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1) Introduction:

Previous reports and feasibility studies have consistently shown that there is an increasing demand for locally-grown and sustainably-produced farm product. While this increase in demand is widely acknowledged by industry, nonprofit local food advocates, and government, it is also widely acknowledged that the flow of product from farmers to consumers is significantly hampered by the lack of distribution infrastructure, particularly for small and medium sized farms (1 to 4 hectares). The contribution of farm product from small and medium sized farms to BC's gross farm receipts is substantial – small farms dominate the most intensely farmed regions of BC – that of the Lower Mainland.

The intention of this report, the fourth in the series, is to provide an account of farmers' needs from a local distribution system. In determining how a distribution model can meet farmers' needs, as producers in the value chain, the farmer's perspective is crucial. Buyers and farmers have many shared requirements including trust, communication, preservation of farm identity, and pricing that supports a profitable business. Farmers are willing to bring more product to market under certain conditions: if there are customers for their product, if they have the capacity to produce more product (access to land, labour, and other resources), and if the growing conditions (economically, and environmentally) are suitable. While many SMFs have previously focused on selling their products direct to consumers, there seems to be a growing desire to expand revenue streams by increasing sales to wholesale buyers. Food hub distribution models are being recognized as a way to fix the local food distribution gap.

In order to develop a distribution model that addresses the needs of farmers, interviews were conducted with farmers about their current distribution challenges. Their responses confirmed that there is a clear need for coordinating and improved distribution model for small to medium farm product distribution to restaurants, retailers, and other wholesale buyers. The flow of farm product from farms to consumers is significantly hampered by the lack of distribution infrastructure, particularly for small to medium sized farms.

This report has been organized into the following sections:

• Production End of the Supply Chain

• Identifying the Needs of Farmers

• Current Distribution Practices

• Farmer's Needs for a Distribution Model

• Recommendations for a Distribution Model

• Additional Considerations

• Conclusions

The farmers' needs that were identified can be used in helping to guide the design of a distribution model. Essentially, the purchasing of farm products needs to be simple, and well coordinated to accommodate the needs of both farmers and buyers. Closing the distribution gap that currently exists between small/medium farmers and restaurants, retailers, and other wholesale buyers will support small/medium farmers in increasing the supply of local farm product to the region's growing population.

2) Sales And Distribution W.R.T Technology:

Cloud Ready Multi-tenant Application Development Platform (CMAP) refers to a suite of technology that can help enterprises and ISVs in designing, developing and deploying Multi-tenant SaaS applications on the Public or Private Cloud. In the absence of CMAP , enterprises and ISVs end up using multiple technologies, architectures and engineering structures thus leading to issues in application maintenance and operational bottle necks. Lack of Multi-tenancy, Scalability and Configurability in the application results in huge inefficiency, cost over-run on application management and slower response to business needs. Good choice of CMAP brings in the agility and ability to respond to fast changing business requirements in the IT world. Now, enterprises and ISVs have started realizing the need to migrate to a unified and strong CMAP which can act as their technology backbone and engineering foundation for all existing and future applications

There are different points technology requirement which may include:

- Ground-up Development

- Solution Accelerator

    o Framework

    o Code Generator

o Components

2.1) Traditional Development using languages such as C#, Java and PHP:

In this approach the team will develop everything using standard languages such as C#.NET, VB.NET, Java, PHP, etc.

- Provides complete control to the architects/programmers on the technology
- No enforced limitations as they are free to choose the technology
- No force fit. Since there are no external software components used.

2.2) Solution Accelerators:

Solution accelerator as the name suggests helps in accelerating the development of applications through one or many of the following ways,

2.2.1) Frameworks

Frameworks can address plumbing layers like security, authentication, rules, workflow, etc. This will significantly help in cutting down the time for developing new applications, as the IT team has to focus only on the functionalities rather than on the plumbing layer. However, one needs to pay attention to the value that the framework brings to the applications. There are several frameworks in the market but many of them provide very basic elements, which may not be of major value for the applications.

