Building Resiliency

Self-Sufficiency + Connectivity = Resilience

Tama New Town’s population shrinkage demonstrates the limitations of an inflexible, single-use residential community. Because of its proximity to Tokyo and the significant existing built infrastructure, Tama cannot be abandoned. To give Tama longevity the population must be sustainable and its physical footprint reduced.

Community resilience stems from self-sufficient features, where the neighborhood can work to support its own food and energy consumption. Features, such as improved connectivity along with mixed-use industry, garden allotments, and a community-supported agriculture farm that can be flexibly employed regardless of population size.

Demographic Analysis

Tama New Town with a shriveling voice of rapid and continuous growth. By recognizing the unpredictability of population size it is possible to create a framework that can accommodate growth or shrinkage, and demographic shifts of Tama’s population.

Lifestyle Analysis

The demographic imbalance in Tama New Town is caused by much by national population trends as by a built environment that is obsolete.

Understanding the different interests and physical needs of different lifestyles is necessary for building a community that will continue to appeal to a broad spectrum of residents.

Demographic Analysis

Despite its convenience to Tokyo, relatively fewer young professionals are choosing to locate in Tama. Those that do live in Tama tend to reside in newer apartment buildings that are convenient both to the highway system and the train station.

Elderly people make up a disproportionate large number of elderly people. Because of accessibility issues, these dwellings are inconvenient to mass transit and the highway. Few live here by choice. Because few elderly persons work, they need a variety of spaces for social and recreational activities to keep their days full and engaged, however, they strongly value convenience.

Existing Building Types and Population Distribution

The diagram above illustrates that the majority of living in Suwa and Nagayama is apartment complexes built in the 1970s. The diagram below illustrates the current spatial distribution of lifestyle groups. These large 1970s structures house a disproportionately large number of elderly people. Because of accessibility issues, these dwellings are inconvenient for elderly residents to interact with their community and the housing form is not popular with families or young professionals who are able to chose where they live. The high vacancy rates and few connections further isolate the elderly from the rest of Tama.

The result of this specialized lifestyle distribution is an unbalanced neighborhood that cannot sustain itself.

Density Analysis

In times of population shrinkage, density buffers the community against shocks. By recognizing the unpredictability of population size it is possible to create a framework that can accommodate growth or shrinkage, and demographic shifts of Tama’s population.

Density: Nagayama: 913.02  Suwa: 869.8
Area (km²): Nagayama: 869.8  Suwa: 1.26
Density (people/km²): 10,452 (New York City)
Area (km²): Nagayama: 1.82 → 1.59  Suwa: 1.26 → 1.04
Density (people/km²): 13,500 (Kichijyouji Honcho; Shibuya)
Area (km²): Nagayama: 1.82 → 1.23 (Suwa)  Suwa: 1.26 → .81
Density (people/km²): 17,000 (Shinjuku)
Area (km²): Nagayama: 1.82 → .98  Suwa: 1.26 → .64

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The system proposed addresses the cumbersome topography of the district by creating an urban core, with a streetcar system with frequent stops convenient to residences. This system emphasizes mass transportation over individual automobile use, envisioning a more sustainable future with fewer individual cars.

Physical Connectivity

Recognizing Topography

Self-Sufficiency through Food Production

Melding urban and agrarian uses will provide economic and social security through self-sufficiency. Urban food and energy production can provide greater security at the time of an escalating global crisis. Integrating this land use with urban infrastructures will create a more environmentally sustainable and engaging live-work structure within the district. The development of different types of agricultural use (a CSA farm and an allotment community garden) creates an opportunity for residents of different ages to contribute to food production and community action.

Building a vibrant community of the future, regardless of population size, requires a system of connectivity mobility possible for every resident. By limiting the location of the population, and suggesting a pattern of growth and shrinkage, connective tissue (a new greenway, walking paths, roads, a street car system) will allow its thrive as the population and its commuting habits shift.

