

DRIED KIWI PROJECT in ARUNACHAL **PRADESH**

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Executive Summary

The dried kiwi has been in high demand due to the nutritional value such as minerals, fiber, and vitamins. The demand is estimated to grow for the next 10 years. According to independent market studies, total market value for global market for dried kiwi slices is at USD 2.8 billion, annual volume sold is approximately 2 million MT. India consumes 1,500 MT Dried Kiwi with the total market value is USD 2 million. The total global consumption is estimated to rise to 2,8 million in 2025 and expected to grow at 4,2 percent per annum, whilst India consumption is predicted to grow at 3,200 MT and continue to grow at 10% per annum. All these figures show that dried kiwi market is potentially lucrative.' Other benefit from dried kiwi production is by processing into dried kiwi prolong the shelf-life of the kiwi fruit from one month to six month, thus dried kiwi could be stored in storage for longer period and easy to transport.

Arunachal Pradesh is the largest grower of Kiwi fruit, or Chinese Gooseberry as it is known. Nearly 80% of the Kiwi produced in India comes from Arunachal Pradesh, amounting to 7000 MT (reference). Arunachal Pradesh produces high quality organic kiwi because they grow in free pollution area and without chemical fertilizer applied. Another value added is that the price is 30% cheaper than imported kiwi. There are still a lot of lands available that potential for kiwi fruits to grow in this state. Like the rest of the North Eastern states, Arunachal Pradesh is an ocean of opportunity, resources and unexplored potential when it comes to agriculture.

However, due to low production of kiwi fruit, unavailability of plant to produce dried kiwi, lack of storage and packaging, lack of sustainable supply chain system and farmer coordination, nearly 70% of the output is wasted annually (reference). Growing Kiwi fruits is a difficult task for the locals due to lack of information access, initial capital support for machinery and tools. Finally, to be able to produce dried kiwi, the level of kiwi fruit production has to be increased to meet the full machine capacity.

This final report presents solutions to the vast challenges faced by locals of Arunachal Pradesh. Due to multitude of challenges of several levels, the true benefits from what this state offers have never been fully harnessed. Through this report, we studied the several bottlenecks that are hindering the economic progress of the state and attempt to propose an actionable and scalable business model for tapping the potential of the agricultural sector in this state. Our group's focus is on increasing kiwi fruits production and then process them into dried kiwi. By selling dried kiwi in the market, will increase the revenue of the farmers and the state. The solution that we propose will be aligned towards easing these bottlenecks and provides benefits to the players.

The proposed solution addresses the challenges from each phase which consists of farm phase, sourcing phase, processing phase, and market phase. We also have identified partners that will engage in each phase. The Farm phase covers the cultivation, harvest, and grading of the kiwi fruits. By applying our model, the production level and the farmers' net profit will increase by four times and approximately 150 new jobs will be created. Dried kiwi production needs minimum of 115 MT of kiwi fruit to meet the full machine capacity. We have engaged with Pollen Plus from New Zealand that will support for pollination process by providing artificial pollination, Moncaster Wire from the UK will supply for frames and fences in kiwi plantation, and Jain Irrigation System that located in India is going to build irrigation system with world class technology.

Benefits of acquiring these machineries will reduce manual efforts and plant failure rates. Further, the management phase partners ensure proper monitoring of orchards including regular soil testing and plant health check. They will leverage technologies to organize activities ensuring proper growth and maintenance of kiwi orchards.

The funds to acquire tools and technologies to engage farmers within activities will be worked out with the help of government schemes and agricultural credit-lending institutions, NABARD and FAO. Initial capital investment is estimated at \$15,200 (for one cooperative of 32 kiwi farmers) for setting up Irrigation system, Pollination Equipment and Fences. NABARD 's capital investment Subsidy Scheme funds 33% of the initial capital cost, alternatives to source the remaining will come from bank or MUDRA loan. FAO will support with tools, seeds, fertilizers, and funding the irrigation system implementation. Kiwi Growers Cooperative Society Ltd that owned by farmers will accommodate training and knowledge sharing, manage all the cost on equipment expenses to achieve economic of scale.

Another partner that is ready to support this project in the sourcing phase is Truckwaale company. Truckwaale company will help to transport of kiwi fruits from plantation to processing plants and from processing plants to distribution hub or to major cities such as Guwahati and Itanagar where the large warehouse would be located. Retailers will serve the transportation from distribution hub to the market. In the final stage of transit, the products will be moved via cargo ships, cargo aircrafts or trains to retail stores within and outside India and this service will be provided by retailers.

Processing phase for dried kiwi takes places in 4 stages which are washing and Peeling, Slicing, Drying, and Storage. Lijie, that located in China will supply the machines for each stage in dried kiwi production. One processing plant needs one unit of washing and peeling machine, three units of slicing machines, and one unit each for drying as well as storage machine. The total capital investment for the dried kiwi plant is USD 44,740, including facility and machine equipment. This investment will be financed by international corporations willing to integrate or strengthen their position in the dried fruit market (e.g. Nestlé).

