

IBM's Smarter Cities Challenge

Date

Report





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1. Executive summary

Introduction

Date City was awarded a Smarter Cities Challenge® grant to help tackle the issues caused by the Great East Japan Earthquake and subsequent Fukushima Dai-ichi nuclear power plant disaster in March 2011.

Before the disaster, Date City faced many of the challenges related to a declining and aging population that are common across all of Japan, and that are leading to the degradation of its agriculture industry. But the problems facing Date City's agricultural industry have become even more pressing in the years following the disaster.

As a result of the immediate radioactive contamination of rice, fruit and vegetables grown in Date City, and lingering doubt about food safety, the sale of these products has decreased. After thorough decontamination efforts in the subsequent two years, almost all the rice, fruit and vegetables have been deemed safe. However, the perception that they are not safe remains among consumers, and sales have not fully recovered.

The challenge

The sustainability of agriculture is a matter of urgency. Without aggressive and timely action, agriculture in Date City will find itself on the edge of extinction. Both City officials and many of the farmers themselves are forward thinkers, open to new ideas and willing to make changes.

Date City's leaders would like to use the nuclear accident as an opportunity to remove some of the ongoing inhibitors to the growth of its agricultural industry. The City is not looking to simply restore the agricultural industry to the state it was in before 11 March 2011, but to grow it, make it more profitable and, in turn, make the city a more attractive place to live.

Date City's leaders therefore asked the IBM Smarter Cities Challenge team to provide recommendations around the following challenge:

Help create a sustainable agriculture industry that, in turn, will help enable Date City to transform into a "smarter wellness" city with a prosperous future for all citizens.

The team's recommendations are designed to provide both immediate actions and long-term systemic changes that can begin to reverse the decline of agriculture.

Findings and recommendations

During a three-week period in April 2013, the Smarter Cities Challenge team met with approximately 25 Date City officials, farmers, agriculture association representatives, professors and others in the value chain in order to better understand the issues. Based on the knowledge gained from interviews, first-hand experience of the city and a consumer survey, the team developed findings under the following themes:

- Agricultural issues
- Impact of the nuclear disaster
- Consumer attitudes

Based on these themes, the team divided its recommendations into three distinct segments, as summarized below:

- **Communications and branding:** Address fact-based issues around radiation contamination, as well as emotional perceptions of food safety
- **Sustainable farming:** Designed to enable large-scale farming through a variety of actions that will ultimately make farming more attractive
- **Modernized agriculture:** Designed to help farmers create new markets for their products and maximize long-term revenue, quality and production

Conclusion

The Smarter Cities Challenge team believes that Date City has what it takes to modernize and grow its agricultural industry and, in turn, prosper. Residents and the government have displayed a willingness to change, and many activities are already happening ad hoc. By leading the way and supporting both new and existing farmers with regulations and practices that inhibit their growth, Date City can become a role model for other agricultural communities in Japan.

Highlights

- Fact-based and emotionally-targeted communication around food safety
- A strong city brand based on premium agricultural products
- A forward-thinking, sustainable business model for farming
- An appealing career path for current and future farmers
- New markets for a profitable, modernized industry

2. Introduction

A. The Smarter Cities Challenge

By 2050, cities will be home to more than two thirds of the world's population. They already wield more economic power and have access to more advanced technological capabilities than ever before. Simultaneously, cities are struggling with a wide range of challenges and threats to sustainability in their core support and governance systems, including transportation, water, energy, communications, healthcare and social services.

Meanwhile, trillions of digital devices, connected through the Internet, are producing a vast ocean of data. All of this information, from the flow of markets to the pulse of societies, can be turned into knowledge because we now have the computational power and advanced analytics to make sense of it. With this knowledge, cities could reduce costs, cut waste, and improve efficiency, productivity and quality of life for their citizens. In the face of the mammoth challenges of economic crisis and increased demand for services, ample opportunities still exist for the development of innovative solutions.

In November 2008, IBM initiated a discussion on how the planet is becoming “smarter.” By this it meant that intelligence is becoming infused into the systems and processes that make the world work, into things no one would recognize as computers: cars, appliances, roadways, power grids, clothes, even natural systems such as agriculture and waterways. By creating more instrumented, interconnected and intelligent systems, citizens and policymakers can harvest new trends and insights from data, providing the basis for more informed decisions.

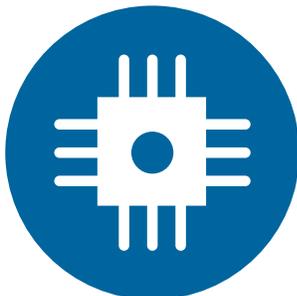
A Smarter City uses technology to transform its core systems and optimize finite resources. Since cities grapple on a daily basis with the interaction of water, transportation, energy, public safety and many other systems, IBM is committed to a vision of Smarter Cities® as a vital component of building a Smarter Planet®. At the highest levels of maturity, a Smarter City is a knowledge-based system that provides real-time insights to stakeholders, and enables decision-makers to manage the city's subsystems proactively.

Effective information management is at the heart of this capability, and integration and analytics are the key enablers. Intelligence is being infused into the way the world works.

As IBM aligns its citizenship efforts with the goal of building a Smarter Planet, it realizes that city leaders around the world face increasing economic and societal pressures. Given the increased demand for services, they have to deliver new solutions ever more rapidly.

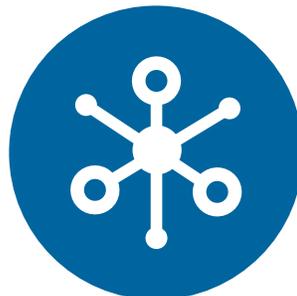
During a three-week period in April 2013, a team of six IBM experts worked to deliver recommendations around key issues for Date City.

With this in mind, IBM Corporate Citizenship launched the Smarter Cities Challenge to help 100 cities around the world over a three-year period become smarter through grants of IBM talent. Date City, in Japan's Fukushima Prefecture, was selected through a competitive process as one of 31 cities to be awarded a Smarter Cities Challenge grant in 2013.



Instrumented

We can measure, sense and see the condition of practically everything.



Interconnected

People, systems and objects can communicate and interact with each other in entirely new ways.



Intelligent

We can analyze and derive insight from large and diverse sources of information to predict and respond better to change.

Figure 1: Instrumented, interconnected, intelligent

B. The challenge

Date City was awarded a Smarter Cities Challenge grant to help tackle the issues caused by the Great East Japan Earthquake and subsequent Fukushima Dai-ichi nuclear power plant disaster in March 2011.

Date City's leaders asked the IBM Smarter Cities Challenge team to provide recommendations around the following challenge:

Help create a sustainable agriculture industry that, in turn, will help enable Date City to transform into a "smarter wellness" city with a prosperous future for all citizens.

Date City faces many of the challenges related to a declining and aging population that are common across all of Japan. They have an enormous impact on one of the city's major industries: agriculture.

The average age of a farmer in the region is rising and the secession of farmland from one generation to the next is becoming less common. Current laws prevent farmland from being sold and even prevent different owners from combining farms, which makes it difficult for the area to transition from traditional agriculture to a more commercialized, profitable local industry. Ultimately, this will impact the city itself as young people move elsewhere to pursue occupations other than farming.

The problems facing Date City's agricultural industry have become even more pressing since the earthquake and nuclear power plant disaster. As a result of the immediate radioactive contamination of rice, fruit and vegetables grown in Date City, and lingering doubt about food safety, the sale of those products has decreased. Immediately after the nuclear accident, the sale of almost all products from Date City was prohibited. After thorough decontamination efforts in the subsequent two years, almost all the rice, fruit and vegetables have been deemed safe. However, the perception that they are not safe remains, and sales have not fully recovered.

Date City understands the significance and urgency of these issues. Its leaders are looking to use the nuclear accident as an opportunity to remove some of the ongoing inhibitors to the growth of its agricultural industry. The City is not looking to simply restore the agricultural industry to the state it was in before 11 March 2011 but to grow it, make it more profitable and, in turn, make the city a more attractive place to live.

The sustainability of agriculture is a matter of urgency. Without aggressive and timely action, agriculture in Date City will find itself on the edge of extinction.

The team's recommendations are designed to provide both immediate actions and long-term systemic changes that can begin to reverse the decline of agriculture. Both City officials and many of the farmers themselves are forward thinkers, open to new ideas and willing to make changes.

3. Context, findings and roadmap

A. Context

Date City was established in 2006 when five neighboring towns merged: Date, Yanagawa, Hobara, Ryōzen and Tsukidate. Date City now has a wider variety of residents, industries and even farmland configurations than it did before the merger.

Date City has a suburban region, a small industrial area that is home to a computer and printer assembly plant, and various agricultural operations. Farms in the flat areas grow rice and vegetables, while farms in the semi-mountainous areas grow various fruits. Agriculture is an important industry and critical to the sustainability of the local community.