Following are available in market:

- Oracle Application Development Framework (ADF)
- Ruby on Rails
- MS ASP.NET MVC
- Dot Net Nuke (DNN)
- CSLA.net
- AppFlower
- .Net Core

2.2.2) Components:

Some of the vendors provide specific components that can help perform a particular feature/functionality. Unlike the framework, components are much lighter in nature due to the scope of functionality they address. Components are available in all architecture layers, starting from UI components (Ex:Grid) to middle-tier components (Ex: Rules Engine) to DB components (Ex:custom scheduling)

Following are some of providers of components,

- DevExpress
- Janus Software
- Component One
- React Native

3) Sales And Distribution W.R.T Fields:

Basically there are various fields in which we use multi-tenancy as software as service application a lot fields are around our daily life and around the world which can used in very better way by multi-tenancy platform like we use two fields.

- Farmer/Food
- Pharmacy/Medicine

3.1) Farmer:

3.1.1) Production End of the Supply Chain:

The agriculture industry in BC is a crucial component of the region's economy. In 2009, it was estimated that the agriculture and agri-food system accounted for over 13% of BC's employment.1 In 2006, a BC self-reliance report concluded that BC farms alone have the potential to produce 48% of all food consumed in BC.2 While self-reliance is not necessarily the overall objective of a regional agri-food hub, these values are real indicators of the significant production value of BC's farms, and their capacity to satisfy the growing demand for local food.

With high quality soils, a moderate climate, access to water, access to diverse markets, and proximity to educational institutions, local farmers are well primed

for producing high quality local food products for a provincial population that continues to increase. For instance, the population in Metro Vancouver, a prominent population base located in BC's Lower Mainland, is expected to rise from 2.2 million (2006) to 3.3 million (2040 projection).3 Demand for food is expected to increase at roughly the same rate, which will create opportunities in linking local farm product and local buyers/consumers.

Farmers can bring more product to market under certain conditions: if there are customers for their product, if they have the capacity to produce more product (access to land, labour, and other resources), and if the growing conditions (economically, and environmentally) are suitable. Overall, farmers, and their agri-food counterparts play a significant role in local food economies; however, additional infrastructure will be required to raise the level of local food production in the Lower Mainland.

The farmer's perspective is crucial in identifying how a distribution model can meet the needs of both farmers and their customers. Their perspectives are captured in the following sections.

3.1.2) Identifying the Needs of Farmers:

This section of the research looks more closely at the distribution needs from the farmers' perspective. In order to develop a distribution model that works for farmers, farmers' considerations need to be considered. The purchasing of farm products needs to be simple, and coordinated to accommodate the needs of both farmers (the sellers), and their customers (the wholesale buyers). The simpler and more efficient it is for the wholesale buyer to purchase product, the more likely local farm product is to be purchased on a regular and ongoing basis. An ideal distribution model would meet the needs of specific points along the supply chain: producers (small/medium farmers), and consumers (wholesale buyers, including grocers, chefs, institutions etc.).

To investigate the distribution needs of farmers, interviews were conducted with seven farmers. The farmers selected for the interviews were chosen because they had past or current/ongoing experience with selling to wholesale buyers (Eg. restaurants/chefs, grocers/retailers, and distributors).

During the interviews, farmers were asked questions to identify the following:

1. Current Distribution Practices of Small/Medium Local Farmers

2. Distribution Challenges

3. Farmers' Needs for a Distribution Model

4. Additional Considerations

The information from primary sources was supplemented with research from secondary sources. This information is outlined below. The list of questions used for conducting interviews with the farmers can be found in the Appendix.

For this report, farmers were specifically selected for the interviews based on two criteria: (1) that they were a small/medium farmer, and (2) that they had previous, or current/ongoing experience with selling to wholesale buyers. Otherwise, the farmer's operations varied considerably. Most farmers focused on selling just their own product. However, one farm in particular sourced product from other farmers to increase the variety and quantity offered in their own product line. Some farmers focused on a small range of crops, while most produced a wide variety and selection of vegetable and/or berry crops. Some farmers also raised livestock, including chickens (for the production of eggs). The farms ranged from 6-7 acres to 40 acres in size. Some farms had small greenhouse operations on-site; some farms also offered U-pick, or other farm attractions (including corn mazes, hay rides, pumpkin patches, and on-site farm stores with value-added products). Four of the farms incorporated multiple enterprises into their business model; these enterprises included specific product lines produced for certain buyers, farm attractions, and buying clubs and CSAs.