On the demand side, wholesalers and retailers such as Adani Agrifresh, Indiamart, Alibaba, Bigbasket and MVB Yugvigyana Private Limited have shown their interest to buy the dried kiwi. With full capacity production of 37 MT/ year, the risk will be diversified into several wholesalers and retailers as mentioned above. The average market price for dried kiwi is USD 6.500/MT. Benefits for selling to these retailers are direct access to the market, scalable business, elimination of branding and marketing cost, and fixed premium price.

This report includes potential impact of the implementation of Smart Village project as viewed by different players included in the model. We chose four perspectives, namely: The Government, the Non-Governmental Organizations, a Villagers and a Corporate Partners, as these players have the maximum involvement in realizing the benefits of creating this ecosystem.

Elevator Pitch

We started this project around kiwi with a simple problem: Kiwi farmers sell fresh kiwi fruits in local Indian markets at a low price and therefore don't take much value out of it. To increase the price for which farmers sell their kiwi fruits, we designed a model that processes dried kiwi. Indeed, dried kiwi is sold 6 times the price of fresh kiwi fruit, but has other advantages such as a longer shelf life (6 times), and keeping fresh kiwi's high nutritional values.

Our proposed model is divided in two phases:

First, increasing kiwi farmers' yield to meet the required supply (115MT/Year) to open a profitable drying factory. Through cooperatives of 32 farmers, each farmer will invest only \$475 to rise their yield. The second phase is to partner with international corporations to build a drying factory that will process dried kiwi slices before selling them to international wholesalers.

Demand:

In 2017, independent market studies reveal a global market value for dried kiwi slices at USD 2.8 Bn for 2 Mn Metric Tons, growing annually at 4.2% until 2025. India consumes 1,500MT dried kiwi slices annually; this figure is growing at 12 per cent per annum. Therefore, Indian wholesalers like Farmpik (by Adani Agrifresh) have expressed interest to source maximum quantity of dried kiwi slices.

Revenue:

Kiwi Farmers: Currently, a 32-farmer cooperative yields 50MT/Year, sold at \$1,000/MT. After implementation of our solution, the same cooperative will yield 180MT/Year and sell them to the drying factory at \$1200/MT. This would provide each farmer with a \$4,600 Annual Net Profit (4 times current Net Profit).

Dried Kiwi Plant: Using a production line for capacity of 115MT/Year, the drying factory will yield 37MT of dried kiwi a year (due to shrinkage). International Corporation will make a \$35K Annual Net Profit.

Investment:

a. Kiwi Farmers: We need pollination equipment, irrigation systems, and frames & fences to rise yield to 115MT/Year. Implemented in 5 months, this will cost \$15,200 to the farmers' cooperative (\$475/Farmer). Also, NABARD's Capital Investment Subsidy Scheme could fund 33% of initial capital cost. This could potentially bring the initial investment per farmer down to \$315!

Finally, FAO of United Nations will support acquisition of irrigation equipment for farmers.

b. Dried Kiwi Plant: An initial capital investment of \$45K is required to start the plant. Here, we partner with International Corporations (e.g. Nestlé showed interest) that are highly interested in integrating the dried fruit market vertically. We are convinced that the high revenues (Net Profit \$35K/Year) generated by this processing plant will attract many other corporations.

Operations:

a. Kiwi fruit production: Farmers' cooperatives will monitor the kiwi production. The annual Operation Expenses is estimated at \$16,800.

b. Dried kiwi processing: Run by corporations, the processing requires 4 steps: Washing&Peeling, Slicing, Drying and Storing (cold storage room). The annual OpEx for the processing plant is \$190,200.

Supply Chain Management:

The transport company, Truckwaale is ready to take care of picking raw kiwi fruits from the farms, then transport them to the processing plant, and then deliver dried kiwi to city hubs. From city hubs, dried kiwi slices transportation is taken in charge by worldwide wholesalers.

Marketing:

Selling dried kiwi to international wholesalers (e.g. Farmpik and BigBasket) allows us not to spend any money on marketing and branding as those wholesalers brand them themselves.

Social Impact:

Our model aims at creating 145-170 new jobs split throughout the whole supply chain process (Cooperative, farmers, dried kiwi processors, Delivery Company who will hire new workers). The model will boost farmers' net profit by 4 times the current one.