Date City had created a long-term growth plan for its future, known as “The Grand Design.” It was divided into two parts, 2008 - 2010 and 2011 - 2015, to define the city’s basic direction for that period of time. But just before the 2011 fiscal year, which began in April, the Great East Japan Earthquake occurred, followed by the Fukushima Dai-ichi nuclear power plant disaster.

Parts of Date City became radioactive hotspots. The City government’s first priority was to support the immediate crisis and ensure residents were safe. It also had to deal with immediate and longer-term health issues, environmental contamination, damaged housing, evacuees and farming restrictions.

After two years of emergency management, Date City is working to reestablish The Grand Design. The plan was completed in March 2013 and established five strategies for the next 10 - 20 years as follows (non-official translation):

1. **A city of lifelong health and happiness:** Develop a “smart wellness city” in which people can live healthily and purposefully throughout the whole of their lives
2. **A city in which our successors grow up to have a richness of spirit:** Implement human resources that support hometown reconstruction and development
3. **A city of innovative agriculture and forestry:** Disseminate information on highly attractive, advanced agriculture and forestry
4. **An environmentally friendly city working to create and save energy:** Promote environmentally friendly regional development through energy saving and energy creation
5. **A city that prospers as a core of wide-area exchange and collaboration:** Create an attractive city that pulls in visitors from a wide area

Agriculture is one of the key topics addressed in The Grand Design.

B. Findings

During a three-week period in April 2013, the Smarter Cities Challenge team met with approximately 25 City officials, farmers, agriculture association representatives, professors and others in the value chain to better understand the issues and offer recommendations.

The team experienced life in Date City, spent time in a local peach orchard and got a first-hand look at the devastation caused by the earthquake and nuclear disaster in Date and other cities in Fukushima. The team also worked with IBM Japan employees to conduct an informal survey pinpointing the major issues consumers have in regard to fruit and vegetables grown in Date City. More than 4,500 people participated in the survey.

Based on the knowledge gained from interviews, first-hand experience and the survey, the team developed the following findings, which formed a basis for its recommendations. These incorporate multiple viewpoints: waka-mono (young person), baka-mono (foolish person), and yoso-mono (foreign person).

1. Agricultural issues

Even before the nuclear disaster, there were significant issues challenging the agricultural community including:

- Eighty percent of farmers work part-time, on a small scale and mostly grow products for their own consumption.
- Farmland is fragmented, difficult to combine and increasingly being abandoned.
- Farmers are getting older, with the average age of 70, and many do not have succession plans.

2. Impact of the nuclear disaster

Since the nuclear disaster, the problems facing the agricultural industry have become more pressing. The team learned that:

- Although Date City has launched communication activities around the safety of its produce, the messages are not reaching local buyers and potential customers in the greater Tokyo area.
- Retailers and consumers are willing to buy products if they understand the safety measures and are guaranteed that radiation levels are below the required standard.
- Farmers need the support of additional services beyond logistics to implement new business models.
- The government sees an opportunity to develop new models to industrialize farming that will support energetic, progressive farmers.

3. Consumer attitudes

Around 4,500 consumers in the greater Tokyo area provided insights into their buying behaviors in relation to fruit and vegetables from Date City and the Fukushima Prefecture.

Key findings include:

- Consumers are willing to buy peaches from Date and Fukushima, however they either cannot find data about safety or they are not convinced of it. The majority indicated that they do not even know that data is available.
- Three-quarters of consumers are willing to accept radiation levels in their produce, as long as it is below European and Japanese standards.
- Almost three-quarters of consumers say they trust third-party assurance of safety more than that from the government, local agriculture associations and social media.
- Most consumers in the greater Tokyo area buy fruit and vegetables from major or local supermarkets.
- Some open-ended comments provide further insight:
 - “I will buy if there is reliable proof that they have been tested.”
 - “If Fukushima products look more delicious than others being sold alongside them, I would buy them.”
 - “I don’t hear much about the evaluation of safety, nor do I do any research myself.”
 - “When only adults, including myself, will eat it, I buy. I don’t think there is a good enough grasp of the safety for children, so when children will be eating, I do not buy.”
 - “I buy, after paying particular attention to displays indicating the level of safety regarding radiation dosages, and checking the efforts made in maintaining safety during distribution.”

C. Roadmap of recommendations

The team’s recommendations for Date City are divided into three distinct segments. However, for maximum impact and success, they should be viewed and executed together. Together, these recommendations can help Date City prosper and grow.

- **Communications and branding:** Address fact-based issues around radiation contamination, as well as emotional perceptions of food safety
- **Sustainable farming:** Designed to enable large-scale farming through a variety of actions that will ultimately make farming more attractive
- **Modernized agriculture:** Designed to help farmers create new markets for their products and maximize long-term revenue, quality and production

4. Recommendations

Recommendation 1: Communication and branding

Date City should launch a proactive communication campaign to help calm consumers' fear and uncertainty about the safety of fresh fruit and vegetables grown in Date City and the Fukushima Prefecture.

Two years have passed since the nuclear accident and many communication campaigns have been put in place, but consumers continue to question the safety of food from the region. The issue is primarily a simple lack of information, rather than a distrust of the information.

Decontamination efforts and testing have been thorough, and the level of radiation in most fruit and vegetables falls significantly below the Japanese and European standard for radiation contamination. All rice packages are also tested and their contamination falls well below the approved level. However, this message is not reaching the majority of consumers, especially those in the greater Tokyo area, which represents a lucrative market.

An informal survey of 4,500 people who work in the Tokyo area showed that at least two-thirds of consumers would be willing to buy fruit and vegetables from Date City and Fukushima if they had access to reliable information about radiation decontamination measures and testing results. The survey also indicated that consumers would trust third-party sources, such as a health oversight agency, more than other sources of information, including the government.

The City should provide fact-based information as well as appeal to the emotional aspect of the issue.

Foundational communication activities

The goal of fact-based communications is to reassure consumers, both locally and in the greater Tokyo market, that products from Date City are safe, that the right measures have been taken to test the products and that the results fall far below the accepted limit. The City should communicate these things immediately by working with Japan Agriculture (JA) and the Fukushima Prefecture.

Almost all previous communications took place during the crisis and focused on the immediate dangers of radiation. Decontamination efforts were also documented and made available to residents.

JA created a printed brochure that did a very good job of showing the effect of radiation on food and comparing it to other sources of radiation that are always present in the environment. It distributed this brochure at the farmers' market in Date City, but the Smarter Cities Challenge team could not find widespread evidence of its usage.

The Prefecture, with the help of an outside agency, created many printed assets that presented fact-based evidence about the level of radiation and how it impacts people, using easy-to-understand language and visually appealing graphics. These were distributed to supermarkets and restaurants in the area, but again, the team saw no evidence of their impact.

Fukushima also held several large-scale meetings with retail buyers in Tokyo to help them understand the safety of food grown in the Prefecture, and participated in many farmers' markets, festivals and other events in the Tokyo area to touch consumers directly.

Date City should take advantage of these materials and events by partnering with the Prefecture. An effort as simple as placing informational brochures in all supermarkets, restaurants and other retail stores within the city would be a good start to reach local residents. The City should also take advantage of its own events, including the Cherry Blossom Festival, peach harvest event and the annual marathon to set up information booths with printed materials and representatives who can talk directly to attendees. This would touch both Date City residents and visitors from other cities.

To add more credibility, Date City should work with an appropriate independent third party to validate its testing methods and results, such as the World Health Organization (WHO), International Atomic Energy Agency (IAEA) or even local professors. It should include a report or statement from these organizations in printed materials, the Date City website, press interviews, social media campaigns and all other forms of communication. It is important that the third parties are well recognized and respected.

Again working with the Prefecture, Date City should aggressively reach out to major print, television, radio, cable and Internet news outlets with ideas for stories that feature not just the safety but also the quality of its produce. Human-interest stories about the new face of farming, such as a young strawberry farmer, a new category of premium peaches or prize-winning peach recipes, could help change the conversation and public perception. The Prefecture already has a working relationship with some major media outlets and highlights different cities and farms to the media. Providing the Prefecture with good examples will help it and benefit Date City.

Date City should update its website immediately with information about food safety and validation from third-party experts. While the current website features basic information about Date City, there is no information about radiation. This should be presented in a simple way and in the context of other radiation levels in the environment. At the very least, the website should include a prominent link to the Prefecture website, which does contain information about local radiation issues. The Date City website is scheduled for a redesign this fall; it should be enhanced to include social media, such as videos and blogs, to make it more interesting, interactive and credible. Facts and testimonials about food safety should be incorporated into all these channels.

