agriCULTURAL reFORM

Francesca Ling
Syracuse University

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Agri[Cultural] Communication:
Architecture as Translator for Coffee Farmers in Ethiopia

In the village of Kellensoo, an Ethiopian family can build a large, round citaa house in just one day. But it took two weeks to build a small, rectangular shed to serve as a temporary storage for bags of coffee. Whereas the house was seen as a family necessity, it was unclear who had ownership of the shed. Therefore, there was a lot of time fussing about who would clear the weeds, bring the wood, build the structure, and so forth. But why is it rectangular in shape? What inspired the shift from 6,000 years of round building construction, to the rectangular form? Well, it’s for coffee storage, I was told. We make coffee because the white men want to buy our coffee. And... white men live in rectangular buildings. So, because white men buy coffee, all the buildings associated with coffee must be rectangular? Yes! It makes sense that way, doesn’t it?

The case of round-form versus the rectangular-form is representative of the architectural symbolism that occurs when two cultures converge. It is a shift from traditional forms of architecture, to another form which signifies the western world - and by association, wealth. It is an interesting anecdote that has yet to be determined whether it is a positive change, or a negative one for the rural communities. There are many angles from which one can evaluate the effects of different architecture; such as social effects, economic effects, and building performance effects. But one thing is clear; the form itself possesses a language that communicates to the people who use the buildings. What do we want it to say? And rather than choose one language, why not instead, act as a translator?

Cooperatively owned coffee businesses already exhibit a particular type of architecture that has yet to be combined; by combining this architecture into a new form, it will increase the benefits of each piece socioeconomically; socially to enhance sense of community as well as better the standard of living, and economically, getting the means (money) to make changes. After all, it isn’t just about the communication of cultural
architecture. Selling coffee is one of the few avenues for rural families to obtain resources other than food, including medicine, books, and shoes. The story for many Ethiopian coffee farmers is the same; it starts off with one farmer’s bag of raw coffee cherries. He sells this kilo of cherries to another man who processes it into coffee beans for $0.04, despite it being worth $230 by the time it is sold in cafes around the world - five-thousand times the grower’s profit! He and his family continuously labor, but remain impoverished. Fortunately, this is not how the story ends. In fact, there is a protagonist, which manifests itself as the Cooperative. Farmers have gathered together to obtain loans to purchase mills and process their own coffee. They work with other professionals in marketing and machine engineering to get a better price for their coffee cherries. This is how we come to know of Fair Trade coffee.

Unfortunately, it is not that simple. There are many types of Cooperatives, some of which are privately owned and do not provide adequate compensation. The type of Cooperative I am researching, is a truly farmer-owned cooperative, and this type of cooperative tends to suffer from the same set of problems. Similar to the situation of round-form versus rectangular-form buildings, there is a disjunction in communication between the buyers and farmers of coffee. It is not always clear to the farmers, why coffee needs to be processed a certain way. For them, coffee grows naturally throughout the country and is consumed to their own liking - which is not the way the International Market prefers their beans. Because of this, classrooms and learning spaces have been proven to be extremely beneficial in explaining why coffee must be processed to a certain grade. Classes on homemade fertilizer are also very helpful, as are other agriculture and ergonomy classes for the farmers and processors. For the buyers, educational spaces are necessary to teach them about a specific region’s coffee. Spaces for teaching are integral for both serving needs, and mitigating between the desires of the two groups.

Then, there are also other issues of efficiency in terms of building performance. Sometimes the shift from traditional
to contemporary has detrimental effects on the quality of living environment. For example, the qorqooroo form is a hybrid structure, consisting mostly of wood, with a pitched roof of corrugated tin. The tin sheets are quick to put up, much less labor intensive, costs money, and therefore symbolize progressiveness. While they do not require annual repairs that thatched roofs do, they do leak at their joints, and do not provide the vertical ventilation for the smoke of a cooking fire. In Kellensoo, villagers wanted to purchase materials to build a drop-down ceiling from their tin roof, because that is how they saw classrooms in American films. Their profits from last year's coffee was originally intended to purchase computers for their new school, but the need for a ceiling was so dire that they opted to purchase the drop-down ceiling. While now they have the aesthetics and acoustic effects of the ceiling, they no longer have money for the computers, and the height of the ceiling has stopped natural ventilation. Another alternative would be to redesign the classroom to have a ceiling made of local materials, and to have an alternative cross-ventilation system. But no such design exists yet, and the outcomes of miscommunication prompt a response. The Coffee Cooperative needs an architecture, one that mitigates between the two cultures; the culture of the International Market, and the culture of Ethiopian Farming Community.