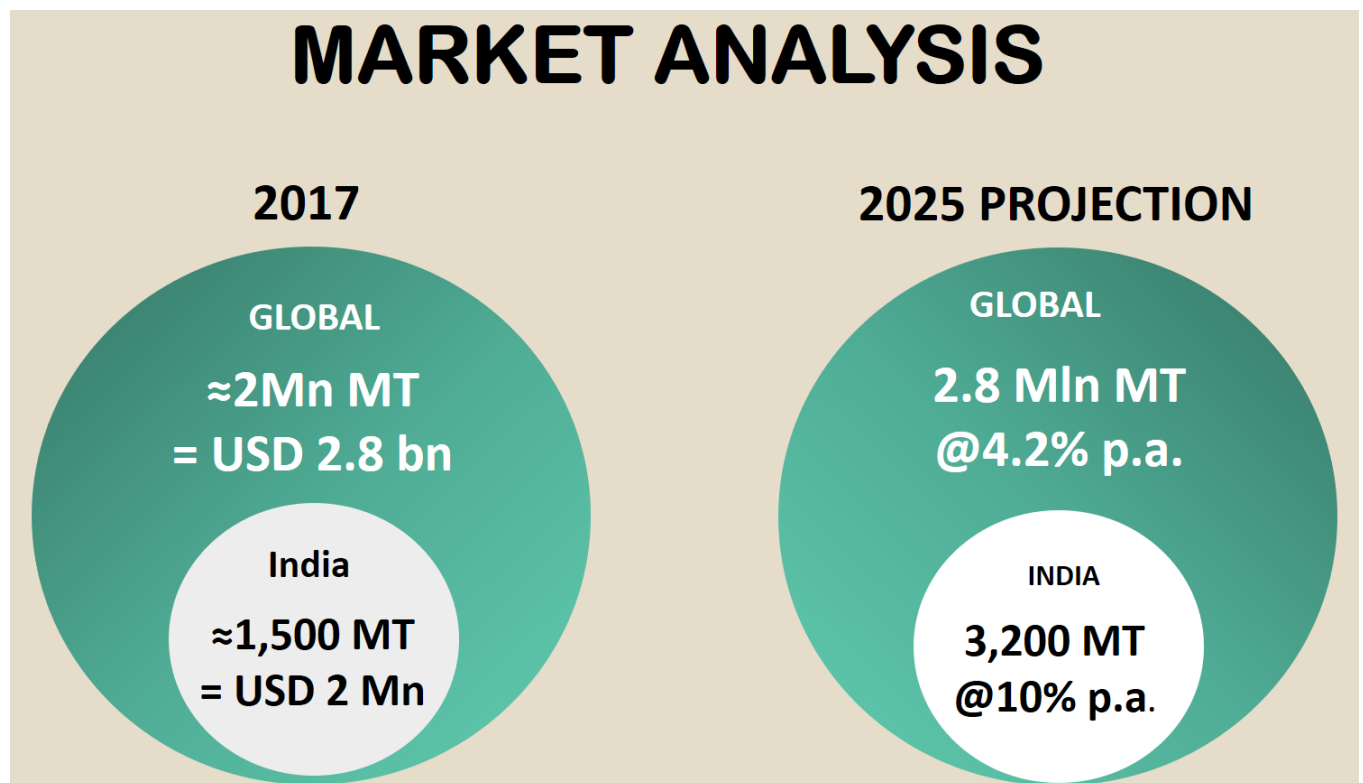
Replicated 60 times*, this initiative has potential to provide jobs to 8,700-10,200 people meanwhile creating a \$2.5Mn Tax Revenue for the Arunachal Pradesh state.

*- Conservative assumption regarding the number of kiwi farms in A.P.

