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SPARSIFICATION AND THE RECONSIDERATION OF CONTEMPORARY RURAL LIVING



THESIS PREP
SPRING 2008
UNDERGRADUATE

Prof. JEAN-FRANÇOIS BÉDARD, Prof. KEVIN LAIR

ERIC MURPHY

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PREFACE

The American rural landscape has been subject to numerous challenges over the last one hundred years. There has been a fundamental shift in the way we value, perceive, and engage our rural environment. The productive landscapes that were once integral and vital to our survival have become fragmented, and serve as mere backdrops to both urban and rural life. The paradigm of agriculture defining ruralism faces new opposition from the concentric growth of urban centers. As our cities continue to grow in population and size, small towns and villages struggle to retain their identities, cultures, values and independence. Thinning communities and fragmented settlement patterns have acted in conjunction with dwindling farmsteads. These concerns raise many questions, but of most importance to this thesis is: ***what does it mean to live rural in contemporary America?***

“I don’t divide architecture, landscape and gardening [farming]; to me they are one.”

-Luis Barragan, Mexican architect

This thesis asserts that architecture and agriculture must form a symbiotic relationship united by sustainability to redefine contemporary rural living. By challenging outdated traditions, idyllic visions, and preconceived notions of the rural paradigm, it is also possible to reprove a diminishing agrarian lifestyle. Rural architecture must become as productive as the ground it replaces, and as integrated as the crop to the soil. A new model needs to be established to facilitate these assertions and reconsider contemporary rural living.



INTENTIONS

The intentions of this thesis is to produce an architecture that is conscientious of contemporary rural living, yet projective. Employing varying degrees of passive and active methods of sustainability, the project seeks to integrate the daily workings of traditional agrarian lifestyles with a modern architectural approach. The viability of the project rests heavily on the current understanding that buildings are the primary contributor of emissions and the single detached home is responsible for our nations greatest energy consumption by type. Couple that with the fact that agriculture is the most environmentally unregulated manufacturing sector in the United States. These factors are personified in the traditional farmhouse and crop based agriculture. The farm model has been in existence since the early colonial period with few changes occurring at small increments and often with hesitation. The current model has diverged into two sectors. The first employs a high degree of mechanization which produces large quantities of food for urban consumption: The second continues with a greater reliance on the traditional model and usually at a smaller scale. The two methods are continually linked because neither one has actively sought out ways to reduce energy consumption of fossil fuels or curtail water polluting from such activities as over fertilization. The project intends to take these issues into consideration as part of the larger design problem. By employing sustainability in the built environment and sustainable agricultural practices, the thesis can be explored through a symbiotic endeavor. In this way, the identity of the rural paradigm is updated to reflect modern day needs and values for contemporary rural life.

Secondary to the development of a new model is the notion that the project is a testing ground or a working laboratory for sustainable rural living. A public component is thus needed to facilitate the sharing of gained knowledge from experimental success and provide an opportunity for learning in a quasi classroom setting as well as hands-on in the field discovery. As a laboratory, less conventional methods of sustainability can be explored, refined, duplicated and adapted to continually improve the productivity of the model. For this reason, the architecture cannot be a stock or prefabricated kit that is designed to be a finished unyielding unit. A degree of flexibility is required from the built form so that continual testing may take place by means of the architecture, agriculture or their intersection. A one-of-a-kind design is a much closer representation of contemporary rural living than something conceived off-site. It speaks to a certain vernacular and a fundamental idea found in sustainability that site and location matters. A home in the plains of the Midwest should not look like a home in the hills of New York. The final project intentions will look at three areas: Sustainability, Agriculture and the Vernacular, with the primary focus being sustainability.



INTRODUCTION: SPARSIFICATION

Translated from the Dutch concept *UTTYNNINGSSAMFUNN*, in English the term can loosely be defined as “thinning communities” or Sparsification. The Norwegian social economist, K Aasbrenn began writing about sparsification in 1983 for the Norwegian Journal of Geography. Since then the term has seen significant study in Southern Australia by geographers Peter J Smailes, Neil Argent and L C Griffin in their article “Rural population density: it’s impact on social and demographic aspects of rural communities” for the Journal of Rural Studies, 2002. The term Sparsification identifies, not the complete desertion of a place, but the displacement of rural populations and fragmented settlement patters. The result is a discontinuous spatial phenomenon related to physical distance between populated areas (Smailes 2002, 4). Sparsification, by it’s nature, challenges the social and cultural well being of a place, while exerting economic strains on a township to support thinning communities. Sparsification brings into question the viability of such rural centers and the impact of servicing intensely dispersed households in terms of environmental sustainability.

The Unites States is undergoing sparsification, but not nearly to the same degree as Australia. Our thinning communities are dispersing at a slow, but constant rate of decline. Sparsification in the US can be attributed to many factors, though most apparent has been because of a change in agriculture. New forms of mechanization and farm consolidation have greatly reduced the number of laborers, who have subsequently move away for other jobs in cities. Cheep rural land has also been a provocative draw for those seeking their own cabin in the woods. Instead of strengthening the local community, homebuilders fragment it by breaking traditional settlement patterns and constructing their single family detached dwelling far from the town center. Former president and CEO of the Northwest Area Foundation, Karl Stauber , has identified four categories that comprise contemporary rural America:

SPARSIFICATION AND THE RECONSIDERATION OF CONTEMPORARY RURAL LIVING

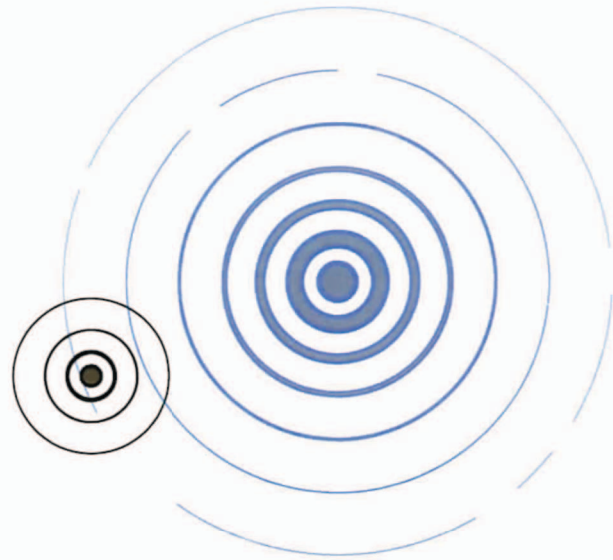
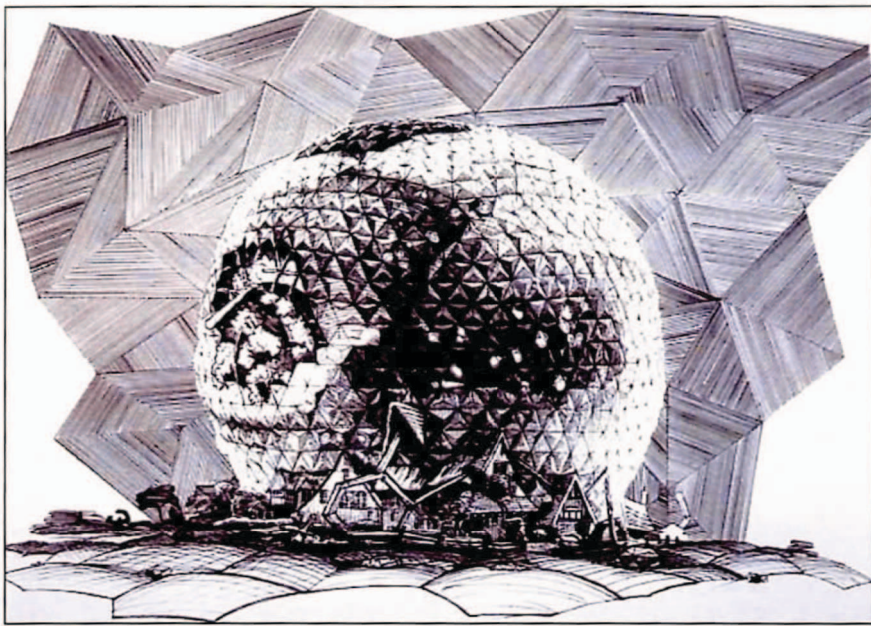
1. Urban Periphery
2. Sparsely Populated
3. High Amenity
4. High Poverty

The four are seemingly listed in a hierarchical fashion as it is becoming exceedingly difficult for townships to remain free from urban influence. Of greatest interest to this thesis is Stauber's recognition of the sparsely populated rural condition. Stauber elaborates this category by stressing a low/declining population density (Stauber, 2001). The significance is a recognition of different types of contemporary rural communities and that based on location, people are living very different rural lifestyles.

The larger issue of sparsification is that it is facilitating a change in the rural environment that requires a reassessment of an established paradigm. Sparsification challenges our preconceptions of the rural-agrarian relationship and demands a reconsideration of what it actually means to live a contemporary rural life. While people continue to leave rural towns and villages, they will seek out cities for three reasons (Milbourne, 2007):

1. Lifestyle
2. Economics
3. Climatic / Territorial

As rural communities begin to recognize their limitations in retaining population, they can start to focus on specific characteristics that truly identify a contemporary rural environment. In doing so, they may attract or simply retain their citizens with a new lifestyle which will reflect rural sensibilities and promote niche economic endeavors. The occurrence of sparsification has ultimately required a reassessment of the rural living in light of pressing urban influence, traditional town settlement, the governments perception of rurality, population densities, and land use.



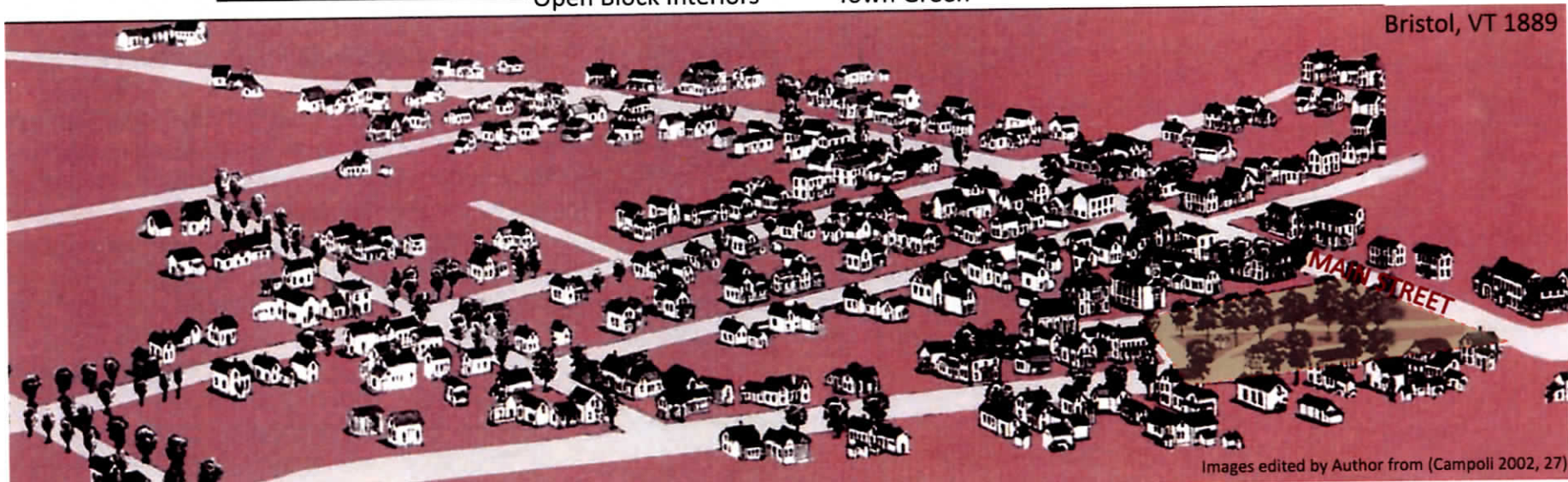
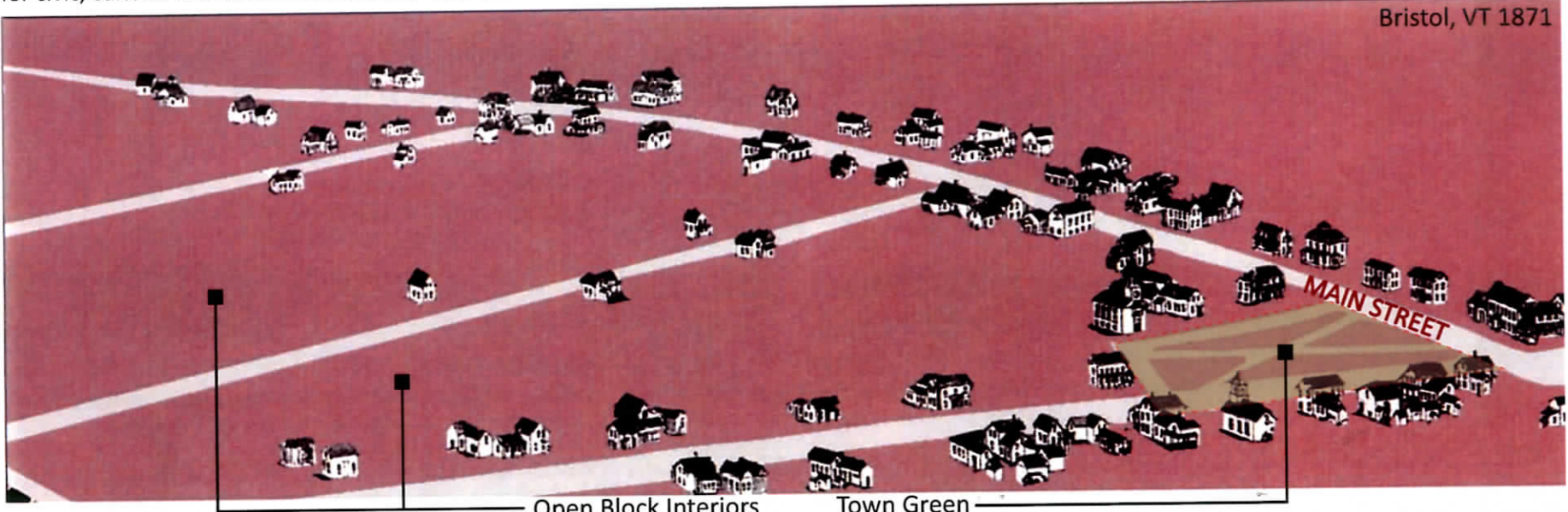
Though the vast majority of the US landscape is rural, comprised of forests, mountains, deserts and rivers, these natural boundaries are not enough to contain the pressures from urban centers. The concentric influence exerted by cities is evident in the diagram to the right. The blue rings display the ripple effect of a sprawling metropolis, where the effects of the city are felt far beyond its physical boundary. The impression on the rural environment is shown with the other two groups of circles. The black rings represent a township located relatively close to the city. The result is a town that has slowly lost its independence and identity apart from the metropolis. Conversely, a town depicted by the rings in green are separated by a great enough distance that it is possible to retain its sense of rurality. This place can be considered truly rural, maintaining a higher degree of traditional cultures and a greater connectivity to the land. The influence of urban centers has been recognized by UK artist Tom Ormond in a number of his works. The lithograph (above) "Plan for a New Beginning" captures the potency of urban concentric influence. The geometric sphere appears ominous as it towers over the nearby village and slowly begins to appropriate the land into its control. Understanding what version of rural town is at stake is key to identifying the viability of the thesis in reference to sparsification.

Tom Ormond. "Plan for a New Beginning". Lithograph, 11in x 17in, 2005.

Authors diagram of Concentric Urban Influence.

SETTLEMENT MODEL

To fully understand the conditions of Sparsification, a comprehensive groundwork must be established in the area of rural town settlement. Bristol, VT represents the typical settlement model established in the US at the colonial period. Three key elements became the building blocks for incremental growth and planned density: 1. A street grid for organization, 2. Open block interiors for future growth (streets, houses), 3. Town Green or public commons for civic, cultural and economic activities. This became a framework for slow change and high density.





Large town block. Surplus of interior block space.



Large town block. Divided to create more buildable land.