In the past, SME farmers have relied heavily on marketing their product directly to consumers – through farm gate sales, on-site stores, CSAs & buying clubs, and farmers' markets. Selling directly to wholesale buyers (restaurants, retailers, agencies, and/or distributors) has been less common in the past, and overall represents a much smaller portion of a typical farmer's revenue stream. However, the interviews revealed that there is a change afoot. Many farmers reported that farmers' markets are no longer their first choice for selling product, and they would like to increase their sales to wholesale buyers. Most farmers reported that they could see a trend in their revenue stream – that over time, the % of revenue generated from wholesale sales was increasing, especially in recent years. Of the farmers interviewed, the % of revenue generated from wholesale sales ranged from 5% to 100%. All farmers reported that they would like help with establishing new

customer relationships – especially relationships with wholesale buyers. Farmers' markets require long hours of work (often an entire day, which includes packing/unpacking, and travel time), with no assurance of sales. Many farmers reported that they are unable to predict why one product will sell out one week, but not the next – often farmers return to their farms with unsold product in their trucks. On hot days especially, product loss due to spoilage can be a concern.

The farmers identified numerous benefits of a food hub/distribution model that could attend to their marketing and distribution needs:

• Being able to spend more time on their farms; spending less time in trucks and at farmers' markets

• Minimizing risk through establishing producer-seller relationships that focus on mutual benefits. Although sale of product can't be fully guaranteed, having a working relationship that serves both parties' interests can help to take the guesswork out of crop planning. For example, a farmer might grow a crop specific to a buyer's needs that could be harvested at a time when the buyer wants the product. Or several farmers could coordinate to grow a crop according to a schedule that extends the harvest season – instead of all farmers harvesting their crop at the same time, farmers harvest in succession. This can prevent price drops when a crop is bountiful, and provide a steadier revenue stream for more farmers, while removing the risk of falling prices, and surplus product on the market

• Increasing sales to wholesale buyers, and decreasing reliance on farmers' market sales

• Being able to spend less time on distribution and transport, and more time farming

• Expanding their farm operations, and increasing revenues

In terms of land use, most farmers reported that they were already maximizing production on the land they had available to them. This isn't to say that the farmers interviewed had limited capacity in expanding their production, but that they were already maximizing production using their given resources. All farmers reported that they had expanded land production as they needed to over the years. Many farmers reported that they would like to scale up their operations, and would do so if the opportunity became available to them. Many farmers identified that increasing revenue through sales to wholesale buyers could help them to expand

production of their operations. It is important to note that a farmer will only expand when it makes financial sense to do so.

3.1.3) Farmers' Needs for a Distribution Model

The farmers interviewed were also asked about their distribution challenges in increasing their sales to wholesale buyers. The comments received were analyzed, and then carefully categorized into a "farmer's need for a distribution model". Hence, the first column of this table describes the farmers' distribution challenge (based directly on their experiences), and the second column lists the corresponding farmer's need. This table is shown below. Some repetition in the listing of Farmers' Needs was necessary.