Project detailed

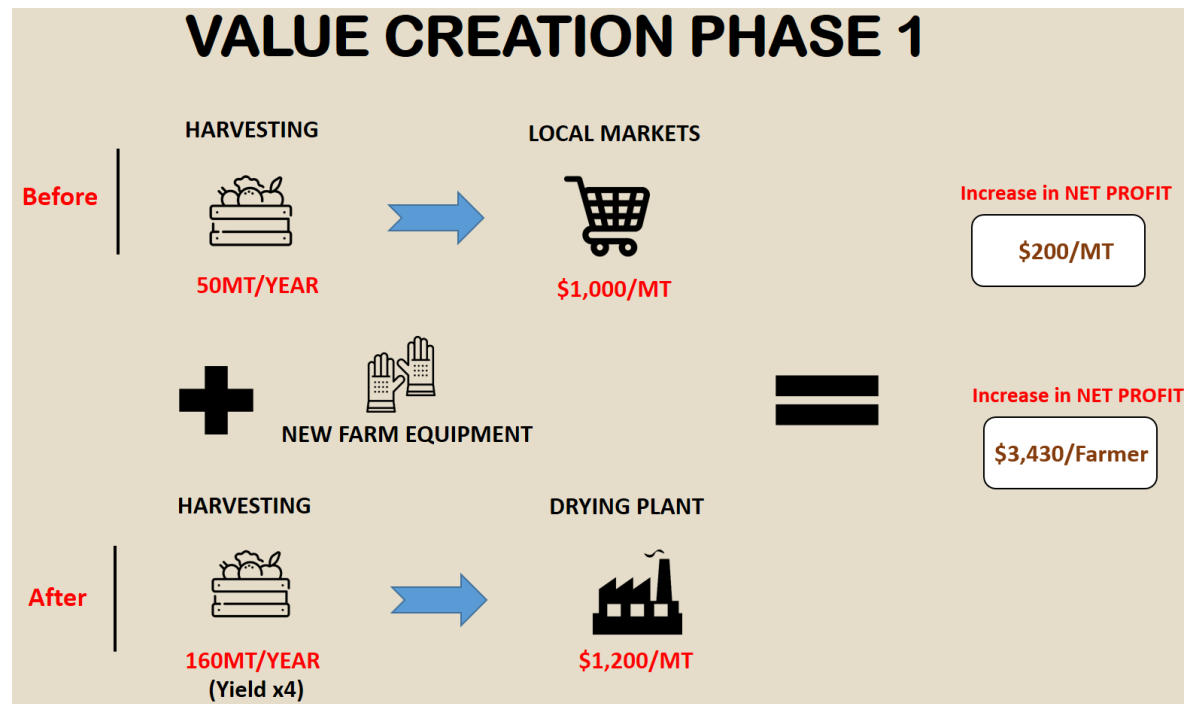
1. Demand

The global demand for dried kiwi has steadily increased over the last decades due to its nutritional benefits such as minerals, fiber and high vitamins. This demand is projected to grow even more for the next 10 years. In 2017, independent market studies reveal a global market value for dried kiwi slices at \$2.8 Bn for 2 Mn MT, growing annually at 4.2 per cent until 2025. India consumes 1,500MT dried kiwi slices annually which accounts for \$2 Mn; this figure is growing at 12 per cent per annum and expect to be 3,200 MT in 2025.



2. Revenue

a. Kiwi Farmers: Currently, a 32-farmer cooperative yields 50MT/Year, sold at \$1,000/MT (average price based on ground researches). After implementation of our solution, the same cooperative will yield 180MT/Year and sell them to the drying factory at \$1200/MT. This would provide each farmer with a \$4,600 Annual Net Profit (4 times current Net Profit). When designing this model, we wanted to ensure that farmers could increase their revenue by selling their fresh kiwi fruit at a higher price. Hence, selling those kiwi fruits directly to a drying factory instead of local markets ensures a fixed price to farmers unlike a variable price when selling to local markets.

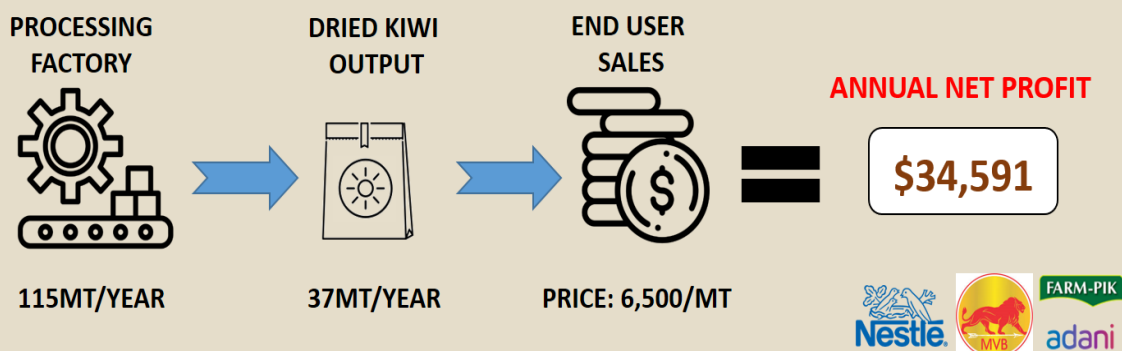


VALUE CREATION PHASE 1

	Current	Year 1 after implementation	Year 2 after implementation
CapEx	-	15,200	-
OpEx	\$3,200	\$16,800	\$18,800
Revenues	\$50,000	\$216,000	\$216,000
Net Profit	\$37,440	\$147,200	\$159,360
Net Profit/Farmer	\$1,170	\$4,600	\$4,980

- b. **Dried Kiwi:** Using a production line for capacity of 115MT/Year, the drying factory will yield 37MT of dried kiwi a year. Indeed, the kiwi fruit weight shrinks by almost 70% (from 75g to 25g) when dried. International Corporation will sell this output to international wholesalers at \$6,500/MT (average price for this premium kiwi fruit quality) to make a \$35K Annual Net Profit.