This thesis then analyzes each step of production and studies the spaces and machinery or structures used to complete each process. The architecture of production in Ethiopia has several characteristics: (1) that it is fragmented in several pieces while traveling the path from farming areas and the capital, and (2), that each piece has socioeconomic and environmental conditions.

As there are relationships of how each piece can be accessed, as well as what each piece implies, culturally, there are additional studies of each component’s varied forms. The variations illustrate the differences between different communities throughout the whole country. Economically, they reflect the costs needed to obtain certain components, as well as the added value invested once purchased or
built. Socially, they show the values of the community, in the choice of building material, the number of aggregated steps into one site, as well as the effects of specific programs, such as classroom or meeting spaces. Environmentally, the details describe the locations of natural resources, as well as proximity access to their informally defined community. Within these sub-sections of analysis, each piece will also propose alternatives to existing typologies to make better use of natural resources or other desirable characteristics.

There is a definite benefit from the formalization of architecture in coffee cooperatives around the world and how it translates to an improved socioeconomic lifestyle for farmers. There is additional documentation of other sites that explore the dynamics of what has worked for those involved in both Brazil and Nicaragua, and what has not. Within the country of Ethiopia, there are their own country regulations and traditional business customs to navigate, which will be compared.

The design of an architecture typology of a coffee cooperative center will be able to increase the efficiency of benefits for these farmers. The center will serve as a place of cultural exchange and mitigation between family farmers, and the world of the international market. It achieves this by being based upon two main design problems: (1) that formally, there is a disjunction between what farmers perceive as desirable architecture for “western” coffee buyers and their own physically successful construction methods, and (2) providing classroom spaces to teach farmers about the business of trading as well as teaching buyers about the coffee. It is through the travel to these countries that responsible design can be generated by directly interacting and witnessing the local culture that the translating architecture is meant for.
PRECEDENTS :
Toni Molkerei, Zurich, 1977
The milk and yogurt processing plant was the largest dairy in a city in Europe and included a spiral truck roadway for deliveries of milk products to be processed in the plant and then distributed.
Highland Park, Ford Motor, Albert Kahn, Detroit, 1913
This poured in place concrete structure for a six-story building, enabled longer spans with open floors. Manufacturing proceeded from top to bottom with gravity, chutes, and innovative mechanized assembly lines. Verticality, both organizational and physical, became a corporate mantra for process control -- from raw materials to final distribution, all accomplished on site.
Drip irrigation provides farmers the most efficient way to grow crops in water scarce areas, but historically has been too expensive for small-plot farmers. After first approaching manufacturers of commercial drip irrigation systems, iDE developed its own design for small farmers. The designers lowered the cost of drip systems by replacing conventional emitters with holes and micro tubes, shifting water distribution lines extending to crops, and customizing system layouts for small plots. Development of a hanging plastic water storage bag further lowered the cost to about $5 for a household garden kit covering 20 square meters (215 square feet). In fact, any plot under .4 hectare (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.
The Internet Village Motoman project connects small villages in Ratanakiri to the Internet and e-mail communications through an innovative, yet surprisingly simple, system. 15 solar-powered village schools, telemedicine clinics and the governor's office have been connected to the larger world, through five bright red Honda motorcycles equipped with First Mile Solutions Mobile Access Points and a 256 Kb/s Satellite uplink. Each of the schools can send and receive email, and browse the Internet using a non-real-time search engine.
Kenya-based Umande Trust worked with residents and artisans in the slums of Nairobi and Kisumu to plan, design, cost, procure and construct the BioCentres. Built from conventional, locally available technology, materials, and unskilled labor, the multi-story BioCentres convert human waste in situ without requiring infrastructure. The bio-latrine uses anaerobic, or airless digestion, in which bacteria transforms human waste into fertilizer and methane-based gas for cooking and heating water. Generated bio-gas can be sold for income. They also provide free toilets to children, washrooms, and showers at a minimal fee. Kiosks sell affordable clean water on the upper floor. Community and livelihood spaces are on the upper floors as well.
Neoliberalism and trade globalization has caused an uneven distribution of profits, despite a global economy. These are cases in which resource-rich nations have been exploited - exporting and producing more, but earning less.
Neoliberalism and the globalization movement have negatively impacted the livelihoods of people in developing countries. Despite the promises of economic prosperity, the western nation-led globalization process has suspiciously benefited the developed nations instead.