Personal promotions

Communicating the emotional aspect of food safety is as important as the facts. While people may understand and believe the testing measures and results, there is a sense that many of them, especially mothers with young children, just do not feel safe eating products from Fukushima.

The most effective way to tackle this is by communicating consumer-to-consumer, and by offering a superior peach on the supermarket shelf. People are more likely to believe information when it comes from someone like them rather than a faceless government official.

The City should collect testimonials about the safety and quality of its produce from a variety of consumers. Stories from mothers of young children would be most important, since this is currently the most resistant audience. Testimonials from pediatricians would also be helpful. These testimonials could be broadcast in a variety of ways: through YouTube videos, endorsements on a Facebook page, in blogs, on printed materials and on the website. Additionally, the people featured in the testimonials could be used as spokespeople at events and in promotional activities.

The City should host in-store promotions with large supermarkets in the greater Tokyo area during peach harvest season. By partnering with retailers who are sympathetic to the situation, Date City could reach consumers directly, for example, through a farmer or spokesperson handing out coupons, recipes and peach samples, or a store display that draw attention to low radiation levels, superior taste and testimonials.

Again, Date City should partner with the Prefecture to participate in events in the Tokyo area throughout the year. The Prefecture does this today and already has a calendar of events. This would provide Date City with an opportunity to talk directly to consumers and would give the Prefecture an added story to tell.

Date City's own events also provide a platform for talking to consumers directly. The City should expand the promotion of these events to attract people in other prefectures, especially Tokyo, and provide information about, and tastings of, its products. Date City should also scale up its events with more vendors, entertainment, activities and giveaways to appeal to a wider audience.

Branding strategy

Date City should build its brand, starting with a focus on the peach. The publication of this report coincides with peach season, and Date City literally produces the sweetest peaches in the world. The brand should then extend to cover modernized farming in general to attract new young farmers and families.

As a first step to successful branding, the City must first determine what it stands for, what it wants to be known for and the brand promise it wants to deliver. As an example, IBM launched a branding effort several years ago. It believed that to be a great brand, it first needed to be a great company, with all its stakeholders, clients, employees, investors and communities, sharing the same vision. IBM held workshops with its employees around the world to teach them the tenets of its brand strategy and identify the gaps to becoming a great company. Actions were then put in place to close the gaps for all stakeholders. This effort took many years and continues today.

IBM believes there are four key dimensions to successful branding: the enterprise's enduring idea; who the enterprise serves; how the enterprise is experienced; and the enterprise's differentiators. For IBM, the enduring idea is progress; IBM serves forward thinkers; IBM is experienced through the IBMer; and IBM is differentiated by its values.

Branding the peach could be the first step toward, and become the symbol for, the type of city Date wants to be. As an example, Date City's brand could be based on the enduring idea of freshness. It could serve people who care about quality. It could be experienced by the senses: taste, feel, sight and smell. It could be differentiated by the sweetest peaches in the world.

The team therefore recommends a branding strategy around "Date City: the Sweet Spot." This is a long-term effort that requires Date City to discuss what it stands for now, and what it wishes to stand for in the future. It should engage residents in this effort, helping them feel ownership through scheduled town-hall meetings. This would give the Mayor an opportunity to reach out to his constituents and proactively bring them into the process. Additionally, this would provide a platform to discuss The Grand Design and how it can be implemented.

As a result of the branding exercise, a consistent logo and slogan should be used on all of Date City's marketing materials including business cards, newsletters, the website, brochures, event posters and flyers.

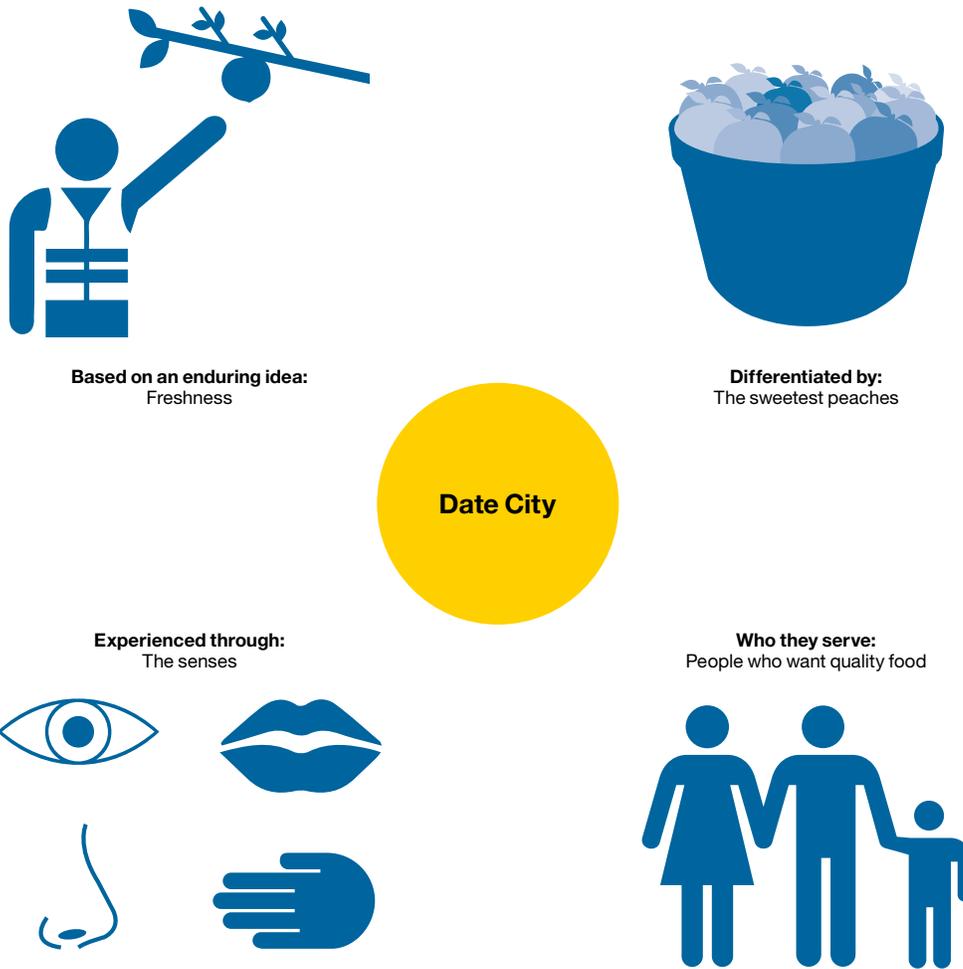


Figure 2:
Elements of a Date City brand

Recommendation 1: Communications and branding

The City should implement a communications and branding campaign around the safety and quality of its locally grown products.

Scope and expected outcomes

Scope

- Utilize assets already created by Fukushima Prefecture and JA, which address the safety and quality of the produce, and broaden the distribution of these materials
- Use the City's own channels and events to better communicate the safety and quality of its products
- Identify credible spokespeople who can give facts and testimonials at events, to media, and through social media
- Partner with supermarkets to promote Date City's superior sweet peaches this season

Expected outcomes

A greater awareness of the safety and quality of Date City's produce, which will lead to increases sales in both in the local area and the larger target market of Tokyo.

Cost of inaction

An ongoing, undisputed perception that Date City's produce is not safe to eat, which will limit sales of produce and potentially put farmers out of work, as well as inhibit Date City's ability to attract new farmers.

Proposed owner and stakeholders	Suggested resources needed
<p>Owner: Communications and Tourism departments</p> <p>Stakeholders: Date City, JA and farmers</p>	<p>A professional branding/communications agency could provide new assets and improve the use of existing channels. This can also be done with existing resources.</p> <p>Cost estimate: No to medium cost (if an outside agency is hired)</p>

Recommendation 1: Communications and branding (continued)

Dependencies	Key milestones, activities and timeframe
Dependent on the ability of the Date City Communications and Tourism departments	<ul style="list-style-type: none"> • Distribute materials from Prefecture (ASAP) • Update web content (ongoing) • Provide third-party validation (May) • Participate in Tokyo events (May to September) • Hold in-store promotions in Tokyo (June to September) • Host Mayor Town Halls in Date City (August to December) • Generate testimonials (October)
<p>Priority</p>	
<p>High</p>	

Recommendation 2: Sustainable farming

Through a combination of events, farming as it has been done for generations in Japan is at risk of extinction.

The City should support the evolution of farming as an industry with a sense of urgency in order to reverse the pattern of degradation. This pattern can be seen in the advanced average age of farmers, the increasing number of abandoned farms, the decline of succession and the absence of a business model that rewards farmers sufficiently to retain and attract new entrants.

The Great East Japan Earthquake and consecutive Fukushima Dai-ichi nuclear power plant disaster exacerbated this situation.