VALUE CREATION PHASE 2



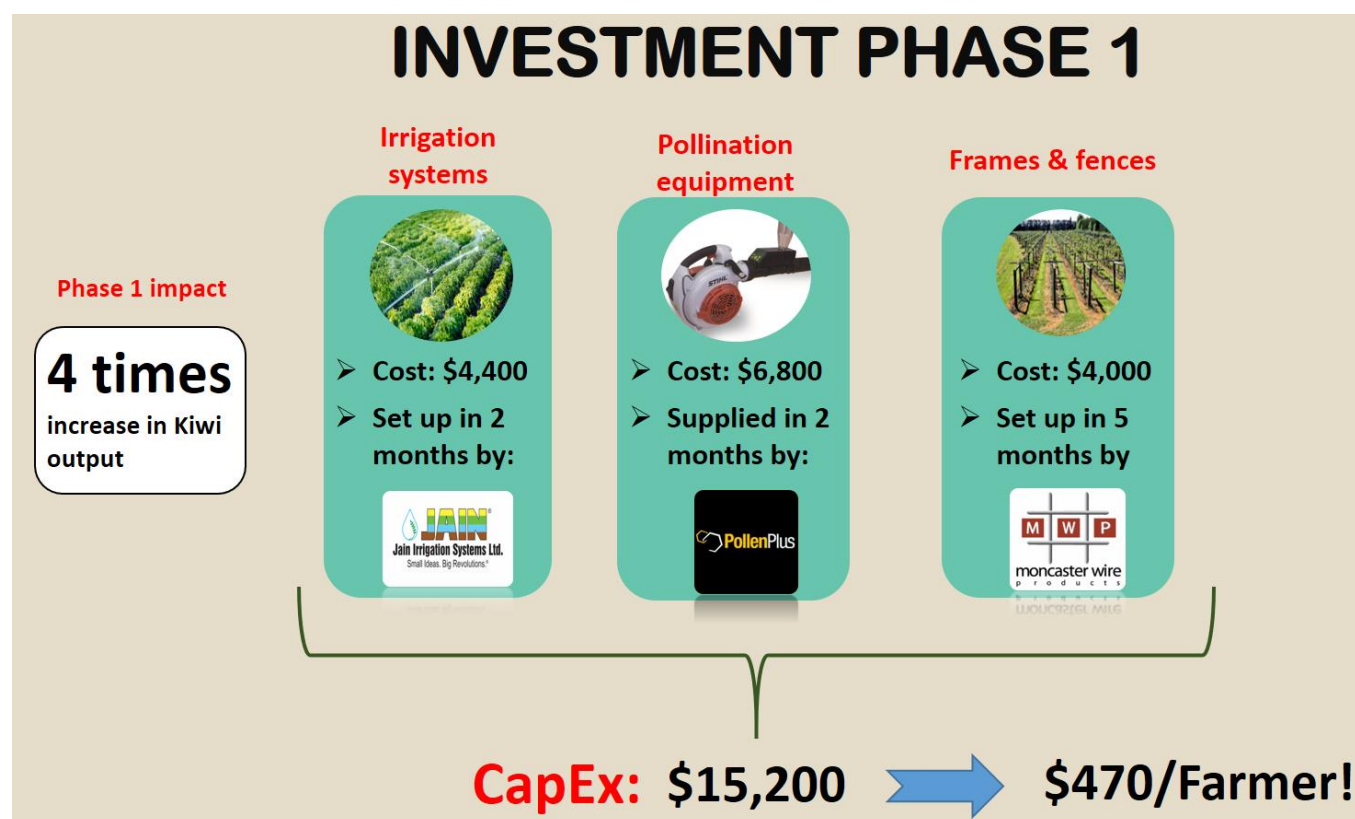
Potential for **further conglomerates** to enter and invest in **the Kiwi Ecosystem** resulting in **faster growth**

VALUE CREATION PHASE 2

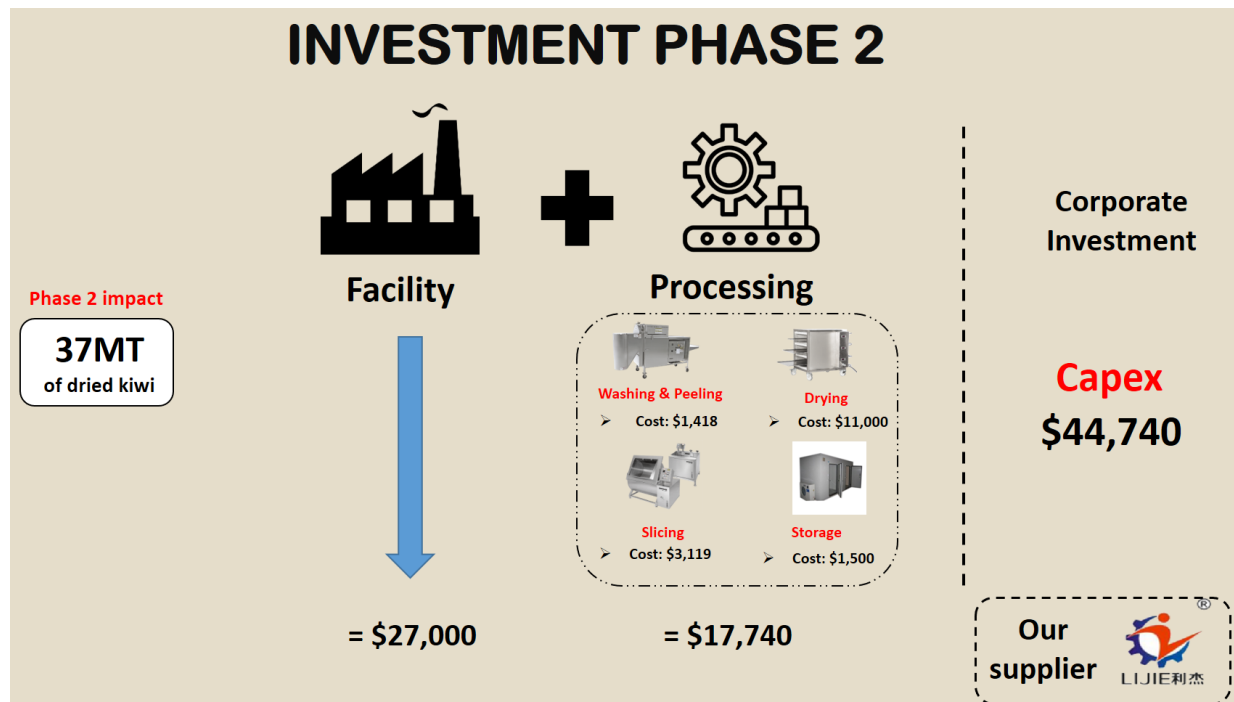
	Year 1 after implementation	Year 2 after implementation
CapEx	\$44,740	-
OpEx	\$190,200	\$190,200
Revenues	\$239,616	\$190,200
Net Profit	\$3,741	\$34,591