The cases of resource rich countries being exploited by economic and trade policies, occur throughout the world. In each situation, the access to the global market demonstrates potential - but a series of policies restrict profit capabilities. This thesis asserts the reclamation of control over production, pricing, and sale of goods, back into the hands of the makers.
JAMAICA AND MILK

Case 1

1987-1992
fresh local milk 30 million lt
1993
fresh 9 million lt
1993-2003
imported powdered milk ~100 million lt

Trade liberalization in 1993 caused local Jamaican milk farmers to be unable to compete with the US, EU, Australian, and New Zealand’s subsidized prices. As a result, previously impressive market progress declined by 60% and local fresh milk was thrown away as imported powdered milk became cheaper. Trade liberalization caused the opposite effect.
International Monetary Fund (IMF) loan to Mexico in 1982 came with a series of “conditions” including no minimum wage rules, as well as a high interest rate. As a result, labor became cheap for other countries to exploit, and families had to work harder and longer hours to make the same pay. Given other conditions, Mexico is still unable to pay off their debt, and continues to agree to other crippling policies in exchange for additional loans. Neoliberal economic policy caused the opposite effect.
MAPPING
PRODUCTION:
(1) FARMING
(2) HARVESTING
(3) STORING CHERRIES
WET PROCESSING:
(1) PULPING
(2) FERMENTING
(3) WASHING
(4) DRYING
DRY PROCESSING
(1) REPOSO 30-60DAYS
(2) HULLING
(3) SIFTING/SIZING
WHAT IS INSIDE?
unique programmatic specifications

GENERAL FOR COFFEE

<table>
<thead>
<tr>
<th>General</th>
<th>For Coffee</th>
</tr>
</thead>
<tbody>
<tr>
<td>collection &amp; storage</td>
<td>collection method &amp; storage</td>
</tr>
<tr>
<td>process goods</td>
<td>initial processing (wet)</td>
</tr>
<tr>
<td>post-processed goods</td>
<td>storage for processed beans</td>
</tr>
<tr>
<td>evaluation</td>
<td>curing &amp; grading area</td>
</tr>
<tr>
<td>pricing &amp; selling</td>
<td>intermediation &amp; pricing</td>
</tr>
<tr>
<td>shipping access</td>
<td>shipping access &amp; arrangement</td>
</tr>
</tbody>
</table>
Programmatically, one unit cell provides support for one farmer* to process his/her goods, reach a buyer, price and obtain payment, and connect to shipment methods. The unit cell is expandable, proportionate to the scale of business’ success. There will be cases in which a minimal unit is preferable, and others when an entire complex is ideal.

*or other producers, including livestock traders, basket weavers, etc. Further analysis is needed to decide whether the smallest scale is ideal for the single worker, or to define a ‘cooperative’ at the smallest scale for functionality.
CURRENT MARKET CHAIN

COFFEE MARKETING CHAIN

production

collection

initial processing (wet)

assembling

curing (sorting, hulling, grading)

intermediation & pricing

shipping

distribution

consumption

small farm

medium farm

large farm

trader

manufacturer

trader/agent

manufacturer

cooperative

union

auction/broker

domestic roasters

wholesaler & retailer

domestic consumer

exporters

importing consumer
GOAL MARKET CHAIN

production
farmers | on farm

collection
farmers | in center

initial processing (wet)
farmers | in center

assembling
farmers | in center

curing (sorting, hulling, grading)
farmers | in center / addis ababa

intermediation & pricing
farmers | in center

shipping
by air (see airports)

distribution
varied worldwide locations

consumption
varied worldwide locations

small farm

exporters

domestic roasters

wholesaler & retailer

domestic consumer

importing consumer
<table>
<thead>
<tr>
<th>Production</th>
<th>Farmland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection</td>
<td>Storage facility 1</td>
</tr>
<tr>
<td>Initial processing</td>
<td>Storage facility 2</td>
</tr>
<tr>
<td>(wet)</td>
<td>tables for sorting, or machinery</td>
</tr>
<tr>
<td>Assembling</td>
<td></td>
</tr>
<tr>
<td>Curing (sorting,</td>
<td>computer, wireless internet,</td>
</tr>
<tr>
<td>hulling, grading)</td>
<td>workspace, file storage,</td>
</tr>
<tr>
<td></td>
<td>calculation method</td>
</tr>
<tr>
<td>Intermediation &amp;</td>
<td></td>
</tr>
<tr>
<td>Pricing</td>
<td>access to shipment methods:</td>
</tr>
<tr>
<td>Shipping</td>
<td>roads, transportation to air/sea</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution</td>
<td></td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
</tr>
</tbody>
</table>
- 1 kg coffee cherries / year
- 1 kg coffee cherries / harvest