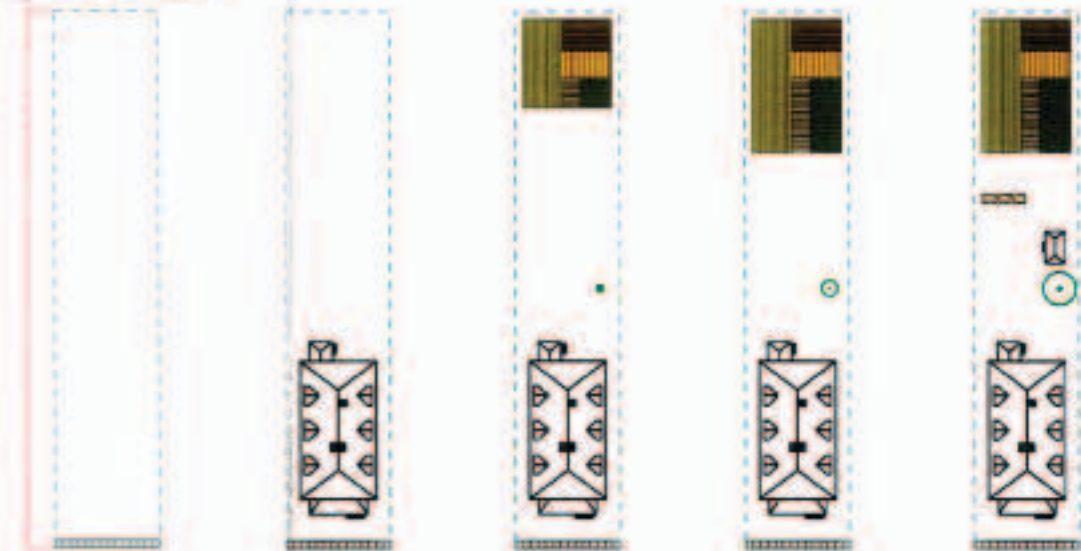
Town blocks subdivided to create smaller, denser blocks.

Yellow rectangle: Detached residence pulled to front of the property lot to encourage social interaction.

Blue rectangle: Property lot. Long and narrow enable higher street front density and space for backyard agriculture.

Blue rectangle: Civic, Cultural and Religious buildings establish the perimeter of the village green.

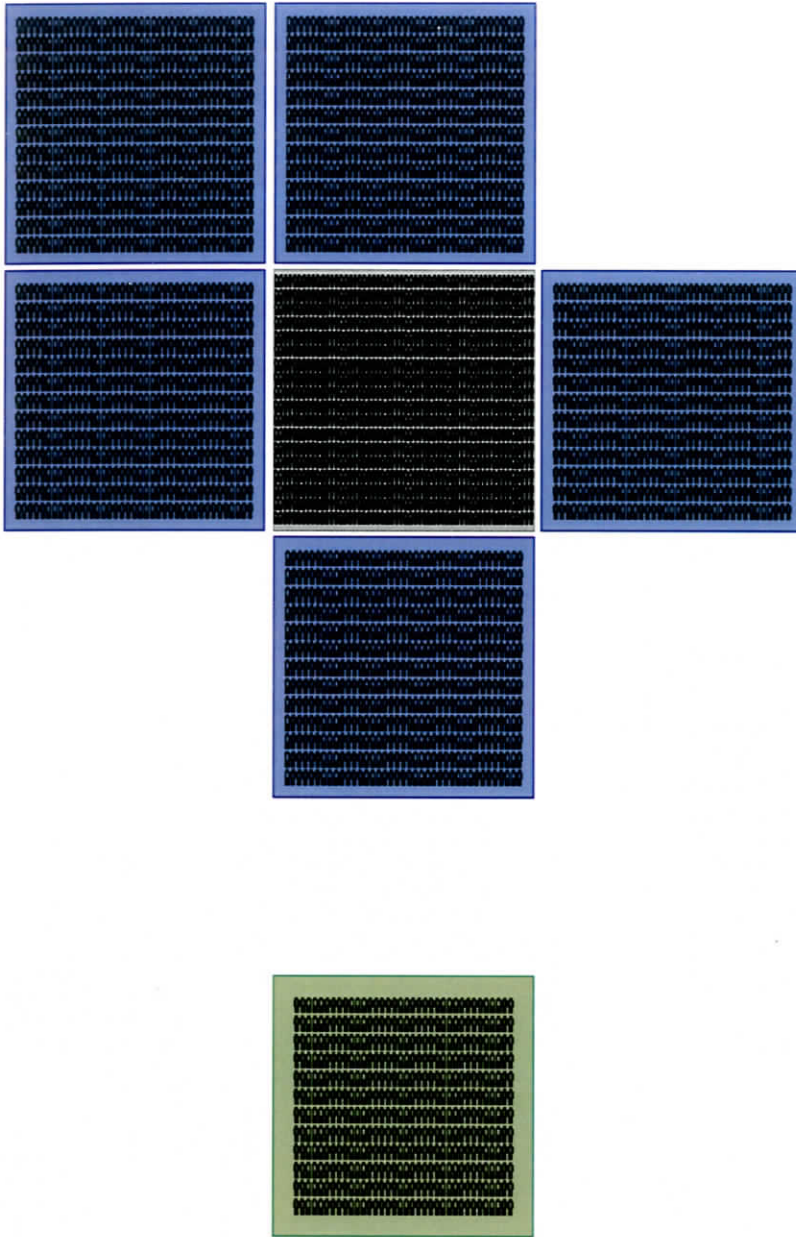
Green rectangle: Village Green. Public space for community activities of a Civic, Cultural or economic nature.



Agricultural growth was permitted within the confines of the long lot. Simple kitchen gardens expanded to subsistence agriculture as the more mouths arrived and the individual household grew.

Early American settlement towns had many issues to consider when establishing a new community. Most often the decision was a geographic one, situated near bountiful natural amenities, a town could rely on local resources to provide for their needs. Secondly, a desire for security and community interaction facilitated small, dense begins. Traditional developments pursued flat open land for agriculture and livestock. The town would be located at the center of the cultivated region and each citizen would take part in the process. As the town grew and more people began to specialize in work activities, a connection to the land was retained via back yard gardening. The rural town developed an association with agrarian practices.

WHAT IS URBAN, WHAT IS RURAL?



Defined by the U. S. Census Bureau:

An urbanized area / urban cluster -

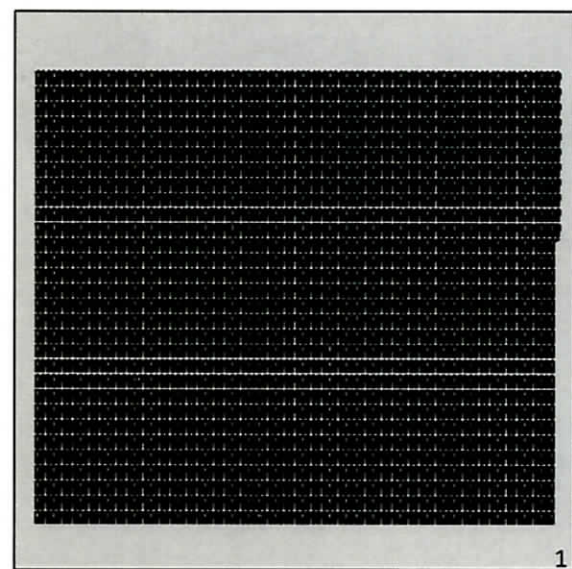
“Core census block groups or blocks that have a population density of 1,000 people per square mile and surrounding census blocks that have an overall density of at least 500 people per square mile.”¹

Any U. S. territory not defined as Urban is Rural.

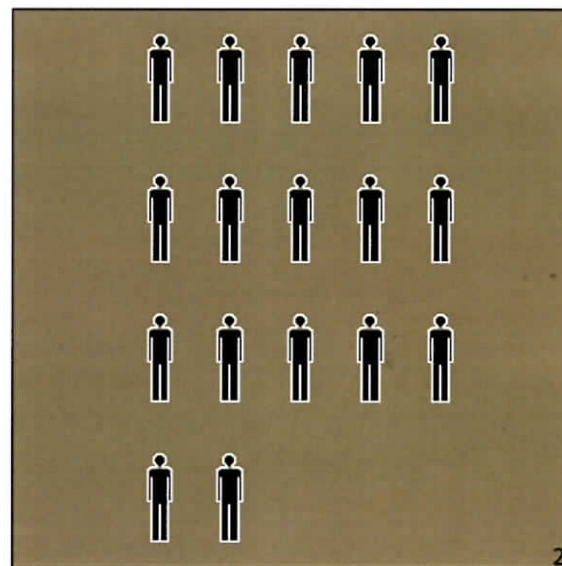
1. Authors diagrams based on data from U.S. Census Bureau.

SPARSIFICATION AND THE RECONSIDERATION OF CONTEMPORARY RURAL LIVING

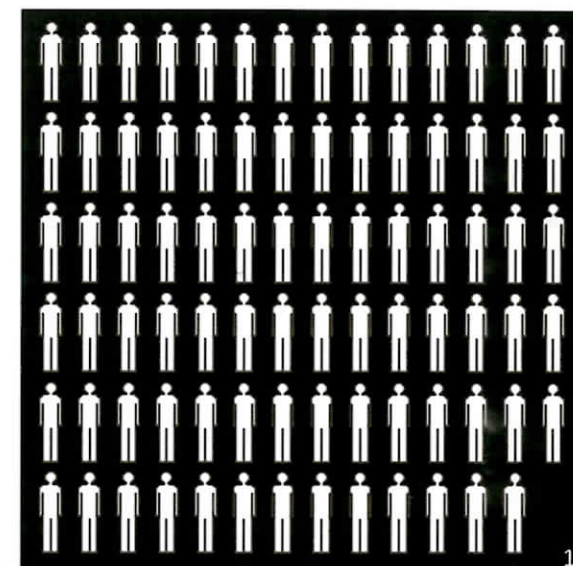
NATIONAL DENSITY: UNITED STATES



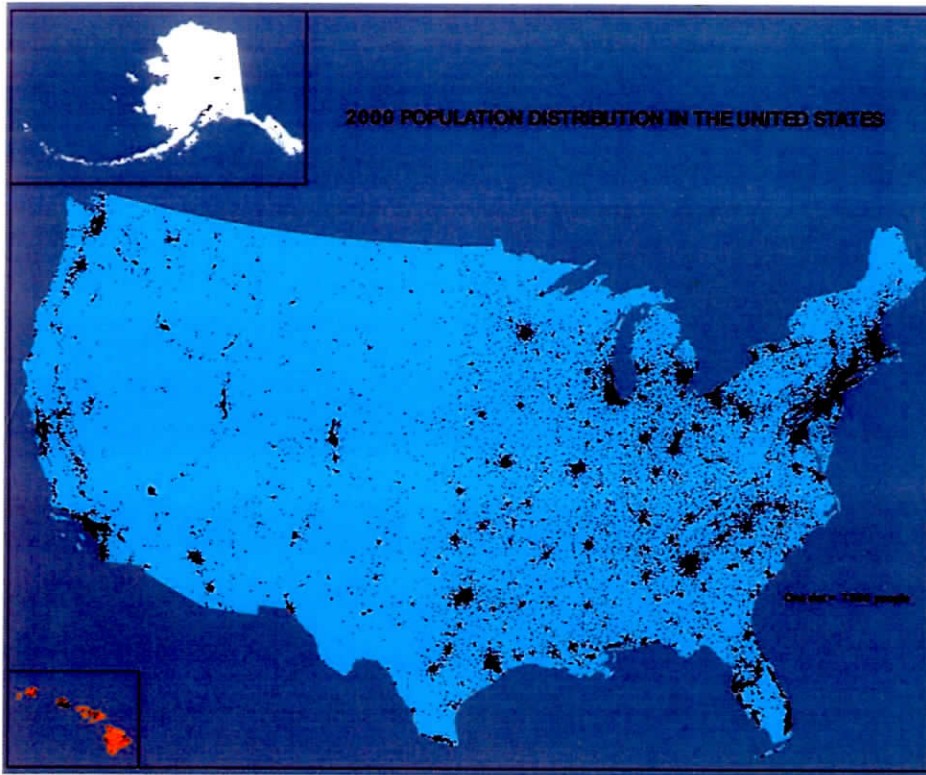
URBAN DENSITY :
2,900 PER. / SQ. MILE



RURAL DENSITY :
17 PERSONS / SQ. MILE



NATIONAL DENSITY :
83 PER. / SQ. MILE



U.S. Population: **303, 500, 000¹+**

Since 1990 the U.S. Census Bureau reports that the population has increased from 248,709,873 to the current estimates of 303,500,000+. This figures to an 18% growth.

During the same time period the Urban / Suburban population has increased **4.8 %** while the Rural numbers have declined by that same percentage.

Map prepared by Geography Division, US Department of Commerce Economics and Statistics Administration. US Census Bureau.

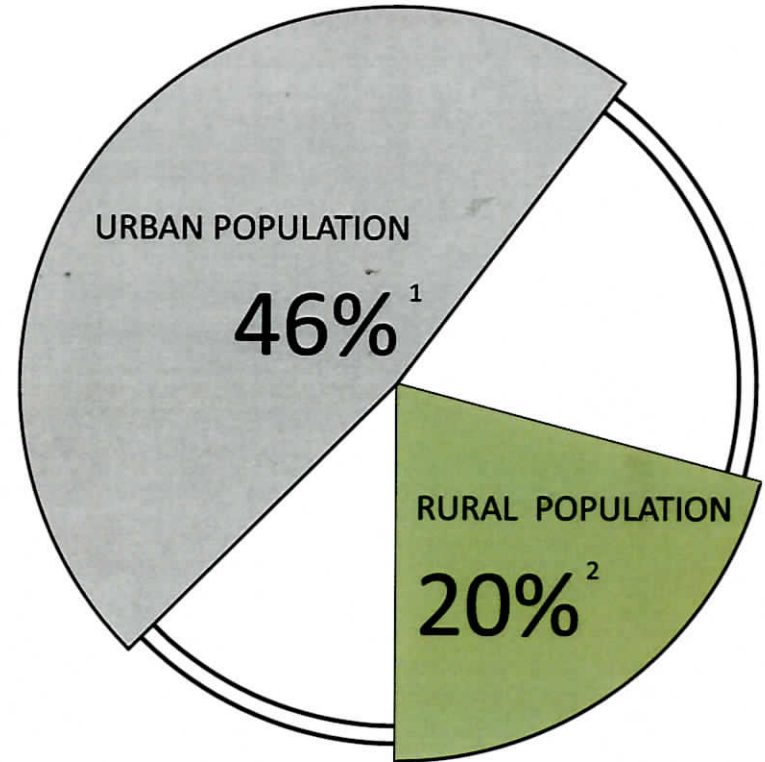
Authors diagrams and commentary based on data from

1. U.S. Census Bureau

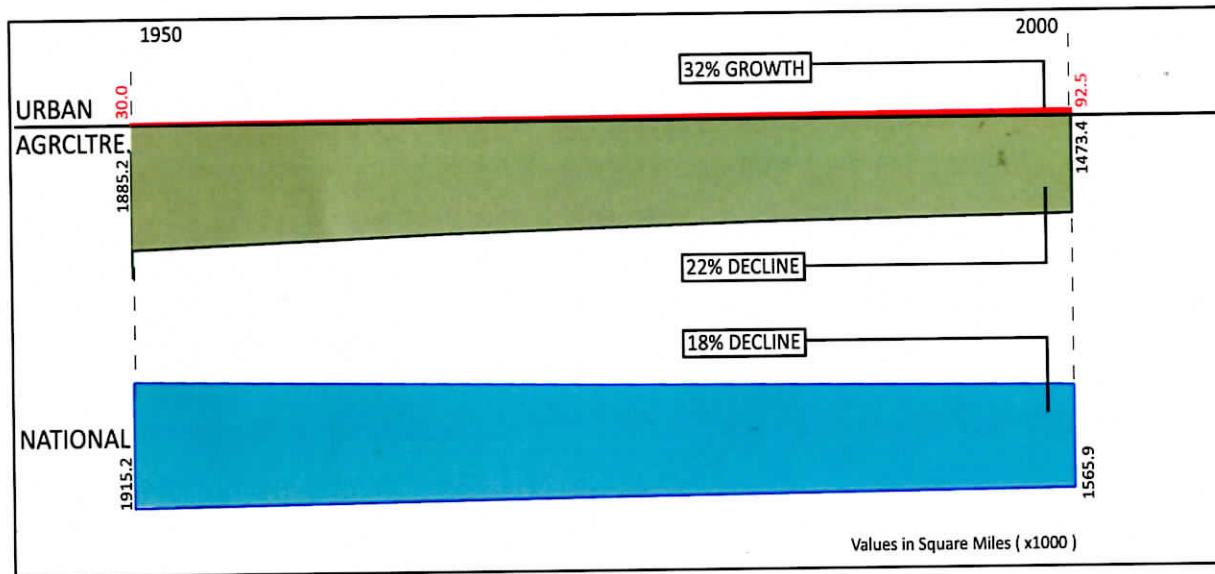
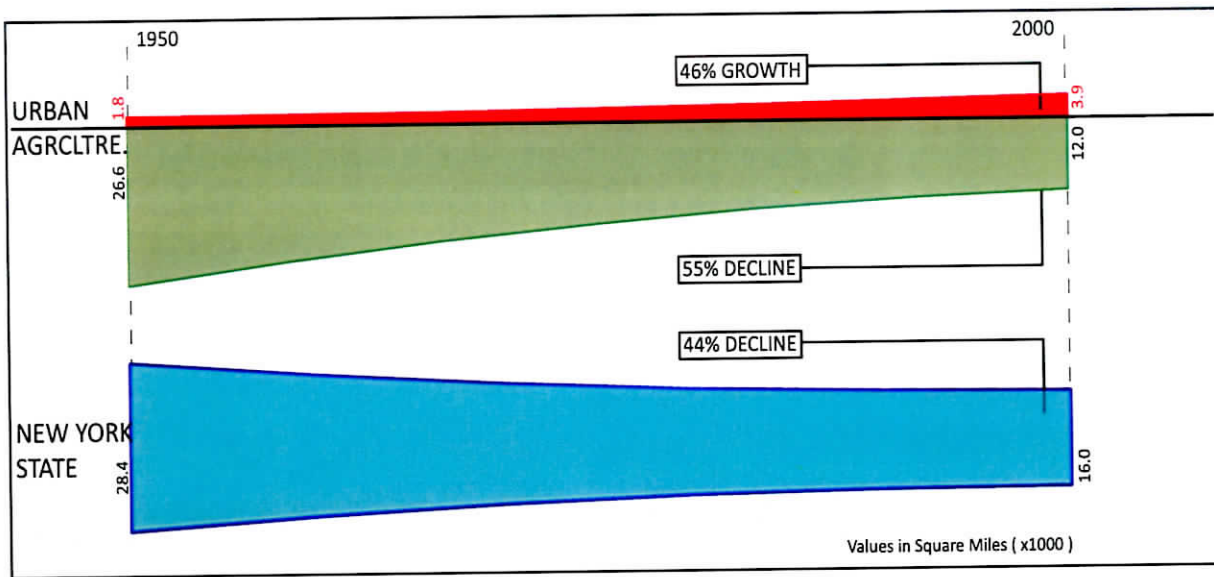
2. Demographia.com

WHY IS RURAL AMERICA IMPORTANT?