The IBM Smarter Cities Challenge team learned that:

- Farmers need the support of additional services beyond logistics to implement new business models.
- There is limited time to capture the knowledge and experience of successful aging farmers.
- The government sees an opportunity to develop new business models to industrialize farming that will support energetic and progressive farmers.

Agricultural consortium to support new business model

Recognizing that farmers depend on limited paths to market, need access to capital and require advice from experienced business leaders, the City should take a two-step approach. It should form an informal agricultural consortium, and then establish a more formal business entity (including a management consultant) to execute plans made by the consortium.

Today, farmers and JA run a number of initiatives to improve the business of farming but their viewpoints and solutions are limited. A mix of viewpoints and knowledge from outside agricultural entities is mandatory to invigorate agriculture as a business.

Date City and the Mayor's Office, through its broad network and influence, will play an important role in facilitating the formation of the consortium. It is important that there be balanced representation from business and finance, aggregators, retailers, farmers who produce a range of products, and academics developing techniques to ensure food safety.

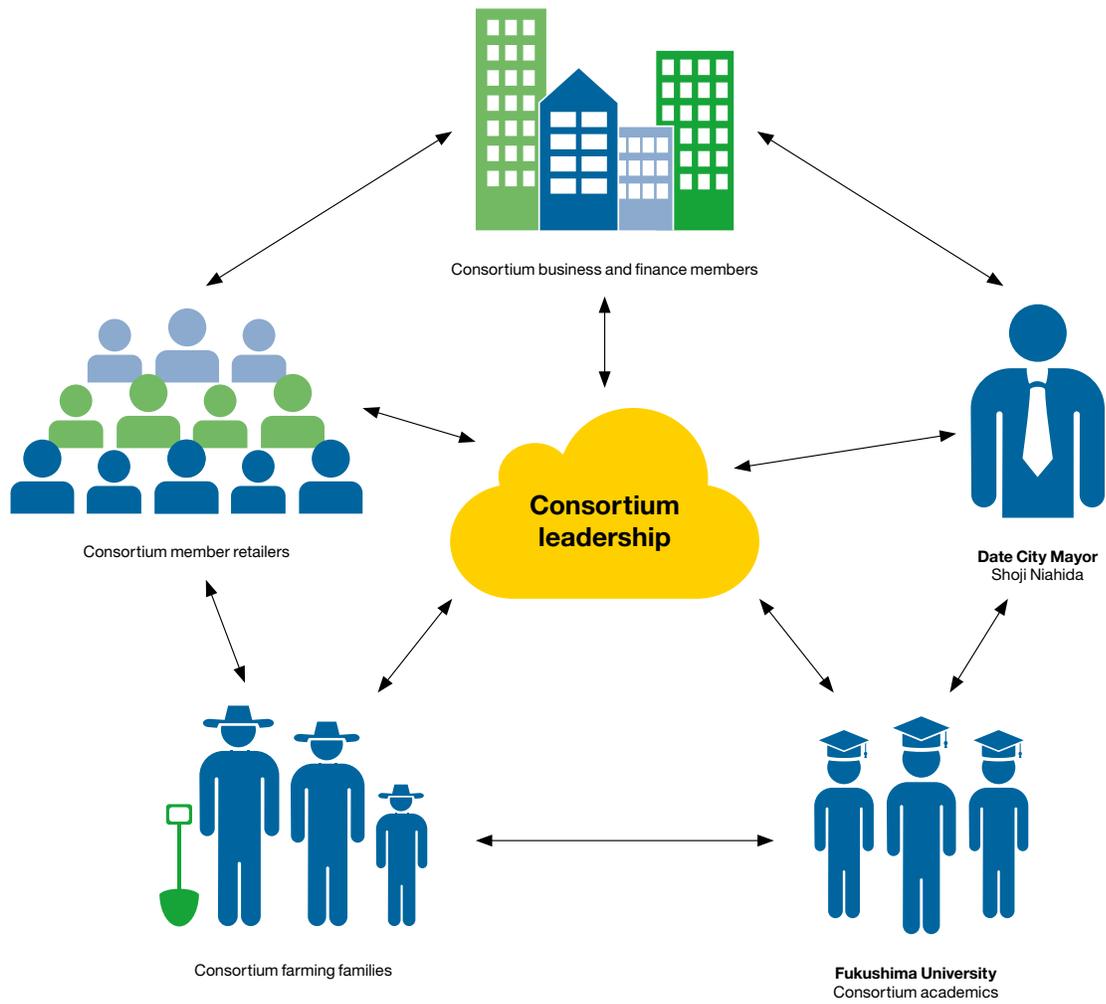


Figure 3:
Model for proposed agricultural consortium

The agricultural consortium should:

- Create a mission statement
- Study various business models
- Define governance process, roles and responsibilities

Consortium members will be expected to provide time and commitment to objectively participate in achieving common goals. The City should therefore develop collateral to foster interest in membership as a first step, and encourage participation by emphasizing that the value obtained for all is realized through the individual contribution of each member.

The Smarter Cities Challenge team identified possible opportunity areas during interviews, which should form the consortium's discussion points:

- Retailers see a need for a wider selection of products at varying price points to meet the demands of their diverse consumer population.
- Farmers know there is a great deal of variability in the fruit and vegetables they grow.
- JA recognizes that it could alter its sorting process to better segment products as desired by retailers.
- Business leaders see an opportunity for innovation in new sorting equipment.
- Finance leaders see a well-reasoned case for investment in agriculture.

The City should establish a new business entity based on the results of the agricultural consortium. Its structure can be defined at a later stage. It should serve as the common central entity through which each constituent group identifies its needs and capabilities to guarantee its own success, along with that of the rest of the group. The new entity should also provide support programs for farmers and operation scaling.

Attract and retain new farmers

The evolution of agriculture as an industry depends on proving that farming is a viable career for current, new and potential farmers. As such:

- Farmers must see they can earn a credible wage.
- There must be an opportunity to expand small family farms into profitable enterprises.
- There must be a cost-effective, trained workforce available
- The current harvest quality and yield must improve.
- New services must be designed to streamline access to loans and subsidies.
- New lease, loan or partnership options must be developed for equipment previously seen as too costly.
- Alternative sales channels must be available to help farmers survive in a competitive market.

The City should:

- Capture knowledge and experiences from skilled farmers
- Organize education and apprenticeship programs
- Streamline processes for education, apprenticeship and subsidies

The cornerstone for attracting and retaining farmers is access to education and training on farming best practices. The Smarter Cities Challenge team learned that it takes a great deal of time to become an experienced farmer. While it might not be possible to quickly develop the intuition of an experienced farmer, it would be extremely valuable to capture their experience in documentary form for repeated use and training.

Farming groups currently provide some training. The City should formalize this process, potentially under the auspices of the agriculture consortium or a new entity, by leveraging professional expertise to create and deliver training materials.

There are many methods available to develop the skills and experience necessary to be successful in a trade or profession, but by far the best way to learn is by doing. Experience is developed through opportunity. The City should establish a mentoring program between experienced farmers and younger, less experienced farmers.

Farmers who lack specific experience to grow a particular crop could work with an experienced farmer to develop a new skill. The mentoring farmer would benefit from cheap or free labor and the mentee gain valuable knowledge.

Individuals with no experience or land to farm, but who desire a career in agriculture, would benefit from an apprenticeship program. Experienced farmers interested in passing on their knowledge, or those simply in need of labor, could register as a master in the apprenticeship program. The City, consortium or a new entity could maintain a database of protégés and masters interested in pairing. The database could include attributes ranging from crop types to experience, stipend offered and room/board options.

Through services, education and training programs, Date City has an opportunity to make steady, incremental improvements toward agriculture as an industry.

Enable large-scale farming

The current Japanese family farming model was established by the central government after World War II. Regulations were designed to protect the independent farmer and Japan's agricultural heritage from ownership by non-agricultural enterprises.

Times have changed, and the regulations that were designed to protect now restrict the expansion, growth and profitability of farming. Despite some deregulation, ownership of farmland is still restricted. Enterprises may only use farmland if they lease it.

Land usage conversion is another issue. The development of shopping centers, highways and other facilities requires farmland to be converted from farming purpose to non-farming purpose. These conversions can bring fortune to landowners. This makes farmers reluctant to give up their land to other farmers, even if they do not have a successor to maintain it as a family asset, because they fear the buyer will convert the land for different usage to make a profit.

This means the liquidity of farmland is reduced and farms are fragmented into small patches of land. As a result, it is difficult to establish and maintain a business capable of creating new jobs, its employees making a sufficient living, retaining existing farmers, expanding yield or attracting new farmers to the industry.

Meanwhile, farmers who care about maintaining agriculture as an important part of the regional economy and the center of a community need an organization that can capture their farmland and continue to farm it.