Distribution Challenges – self-identified	Farmers' Needs for a Distribution Model
Finding trucking companies who would pick-up less than full-truckload loads	Coordination of transport logistics Aggregation of product for more efficient transport/distribution
Equipment maintenance Organizing full truck loads Minimizing trips	Coordination of transport logistics Aggregation of product for more efficient transport/distribution Cost-sharing or shared risk management of high-value infrastructure (Eg. loading equipment, trucks, coolers etc.)
Self-delivery takes time away from farming Their current distribution model may not be financially sustainable –costs are subsidized, but only temporarily. There is an urgent need to aggregate resources for the truck costs.	Cost-sharing or shared risk management of high-value infrastructure Coordination of transport logistics
In need of a refrigerated truck, especially in the summer months	Coordination of transport logistics Cost-sharing of high-value infrastructure
Lack of purchasing assurance, which would ensure revenue generation Distribution takes time away from farming High costs of fuel, delivery, and administration	Coordination of crop planning, including harvest schedules Coordination of transport logistics Cost-sharing of high-value infrastructure
Lacks enough appropriate drop-off points Difficulty in coordinating crop schedule, planning, farmer collaboration, logistics of transport	Coordination of transport logistics Coordination of crop planning, including harvest schedules Assistance with marketing/sales, developing new sales relationships
Lacks an efficient distribution pathway Lack of purchasing contracts, which would ensure revenue generation	Coordination of transport logistics Coordination of crop planning, including harvest schedules Assistance with marketing/sales, developing new sales relationships

4) Pharmacy:

4.1) Supply Chain Of Growth:

In order to set-up a multi-tenant , the investor needs to get the store and site registered with the model of basic requirements of the respective region. The

registration requirements are be like the market trend is. In this prefeasibility study the proposed medical store will be established in rented premises with an area of around 400 sq. feet, having electricity & telephone connection.

The range offered in this Medical Store is a blend of both multinational and national pharmaceutical products. General Products such as Food Supplements, Toiletries, Shampoos, Soaps, Diapers, & Sanitary Napkins, and Prepaid Cellular Cards will also be available at the store. The medical store will remain open for 16 hours / day. Initial trade volume is calculated at Rs. 11.97 million in the first year, with an annual growth of 10%, providing employment to 6 individuals.

The online marketplace for medicine has been thriving for many years. In 2018 online sales accounted for approximately $20 million or 20% of total medicine sales worldwide.

4.2) Needs Of People:

So as to be fruitful, system must separate itself from rivals so as to interest clients in the online commercial center. To do this, system will use its routine with regards to customizing its item bundling which it as of now offers in-store clients. Current contenders don't at present give any personalization of bundling. Clients will be able to customize messages on or within item bundling, demand explicit shading based topics, or tailor bundling for exceptional events or occasions.

System will execute a client messaging list so as to send item advancements, deals notices, and other exceptional contributions to clients who register. Also, system will offer referral motivating forces to clients who allude our items to loved ones so as to give extra motivators. System will likewise keep up a client database so as to decide its objective client gatherings and land areas. System will research showcasing insight suppliers to decide the advantages and expenses of obtaining client data for mass email battles too. Another significant thought of System internet showcasing technique is cost. Electronic showcasing correspondence expenses are little in contrast with post office based mail promoting which system at present uses. Nonetheless, we expect the extra income from online deals to incredibly exceed these extra electronic advertising costs.

4.3) Distribution Model:

The online sales campaign is not anticipated to significantly affect the organizational structure of the company. There are, however, several staffing additions required to successfully implement the online sales campaign. All of these positions will work within existing departments and report to department managers.

Staffing Position #1: Online Sales Manager – this full time position will lead sales staff in identifying sales opportunities and converting these opportunities to actual sales. This person will report to Director of Sales and will work in required field.

Staffing Position #2: Online Marketing Manager – this full time position will lead marketing staff in identifying target customer groups/markets and conducting online advertising/marketing efforts to maximize traffic to system online marketplace. This person will report to system Director of Marketing and will work in ABC headquarters.

5) Recommendations for a Distribution Model:

A short list of priority needs based on the small/medium farmers interviewed was generated from the interview findings. This list serves as a list of priority recommendations that small/medium farmers have identified as necessary for including in the design and development of a food hub/distribution model. In no particular order, this list of priority recommendations includes the following:

- Coordination of transport logistics
- Aggregation of product for more efficient transport/distribution
- Cost-sharing or shared risk management of high-value infrastructure (Eg. loading equipment, trucks, walk-in coolers etc.)
- Coordination of crop planning, including harvest schedules
- Assistance with marketing/sales, developing new sales relationships

This short list of farmers' recommendations for a distribution model should be utilized in designing and developing the food hub/distribution model.