Rural America is important because it makes up 20% of the population and covers over 90% of the total land acreage of the United States. Rural agricultural farms are also responsible for the vast majority of our nations fruits, vegetables, cereals and meats.



DOMESTICATED LAND USE



Domesticated Land refers to a parcel measured in square miles that has been cultivated for human use. The land may be derived from a natural state such as wilderness, meadow, wetland or mountain, but may also be conceived from existing domesticated landscapes. Domesticated Land is secondarily understood as having embedded within it the capability to produce something of value to humans. Such rural productive land would include agriculture, live stock, gathered natural resources, and townships. Examples of urban land would be the city itself as an economic engine, nearby industry or manufacturing at the metropolitan edge.

In both diagrams to the left a significant shift has occurred in rural and urban domesticated land. Within a fifty year span, ranging from 1950 to 2000, the nation has lost 22% of its productive agricultural land. During this same period urban centers have had a growth of 32%. What is this data saying? The data emphasizes the growth of cities and the decline of rural areas. It is Sparsification at work, reflecting current cultural thinking that a rural agrarian way of living cannot produce a productive lifestyle.

NEWFIELD, NY

Tompkins County

Population: Apx 5,100

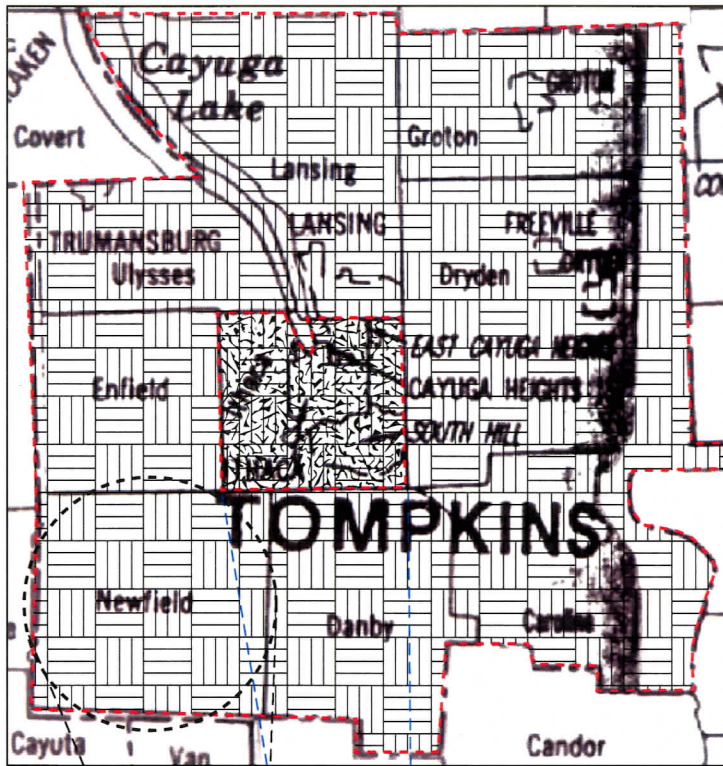
10 Year Population Change: -6.5% Hamlet

Household Vacancies: 6.4% (2000)



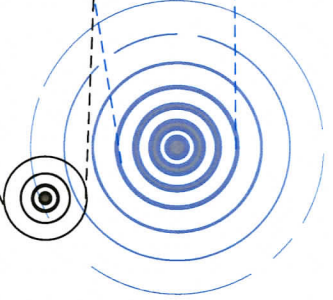
Two common sparsification trends: Clearing agriculture land to build isolated homes and Abandonment of traditional farmsteads.

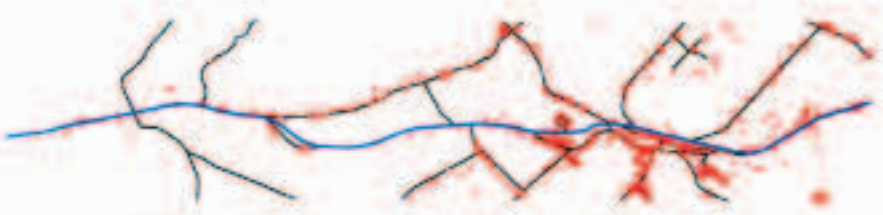




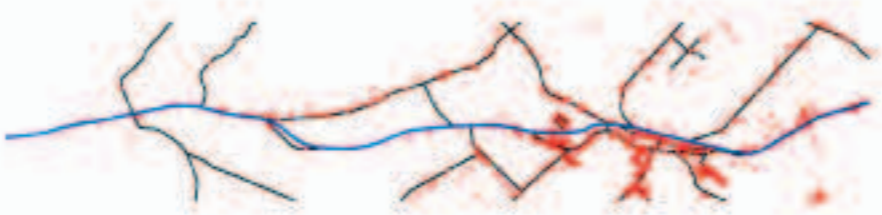
NEWFIELD, NY

The town of Newfield located in central New York, just outside the City of Ithaca, is a prime case study example of urban concentric influence. Once a thriving agrarian community, the village center and large portions of the populated areas now make up this bedroom town. Established in the early 1800s, the towns name was derived from the vast quantities of uncultivated land suitable for farming. The village center developed as a result of this resource. A variety of agricultural practices were performed in Newfield, and ranged from subsistence gardening to large production farms. Within the village there are at least a dozen farm buildings that remain and profess the towns agricultural roots. The village center suffered great losses to several fires during the late 1870s through the 1960s, ravishing the town hall, library, numerous churches, homes, a furniture factory and dozens of small businesses. As the town was continually stripped of it's community amenities, agriculture prevailed as Newfield's identity. In 1960 the road that connected Ithaca to Elmira was rebuilt as Rt 13 and bypassed the town center, having a profound effect on the economy. Nearby universities, hospitals and manufacturing jobs in Ithaca became more accessible and residents either moved away from the town or the farmer was replaced by a non-agrarian workforce (Emerson 2001). Today the effects of sparsification are evident throughout the township. Abandoned homes, derelict farm buildings, and single detached homes speckle the region. The diagrams on the facing page details the fragmented settlement pattern and dispersed population.

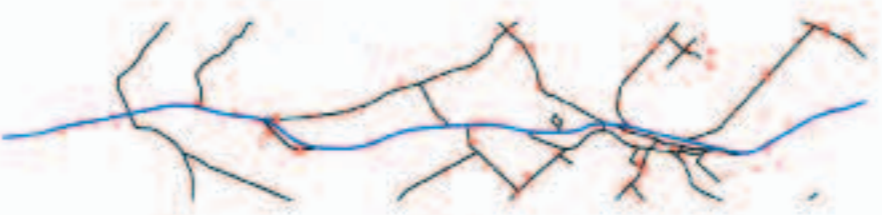




SINGLE DWELLING + MULTIPLE DWELLING +
VACANT DWELLING + FARM BUILDING



SINGLE DWELLINGS



FARM BUILDING + FORMER FARM BUILDING



FARM BUILDING

Authors diagrams based on aerial map edited from Google Earth.



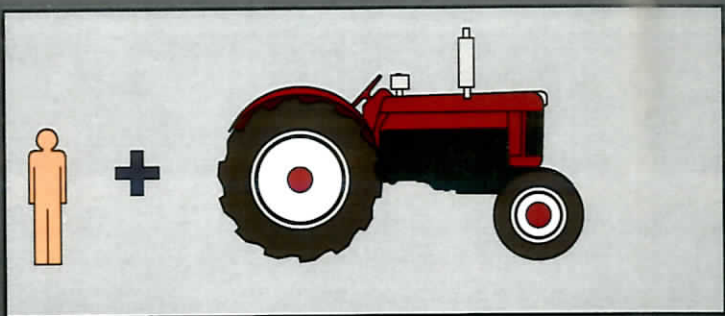
“Now, the master of a...villa finds health in the change it affords from his occupation as a citizen; ...in the personal cultivation of his garden. He also finds enjoyment, not only in his family, friends, and books, but in his garden, and in the other rural objects which he can call his own, and which he can alter at pleasure, at a trifling expense, and often with his own hands. It is this which gives the charm of creation, and makes a thing essentially one’s own....The master of a [rural] residence , however small may be his demesne, may thus procure health and enjoyment at the same time, with more certainty than the possessor of a larger property; because his ground lie more in his hands, and he can superintend every change himself.”

(Louden, J.C. 2006,

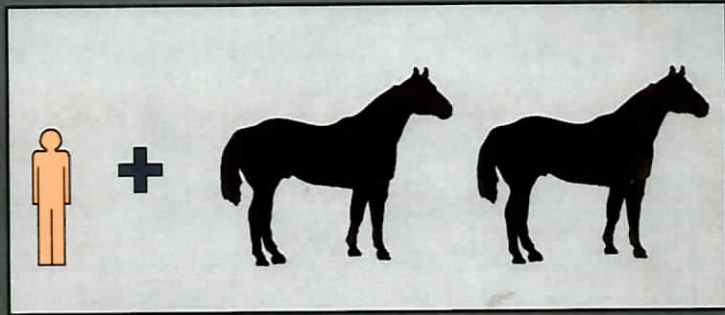
J C Louden wrote these words in 1886 England, and what’s important to recognize in the authors words is an idea that a degree of pleasure can be derived from working with the land. The notion of ones own hands cultivating the soil to produce something productive or beautiful can evoke an enjoyment not found in the other parts of life. In many respects this thinking has been embedded in agriculture since civilizations moved past subsistence farming. Agrarian communities in the United States have since moved into a period of over productivity; where crops are grown to provide for a country that is four fifths urban and rely heavily on livestock for meat, milk and cheese. The city dwellers connection to farm has been reduced to a silhouette of a cow on the cottage cheese container. This thesis is not claiming a need for metropolitan America to become farmers, but questions the validity of rural dwellers who, like the urbanite, have disconnected themselves from productive landscapes. This form of Sparsification is largely due to mechanization in agriculture. Bigger, more, better, faster has become the mantra, and fewer laborers are required to carry it out. What has not been addresses in rural American is the fact that the procedures have change but the traditional agrarian model has not. A reassessment of contemporary rural living must take place with proper attention being paid to agriculture, as well as its subsets in mechanization, technology, predominate practices, harvesting, labor, and sustainability, in order to generate a new model.

TOP: Lancashire database image, #2179, 2008. Lancashire, UK.
<http://www.lancashire.gov.uk/> (accessed March 29, 2008).

Louden, J.C. 2006. “The Suburban Gardener and Villa Companion”. In *The Suburban Reader*, ed. Becky M. Nicolaides and Andrew Wiese, 16-18. New York: Routledge.



1 Man + 1 Tractor = 8 Acres Plowed / Day²

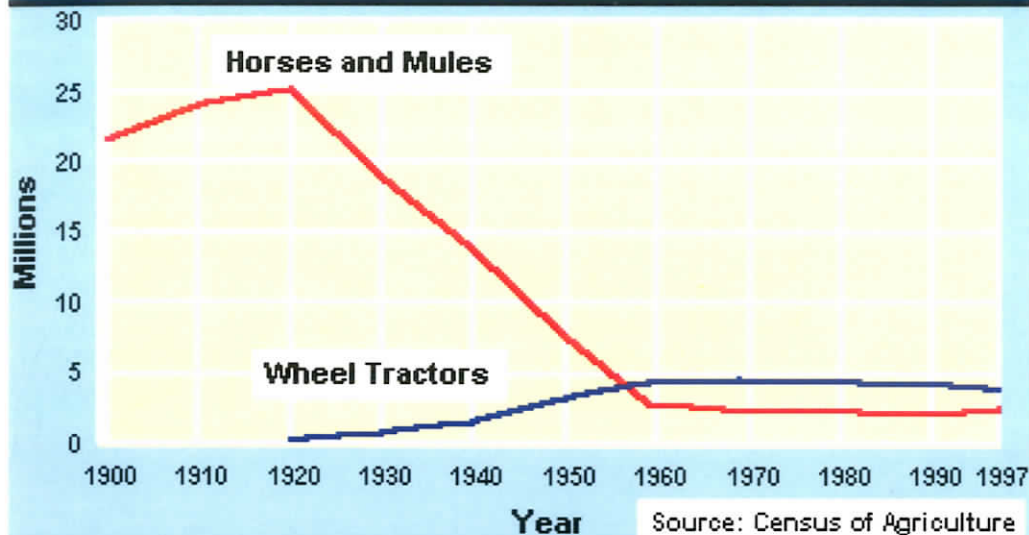


1 Man + 2 Horses = 1.5 Acres Plowed / Day¹

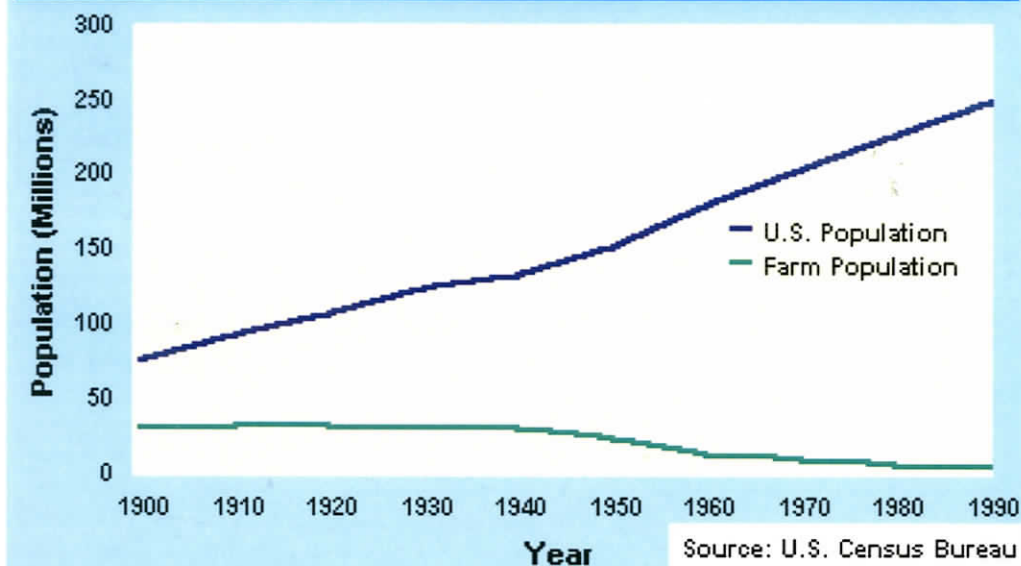
Authors diagrams based on data from
1. USA TODAY, "Horse-and-plow farming makes comeback in U.S.," <http://www.usda.gov/nass/pubs/trends/farmpopulation.htm>.
2. African Technology Forum, "Mathematical Models Can Make Farmers More Efficient," massachusetts institute of technology. <http://web.mit.edu/africantech/www/articles/MathFarming.htm>

Photo by Loomis Dean. USA. For LIFE Magazine.