These issues are more difficult to resolve at the City or agricultural consortium level. But it is important that local decision-makers thoroughly understand proposals and how changes in regulations made by central government or the Prefecture affect Date City. The City, together with the Prefecture and consortium, should consider special zoning (tokku) to challenge the regulations and laws that have the most substantial impact on Date City.

The City should approach this in three ways.

First, match new and active farmers to abandoned farmland in order to return it to active use. Farmers have abandoned this land for a variety of reasons, including the lack of a succession plan, inability to remediate food safety issues, reduced income or lack of scale. The City should create an “abandoned farm” registry through which farmers interested in starting out or expanding could develop a relationship with the family/owner of abandoned land.

Second, establish alliances between farms and farmers to provide additional coverage, enabling a farmer to:

- Take vacations
- Increase influence in the agricultural community
- Improve purchasing power
- Share farming equipment at a lower cost

As with the abandoned farm registry, farmers could identify their needs by updating a series of attributes in a farm registry database, which could then be used to match them up with other farmers with complementary needs.

Lastly, as the industry grows, the need for a larger seasonal workforce will increase. To prepare, there must be a program to expedite approval of migrant workers. Migrant workers are common in many countries worldwide and provide a valuable service moving from one agricultural area to another as planting and harvesting seasons change.

Through careful monitoring and support of regulations to enhance farming opportunities and the optimization of available land, Date City will witness the birth of large-scale farming.

Recommendation 2: Sustainable farming

The City should take a variety of actions to enable large-scale farming in order to make farming more attractive and sustainable as a significant industry.

Scope and expected outcomes

Scope

- Create a new “agricultural consortium” bringing together agriculture, distribution, finance and retail to provide sales- and marketing-related services to farmers
- Establish a business entity to execute the recommendations of the agriculture consortium
- Make farming a viable career path for current, new and potential farmers by providing access to education, training, mentoring and apprenticeships
- Seek special zoning (tokku) to challenge restrictive planning regulations
- Match new and existing farmers to abandoned farmland in order to return it to active use

Expected outcomes

The establishment of larger-scale, more industrialized farming, which will help attract and retain farmers and sustain agriculture as a viable and thriving industry.

Cost of inaction

The extinction of Date City's agricultural industry and a subsequent decline in population.

Proposed owner and stakeholders

Owner: Date City senior officials

Stakeholders:

- Farmers
- JA
- Professionals who support the farming community

Suggested resources needed

A management consultant

Cost estimate: Medium cost for management consultant

Recommendation 2: Sustainable farming (continued)	
Dependencies	Key milestones, activities and timeframe
<p>Dependent on hiring a management consultant, gaining support from the City government and cooperation from JA, farmers and academics</p>	<ul style="list-style-type: none"> • Establish consortium (by September) • Establish organization and execute plan (September to December) • Launch new entity (by year end) • Provide services to farmers (ongoing) • Establish apprenticeship program (October to Spring 2014) • Establish education for farmers and publish training materials (by December 2014) • Begin working with Prefecture and national government to get special zoning approvals (by end of 2013) • Develop program to match willing farmers with abandoned farmland (begin in August) • Execute plan for seasonal workforce (by July)
Priority	
High	

Recommendation 3: Modernized agriculture

The City should work with farmers to create new markets for their products and maximize long-term revenue, quality and production.

Open new markets and recapture customers

To help farmers regain some of the losses they incurred over the last two years, the City should support them to maximize revenue for the current peach harvest by targeting the under-promoted large markets such as the Tokyo and northern Tohoku regions with quality products at a small premium.

Currently, all peaches from Date City are segmented into two categories: premium, which are large and sweet; and standard, which are slightly smaller and less sweet. Premium peaches are very expensive and only make up a small portion of overall sales. Standard peaches, which sell at a lower price, actually represent a range of quality and size.

The City should capitalize on this and create two semi-premium categories as follows:

- Premium: Sweet and large
- Semi-premium A: Sweet but small/average size
- Semi-premium B: Average sugar content but large
- Standard: Average sugar content, average size

Semi-premium peaches should primarily be sold to the new target markets to recapture or gain new customers with a superior product.

Maximize long-term revenue

Starting with this season's peach harvest, the City should capture pricing data from both wholesale and retail sales to facilitate market and pricing optimization in the future. Using pricing optimization tools, it should then develop an automated market analysis and pricing model encouraging maximum long-term profit for farmers.

Additionally, the City should collect consumer demand and preference data through social media and use it to sell the right products to the right people at the right price. A feedback mechanism to provide farmers with the direct correlation of quality to revenue would help them to plan better and improve their profit margins.

Maximize quality and production

With better knowledge tools and techniques, farmers could maximize the quality and yield of all products produced in the region, while reducing resources and costs.

The City should deploy new technologies to assist in various aspects of farming production, such as:

- Precision weather
- Traceability from farm to consumer
- Soil analysis
- Analytics

Each crop could be traced from farmland and farmer to consumer. For each crop, a wide variety of sensor data could be collected, such as temperature, humidity, rain, wind, photograph of farmland, bud, flower, crop, and a farming activity log for trimming and agrichemicals. Additionally, a rating system for data such as sweetness, size, and consumer preference could be gathered from questionnaires and social media. Once collected, the data could be analyzed to optimize farming activity and pricing for the future.

See Appendix C and D for detailed examples of methods to maximize production.