The interview findings confirm that the flow of product from SMFs to consumers is significantly hampered by the lack of distribution infrastructure aimed at small/medium farmers. In determining how a distribution model can support

small/medium farmers as valuable producers in the value chain, it is crucial to consider their perspectives. Farmers will expand their farm operations accordingly; however, a distribution model is urgently needed in order to help them grow their businesses. The main recommendation from this report is that in order to satisfy growing demands for local food, small/medium farmers will need distribution infrastructure that addresses their needs. The distribution model should include the items listed in the priority recommendations above. As well, the distribution model should ultimately help SMFs expand revenue streams by increasing sales to wholesale buyers. A food hub distribution model in this case can be used to help fix the local food distribution gap.

6) Additional Considerations:

During the interviews, the farmers shared past experiences around distribution attempts and successes. From these anecdotes, a list of additional considerations formed. This information should be considered when designing and developing a food hub distribution model that serves to connect local food producers to wholesale buyers.

Bellman Specialty Produce started off selling directly to a well-established restaurant chain – this was initially made possible because the farm operator had previously worked as a Red Seal chef. Eventually, the restaurant chain asked their wholesale distributor to take over the sales relationship with the farmer, and this led to Bellman's farm products being carried by large wholesale distributors like Sysco and GFS. The lesson to be learned in this case is the value of relationships. Bellman had an existing relationship between a chef-turned-farmer, and a well-established restaurant chain. It was the strong partnership between the two parties that led to the sales relationship that exists between Bellman, Sysco/GFS, and the restaurant chain today.

Urban Digs Farm has numerous relations with high-end restaurants that want to purchase local farm product. However, Urban Digs was unable to produce the quantity necessary to fill the orders. In response, the farm operator started sourcing product from other farmers to fill large orders, which enabled her to maintain a high number of relationships with chefs. This has led the farm operator to becoming a part-time farmer, and part-time distributor, since she makes the delivery rounds herself. While this has been working in recent months, the farmer

reported that this model is not financially sustainable in the long-run. Also, having to coordinate the distribution, and make the deliveries herself takes her away from on-farm activities, reducing capacity for her own production. The key consideration from this experience is the need for a distribution model that supports farmers by helping to organize, aggregate, and coordinate product, while managing sales from buyers, and also sharing distribution resources (Eg. driver, vehicle, cooler).

Urban Digs Farm and City Farm Co-op have extensive experience with using various types of softwares that could serve as a marketing service that connects farmers with more wholesale buyers. A key consideration is the utilization of online software that provides a marketing service that meets the needs of the users (in this case the farmers, and 12 the wholesale buyers). A shared marketing service also enables cost-sharing of the product amongst users, leading to minimal administration/coordination costs. An online mobile tool (smart phone app) could also be considered to help farmers coordinate their purchasing orders and product distribution more efficiently. Oftentimes, software is designed to be used at a computer; however, farmers are not often found at a computer. A key lesson here is considering the needs of farmers at every stage. If a software tool is to be incorporated as part of the model, it would be wise to include farmers in early discussions.

Some farmers expressed concern around how their product would be marketed. In the SMF community, different standards exist around product quality, handling practices, packaging, storing, packing, traceability, labeling, food safety certification etc. The key consideration to keep in mind here is that farmers will need to be consulted at every step. Clear expectations will need to be established concerning all standards.

In talking to farmers, no tried-and-true models that had stood the test of time were identified. Most models that had been attempted were co-ops, or co-op-like, in that farmers worked together, and shared distribution/marketing costs evenly amongst those who contributed. Decisions were made together; sometimes disagreements occurred. Some farmers have stories that end in the loss of revenue, wasted/ruined product, and disappointment. For the most part, groups disbanded over time. A key lesson that was identified by several farmers is the need for trust between members in the community. Failed attempts at farmer-run co-ops, or other shared marketing/distribution services have left some farmers wary of this idea. Building

trust will be crucial: trust between farmers, and trust between farmers and other stakeholders (wholesale buyers, food hub managers etc.).