Farm Mechanization: 1900-1997



U.S. Population and Farm Population: 1900 - 1990



The mechanization of agriculture has played a significant role in changing the face of farm labor. The need for large numbers of full-time workers to till, sow and tend crops has been reduced to seasonal harvest laborers or in some instances been supplanted by more machinery.

The graph on top shows the drastic decline of horses and mules as the primary means of "mechanized" cultivation of farmland. From 1900 to 1920 a steady reliance on this mode of production is apparent. With the introduction of the Wheel Tractor in the early 1920s a major shift began to take place in US agriculture. The "sweat of your brow" was replaced with the "quality of your machine."

The wheel tractor represented the first significant implementation of mechanized farming methods. Mechanization has had a direct effect on hired farm workers as they have been replaced by various machines. In the past it might have taken dozens of workers to do the same task as a new farm apparatus performs while being operated by a single individual.

The photo by Loomis Dean on the facing page demonstrates the speed and power of mechanized farming. It also explains the bottom graph in which farm population has declined while the National population continues to grow. New machines and better technology have been the accelerant in this process.

CLASSIFICATION AND THE RECONSIDERATION OF CONTEMPORARY RURAL LIVING



Photographer: Andrew T. Sawyer, 2006. For the AP. USA

85%

Fruit and vegetable crops in the U.S.
still harvested by hand
for human consumption¹

24 FRUITS / 21 VEGETABLES

Still require manual harvesting
throughout the U.S.²

NEW YORK STATE HAND HARVESTED CROPS			
Crop	Fresh	National Rank	Labor Hours per Acre
Apples	B	2nd	50
Grapes	F	3rd	50
Pears	B	4th	55
Strawberries	B	7th	200
Cauliflower	B	3rd	80
Cucumbers	F	5th	150
Snap Peas	F	5th	75
Sweet Corn	F	4th	30
Tomatoes	F	13th	50

Fresh: (F) Hand harvested for fresh produce only
(B) Hand harvested for fresh and processed delivery

The history of agriculture is littered with examples of man cultivating the land with his bare hands. Tilling, sowing, weeding, watering and harvesting. Despite numerous improvements of primitive tools, animal assistance, mechanical production and technological advancement, human labor continues to play a significant role in farming.

With 85% of fruit and vegetable crops being harvested by hand, the U.S. must continually consider the value of the farm worker and the small scale farm enterprises that supply the market with fresh produce. Without adequate labor populations, thousands of acres of the 24 fruits and 21 vegetables hand picked would rot in the fields or drop from tree bows.

New York State ranks among the nations top producers for numerous hand harvested crops. Most notably, New York ranks 2nd at 50 labor hours per acre for apples. Apples that are gathered for both fresh and processed delivery.

Though the farm population workforce has steadily declined since 1900, New York has been able to maintain it's productivity levels. With the employment of seasonal, transient and migrant workers, farmers have been able to implement varying degrees of mechanization without fully sacrificing the need for manual labor harvesters.

1. National Farm Workers Ministry. www.nfwm.org (accessed April 11, 2008).
2. Center for Immigration Studies (CIS). www.cis.org (accessed April 11, 2008).
Chart produced by Author with data from CIS and the New York State Department of Agriculture & Markets. www.agmkt.state.ny.us (accessed April 12, 2008).

SPARSIFICATION AND THE RECONSIDERATION OF CONTEMPORARY RURAL LIVING



The Potato Farmer, 1992. Stuart Franklin. Photograph.

3 - 5 MILLION

Farmworkers labor in the fields of the U.S. each year.¹

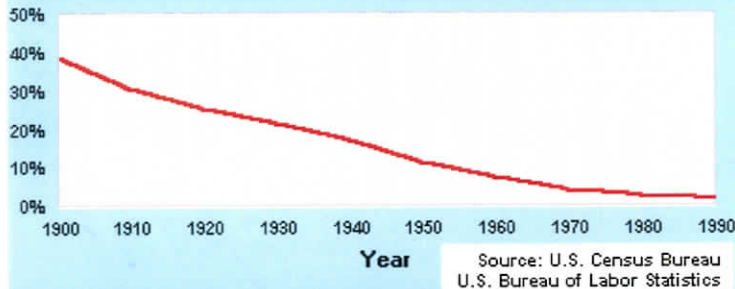
77%

Of these workers are Mexican.¹

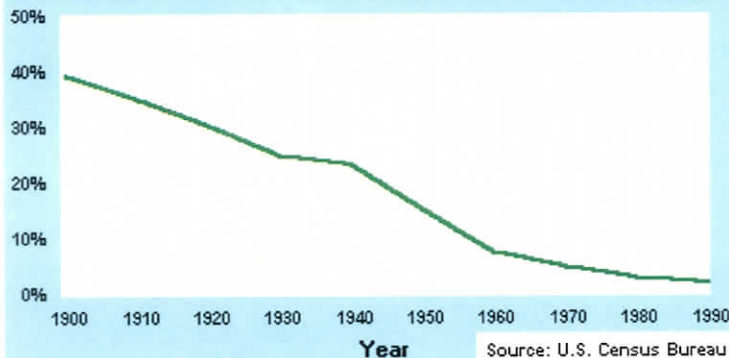
Apx. 56%

Are migrant workers.²

**Percent of U.S. Labor Force Working on Farms:
1900-1990**



Percent of U.S. Population Living on Farms: 1900 - 1990



There has been a dramatic shift in the agricultural labor force of U.S. since the beginning of the 20th century. Farm labor has declined nearly 35% from 1900 to 1990. A similar decline has taken place in the population actually living on farms, a drop of almost 38%.

What these graphs really express is the decline of the *full time* farm worker. While the population of those living on farms is a fraction of what it was in 1900, the actual need of manual labor remains true. The data shows that fewer US citizens are viewing this type of work as a viable means to live by. The void in the workforce is being filled by migrant workers, some legal, some illegal.

As the machine age has reduced the need for large quantities of full time farm laborers, it is most often during the harvest season that the vast number of these workers find employment. This explains why an estimated 56% are migrants who travel long distances from their homes for work.

Often traveling in large groups under the direction of a gang leader, the workers assume a nomadic quality. They create a new community and temporary population density in the places they find work.

1. National Farm Workers Ministry. www.nfwm.org (accessed April 11, 2008).
2. National Agricultural Workers Survey (NAWS). www.doleta.gov (accesses April 11, 2008).

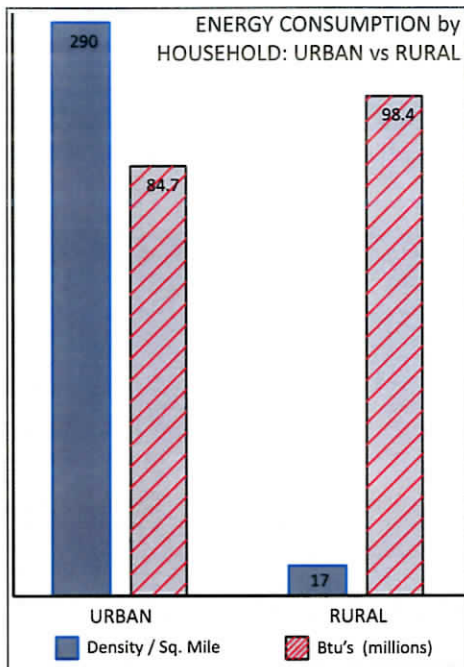




INTRODUCTION: SUSTAINABILITY

Sparsification of rural areas has caused other related topic to surface that have become just important as agriculture or community. The concept of sustainability is gaining ground throughout the world and primarily with developed nations. Sustainability is an evolving term that has different meaning today than it did a century ago or will have one hundred years from now. Certain sustainable practices have been in use for untold years, while others have recently been developed through technology and research. Sustainability, in it's crudest format, is the practice of conservation and reuse of materials and natural resources in a manner that is less harmful to humans as well as the environment.

Sustainability will become a integral part in the construction of a new model for contemporary rural living as asserted in this thesis. The data sets in this section will reveal areas of greatest energy consumption and outline accepted design practices found in both architecture and agriculture. Currently, the major focus of sustainability has been towards architecture and the build form. Buildings have been identified as the major culprit of greenhouse emissions, but much less attention has been given to softening the effects caused by farming. Federal and State governments have initiated programs such as the U.S. Green Building Council (architecture) and E-Farm (agriculture) in New York State to assist in developing sustainability as a daily commitment in ones lifestyle. This section also expands on the connection between sparsification and the need for sustainable practices in contemporary rural living.



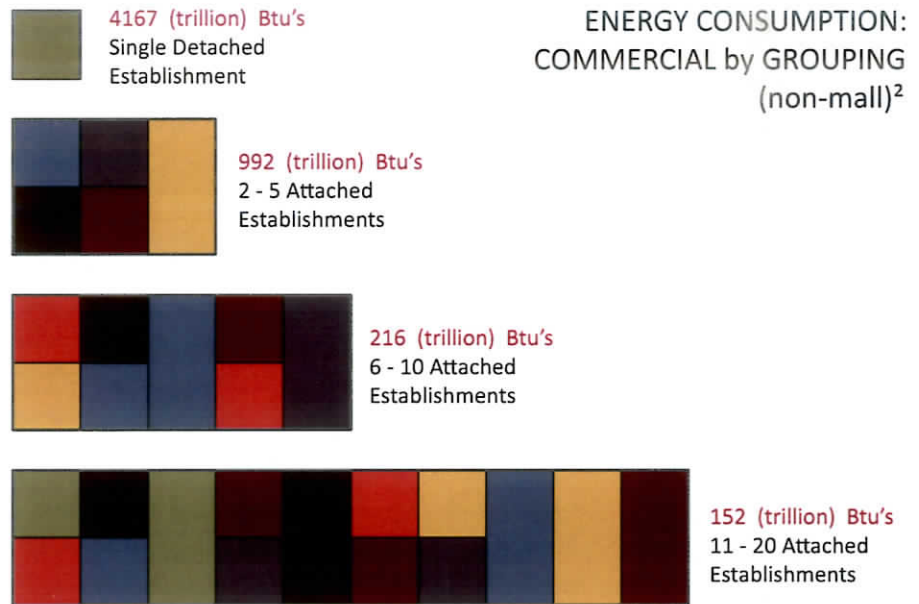
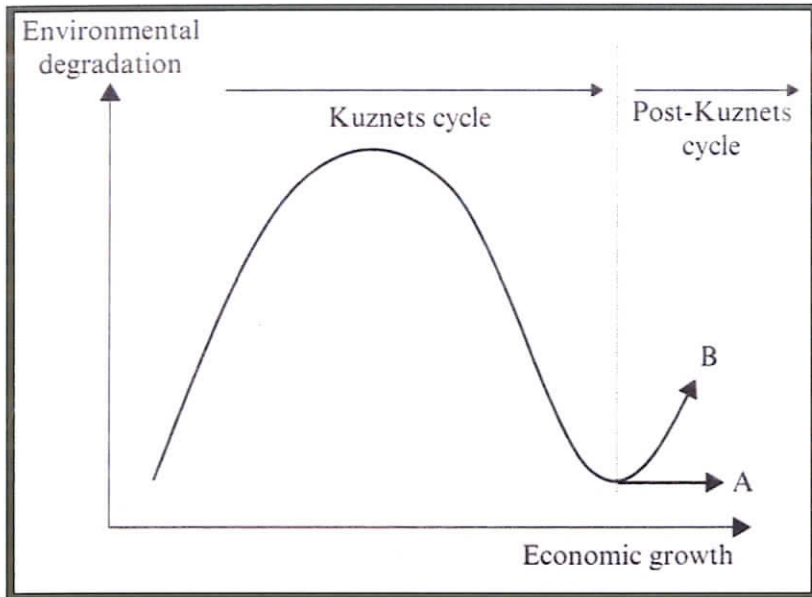
The **LEFT** graph depicts the relationship between density and energy consumption. When compared side by side, the disparity between rural energy consumption is decidedly higher than that of urban areas. The relationship between density and energy consumption can be understood as the equation:

$$\text{HIGHER DENSITY} = \text{LOWER ENERGY CONSUMPTION}$$

The **RIGHT** diagram depicts the relationship between the density of residence type and energy consumption. Detached Single family homes represent the greatest energy consumer by unit. When compared side by side, the decreased energy consumption is readily apparent as units are clustered into large apartment buildings. The relationship between density by residence type and energy consumption can be understood as the equation:

$$\text{HIGHER DENSITY RESIDENCE} = \text{LOWER ENERGY CONSUMPTION}$$

Rural areas are primarily composed of detached single family homes, and as this data displays, they are presupposed to consume higher quantities of energy because of their spatial proximity and density. By this set of information only, it would appear that only dense urban living is a viable manner of reducing energy consumption. Should this route be taken, sparsification in rural areas would increase dramatically, and without a re-examination of the rural agrarian model. Energy consumption through density, can however be addresses within the framework of this thesis as traditional and current farmsteads operate within a series of differently programmed structures.



The Kuznets Cycle graph is a theoretical proposal connecting Economic Growth and Environmental Degradation. Kuznets theory surmises that as economies grow beyond mere subsistence living, there is a marked climb in environmental degradation. As economic and physical growth continues, citizens values shift towards environmental conservation, thus creating an atmosphere for sustainability.

The Kuznets theory also supposes: (A) That an equilibrium of economic growth and sustainability takes place, or (B) New technologies make it easier to interact with sustainable landscapes and the cycle of environmental degradation again take hold.¹

The **TOP** diagram depicts the relationship between clustered commercial establishments and energy consumption. Yearly values are based on single units within grouping. The data reflects a reduction in energy consumption when commercial establishments are grouped together. The 11-20 cluster becomes the optimal size for maximum energy savings. Malls have been excluded as they have interior space not directly attributed to the individual establishments. The relationship between commercial grouping and energy consumption can be understood as an equation:

$$\text{LARGER COMMERCIAL GROUPINGS} \leq 20 = \text{LOWER ENERGY CONSUMPTION}$$

The clustering of commercial establishments have shown to decrease energy consumption per unit. Commerce, being the driving economic force of cities, also has a negative connotation in terms of environmental degradation. The Kuznets Cycle charts environmental degradation against economic growth. Taking both sets of information into consideration, it can be concluded that density of any scale for economic advancement will have a negative effect on the environment. For this reason, sustainability must factor prominently into this thesis, as the new model of contemporary rural living seeks to interact with the physical landscape and create a productive (economic) environment.