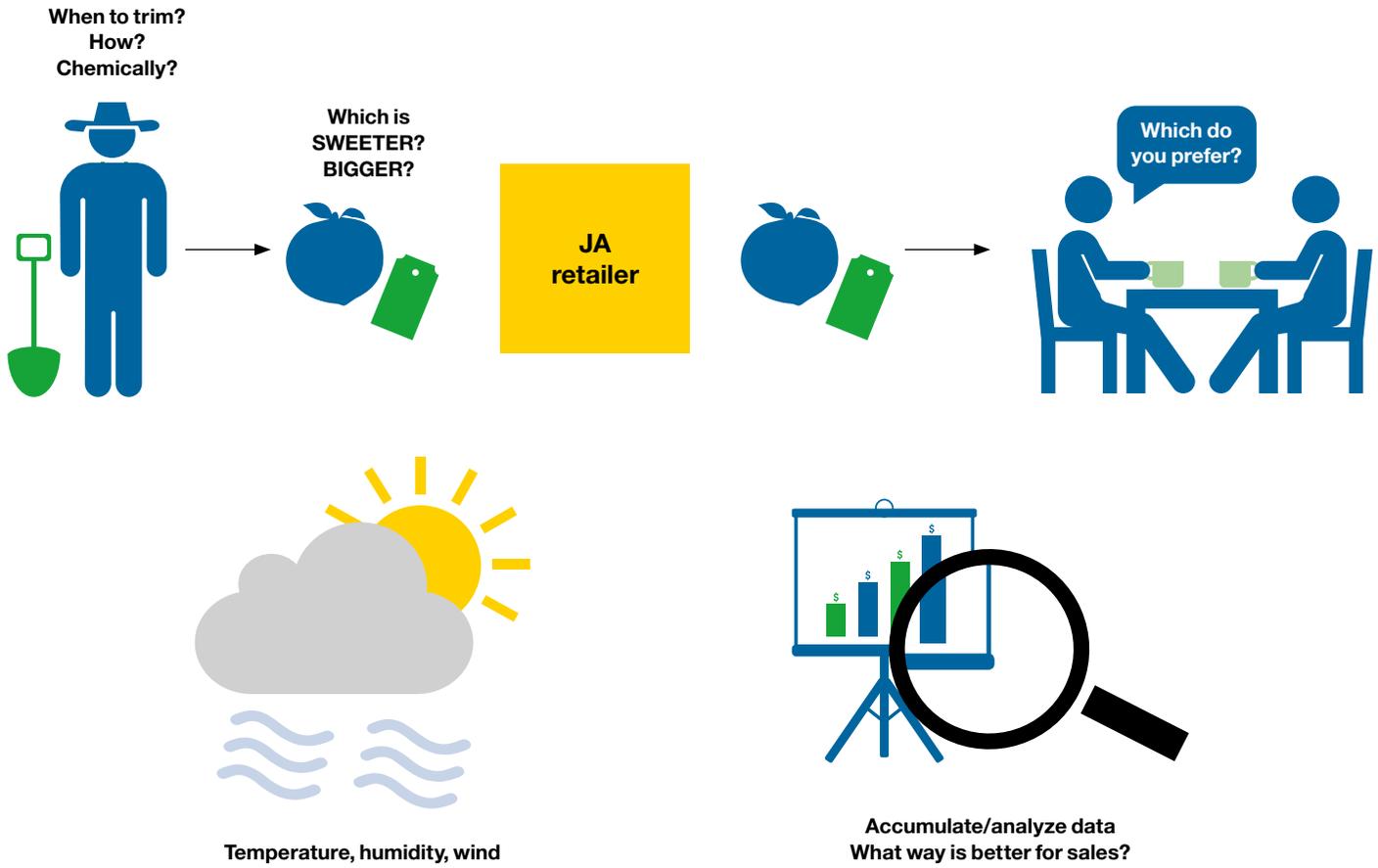
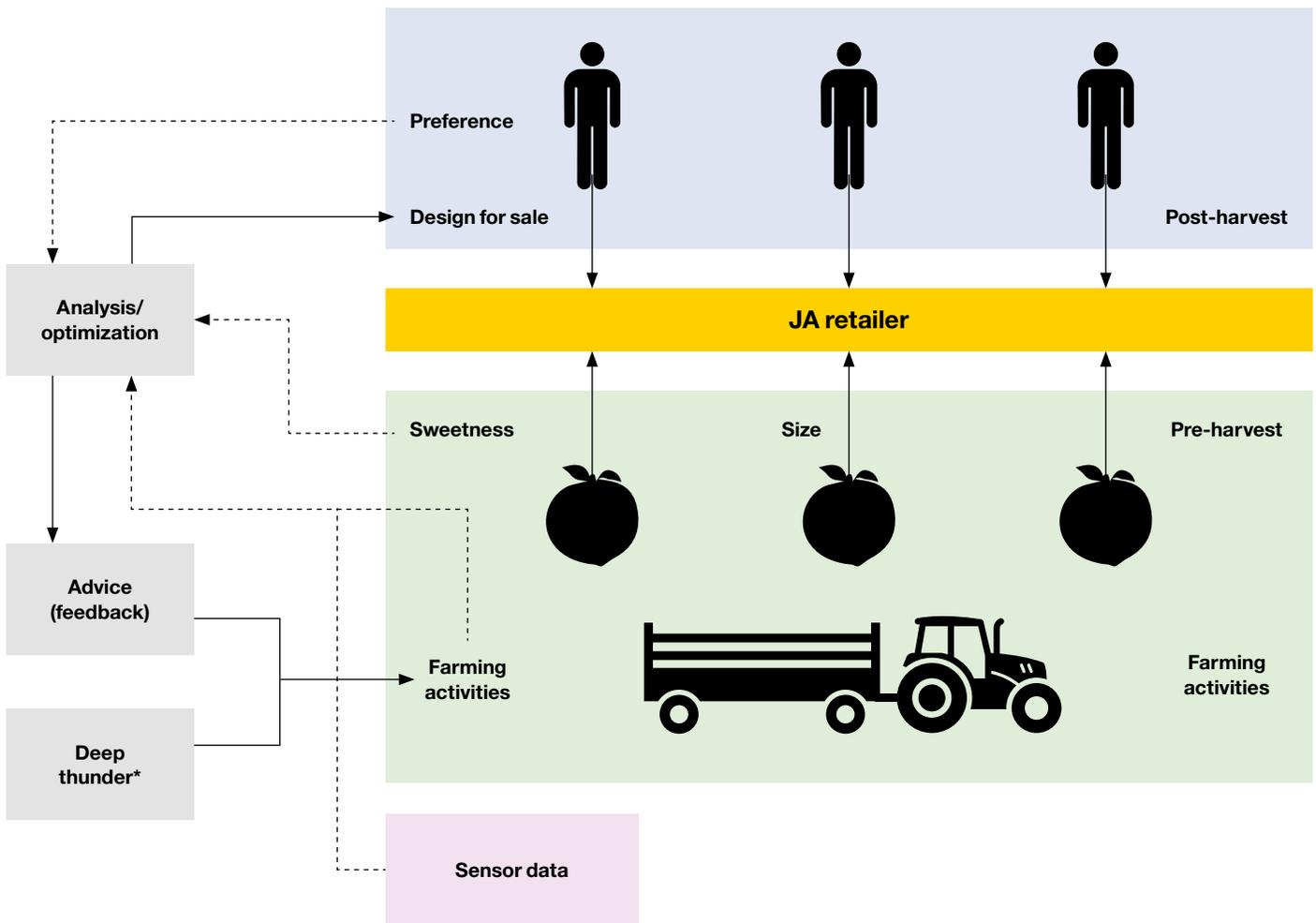


Figure 4: Maximizing quality and production pre- and post- harvest



* IBM superconductor that performs weather modeling.

Figure 5:
Data flow for agriculture

Recommendation 3: Modernize agriculture

The City should help farmers maximize revenue for the current peach harvest by targeting new markets to regain some of the losses they incurred during the last two years.

Scope and expected outcomes

Scope

- Target under-promoted large markets, such as Tokyo, through better product segmentation based on sugar content and size
- Create an automated market analysis and pricing model for maximum long-term profit that enables farmers to determine the best price for various grades of produce for the various markets
- Maximize the quality and quantity for all products
- Reduce resources and costs through new technologies and innovations

Expected outcomes

Date City's market share for peaches expands, and the growth in revenue ultimately improves the quality of future crops.

Cost of inaction

A lost opportunity to expand sales and build market share in major regions such as Tokyo, as well the potential to improve the quality and quantity of future crops.

Proposed owner and stakeholders

Owner: Agricultural consortium

Stakeholders:

- Farmers
- JA
- Government
- Retailers
- Consumers

Suggested resources needed

- Creation of agricultural consortium
- Access to the right technology to collect and analyze information

Cost estimate:

- No additional cost to the agricultural consortium
- Potential high cost for technology

Recommendation 3: Modernize agriculture (continued)

Dependencies	Key milestones, activities and timeframe
<ul style="list-style-type: none"> • Creation of agricultural consortium • Appetite for changing the segmentation for peaches 	<ul style="list-style-type: none"> • Establish new categories for peach segmentation (through September) • Collect market and pricing data (July to October) • Collect consumer sentiment (August to October) • Provide feedback to farmers (September to November) • Determine pricing optimization (November onward) • Explore new technologies (ongoing longer term)

Priority

Medium: While this can have the greatest impact, the other recommendations need to happen first to condition the market and launch the necessary infrastructure.

5. Conclusion

The Smarter Cities Challenge team believes that Date City has what it takes to modernize and grow its agricultural industry and, in turn, prosper. Residents and the government display a willingness to change. Many activities are already happening ad hoc. By leading the way and supporting both new and existing farmers with regulations and practices that inhibit their growth, Date City can become a role model for other agricultural communities in Japan.

6. Appendix

A. Acknowledgments

市職員 **Government officials**

- 仁志田 昇司 Shouji Nishida-san – Date City Mayor
- 嶋原 貞夫 Sadao Shigihara – Vice Mayor
- 小野 宏 Director – Mayor’s Office
- 佐藤 芳明 Yoshaki Sato-san – General Manager, Office of Industries
- 三浦 敏徳 Toshinori Miura – Manager, Agriculture and Forestry
- 吉田 浩幸 Hiroyuki Yoshida – Manager, Agriculture
- 原 好則 Yoshinori Hara – Manager, General Policy Section
- 鹿股 敏文 Toshifumi Kanomata – General Policy Section
- 丹治 絵美子 Emiko Tanji-san – General Policy Section (Grand Design)
- 岡崎 信幸 Nobuyuki Okazaki-san – Date City Tourism and Product Promotion Association
- 星 祐一 Yuichi Hoshi-san – Manager of PR
- 八巻 正弘 Masahiro Yamaki-san – PR Team Leader

産業部門 / 学識者 **Industry/academics**

- 岡崎 信行 Nobuyuki Okazaki – Manager, Date City Local Product Promotion Association
- 数又 清一 Seiichi Kazumata-san – JA Head of Recovery Initiative
- 菅野 良裕 Yoshihiro Kanno-san – Chariman, Committee Certified Agricultural Workers

- 高橋 弘 Hiroshi Takahashi-san – Store Manager, Date Mirai Farmer’s Market
- 千葉 秋二 Shuji Chiba-san – Executive Officer, Senior Buyer of York-Benimaru Co
- 小松 知未 Tomomi Komatus-san, PhD – Fukushima University, FURE
- 渡辺 正彦 Masahiko Watanabe-san – Fukushima University, FURE
- 星 効 Hoshi Isao-san – Fukushima University, FURE
- 横山 光衛 Mitsue Yokoyama – President of CIA Corporation

農産者 **Fruit producers**

- 石上 一成 Kazushinge Ishigami-san – Rice, peach and persimmon farmer
- 大和田 妙子 Taeko Ohwada-san – Member of Female Farmer’s Group
- 大橋 松太郎 Shotaroh Ohashi-san – Strawberry farmer
- 宍戸 弘行、タケヨ Hiroyuki & Takeyo Shishido – Owner of peach orchard

Special thanks

- 小峰 未穂 Miho Komine – Translator
- 吉崎敏文 Toshifumi Yoshizaki – Vice President, Smarter Cities, IBM Japan
- 後藤浩幸 Hiroyuki Goto – Tohoku Revitalization representative, IBM Japan

B. Team biographies



Paul Chang
Global Leader,
Consumer Products Industry

Chang leads business strategy and market development for the Consumer Products industry for IBM Software. In this role, he is responsible for the development of business strategies and market development of IBM's Smarter Planet solutions across multiple industries, including consumer products, wholesale/distribution and agricultural.