Based on the above, key lessons and considerations have been summarized as follows:

• The importance and value of farmer-buyer relationships

• The need for a distribution model that supports farmers by helping to organize, aggregate, and coordinate product, while managing sales from buyers, and also sharing distribution resources

• The potential utilization of online software that provides a marketing service that meets the needs of the users (in this case the farmers, and the wholesale buyers). An online mobile tool (smart phone app) could also be considered. The importance of considering farmers' needs at every stage, especially in software design and construction.

• The need for clear expectations to be established concerning all standards. Farmers will likely need to be consulted at every step.

• The need for trust between members in the community. Building trust will be crucial: trust between farmers, and trust between farmers and other stakeholders (wholesale buyers, food hub managers etc.).

7) Conclusions:

Food hubs are increasingly being recognized as an emerging solution to distribution barriers, addressing aggregation, marketing/sales, and distribution services for small/medium farmers. The growing demand for locally produced food is widely acknowledged by industry, local food non-profits, and government – food hubs can help meet the needs of SMFs, while satisfying demand for locally produced food.

Interviews were conducted with farmers about their current distribution challenges. The challenges of external distribution for SMFs include the additional cost of paying someone to do this work, the preservation of a farm's brand, the potential for increased logistical complexity, and, if organized by farmers, the shared cost of additional infrastructure such as bigger trucks, or the rental of temperature

controlled storage. Main benefits were identified: when distributors have the farmers' interests at the centre of their mandate, farmers can focus on farming rather than on coordinating logistics, marketing/sales, and transport/distribution. Additional benefits are that buyers can purchase unique local products, experience specialized services, minimizing risk through establishing mutually beneficial producer-seller relationships, and expanding farm operations, and increasing revenue.

The farmers' responses confirm that there is a clear need for coordinating an improved distribution model for small/medium farm product sales to restaurants, retailers, and other wholesale buyers. The flow of farm product from local farms to consumers is currently hampered by the lack of distribution infrastructure suitable for SMF needs.

The farmers' needs were identified as priority recommendations to be included in the design and development of a distribution model that suits SMFs.

These recommendations include the following:

• Coordination of transport logistics

• Aggregation of product for more efficient transport/distribution

• Cost-sharing or shared risk management of high-value infrastructure (Eg. loading equipment, trucks, walk-in coolers etc.)

• Coordination of crop planning, including harvest schedules

• Assistance with marketing/sales, developing new sales relationships

Additional considerations were also identified and collected. These considerations include the following:

• The importance and value of farmer-buyer relationships

• The need for a distribution model that supports farmers by helping to organize, aggregate, and coordinate product, while managing sales from buyers, and also sharing distribution resources

• The potential utilization of online software that provides a marketing service that meets the needs of the users (in this case the farmers, and the wholesale buyers). An online mobile tool (smart phone app) could also be considered. The importance

of considering farmers' needs at every stage, especially in software design and construction.

• The need for clear expectations to be established concerning all standards. Farmers will likely need to be consulted at every step.

• The need for trust between members in the community. Building trust will be crucial: trust between farmers, and trust between farmers and other stakeholders (wholesale buyers, food hub managers etc.).

The intention of this report was to provide an account of farmers' needs from a local distribution system. The interview findings confirm that the flow of product from SMFs to consumers is significantly hampered by the lack of distribution infrastructure aimed at small/medium farmers. In determining how a distribution model can support small/medium farmers as valuable producers in the value chain, it is crucial to consider their perspectives. Farmers will expand their farm operations accordingly; however, a distribution model is urgently needed in order to help them grow their businesses.

The main recommendation from this report is that in order to satisfy growing demands for local food, small/medium farmers will need distribution infrastructure that addresses their needs. The priority recommendations identified can be used in helping to guide the design of a distribution model. Essentially, the purchasing of farm products needs to be simple and well coordinated to accommodate the needs of both farmers and buyers. As well, the distribution model should ultimately help SMFs increase sales to wholesale buyers. Closing the distribution gap that currently exists will help to satisfy increasing demand of local farm product in the region and beyond. A food hub distribution model in this case can be used to help fix the local food distribution gap.