1. Graph from Marcouiller 2005, 11-12, text paraphrased by Author.
 2. Authors diagrams based on data from Energy Information Administration. www.eia.doe.gov

TABLE 5.1**Savings in Water and Sewer Infrastructure under Compact Growth Scenario, United States, 2000–2025**

	<i>Number of New Water and Sewer Laterals</i>	<i>Cost of New Water and Sewer Infrastructure</i>
Sprawl growth scenario	45,866,594	\$189,767,000,000
Compact growth scenario	41,245,294	\$177,160,000,000
Savings	4,621,303	\$12,609,000,000
Percent savings	10.1	6.6

TABLE 5.2**Water/Sewer Infrastructure Costs by Type and Location of Unit**

<i>Type</i>	<i>Single-Family Detached</i>	<i>Single-Family Attached</i>	<i>Multifamily</i>
Rural: septic	\$9,600	n/a	n/a
Suburban: package	\$8,500	\$5,755	n/a
Urban: public system	\$6,540	\$5,050	\$3,860

TABLE 5.3**Savings in Road Construction under Compact Growth Scenario, United States, 2000–2025**

	<i>Miles of New Roads</i>	<i>Cost of New Roads</i>
Sprawl growth scenario	2,044,179	\$927,010,000,000
Compact growth scenario	1,855,874	\$817,310,000,000
Savings	188,305	\$109,700,000,000

SERVICES AND UTILITIES

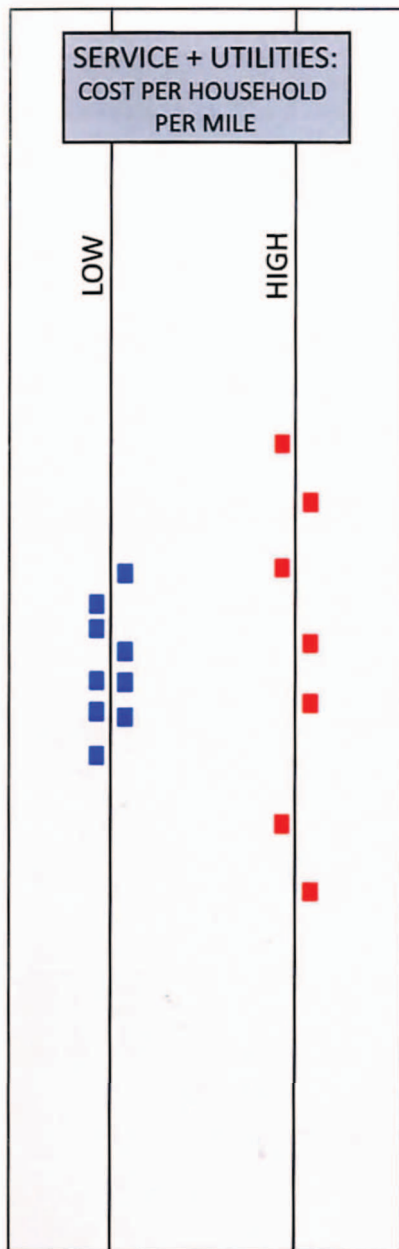


TABLE 6.1

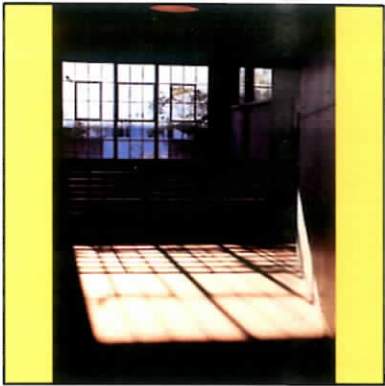
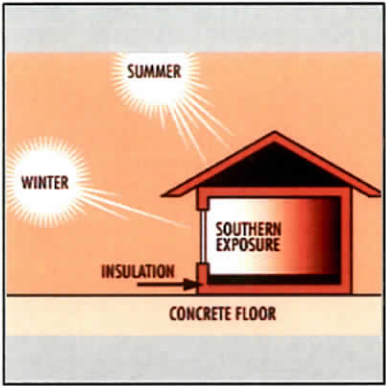
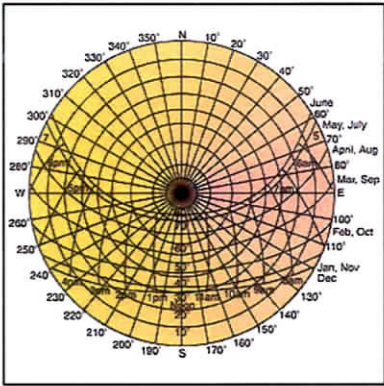
Property Development Savings under Compact Growth Scenario, United States, 2000–2025

	<i>Per-Unit Property Development Costs (\$)</i>		<i>Aggregate Property Development Costs (\$ Billions)</i>		
	Residential	Nonresidential	Residential	Nonresidential	Total
Sprawl growth scenario	167,038	75,463	4,377.3	1,998.1	6,375.4
Compact growth scenario	154,035	74,598	3,993.0	1,962.1	5,955.1
Savings	13,003	865	384.3	36.0	420.3
Percent savings	7.8	1.1	8.2	1.9	6.6

Sparsification, fragmentation, and dispersed populations have caused rural areas to experience effects beyond community decline in the economics and sustainability of infrastructure and municipal services. Municipalities who provide water and sewer lines are projected to see a 10% savings in areas of compact growth between 2000 and 2025. The study done by the Center for Urban Policy Research at Rutgers University also finds that rural (less dense) single family detached homes will pay significantly more for a septic tank than urban (higher density) homes of the same type who are linked into the public system. The results of sparsification causes undue hardship on small towns when they become fragmented rather than depopulated. Utilities and services become extended to provide for fewer users per linear mile. Sparsification becomes a burden on the rural economy and sustainability is disregarded while miles of additional piping is employed for sewage or filled with quantities of excess water. The diagram to the LEFT attempts to illustrate the compact vs dispersed scenarios and their associated costs. Table 5.3 references road construction savings for compact growth, and it could be assumed that telephone, electricity and cable services would also reap similar benefits. Sparsification has broken the trend of tightly woven rural centers and townships are less able to take advantage of economic or sustainable practices. New models for contemporary rural living must consider the additional costs of greater independence and design sustainable alternatives that will reflect an economic competitiveness if not a savings.

SUSTAINABLE DESIGN PRACTICES

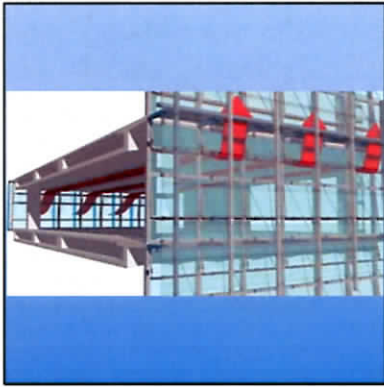
SOLAR:
ORIENTATION
PASSIVE GAIN
NATURAL LIGHTING



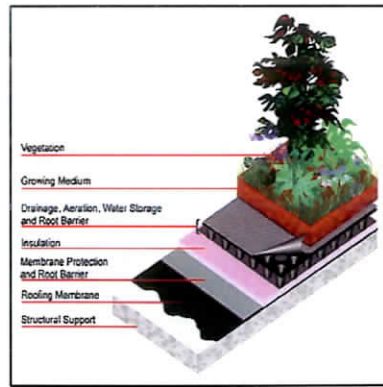
ALTERNATIVE ENERGY:
PHOTOVOLTAIC PANELS
WIND TURBINES



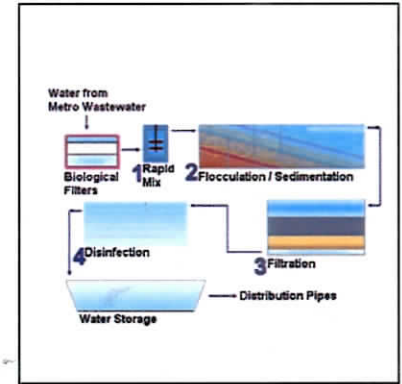
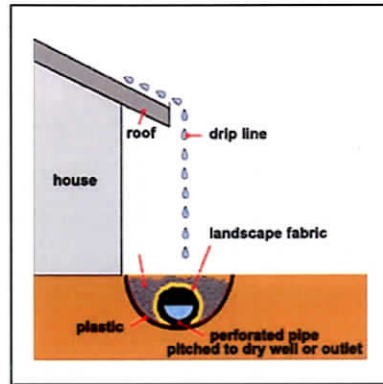
VENTILATION:
NATURAL MOVEMENT
SEASON USE
CLEAN AIR



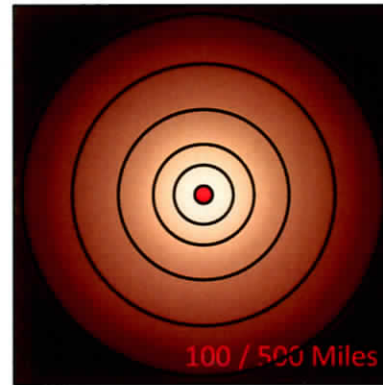
PLANTS:
GREEN ROOFS
LIVING WALLS



WATER:
COLLECTION
RETENTION
RECYCLING



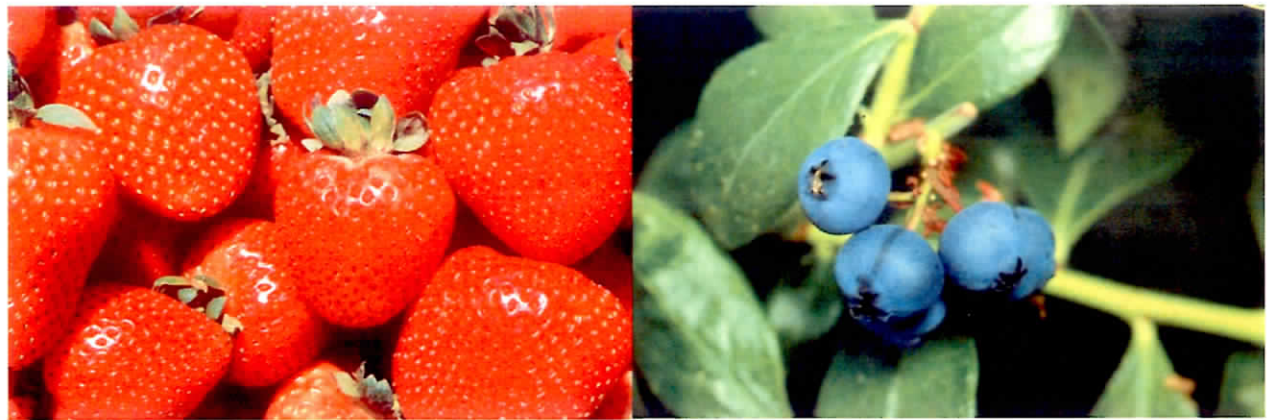
MATERIALS:
LOW EMBODIED ENERGY
LOCAL
NON TOXIC



SPARSIFICATION AND THE RECONSIDERATION OF CONTEMPORARY RURAL LIVING

WHAT IS SUSTAINABLE AGRICULTURE?

“Sustainable agriculture is one that produces abundant food without depleting the earth’s resources or polluting its environment. It is agriculture that follows the principles of nature to develop systems for raising crops and livestock that are, like nature, self-sustaining. Sustainable agriculture is also the agriculture of social values, one whose success is indistinguishable from vibrant rural communities, rich lives for families on the farms, and wholesome food for everyone.”



Sustainable agriculture integrates crop and livestock.

This increases biodiversity by creating natural, competitive, symbiotic and productive ecological relationships.

Sustainable agriculture is best suited to small or family scale farms.

The effectiveness of sustainable agriculture is enhanced when connected to local markets.

Organic produce is the fastest growing grocery segment in the US.

Organic produce in a local market is an example of niche farming.

Niche markets create economic viability and develop culinary regionalisms.

SUSTAINABILITY: AGRICULTURAL PRACTICES

FALLOWING:

Allowing depleted agricultural land to *rest* and re-establish productive soil. This process requires leaving the stalk and root systems from the previous years crop to remain in the soil. Any remaining nitrates are reinvested into the ground as the remnants decay. This is a method of sustainable agriculture is carried out every few years or as needed, depending the crops planted and the resilience of the soil in that region.

CROP ROTATION:

Crop rotation has been an established mode of retaining valuable farm land. Every crop requires a different mixture of nitrates, phosphates and other minerals found in the soil. Rotating crops from year to year enables certain nutrients to build up in the earth and benefit a different crop the following season. Farmers are often reluctant to do this because it usually means sacrificing a higher yield cash crop for a lower yield crop.

CONSERVATION TILLING:

Soil erosion is of great concern to the farmer. It can result in slow decline of agricultural land or have drastic consequences such as the “Dust Bowl” in the early 1900s. Erosion is the result of over worked land, but practitioners and science have converged to develop an experimental method of tilling the soil. A previous years crop that would normally be tilled under is left to release nitrates into the soil, a *cover crop* is planted so it’s roots can dig deep and loosen the ground; finally the cash crop is laid down on the surface and covered by a thick layer of mulch. This mode of planting greatly reduces the disruption of the soil that leads to erosion.





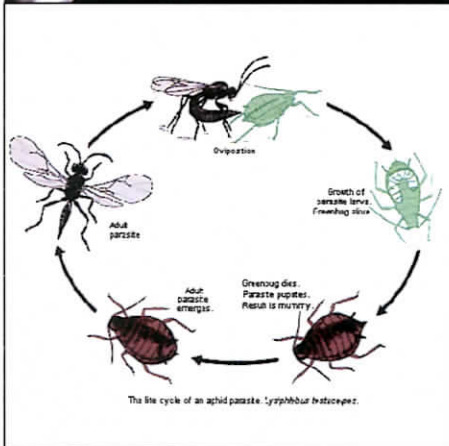
RAINFED AGRICULTURE:

Reliance on natural rainfall significantly reduces energy consuming practices of irrigation. The reliance on nature makes this portion of agriculture the most sustainable practice available. This method is only effective in portion of the US that garner consistent quantities of precipitation. Complete abandonment of irrigation would leave some states with little to no agriculture; California which has one of the longest growing seasons, would be effected the most.



CLEAN WATER:

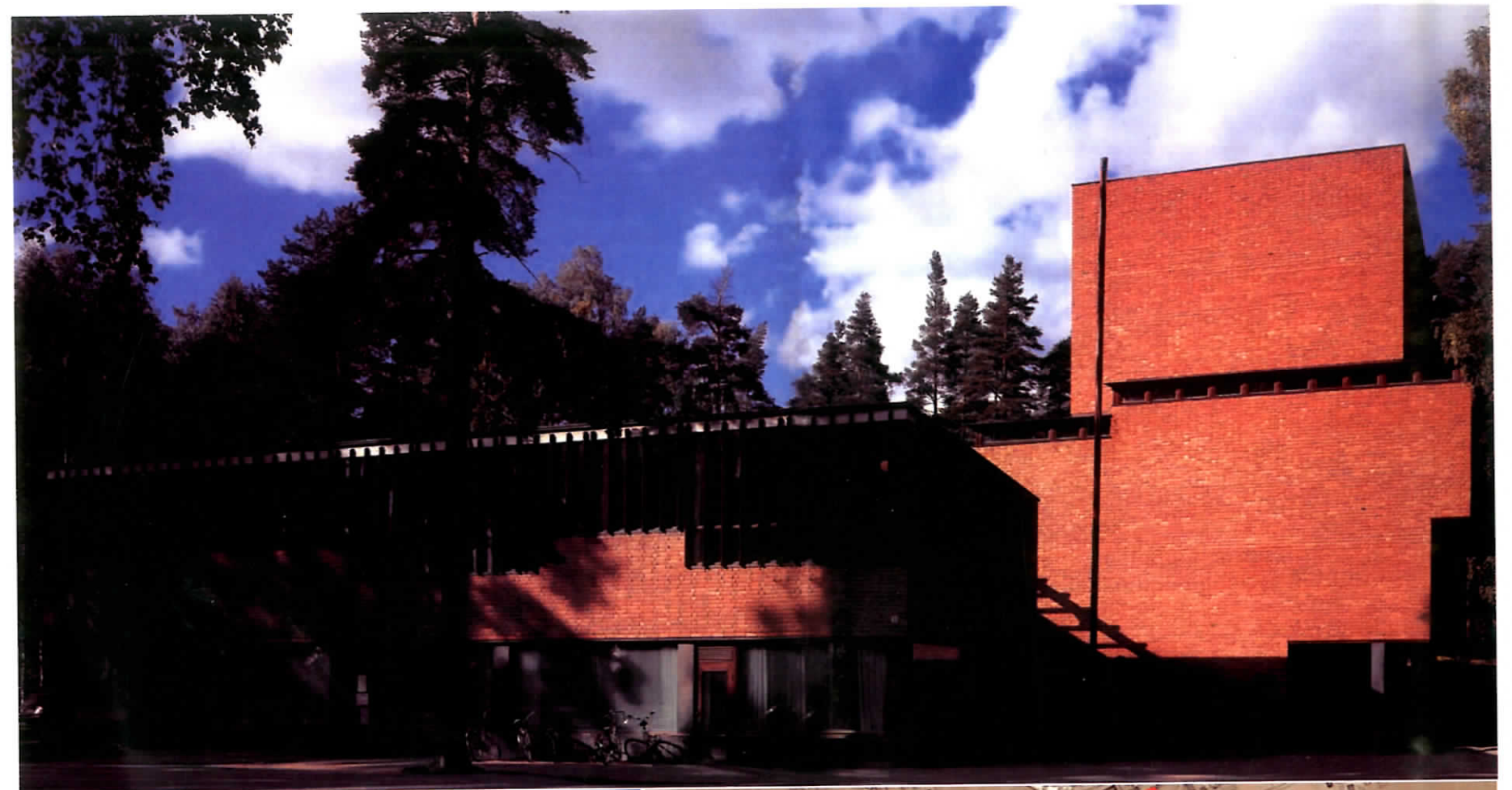
Clean water is most important to the farmer and his crops. In order to yield at crop at it's fullest potential, the water a farmer uses must be clean. The 1972 Clean Water Act was established in part to help protect potable water sources from pollution due to storm water runoff and self induced over fertilized crops that contaminate under ground reservoirs with nitrates and pesticides.