3. Investment

Kiwi farmers: We need pollination equipment, irrigation systems, and frames & fences to rise yield to 115MT/Year. This equipment is going to be providing by Jain Irrigation, an Indian irrigation systems specialist, PollenPlus, a New-Zealand kiwi growing company, and Moncaster Wire, a British frames provider. Implemented in 5 months, this will cost \$15,200 to the farmers' cooperative (\$475/Farmer). Also, NABARD's Capital Investment Subsidy Scheme could fund 33% of initial capital cost. This could potentially bring the initial investment per farmer down to \$315!



Dried kiwi factory: An initial capital investment of \$45K is required to start the plant. First, a 2,000sqm facility needs to be constructed nearby the crops to ensure a just in time delivery. Based on our ground researches, such a building will cost \$27,000. Then, LIJIE (our Chinese processing machine supplier) will provide a washing & peeling machine for \$1,418, three slicing machines for \$3,119, a drying machine for \$11,000, and a cold storage room for \$1,500. Here, we partner with International Corporations (e.g. Nestlé showed interest) that are highly interested in integrating the dried fruit market vertically. We are convinced that the high revenues (Net Profit \$35K/Year) generated by this processing plant will attract many other corporations.



4. Operations

We are focused on increasing local farmers' Kiwifruit cultivation in Year 1 to reach the supply needed to make the drying factory run a 100% throughout the year. Then, in a second time we will start up a dried kiwi production in Year 2.

Kiwi Fruits: There are 3 steps for the kiwi farming: Cultivation, Harvest, and Grading. Farmers will use pollinators and irrigation systems to increase crops' yield. Moreover, frames and fences will be set up to ensure a sustainable production (kiwi plants need wires that hold their branches, otherwise they bend and break). Farmers' cooperatives will monitor the kiwi production for which annual Operation Expenses is estimated at \$16,800.

Dried Kiwi: Run by corporations, the processing requires 4 steps: Washing & Peeling, Slicing, Drying and Storing (cold storage room). The annual OpEx for the processing plant is \$190,200.

5. Supply Chain Management:

The transport company, Truckwaale is ready to take care of picking raw kiwi fruits from the farms, then transport them to the processing plant, and then deliver dried kiwi to city hubs. We do trust Truckwaale to perform on-time deliveries as it is one of the major player in the delivery market in India. From city hubs, dried kiwi slices transportation is taken in charge by worldwide wholesalers.

The transportation from kiwi crops to the dried kiwi factory will take one day as the kiwi factory will be located nearby the crops. This just-in-time system allows farmers not to invest in costly cold storage warehouses and deliver their fresh kiwi fruits straight to the dried kiwi factory.

Then, the drying factory can process batches of 450kg of fresh kiwi fruits per day (=126kg of dried kiwi per day). Once processed, this batch is put in large wholesale bags (unbranded) provided by our B2B customers (wholesalers) stored in a cold storage room waiting for the delivery truck to come and pick it up.

Truckwaale will design an efficient delivery route, but they ensured us that they could come pick up the production twice a month. Thus, the cold storage in the factory is designed to store at least 4MT of dried kiwi as the factory will produce 2MT of dried kiwi between each delivery (126kgx15days=1.9MT). The transport to city hubs in Itanagar is still ensured by Truckwaale and takes 1 day.

Then, our B2B customers (wholesalers) take over the branding and delivery to end customers.

6. Marketing & Branding

Selling dried kiwi to international wholesalers (e.g. FarmPik and BigBasket) allows us not to spend any money on marketing and branding as those wholesalers brand them themselves. Plus, they will provide the large unbranded bags used to pack the dried kiwi at the drying factory.