= ( ? ) of the following units:

= 1 kg coffee cherries / harvest
= 1 kg coffee cherries / harvest
MAPPING:
ETHIOPIA & ITS COFFEE
Ethiopia produces some of the best coffee in the world. The production accounts for more than one third of the country’s exports, and more than a quarter of the population depend on the industry for their livelihoods.

Since entering the global market, farmers frequently earn $0.11 per kilo of coffee cherries, which retail in the western world for $230 per kilo. Coffee collectives help in establishing fair trade exchanges, but more intervention is needed to return more of the profits to the farmers.
ETHIOPIA COUNTRY

- coffee
- sesame seeds
- legumes
- flora
- lie plants
- oil seeds
- vegetables
- bovines
- sheep & goatmeat
- sheep & lamb leather
- spices
- gold
- machinery
- electric machinery
- footwear
- other animals

**Population**: 84,320,000

**Density km²**: 76.4

**Employment**: 25% non-farm
DIVISION OF ETHIOPIA
regions

alt: states

ORTIGRAY
AFAR
AMHARA
BENISHANGUL/GUMUZ
DIRE DAWA
HARARI
GAMBELLA
SOMALI
SNNPS

alt: oromiya(a)

OROMIA
OROMIA REGION

Population: 27,158,471
Density: 76.93 km²

Economy: Farm vs Non-Farm Employment

- Coffee: 24%
- Cattle
- Sheep
- Goat
- Horses
- Mules
- Donkeys
- Camels
- Poultry
- Beehives

Economy Pie Chart

Non-Farm Employment Pie Chart
**Jimma Zone**

- Population: 2,486,155
- Density: 159.69 km²

- **Coffee Production**:
  - Jimma: 23.2%
  - Oromia Region: 11.8%
  - Ethiopia: 23.2%

- **Employment**: Farm vs. Non-farm
  - Non-farm: 15.1%
  - Total Employment Percentage: 23.2%
DIVISION OF ETHIOPIA

woredas

alt: weredas
districts

ADDIS ABABA
capital of ethiopia

SEKOR
LIMU KOSA
LIMU SEKA
TIRO AFETA
SETEMA
SIGMO
GOMA
GERA
SEKA CHEKORSA
MANA
alt: manna

KERSA
DEDO
OMONADA
MANA WOREDA

**Population**
- Population: 146,675

**Density**
- Density km²: 306.27

**Most Profitable Crop**
- Coffee

**Land Use**
- Swampy
- Forest
- Pasture
- Cultivable Land
- Land Use

---

37
DIVISION OF ETHIOPIA

kebeles

alt: wards
neighborhood associations

YEBU
alt: yabo, yebru
administrative center neighborhood

JIMMA TOWN
alt: jima
location of Jimma airport
39

Paved road
Dirt road
Storage
to Jimma Town

Road intersection to Jimma

Y E B U  M A N A  O R O M I Y A  E T H I O P I A

Road intersection to Jimma

39
MAPPING:

RESOURCES:
transportation
access
access
RAILROADS
by rail

yebu, mana
Selected Annotated Bibliography


Thirty essays about architectural projects that aim to assist in the alleviation of various social issues. They serve as excellent case studies for future interventions. Simultaneously engages in discourse of architecture as activism, limitations, and possibilities.


Article on two cases of agricultural and industrial environments. Discusses in relation to both vertical and horizontal mobility in capitalist and socialist societies. Outlines prerequisites for forming environments suited for socialist societies, including the key relationship between work and play spaces.


Highlights several key points from the film "Black Gold" that reflect on the socioeconomical consequences of current coffee trade regulations.


Discusses utopias from Le Corbusier’s Radiant City to Ebenezer Howard’s Garden City. Covers topics of transforming economies, urban and country relations, residential niches, and other desired trends of living.