NO PESTICIDES:

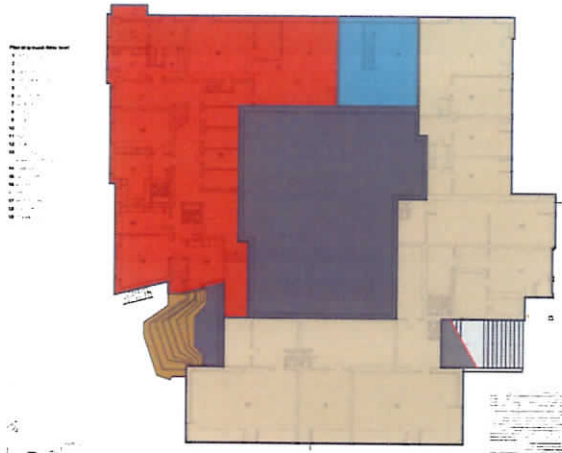
Pesticides have become a sticking point among growers and buyers. Farmers prefer them because they help facilitate a greater crop yield, while the consumer would enjoy their produce without a layer of chemicals. Pesticides have a short lifespan as various agents adapt to their effects. It is also very costly to use the chemicals as it requires crop dusting by plane or mechanical sprayers. The most effective, non pollution way to deal with unwanted bugs and insects is crop rotation which breaks pest cycles. By not using pesticides, a safer/healthier environment is created for the millions of farm laborers who pick these crops each year.

The numerous case studies found in this section were carefully chosen for specific qualities found within the design. That is not to say that a case study cannot be taken in its entirety, but given the projective nature of this thesis towards a new model, that would be highly unlikely. Some of the larger themes explored include landscape, combined programs, agriculture + housing, narrative, foreign models, sustainable techniques, agriculture + education/interaction, and farm workers housing. The case studies are only intended to be examples of specific themes and not designs to be picked at for the creation of a patchwork solution to contemporary rural living.



Saynatsalo Town Hall, 1952
Alvar Aalto

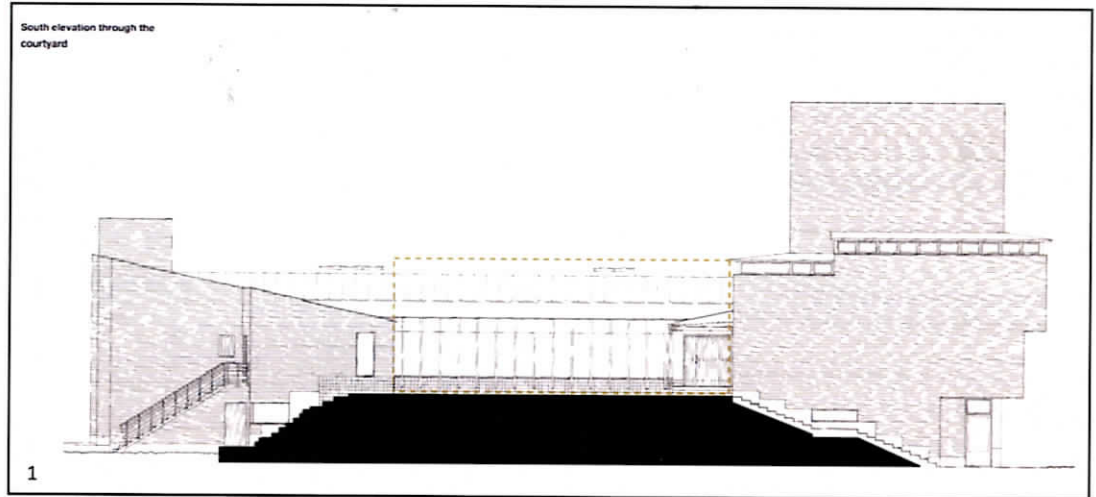
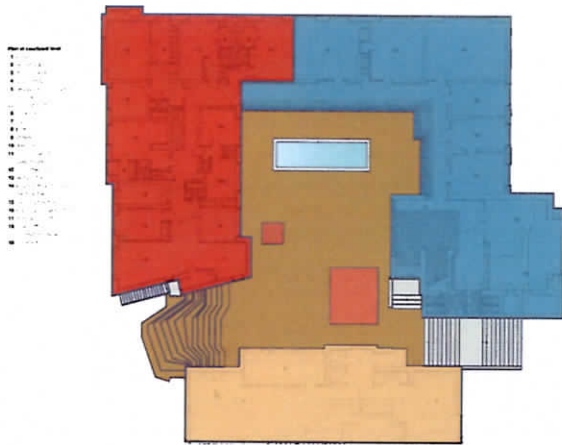
GROUND FLOOR



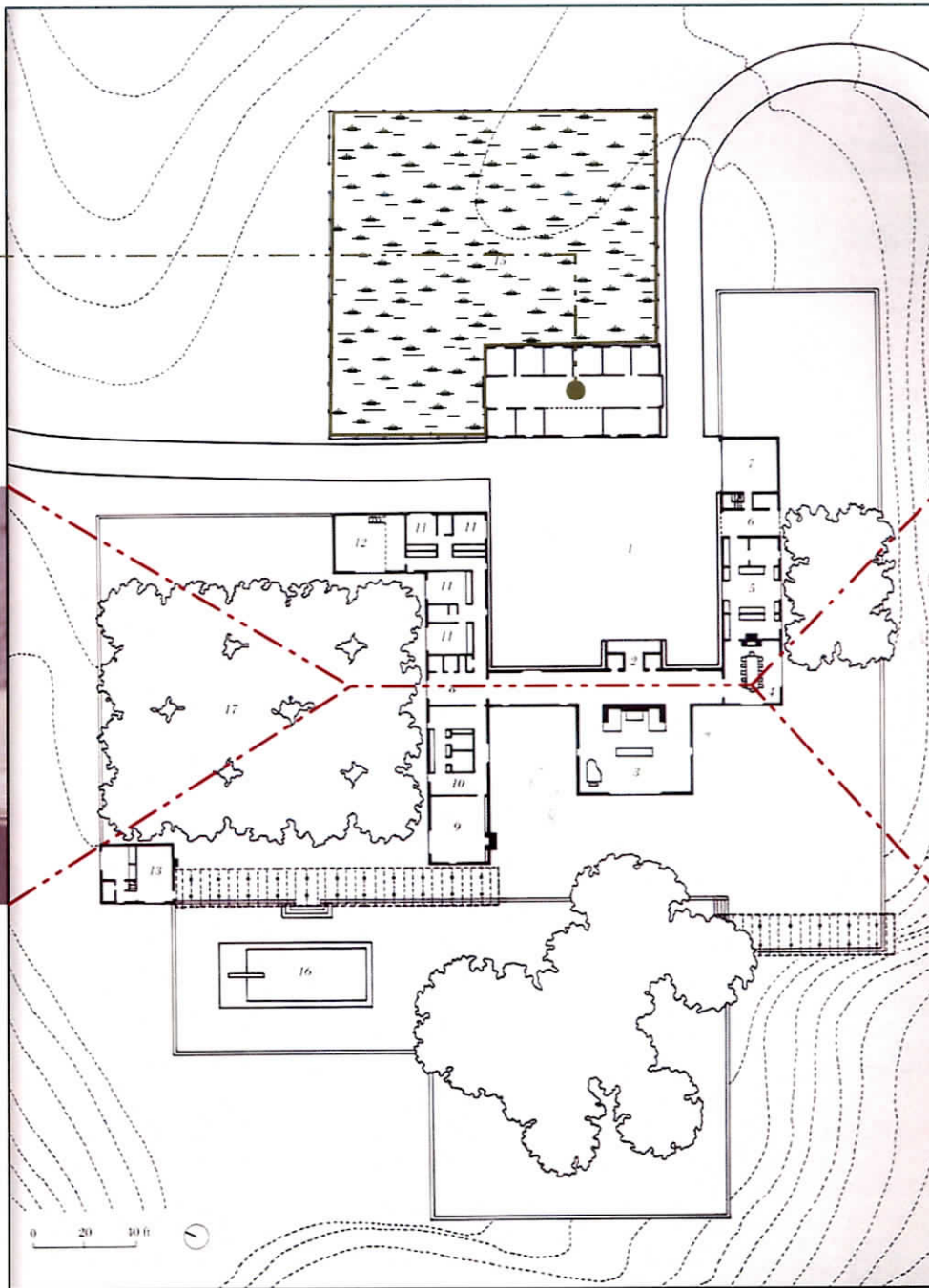
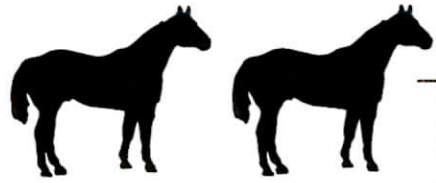
- RESIDENTIAL
- CIVIC [Town Hall]
- CULTURAL [Library]
- COMMERCIAL [Bank, Shops]
- COURT YARD
- EARTH INFILL

The Town Hall of Saynatsalo by Alvar Aalto was built in 1952 for a town of 2000. Designed as a culture and civic building, the town hall is an exemplary model of mixed programming on a very small scale. Acting as a miniature district, the structure includes the town hall, public library, residential units, bank and others small shops surrounding a courtyard. A reference to Tuscan hill towns, the court yard is raised like a mound to serve as the piano noble, thus linking landscape with architecture and elevating it's status.

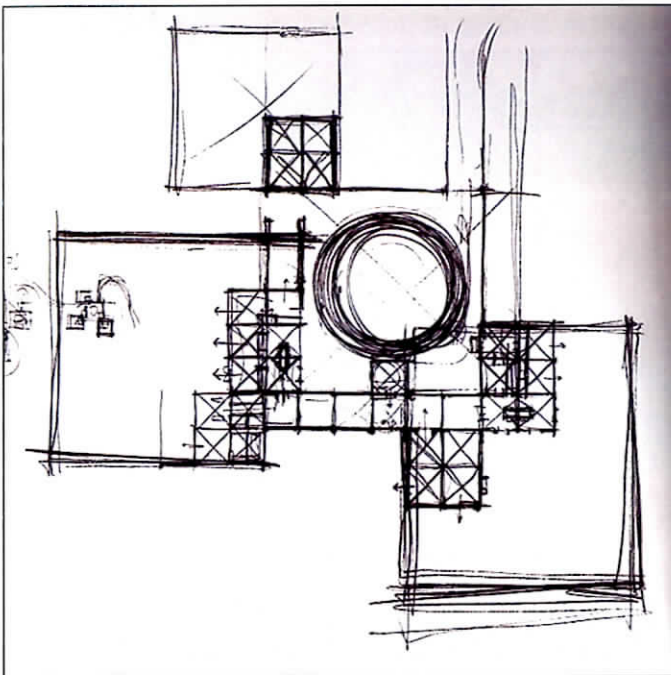
FIRST FLOOR



1. Authors diagrams based on images from Richard Weston, *Town Hall, Saynatsalo* (London: Phaidon Press Limited, 1993)



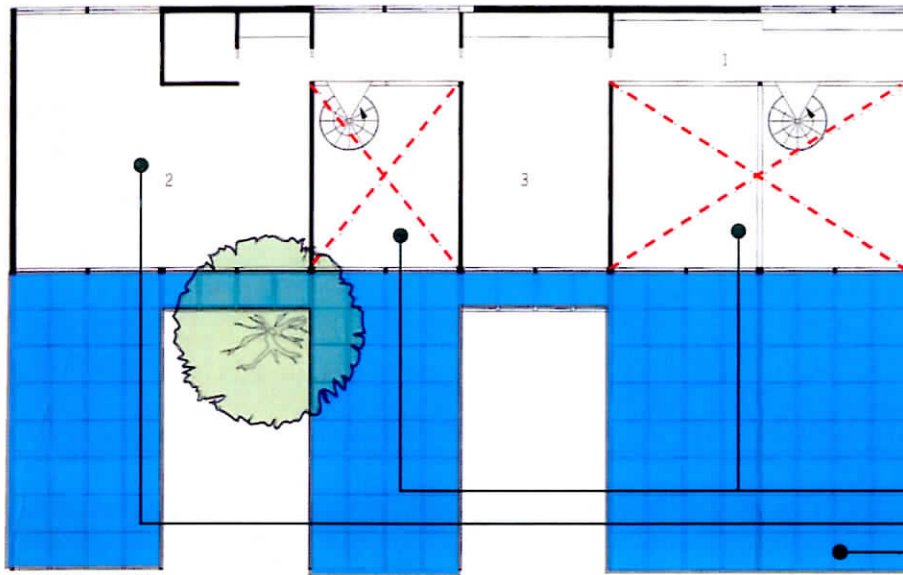
Cowles House, 1962
Edward Larrabee Barnes



The Cowles house is a country home set in a rural area and surrounded by agricultural land. The owner practices, to a degree, farming of wheat and growing of apples in the orchard as well as working animals. What is interesting about the design is the visual connections made between spatial orientations and framed views. The montage on the facing page depicts the view of the orchard as seen by the owner from the dinner table. Part of the theme might have been to remind the inhabitants of their surroundings and even where their food came from.



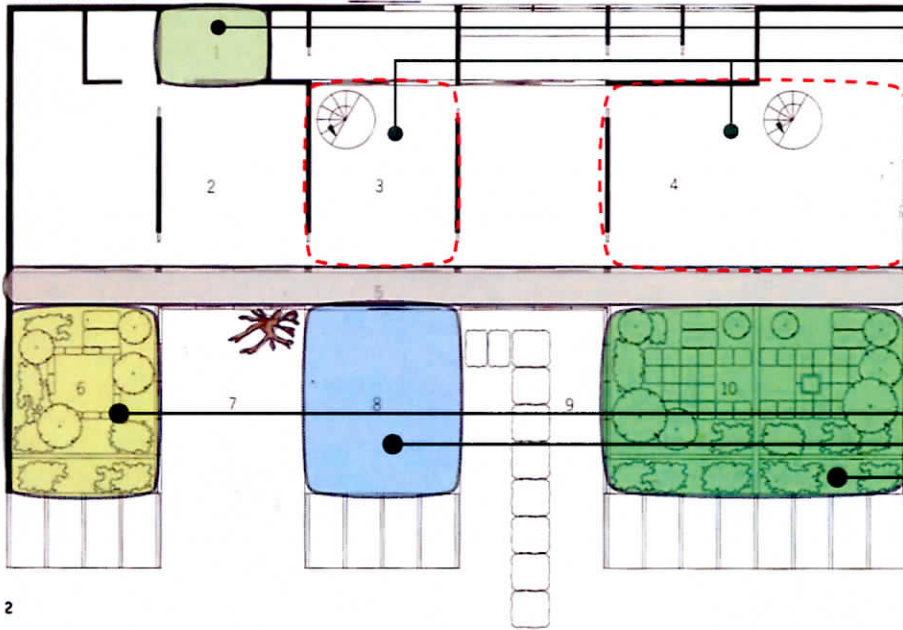
The house at Regensburg is a prime example of the intersection of modern and sustainability driven architecture. The pie shaped section of the house was conceived as a passive solution to solar heat gain and ventilation. The design also makes intentional strides in integrating house and conservatory. By placing the conservatory under the same roof line as the dwelling, Herzog facilitates a symbiotic relationship between garden and house.