Community Connections through Food Production

By coordinating residential cultivation plots with the community’s CSA, residents can benefit from larger economies of scale and greater variety in produce. Because residential plots can be incorporated into a larger framework of agricultural production, residents become more civically engaged, while the community at large becomes more attentive to all of its members.
Building Resiliency

Christopher Guignon, Haruka Horiuchi, Deborah Morris, Sarah Snider

ECOLOGICAL RESPONSIBILITY

"First, exploding human populations are degrading the environment at an accelerating rate, especially in industrialized nations. Second, science is discovering new ways for biological diversity in ways that can reduce both human suffering and environmental destruction. Third, much of the diversity is being irreversibly lost through extinction caused by the destruction of natural habitats.”

Source: Wilson, E.O. The current state of biological diversity.

Reasons To Preserve Ecology And Biodiversity

1. There are no habitat corridors through Tama, isolating biological diversity.
2. Non-native plant species exist.

Current Water Management Issues:

1. Water treatment is energy intensive.
2. Flow speed is increased due to piping, leading to flood risk.
3. Stormwater is not used productively.
4. People are disconnected from the source and treatment of water.

Current Water Management Solutions:

1. Treat naturally using landscaping techniques.
2. Slow the speed of the stormwater with natural, non-canalized paths.
3. Collect stormwater for productive uses: irrigation of landscaping and agricultural spaces, cooling systems, and attractive design features.
4. Reconnect community to water through innovative landscaping, collection, and irrigation techniques.

Landscape ecology

Habitat fragmentation:
The process by which contiguous large blocks of habitat are broken or sliced into progressively smaller pieces by housing and industrial development, intensive agriculture, roads, and other development activities.

Patch:
A surface on the landscape differing in appearance from its surroundings. Patches may be due to natural (e.g., soil type or vegetation) or anthropogenic (human-caused; e.g., housing development) factors. Areas of old woodland, chaparral, or residential development are examples of patches within a landscape.

Edge habitat:
The outermost band surrounding patches that has an environment significantly different from the interior of the patch. Edges can be a few to several hundred feet wide depending on environmental factors.

Interior habitat:
Habitat within the interior of a patch that is removed from edge effects. Interior habitat is necessary for certain oak woodland species, providing insolation from edge effects such as noise, wind, solar radiation, and increased predation.

Current Habitat Solutions:

1. Design and plan for future habitat corridors in conjunction with future growth and decline strategies.
2. Design and install habitat with only native vegetation material.
3. Collect stormwater for productive uses: irrigation of landscaping and agricultural spaces, cooling systems, and attractive design features.
4. Reconnect community to water through innovative landscaping, collection, and irrigation techniques.

Advanced Japan Design Workshop Fall 2008
This regional map of the Tokyo Metropolitan area shows the disconnection of natural resources and habitat corridors as it exists today. Nagayama and Suwa are situated in the middle of the map, outlined in red.

This map shows the possibility for more natural connections in the future. The movement of water through natural landscapes creates important connections between terrestrial and hydro-based ecological systems.
Building Resiliency

Existing Conditions

The proposed Nagayama Core area extends from Nagayama Station in the North of the research area. It consists of two of the original developments in Tama New Town, as well as three underutilized schools and a difficult topography.

Transit Corridor Extending from Regional Transit Hub

The first strategy aims at providing better connectivity through Nagayama by extending a public transportation line from Nagayama Station through Nagayama Core.

Stops are spaced 400 meters apart, meaning that a shuttle stop is rarely more than 10 minutes by foot, even given the difficult terrain.

400m Radius Walkable Neighborhood and Identifiable Urban Form

This transit corridor that extends down Nagayama Core is widened slightly to accommodate a hybrid bus or streetcar line. It becomes a main pedestrian corridor as civic, commercial, and service buildings are built on the hillsides. These public buildings have the added function of providing better access between elevations.

Dense Mixed Use core area and flexible peripheral areas

Preemptive Historic Preservation

Though the housing blocks that make up Tama New Town are problematic, it cannot be denied that the Tama New Town project holds historical value. By preserving the very first development in Tama New Town, historical and cultural significance is added to the site. When Nagayama becomes a new sustainable community, the preserved buildings can act as an educational tool in the narrative of Tama New Town’s progress.

