterloo.ca/tetherless/index.php/Concrete-example)> (accessed 30 June 2009).

8 <http://blizzard.cs.uwaterloo.ca/tetherless/index.php/KioskNet> (accessed 30 June 2009).

9 <http://blizzard.cs.uwaterloo.ca/tetherless/video_old/> (accessed 30 June 2009).

10 <http://www.afrigadget.com/2008/07/05/keyhole-gardens/> (accessed Aug 10, 2009).

11 <http://www.sendacow.org.uk/growing-more-food> (accessed Aug 10, 2009).

12 <http://www.rain-barrel.net/make-your-own-keyhole-garden.html> (accessed Aug 10, 2009).

13 <http://other90.cooperhewitt.org/Design/drip-irrigation-system> (accessed April 2009).

14 <http://www.ideorg.org/OurTechnologies/DripIrrigation.aspx> (accessed April 2009).

15 <http://www.bioone.org/doi/pdf/10.1659/0276-4741%282003%29023%5B0027:SDIT%5D2.0.CO%3B2?cookieSet=1> (accessed 25 September, 2009).

16 <http://www.schools.indiawaterportal.org/?q=node/154> (accessed 30 November 2009).

17 <http://www.globalgiving.org/projects/improve-rural-living-in-mexico/photos> (accessed 30 Novebmer 2009).

18 <http://www.akvo.org/blog/?p=997> (accessed 30 November 2009).

19 <http://openarchitecturenetwork.org/projects/707> (accessed 18 October 2009).

CONCLUSION

A DESIGN THAT BUILDS SOCIAL CAPITAL

The principle challenge of this thesis has been to establish a new model for the outsider architect to engage in local development. The goal has been to design an architectural intervention capable of fostering a local-global relationship that can become the foundation for future collaborative initiatives. The resulting design was an Internet Station that can act as an interface to combine global expertise and resources with local on-the-ground skillful adaptation and implementation. The design involves the outsider architect in an active participatory role: to use the process of building as means to initiate dialogue, reciprocal learning and collaborative production.

The intervention embodies an optimistic quality that champions the latent potentials of the villagers and reflects my own experience of working in Puma. The Internet Station does not foster Internet access in an instantaneous manner that we in the Global North enjoy, but instead leverages the villagers' existing social patterns with new accessibility to create an opportunity for local deliberation and application. The intervention is meant to engage the majority of villagers who have regular access to the tarmac road. It is implied that these villagers will benefit from the new services and ultimately share their new skills and tools with those without access. This "trickle down effect" stems from my belief in the open sharing ritual that permeates throughout the village. There is little chance that certain individuals will commandeer the intervention and disregard their fellow citizens since Puma has a long-standing tradition of respectful social-spatial use. The Internet Station aligns to existing systems that maintain its open social platform while the collaborative building process is the means by which convivial patterns are reinforced.

Of course, the intervention cannot be completely based upon a belief in the community's social mores. The architect must have a critical awareness of associated risks that may arise from unforeseen challenges. Should this intervention be translated into a broader application for other communities, the architect must engage his or her respective communities to identify their distinct conditions. Since the thesis design is specific to and based upon assumptions unique to Puma, further investigation is necessary to ensure that the intervention can be applied to another context. Fortunately, the design is a framework that is able to absorb emergent conditions and act as a means for engagement. Dialogue and reciprocal learning during this collaborative process is the means by which the expectations of each party are revealed and contingencies are resolved.

The success of the Internet Station relies on the dependability of the KioskNet technology and a continuous respectful use of the social space and its services. Should one of the components of the KioskNet system break down, the integrity of the intervention is compromised. The Internet Station is resilient to these risks. Kiosknet is made up of durable components: the hardware that contains and transfers digital information, the buses that act as ferries to transport the information, and the computer

equipment that make up the kiosk interface. Each of these components differ from their western counterparts as they are all designed to withstand harsh conditions such as bumpy roads, dust, and third party tampering. Each of these parts can also be replaced independently from the whole. In the event that parts do break down, new parts can be easily and affordably purchased and replaced. During the period between replacements, the platform can continue to be used as a collaborative space for production.

While Kiosknet and the Project Webpage are effective technologies and network interfaces for Puma at this point in time, their implementation into other communities may not always be the best choice. Newer technologies may emerge that are more accessible, affordable and applicable. Neighbouring communities may have existing systems in place that can be applied. The architect must consider how technologies can be implemented in a way that ensures the community will adapt and align them to their needs and everyday patterns. The intervention must be economically feasible; the practitioner needs to be aware of initial expenses and ongoing management and expansion costs. In some communities, private enterprise may not be the most effective system. Other authorities such as local village governments or civil society organizations may be more reliable options.

Another important factor to address are vulnerable groups and demographics. In underdeveloped communities, women are often disempowered citizens. They have the most responsibilities and hold the least amount of influence. While this thesis has not explicitly stated the role of female empowerment, the intervention does ensure that women's rights are addressed. The Internet Station is designed with simple building elements that create comfortable shaded spaces for temporary informal use and is situated in proximity to stands and amenities run primarily by women. By aligning Puma's vernacular conditions of spatial use and local demographic patterns, the thesis encourages women to play a daily role in the Internet Station. As a result, women are placed in a position in which they can become active players in social development.

The role of the architect is to ensure that the building process creates opportunities for the vulnerable to participate in active decision-making, meaning that the often-ignored voices are heard and respected. The building process consists of four phases of construction. Each phase builds upon the one before it, creating more and more involved conditions from which engagement and collaborative effort between outsider architect and villagers can occur. This building process is also a vehicle that the architect can use to identify conditions of disempowerment from which special measures can be founded. These special measures may cause delays in the original project timeline. While the process is flexible to unanticipated contingencies, reconfigurations may involve additional costs. The positive byproduct of this situation is the prolongment of direct outsider-villager interaction and dialogue.

Whether the Internet Station is specifically implemented in Puma or adapted for other communities, the proposed design addresses the conditions of ongoing transformation in this contemporary age. New tools will no doubt emerge and the intervention might find itself outdated. If faced with this condition, the design can be modified to adapt newer tools. The design approach itself, however, will always be relevant. When the challenge is to confront two different cultures to build a collaborative relationship, the architect must first commit to directly engage the community and recognize their needs. The architect must then design an intervention to stimulate the community's active ownership of their development potential. Architecture must act as an agent for incremental implementation, align with existing traditions, and introduce new possibilities that can be adapted by the community. The resulting architecture is then positioned to become a register that absorbs and embodies a variety of voices and emergent conditions, and able to expand and react to the changing needs of the community.

In the words of Foucault:
Architects and planners have long since lost any supremacy with regard to interpretation over their own work. As such the former "author's function to provide coherence" has been passed on to the recipient. The allocation of meaning is no longer an "original act" of creation, but rather has become the compilation of fragmentary quotations within a performative act.

The design intervention proposed here is a modest one; it aims to seamlessly insert itself into Puma by aligning with existing social interactive routines and creates moments to celebrate both vernacular and newly adapted ideas. The design is a means to forge a collaborative local-global relationship in a community unfamiliar with successful self-initiative and with reservations concerning the intentions of outsiders. The result is a platform for collaboration that empowers villagers to become active in determining the direction of their own development.

Go to the people:
live with them, learn from them
love them
start with what they know
build with what they have.

But of the best leaders,
when the job is done,
the task accomplished,
the people will say:
"We have done it ourselves"

-Lao Tzu

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