SECOND FLOOR

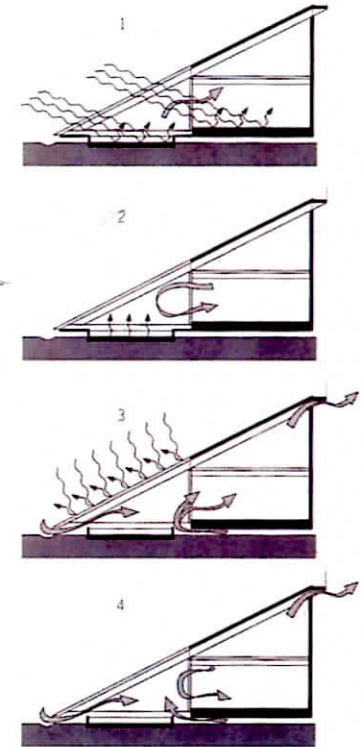
OPEN TO BELOW
APARTMENT
GLASS

FIRST FLOOR



PLANT ROOM
DOUBLE HT SPACE

FERN GREENHOUSE
COVERED PATIO
MEDITERRANEAN GREENHOUSE



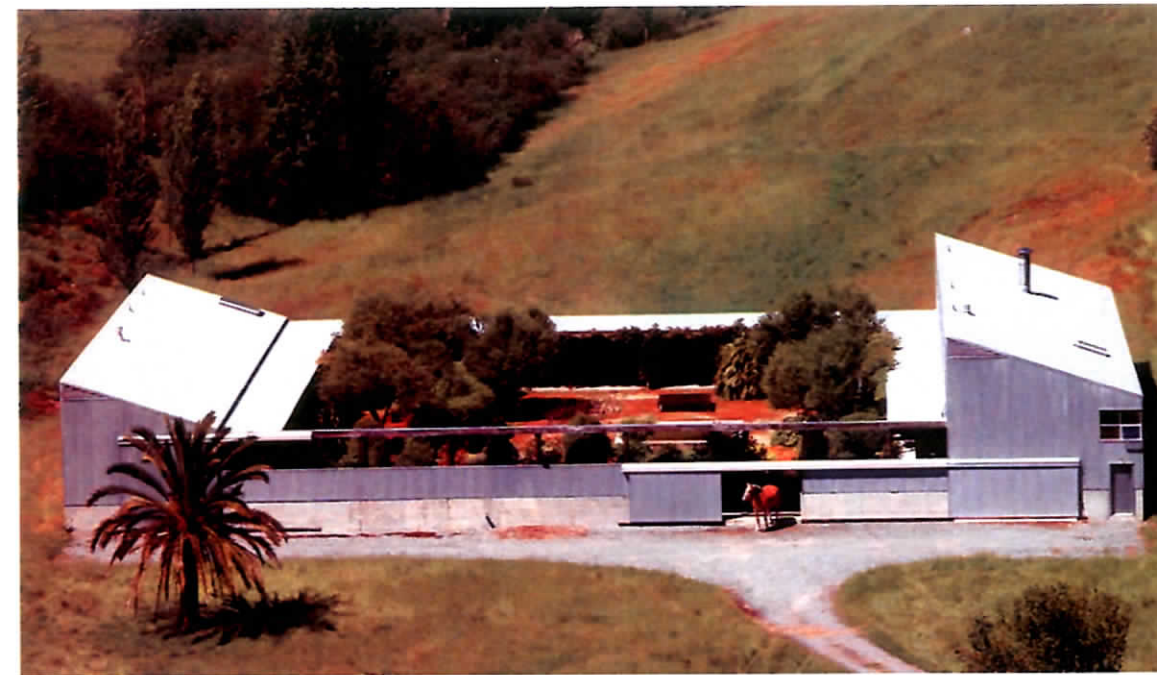
HOUSE + AGRICULTURE

Hillclimb Ranch
David Morton &
Thomas Cordell

The Hillclimb Ranch house has transformed the stable, paddock and home into a single compound. The enclosed paddock serves double duty as the recreation ground for Big Betty the horse and a back yard for the residence. The ranch attempts to connect the landscape of a working stable with every day living.

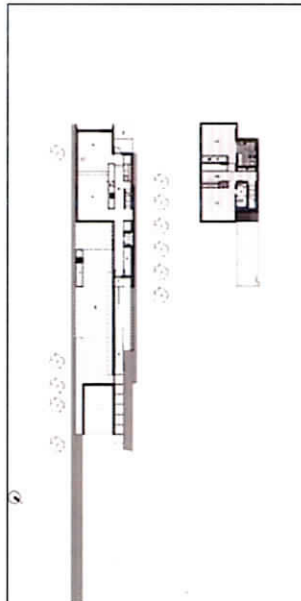
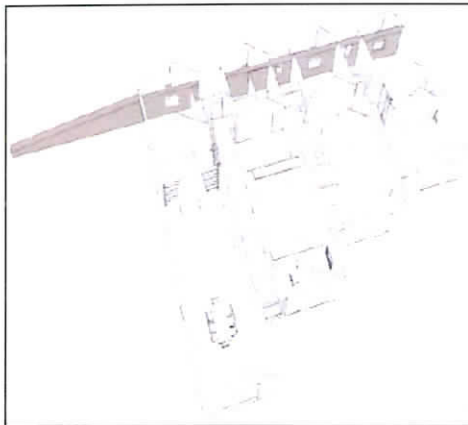
The Farm Project, 2007
Cologne
Mike Meiré

The Farm Project was an installation in Cologne during 2007 for a German bathroom fixture manufacturer. The company was looking to expand and asked Mike Meire to curate the project. Meire took the design as an opportunity to reassociate the food in the oven with it's living counterpart. Just two small ways he did this was to create a herb patch in the counter top and position a window that looks out to a bedded pen for a lamb.



The Farm Project

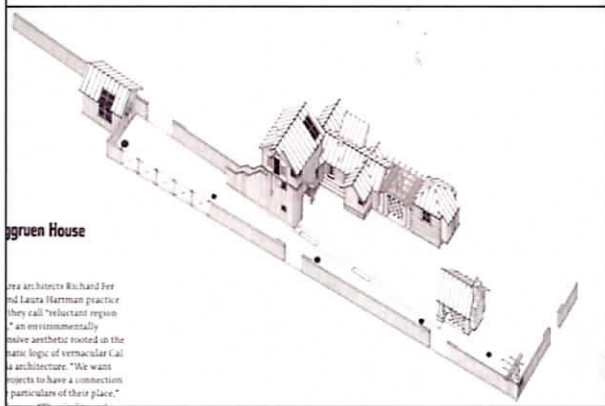
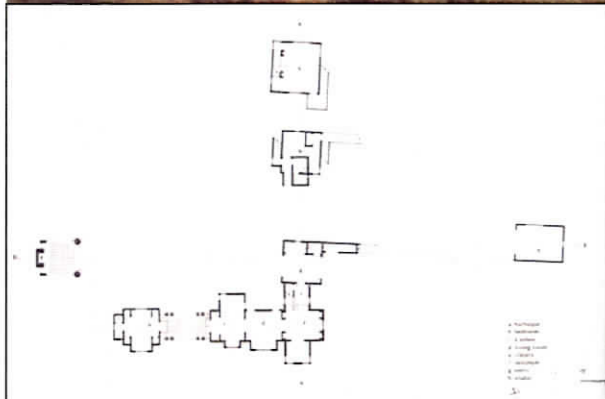




Urray House
Scottish Highlands
John Brennan.
(Left)

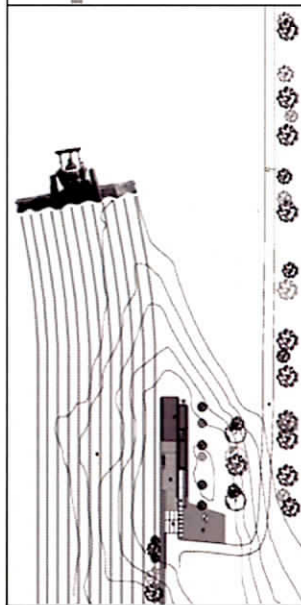
Berggruen House
California
Fermau & Hartmann
(Center)

CC_01 House NY
New York
Leven Betts Studio
(Right)



Berggruen House

Area architects Richard Fermau and Laura Hartman practice in a region they call "reluctant region" - an environmentally sensitive aesthetic rooted in the native logic of vernacular California architecture. "We want projects to have a connection particular to their place."

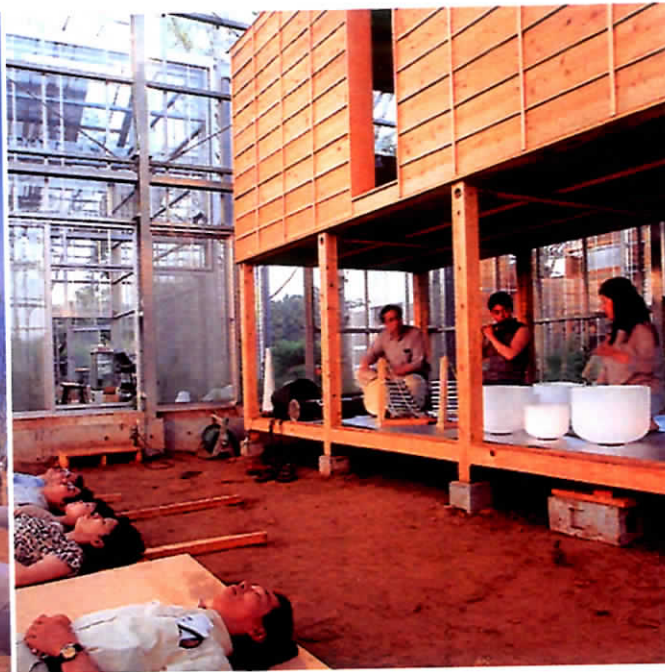


All three projects carry within them a narrative that is germane to their location. Urray House and traditional scale. Berggruen house is an evolving vernacular. CC_01 House mimics the croplines of adjacent farms. Narratives can be established in rural areas even if the location is remote or isolated.

NEW MODELS FOR LIVING

Millennium City, 2005
Japan
Hiroshi Iguchi

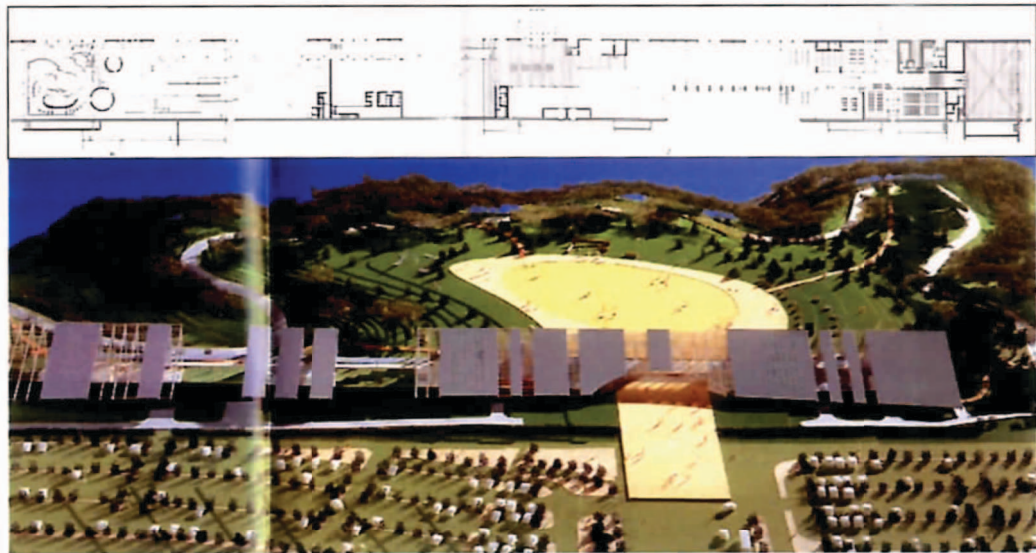
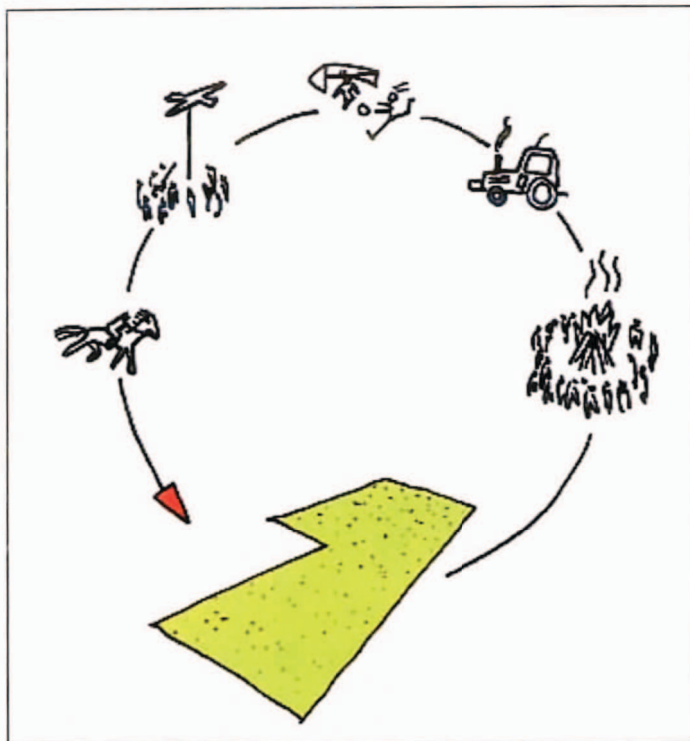
Iguchi's Millennium City is not a city at all, but a new way of thinking about living rural in Japan. Wooden units are built inside a series of greenhouses, complete with dirt floors. Iguchi suggest that living and farming can happen literally under the same roof.



Australian House of
the Future, 1992
Ackert & Dawson-Browne

This house was created as a showcase for sustainable rural living in Australia. Australia is one of the most sparsely populated developed nations in the world. The desire was to feature new methods and materials that would enable the rural aussie to live independently and comfortably.

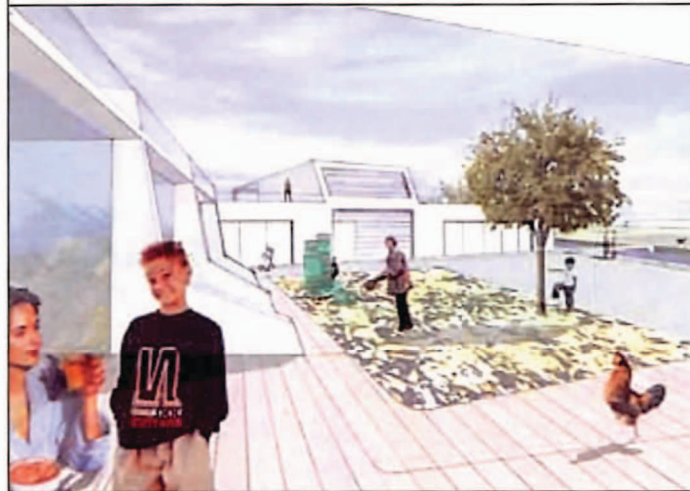




Agriculture Park
Hayami-gun, Japan
Toyo Ito

Toyo Ito's Agriculture Park serves as a resource for promotion and training of the public in new agricultural practices for the region.

The competition entry by Kunst+Herbert makes direct ties between housing developments, program and agriculture. Residents become users, overseers, stewards and Rangers of the land in their neighborhood.



Home, Sweet Home competition
Fischbek-Mississippi, Hamburg
kunst+herbert Architects

HELP
Is on the Way



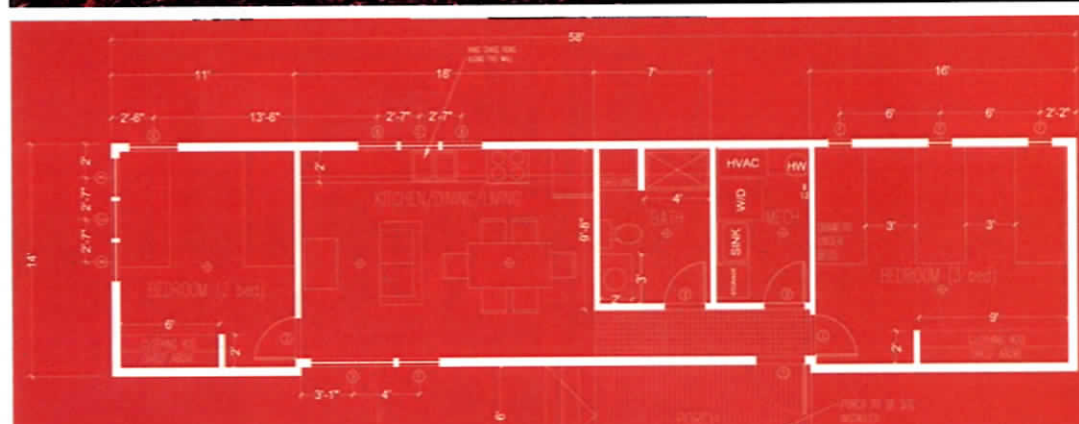
WORKER HOUSING

HELP House prototype, 2005
Carib Daniel Martin
& Rob Bragan

Developed in response to Hurricane Katrina, Martin and Bragan's 8'x12' shelter transforms to include a kitchen, dining room, bath or living room and sleeps two.