Chang has more than 20 years of experience in technology and market development in new technologies, such as track and trace, biotech and optical networks. Chang has led the global initiative at IBM in the product tracking technology for pharmaceutical, food and industrial sectors. He has also been actively involved with the US Food and Drug Administration's drug anti-counterfeiting initiative since 2003, and has been working with government entities and private sector companies around the world to develop a globally interoperable food traceability system.

Chang earned a Bachelor of Science degree from Carnegie Mellon in mechanical engineering.



Gene Brown
Distinguished Engineer
Strategic Outsourcing Delivery

Brown has more than 29 years of experience in the IT industry and is an IBM Distinguished Engineer, an executive-level corporate technical position reserved for those who have demonstrated superior technical leadership. Brown leads a team of subject matter experts in IBM Global Technology Services to evaluate and qualify solutions for some of IBM's largest strategic outsourcing customers.

Before joining IBM, Brown owned and managed an IT consulting firm focused on helping public- and private-sector customers achieve their business objectives through the application of technology.

Brown is currently the Specialty Service Area Leader for Virtualization and Distributed Server Management team in IBM's Delivery Technology and Engineering group. Previously, beyond his professional role, Brown served more than 13 years in numerous elected positions in local government as Board Finance member, Selectman and member of the Board of Education.



Stacy Spiegel
Director,
Workforce Enablement,
IBM Software

Spiegel currently oversees internal and executive communications for the global IBM Software team of more than 60,000 developers, sellers and technical service professionals. IBM Software covers nine major product groups and generates almost half IBM's profit.

Since starting at IBM almost 15 years ago, Spiegel has led workforce communications for various segments of IBM business, including sales, finance, human resources and corporate headquarters, focused specifically on IBM's 35,000 global managers.

Prior to joining IBM, Spiegel was Director of Community Relations for a Connecticut-based healthcare system. In this role she was responsible for employee communications, public relations and community programs.

Spiegel began her career as a newspaper journalist, working for more than 12 years as both a reporter and editor covering news, features and community activities at newspapers in Pennsylvania and Connecticut. She graduated from Syracuse University with a dual bachelor's degree in journalism and political science.



Yutaka Ohnuma
Business Development Executive
Smarter Cities, IBM Japan

Ohnuma-san joined IBM in 2001 as Solution Specialist for global projects in the division that supports one of the biggest automotive companies in Japan. In 2006, he changed profession to become a consultant in strategy and SCM, working with automotive clients. Since 2010, he has worked as a Business Development Executive for Smarter Commerce and Smarter Cities. Before IBM, Ohnuma-san worked for an automotive company in IT organization and business development.



Yukihiisa Yonemochi
Consulting IT Specialist,
Technology Evangelist
Technical Solutions, Smarter Cities,
IBM Japan

Yonemochi-san is a specialist in Text Analytics, technical leader for the Social Media Analysis team in BAO, GBS. He implements crawlers, text processors and big data infrastructures for SNS analysis for marketing, and tests projects for social sensors. He is also a TEC-J SIG Natural Language Processing leader. Yonemochi-san is well versed in software products with text analytics, IBM Content Analytics, InfoSphere Streams and BigInsights. Formerly Yonemochi-san was a SWG Technology Evangelist.

Yonemochi-san has authored and published 13 technical books, published over 100 technical articles in magazines, and provided hundreds of presentations to Japan's IT market. He has also disseminated the latest technology trends, including Cloud Computing, Web 2.0, rich client, BPM, SOA and JavaEE, XML. Yonemochi-san's background is as the lead developer of workflow systems for mainframe, and technical support for mainframe software.



Hideko Hamada
Business Unit Executive,
Online Commerce
Marketing and RLM,
IBM Inside Sales IBM Japan

Hamada-san joined IBM in 1989 as an Industry Solution Specialist for the distribution industry in General Business Enterprise following work experience at a Japanese apparel manufacturer and as an executive for supply chain management.

From 1997, Hamada-san specialized in marketing as Marketing Segment Manager for the distribution industry, then experienced several marketing roles such as e-business marketing leader; manager of integrated marketing communications; and manager of System and Technology Group Marketing.

From 2011, Hamada-san has led the Online Commerce, Marketing and RLM in Inside Sales team as Business Unit Executive. Hamada-san's goal is to maximize new digital sales to provide new value through eProcurement, web experience, telemarketing with marketing automation and social media.

C. Localized weather forecasting

A need has been expressed to have more specific localized weather information. This can help farmers in their day-to-day decision making and can also be an input for the forecasting and planning tool.

The recommendation is to create a “Community Climate Information Center Network,” part of the e-Farmer portal that uses observed data to rescale weather forecast at a user’s end.

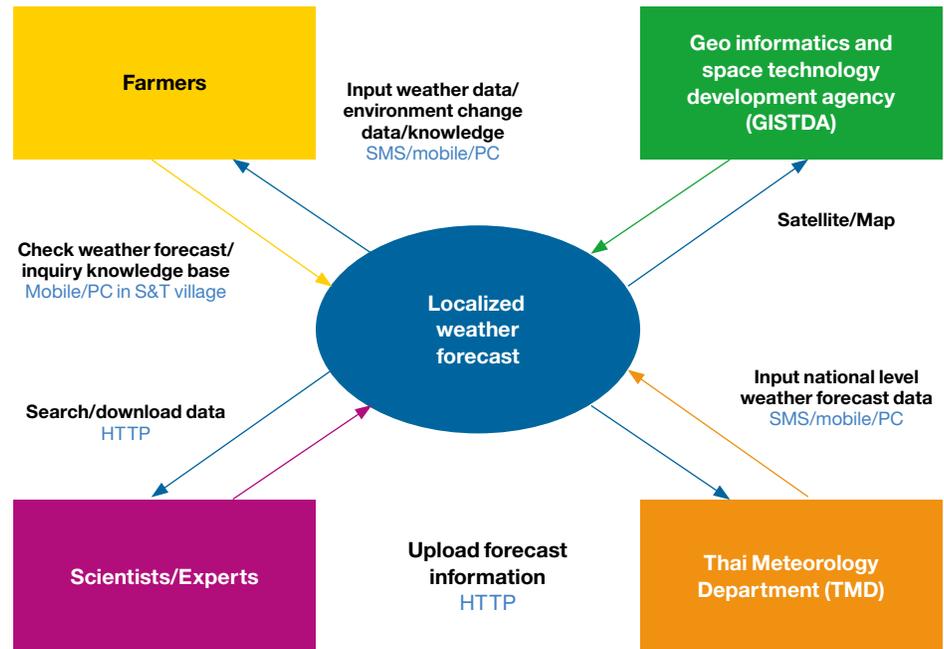
A pilot with selected district and farmers who also participate in e-Farmer portal could be started.

Actions to be taken:

- Identify district for pilot and get cooperation from farmers. Link with possible pilot on “smarter irrigation”
- Identify the data source on the weather information (GISTA & TMD)
- Create the farmer and expertise community to update the real-time climate change
- Use the information from selected sources to process into localized weather forecast
- Create SMS service to update farmers on extreme weather conditions

Weather forecasting solution overview

- Today’s weather forecasting is based upon about 100 stations of TMD, representing 100 villages each.
- The Community Climate Information Centers Network would enable to create a more localized weather forecast.
 - Use observed data to rescale weather forecast at user’s end and not interfere with overall weather prediction modeling
 - May not be as accurate as upstream assimilation, but will not violate internal consistency in physics
 - Does not require highly professional quality meteorological data
 - Weather info to be used for informing farmers, both for flood info, and for deciding when to harvest



D. Traceability: smarter food systems

There are opportunities to provide end-to-end visibility across the entire global supply chain:

- To allow farmers to obtain better real-time market pricing for produce and supplies
- To enable retailers and manufacturers to more efficiently integrate product demand with supply replacements

This is an opportunity to ensure that food will be fresh and safe, and to know where it came from.