7. Social Impact

One model will create 145-170 jobs while increasing each farmer's net profit by 4 times the current one. Indeed, based on our researches the current average annual net profit of a kiwi farmer is \$1,170. This model ensures a rise to \$4,600 of net profit per annum. Also, we provide farmers with an easy and sustainable access to global markets through an effective supply chain model.

In the long-term, a replication of this model throughout the state by 60 times (conservative assumption regarding the number of kiwi farms in the Arunachal Pradesh State), there will be 8,700-10,200 new jobs created. For the Arunachal Pradesh State, it could bring a new annual tax revenue of \$2.5n. Furthermore, the biodiversity increases as the land and water are preserved from the Jhum practice.

ECONOMIC & SOCIAL IMPACT

Short-Term



1 model = **145-170** jobs created



Kiwi farmers' **Net Profit X 4**



Easier & **direct access** to markets for farmers

Long-Term



Model replication throughout the state:
8,700-10,200 new jobs



\$2.5 MN per year Tax Revenue for AP



Reduction in **traditional shifting** cultivation practice

Perspectives

a) Government's Perspective (Akhil)

What is the current value addition on Government's part?

Arunachal Pradesh has long been among India's most underdeveloped states since independence. Most economic issues for the state arise from its remoteness, poor connectivity, hilly and inhospitable terrain creating bottlenecks for infrastructure growth. In 2015-16, its contribution to the national GDP was a meagre INR 19,473 crores which translates to 0.11% of the overall (NITI Aayog, Government of India, 2015-16). Nevertheless, the state has displayed one of the strongest GSDP growth since 2013-14, growing at 16.3% CAGR (Sathguru Management Consultants, 2017).

Arunachal Pradesh's economy is highly agriculture dependent, with 67.4 per cent of its working population gaining livelihood through this sector (IBEF, 2018). Agricultural yields are low owing to sparse population and low skill endowment that has caused continuous labor shortage issues. Further, limited working season, poor investment in infrastructure and high transit costs add to growing issues (Department of Planning, 2012-13). However, there is immense potential in the agriculture sector of Arunachal Pradesh, which if tapped and exploited robustly, in tune with the comparative advantage of the region, can help boost the economy of the region.

Currently, a lot of developmental activities are being carried out by various government agencies, though limited organizational mandate limits the realization of the support extended by them (Sathguru Management Consultants, 2017). Here, we have identified that the governments will play a crucial role in keeping the initiatives alive through subvention policies and development of support infrastructure to support all the agencies. The state government has identified the importance of strengthening value chains linked to agricultural sector by understanding the strengths and weaknesses of them (Sathguru Management Consultants, 2017).

In view of this, both central and state governments have launched several agricultural development schemes aimed at empowering farmers through cooperative approach and facilitating economic support for equipment acquisition for farming (Department of Agriculture, Arunachal Pradesh, 2018-19).

How will the Smart Village Movement transform the government initiatives?

The state and central government will be among the top indirect beneficiaries from this project. Propagating entrepreneurship and self-employment in an agriculture-dependent state will be the need of the hour, where developmental prospects are marked by peculiar topographical challenges (Mihu & Jena, 2018). These initiatives will empower budding entrepreneurs and locals by increasing their confidence in acquiring resources to launch their businesses. Through leveraging organic production methods, use of technology to bring efficiency to rural supply chains and partnerships with private businesses, farmers and entrepreneurs will gain easy access to markets, both national and international. The resulting outcomes will be enhanced farming income for the farmers and increased revenue for the primary and secondary processors of agricultural products. Governments benefit from the taxes collected at each transaction stage, as well as earn export revenues.

How will Government initiatives help us develop our project?

Government has the highest organizational mandate in terms of making capital available for projects and implementing policies which maximise their impact. Our research has helped us identify over 20 rural projects including road, bridges and irrigation infrastructure in several parts of the state (RIDF, 2017-18). As on February 9, 2019, a Greenfield airport near Itanagar has been inaugurated with an investment of INR 4,000 crores. Government investment in transport infrastructure will reduce delays in transit of products from high altitude and remote villages to centrally located hubs.

As part of the Digital North-East Vision 2022, the central government announced a mega investment scheme of nearly INR 10,000 crores through over 400 programmes expected to be rolled out until 2022. These programmes aim to give a booster to the telecom infrastructure through investments of INR 7,800 crore for enhancing towers, optic fibre and other connectivity initiatives (Times of India, 2018). These schemes will help our team develop, launch and sustain the digital platform that will connect individual farmers with worldwide kiwi experts, NGOs, government agencies, startups and private retailers.

Under Horticulture Mission for North East and Himalayan States' (HMNEH) initiatives, the government plans to extend support to Kiwi farmers by reimbursing the cost of second- and third-year maintenance of orchard. Further, the Deen Dayal Upadhyaya Swalamban Yojana launched by Government of Arunachal Pradesh in 2017 aims to encourage unemployed youth gain access to cost capital for entrepreneurship. Under this scheme, the government will facilitate 30% back ended capital investment subsidy for entrepreneurs, who wish to set up small and medium enterprises with a loan from INR 10.00 lakhs up to INR 1.00 crore excluding the cost of land and building. The benefits of this scheme extend to value addition in horticulture and allied sectors including packaging, cold chain, cold storage, food processing, etc (Government of Arunachal Pradesh, 2017).