Farmworker-specific prefabricated
housing unit.
By Designcorps

The not for profit organization Designcorps has developed a prefab solution to the poor housing conditions of migrant workers. The five bed dwelling offers 1.5 baths, a common space and some respectability.



farmworker-specific prefabricated housing unit

PRIMARY RESIDENCE _____ 1500 SQFT (TOTAL)

BEDROOMS (3)	400 SQFT (TOTAL)
KITCHEN	150 SQFT
DINNING ROOM	150 SQFT
LIVING ROOM	200 SQFT
BATHROOM(S)	150 SQFT (TOTAL)
STORAGE	100 SQFT (TOTAL)
MECHANICAL	150 SQFT
CIRCULATION	200 SQFT (TOTAL)

CARPORT _____ 400 SQFT (TOTAL)

VEHICLES (2)	350 SQFT
STORAGE	50 SQFT

GREENHOUSE _____ TBD

ROOFTOP	2/3 RES. ROOF SQFT
GROUND	1000 SQFT (TOTAL)

GREEN TERRACE _____ TBD

ROOFTOP	1/3 RES. ROOF SQFT
---------	--------------------

AGRICULTURAL LAND _____ 150 ACRES

COMMUNITY

RESOURCE CENTER _____ 1100 SQFT (TOTAL)

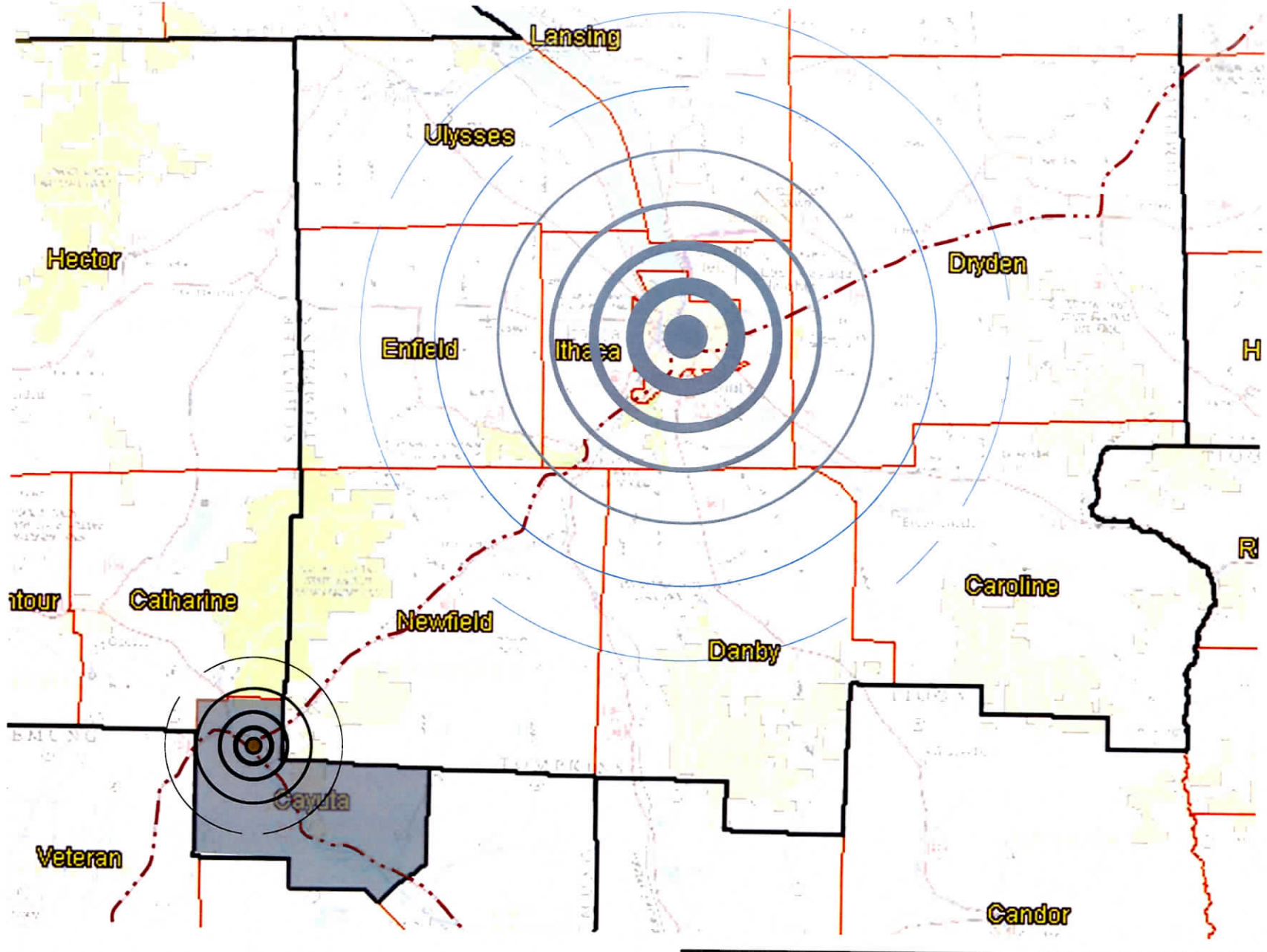
BOOK STACKS	200 SQFT (TOTAL)
RESEARCH TABLES	100 SQFT
OFFICE	100 SQFT
STORAGE	50 SQFT (TOTAL)
BATHROOM	50 SQFT
FLEX SPACE	400 SQFT
MECHANICAL	50 SQFT
CIRCULATION	150 SQFT (TOTAL)

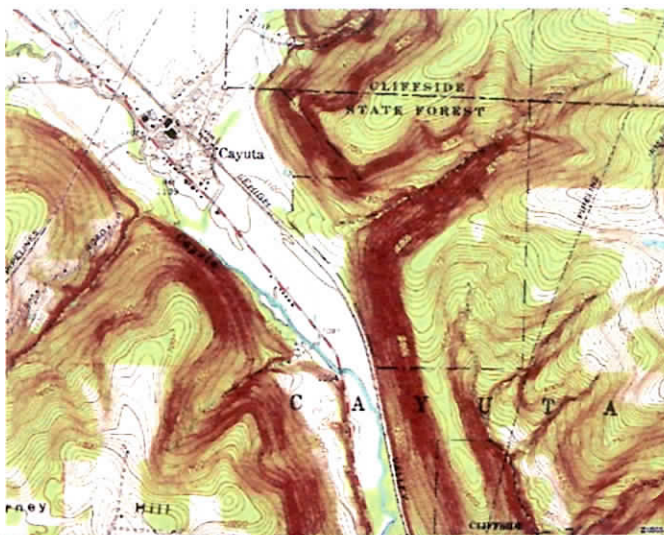
MIGRANT HOUSING _____ 1200 SQFT (TOTAL)

4 MAN BUNKS	600 SQFT (TOTAL)
COMMUNAL ROOM	300 SQFT
BATHROOMS	200 SQFT (TOTAL)
STORAGE	50 SQFT (TOTAL)
CIRCULATION	50 SQFT (TOTAL)

SERVICE BUILDINGS _____ 2000 SQFT (TOTAL)

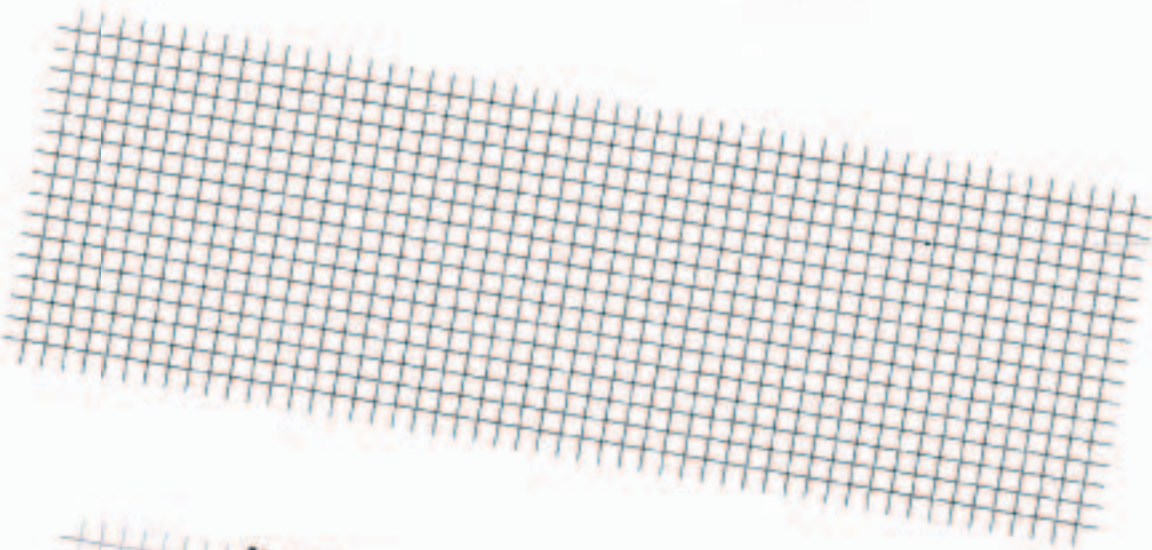
STABLE	600 SQFT
COW BARN	400 SQFT
CHICKEN COOP	300 SQFT
SUPPLY BARN	700 SQFT
FOOD STORAGE	1000 SQFT



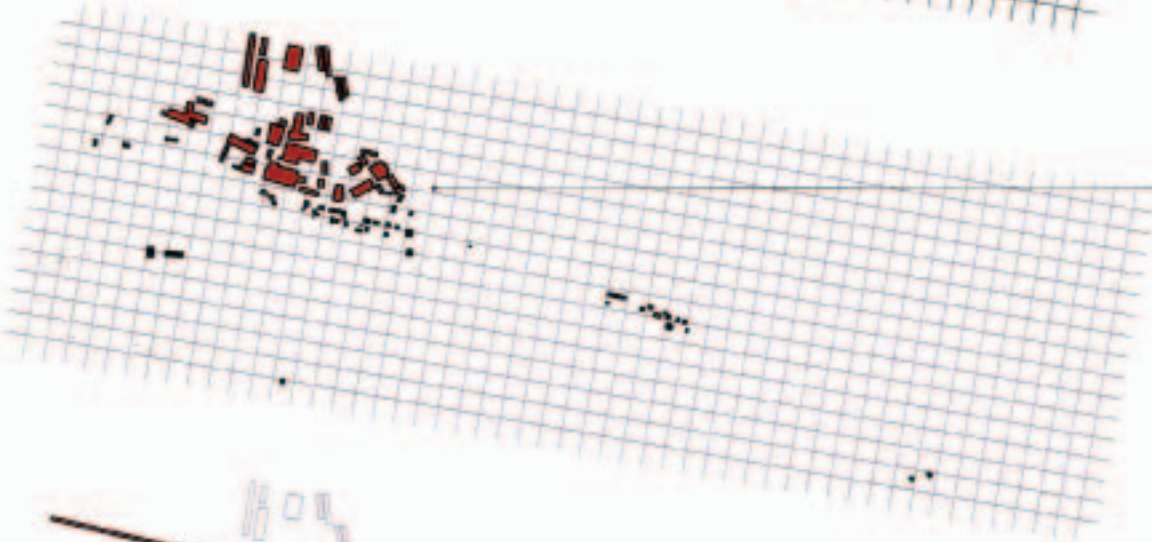




CAYUTA, NY



ONE ACRE SQ GRID



TOWN STRUCTURES



OLD RAILROAD BED



ROADS



CREEK



CEMETARY

WETLAND

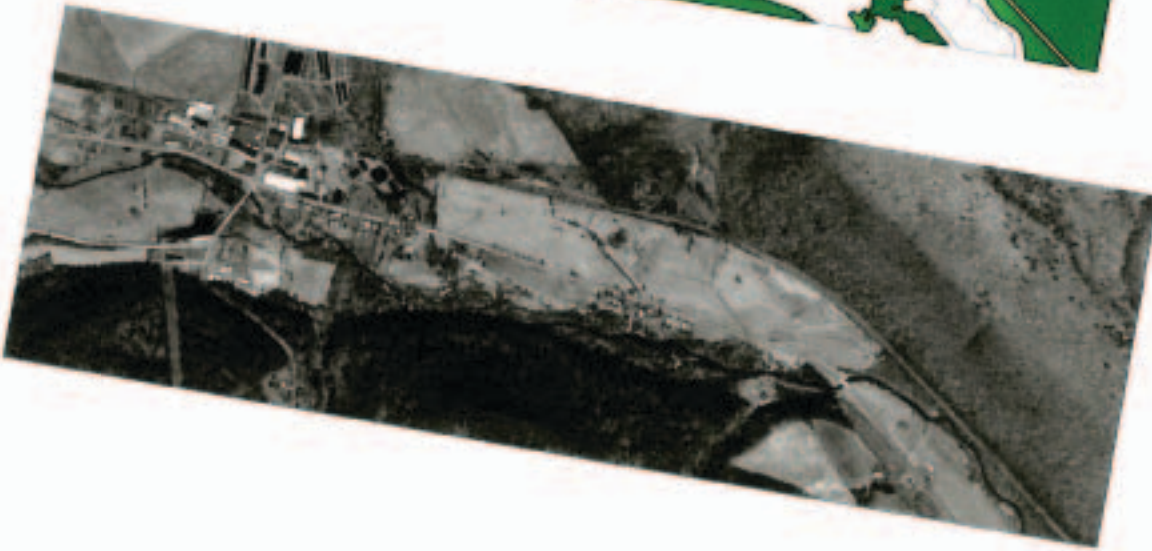


AGRICULTURE LAND

PASTURE



FOREST



BIBLIOGRAPHY

African Technology Forum, "Mathematical Models Can Make Farmers More Efficient.," massachusetts institute of technology.
<http://web.mit.edu/africantech/www/articles/MathFarming.htm>, (Accessed February 25, 2008).

Campoli, Julie, Elizabeth Humstone, and Alex MacLean. Above and Beyond: Visualizing Change In Small Towns and Rural Areas. Chicago: American Planning Association, 2002.

Center for Urban Policy Research, Rutgers University. <http://policy.rutgers.edu/CUPR/> (Accessed March 25, 2008).

Center for Immigration Studies (CIS). www.cis.org (accessed April 11, 2008). Chart produced by Author with data from CIS and the New York State Department of Agriculture & Markets. www.agmkt.state.ny.us (accessed April 12, 2008).

Demographia. [Http://www.demographia.com/db-usacultura2000.htm](http://www.demographia.com/db-usacultura2000.htm), (Accessed February 23, 2008).

Energy Information Administration. "Total Energy Consumption by Major Fuel for Non-Mall Buildings, 2003." Consumption and Expenditures Tables for Non-Mall Buildings. http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003pdf/c1.pdf (accessed March 4, 2008).
Energy Information Administration. "Total Energy Consumption in U.S. Households by Type of Housing Unit, 2001." Household Consumption and Expenditure Tables 2001. <http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html> (accessed March 4, 2008).

Energy Information Administration. "Total Energy Consumption in U.S. Households by Urban/Rural Location, 2001." Household Consumption and Expenditure Tables 2001. http://www.eia.doe.gov/emeu/recs/recs2001/ce_pdf/enduse/ce1-8c_urbanrural2001.pdf (accessed March 4, 2008). Energy Information Administration. "U.S. Per Household Vehicle-Miles Traveled, Vehicle Fuel Consumption and Expenditures, 2001." Vehicle Energy Consumption. http://www.eia.doe.gov/emeu/rtecs/nhts_survey/2001/tablefiles/page_a02.html (accessed March 4, 2008).

Emerson, G. The History of Newfield, NY. www.newfield.netfirms.com. (Accessed April 20, 2008).

Google Maps. <http://maps.google.com>. (Accessed April 12, 2008).

Lancashire database image, #2179, 2008. Lancashire, UK. <http://www.lancashire.gov.uk> (accessed March 29, 2008).

Louden, J.C. 2006. "The Suburban Gardener and Villa Companion". In The Suburban Reader, ed. Becky M. Nicolaides and Andrew Wiese, 16-18. New York: Routledge.

Milbourne, Paul. "Re-populating Rural Studies: Migrations, Movements and Mobilities." Journal of Rural Studies 23, no. 3 (July 2007): 381-386.
<http://www.sciencedirect.com/> (accessed January 26, 2008).

National Agricultural Workers Survey (NAWS). www.doleta.gov (accesses April 11, 2008).

National Farm Workers Ministry. www.nfwm.org (accessed April 11, 2008).

Smailes, Peter J., Neil Argent and Trevor L. C. Griffin. "Rural population density: its impact on social and demographic aspects of rural communities." *Journal of Rural Studies* 18, no. 4 October 2002): 385-404. <http://www.sciencedirect.com/> (accessed January 26, 2008).

Stauber, Karl N. "Why Invest in Rural America—And How? A Critical Public Policy Question for the 21st Century". Northwest Area Foundation www.nwaf.org (Accessed February 12, 2008).

USA TODAY, "Horse-and-plow farming makes comeback in U.S.," <http://www.usda.gov/nass/pubs/trends/farmpopulation.htm>, (Accessed February 25, 2008).

U.S. Census Bureau. "Census 2000." <http://www.census.gov/>. (Accessed February 12, 2008).

U.S. Department of Agriculture, National Agricultural Statistics Service, Trends in U.S. Agriculture. Washington, D.C., 2005.
<http://www.usda.gov/nass/pubs/trends/farmpopulation.htm> (Accessed March 9, 2008).

Photos provided by USDA Agriculture Resource Service. <http://www.ars.usda.gov/is/graphics/photos/> Text paraphrased by Author from ATTRA, National Sustainable Agriculture Information Service. www.attra.org.

U. S. Fact finder. [Http://www.factfinder.census.gov](http://www.factfinder.census.gov). (Accessed March 15, 2008).

U.S. Green Building Council. <http://www.usgbc.org/> (Accessed April 23, 2008).