Biodiversity Corridor and Recreation Escape

Green Space Size Comparison

Advanced Japan Design Workshop Fall 2008
The Nagayama-Suwa resilient city plan is made up of two main neighborhoods. One is primarily connective in nature, extending a transit corridor from the regional train station. Its center and its edges are made clear and legible, providing a sense of orientation and identification for the residents who reside there. The other neighborhood is primarily self-sufficient. It is connected to the greater region by Nagayama Core but provides much of its own sustenance through resident food production. A third main element to the plan is a productive landscape that serves the system as a whole. This takes shape as a Community Supported Agriculture plot. By creating two distinct neighborhoods, residents of Nagayama Suwa can choose from a variety of supported lifestyles.

The existing site is full of disconnected green areas and a homogenous building type. This leads to undifferentiated spaces that are unidentifiable and difficult for residents to orientate themselves within.

By 2030 a public transit line efficiently connects the two changing neighborhoods to each other and the greater region. A CSA at the east corner of the site provides food to both neighborhoods, creating a small food based economy and offsetting Nagayama Suwa’s reliance on external resources. Densification begins near the station.

In 2050, the changes implemented for a sustainable community in Nagayama-Suwa have attracted new lifestyle groups, creating a socially diverse community. The two neighborhoods, while still distinct in character and identity, begin to operate as a unified system, bolstering its self-sufficiency and resilience. The urban agriculture lifestyle and large recreational nature reserve, attract people from both inside and outside the metropolitan region. Density around the station and by new eco-industry to the South support an efficient transportation system.
**Detail Area 01: Community Gardens**

A network of community gardens on reclaimed former social service sites and open spaces map the community's agricultural landscape. These gardens are shared plots, serving as community resources for small-scale consumption. They are often managed by local and non-profit organizations and are run by groups of individuals, often in families or cooperatives. Community gardens are typically located in urban or peri-urban areas and are accessed by a public but intimate, community gardens are open to the greater neighborhood value and community identity are characteristics of these gardens. They serve as shared resources and are seen as a carpet from one boundary and edge to another. The size of these gardens can vary, with locations ranging from less than 1000 m² to over 10,000 m². The yield of these gardens can range from 1-2 kg/m²-yr to 3 kg/m²-yr.

**Example:**
- **Granby, MA:** Red Fire Farm
  - Agricultural share: 50-100 people
  - Produce for sale to the public
  - Owned or private
  - Group of individuals formed into a collective institution
  - Technical support and advice
  - A community-supported agriculture type
- **South End, Boston:**
  - Educational resource
  - Community gardens in urban or peri-urban locations
  - State-owned or private
  - Educational or health facility
  - Lots within the greater urban area

**Precedent:**
- **Municipio Playa, Havana, Cuba [Viljoen 2005]**
- **Gastronomica Playa Municipio Playa, Havana**

**Crop Examples:**
- **Tomatoes, lettuce, parsley, cabbage, chives, leeks**
- **Tomatoes, potato, garlic, cabbage, chilies, lettuce, carrots, celery, pumpkin, squashes, beans, zucchini, peppers**
- **Aloe, mint, pumpkins, lettuce, spinach, parsley**

**Materials:**
- **Corrugated cement sheet, chain link fence, earth**

**Vision for 2030**

Water, recreational green space, open green space, new streetcar line, new car share hubs, demolished buildings, existing buildings, food production, new civic and commercial.