Matiq – largest food producer in Norway

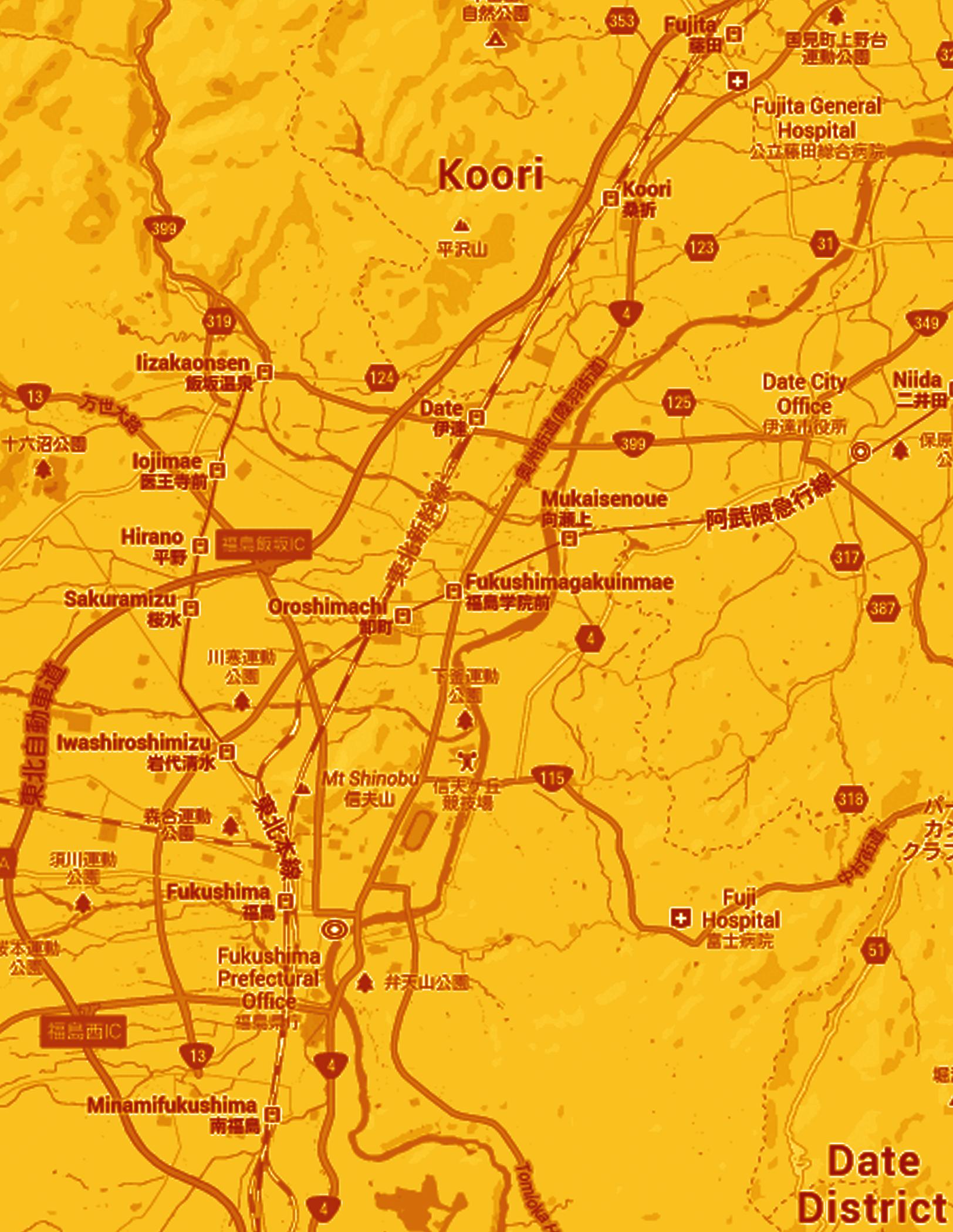
Employs RFID tags to trace meat and poultry from the farm to store shelves to ensure safety and freshness and provide more transparency to consumers.

Province of Manitoba Agricultural, Food and Rural Initiatives – Canada

Tracing agricultural products from farm to fork. Smarter tracing of ingredients, packing and products through all stages of production, processing and distribution.

Consumer product company – perishable food tracking

Targets to reduce product waste by 10% per year. Enhance supply chain efficiency and discipline. Improve supply-chain traceability by enhancing documentation (product movement/handling/storage temperatures and corrective actions).



Koori

Date District

平沢山

国見町上野台運動公園

Fujita General Hospital
公立藤田総合病院

Koori 桑折

Izakaonsen 飯坂温泉

Date 伊達

Date City Office
伊達市役所

Niida 二井田

Iojimae 医王寺前

Hirano 平野

福島飯坂IC

Mukaisenoue 向瀬上

阿武隈急行線

Sakuramizu 桜水

Oroshimachi 御町

Fukushimagakuinmae 福高学院前

川塞運動公園

下碓運動公園

Iwashiroshimizu 岩代清水

Mt Shinobu 信夫山

信夫ヶ丘競技場

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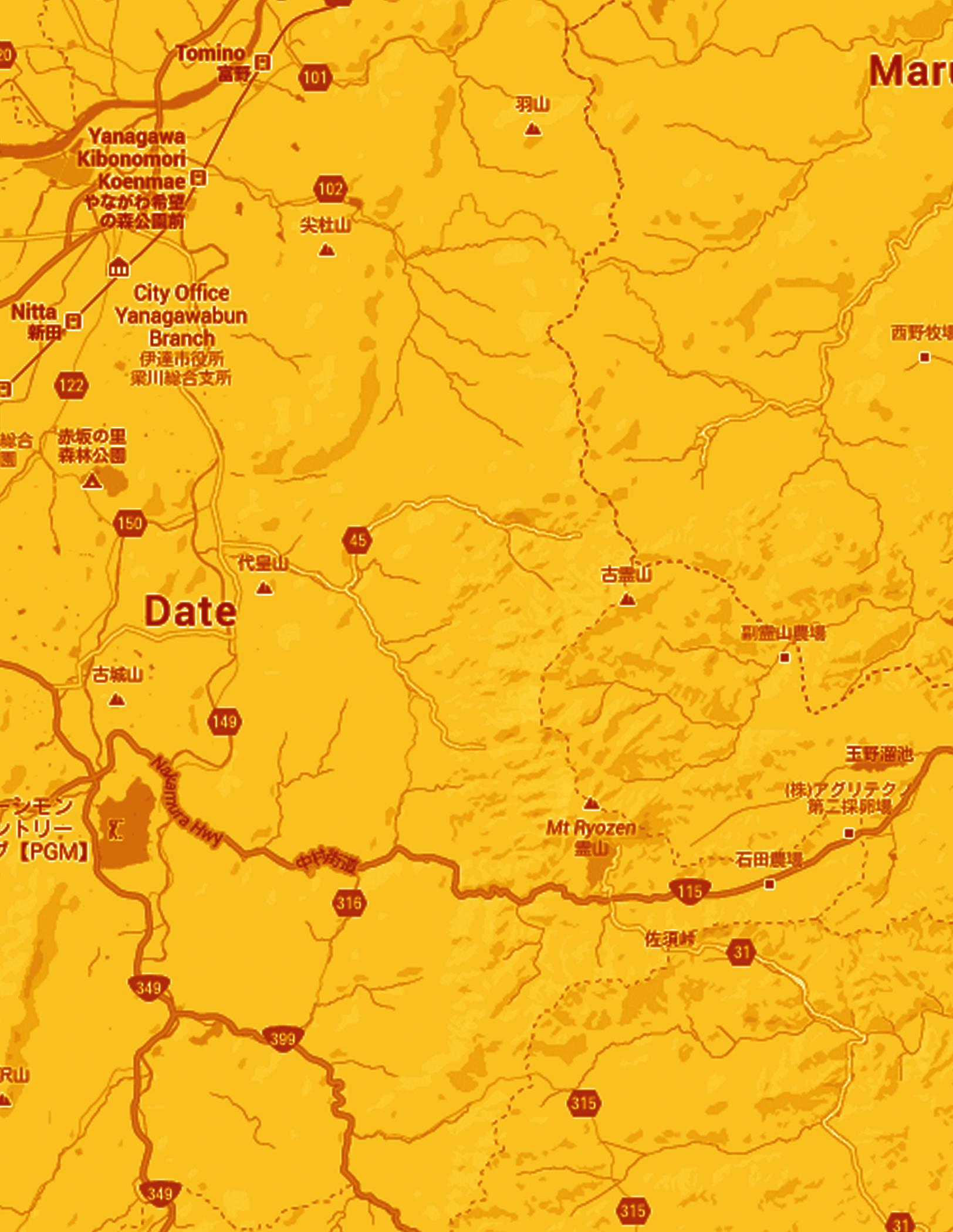
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Minamifukushima 南福島

Tomikata Rte



Maru

Tomino
富野

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Kibonomori
Koenmae
やながわ希望
の森公園前

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City Office
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Branch
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栗川総合支所

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西野牧場

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45

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Mt Ryozen
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(株)アグリテク
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石田農場

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31



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Armonk
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