**Detail Area 02: Educational Farms**

Educational + productive landscape

**Precedent:**
- **Plan E, South End, Boston, USA**
- **Playa Organoponico, Havana, Cuba**

**Characteristics:**
- Plants
- Flowers
- Herbs
- Vegetables
- Fruits
- Forage

**Features:**
- Gardens
- Patios
- Entrance
- Wood
- Stone
- Soil
- Concrete
- Corrugated cement sheet
- Chain link fence
- Earth
- Plants
- Flowers
- Pumpkins

**Prospects:**
- A space between one story high school and a multi-story high school
- A constantly changing relationship with urban agricultural

**Example:**
- **Plan E, South End, Boston, USA**
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**Detail Area 03: Community-Supported Agriculture**

Community-supported agriculture

**Precedent:**
- **Plan E, South End, Boston, USA**
- **Playa Organoponico, Havana, Cuba**

**Characteristics:**
- Plants
- Flowers
- Herbs
- Vegetables
- Fruits
- Forage

**Features:**
- Gardens
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Water, recreational green space, open green space, new streetcar line, new car share hubs, demolished buildings, existing buildings, food production, new civic and commercial.
**Detail Area 04: Vertical Agriculture**

**Vision for 2050**

**Detail Area 05: High-Yield Urban Garden**

**Organizational Characteristics**
- Undulation marking topography
- Making a new surface
- Viewing from above
- Bridging territories

**Precedent:**
Organiponico, Pastorita Cienfuegos

**Characteristics:**
- Recycled five meter long precast concrete beams enclose planting beds and articulate topographical changes, thus defining territories and edges.
- This landscape, currently a visual resource, could become a physical resource if overlaid with publicly accessible paths and spaces, increasing the variety of occupation.

**Crops:**
- Aloes, mint, pumpkins, lettuce, spinach, parsley, beans, beetroot, tomatoes, carrots, coriander, citrus trees

**Materials:**
- Precast concrete slabs, 400mm by 400mm precast concrete beams, concrete blocks, concrete fence posts, wire fence

**Precedent:**
Reuse of 1970s structures

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**Vision for 2050**

**Detail Area 04: Vertical Agriculture**

**Detail Area 05: High-Yield Urban Garden**

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**Advanced Japan Design Workshop Fall 2008**

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Specific Policies

With the vision for Tama and 7 driving principles, below are some specific program, policy and design implementation ideas for the site.

Zero carbon defined for Flexible Adaptable Tama:

1. All buildings, city operations and services, onsite generate all energy used within the building (or, in the case of city services, from city energy farms) from renewable, noncarbon emitting sources.

2. Local materials must be used as much as possible, i.e., new buildings or structures can use reclaimed materials from demolished structures.

3. Exempt from “zero carbon” are goods and services that are not able to be produced within Tama. Over time, a majority of these goods and services will either be sourced in Tama, or their source areas will also become zero carbon.

These following ideas match up to Tama’s 7 principles:

- Construction bids must include measures for reducing pollution and alternative energy. New innovations, such as hybrid excavators, must be incorporated. (Zero carbon)

- All students receive a bicycle, as part of their admission, to encourage bicycling. Innovative bicycles, such as a solar powered electric bicycle (to help tackle Tama’s hills!) can also be given, will help promote new ideas in sustainability. (Zero carbon, Education)

- Buildings designed with flexible interiors, to be reused over time, as needs change. (Flexible buildings)

- Incentive zoning for mixed use, semi intensive retail along main spine in Tama.

- Shops and housing can use similar footprints, with flexible interiors.

- Incentives for producing local goods.

- Natural "stopping points" along spine, allow flexibility for growth. (Concentrated Retail, Flexible buildings, Education)

- Incentives for package reduction. (Waste processing)

- Initiative for personal energy generation (solar panels, green roofs, etc)

- More visible and attractive recycling and composting areas.

- Bioswales throughout Tama to help stormwater.

- Planting of native species to reduce maintenance, increase pride, boost local ecosystem. (Zero carbon, Micromeasures, Waste Processing Education)

- Schools and universities work together to educate students and community members.

- All energy consumed is measured, for citizen awareness.

- City sponsors community groups to form volunteer organizations to assist in community needs. (Education, Zero carbon, Micromeasures)

- Building demolition, CSA or natureal preserve implementation, if population falls below a certain point. Paths and street "ghosts" preserved onsite for future development. (Back to nature)

- Bioswales and green roofs, living machines to treat sewage. (Waste processing)