We thus believe that developing collaborations through MoUs with partner companies at each stage of the value chain and introducing development schemes can help bring fluidity in the market chain by employing capital to support connectivity between several players within the chain.

b)NGO perspective (Andéol)

How our project fits their goals?

In 2015, the average daily income in households across rural India was between INR 250 to INR 333 (\$3.5 to \$4.66) which is one of the world's lowest (Statista, 2015). Therefore, many international Non-Governmental Organisations (NGOs) are really involved in projects aimed at rural economy development to help improving the livelihood of local villagers.

Therefore, we truly believe that international NGOs are interested in the project that we are currently developing as our project and their missions have many common objectives. Indeed, our project focuses on empowering and increasing the way of life of Arunachal Pradesh kiwi farmers which perfectly matches goals of many international NGOs that are already working in India such as the Food and Agriculture Organization (FAO) or the Consultative Group for International Agricultural Research (CGIAR), a World Bank partner.

Globalization tend to exclude small farmers from the value chain, even economically valid ones, mainly because they lack structures such as supply chain to be connected to global marketplaces. To overcome this issue, the FAO has established its main goal as to 'Enable inclusive and efficient agricultural and food systems' (FAO, 2019). Our project completely matches the FAO's one as we are designing a sustainable supply chain process (See appendices) that will connect local kiwi farmers from the Arunachal Pradesh state to the world.

Another goal of the FAO is to 'Reduce rural poverty' (FAO, 2019). Thus, the FAO aims at 'increasing productivity of small-scale farms' and 'encouraging economic diversification'. Also, according to the World Bank's researches, only 37% of total agricultural land in India is irrigated which tremendously reduces the potential outcome of each farm (World Bank, 2012). Once again, their missions and our project connect as we are also working with partners to provide kiwi farmers with solutions to improve their productivity and efficiency to grow their income (see corporate perspective).

How they could help us developing our project?

First, we believe that NGOs could help us empowering kiwi farmers throughout the crop cycle, so they can improve their productivity. Thus, in our recent researches we found out that the FAO is currently running a project called 'RADHORT' (FAO, 2019) to develop horticulture production in Africa by sharing agricultural techniques, but also providing tools, seeds and irrigation systems. Therefore, we will contact the FAO to see if they would be interested in developing the same kind of project in India and more specifically in the Arunachal Pradesh state.

Also, we wanted to focus on another issue of importance which is corruption in India. According to Transparency International, India had a corruption index of 40 (out of 100) in 2017, above the world average of 43 (Transparency International, 2019). Corruption means taking value out of farmers' hands, hence, decreasing their motivation to work and create farms. In practice, corruption happens partly when farmers ask the Government the authorization to use land to perform agricultural activities. Government local representatives then ask farmers a 'compensation' to grant the authorization. Such behaviours happen because no one can see them doing so and it is not reported to the world. Thus, we had the idea of creating a platform on which farmers could send any formal inquiry to the government (E.g. Asking authorization for land, subsidies, construction of warehouse financed by the government). This platform would be run by an international agricultural NGO that

would ensure farmers are not harassed by government local representatives during the process. Thus, we believe that the FAO could play this safeguard role to help empowering farmers. We met with the FAO to discuss the project and they are interested in such running such a platform. We are now trying to contact the Indian government to suggest them to send a formal demand to the FAO to start the project.

Moreover, we know that the CGIAR, is conducting many researches to improve crop yields. We will contact them to discuss any solution that could help increasing kiwi farmers' productivity. We are here thinking of new genomics discoveries, irrigation technologies, harvesting techniques, tools etc.

Finally, even though we have not found one yet, we are still conducting researches to identify local NGOs to involve in our project as we feel that they would have much interest in it and could bring vital resources to it.

c) Corporate Perspective (Surita)

There are approximate 12 corporate companies that are involved in the commercialization and crop cycle. All companies are categorized into 5 sections: sourcing, production, distribution, front end markets, and transportation section. Apart from substantial revenue they will get from this project, they are able to increase market share and brand power in India, specifically in Arunachal Pradesh.

The technological company such as Pollen Plus from New Zealand who provide artificial pollination to distribute dry kiwifruit pollen into the flowering canopy, sustainably helps the horticulture solving the challenges of labour shortages, pollination gaps and yield security. Pollen Plus will gain more market share at Arunachal Pradesh as farmers have yet to achieve full production capacity and still imports 75% of its domestic demand for fresh kiwis (Mani, G., et.al, 2018). Thus, it requires pollination technology and harvesting machines to enhance domestic production and companies have a chance to gain market share from this situation.

Global online retailers like Alibaba, Bigbasket, Adani, Farm PIK, Indiamart, and MVB Yugvigyana Pvt Ltd will have more product ranges of fresh organic, dried kiwi for customers to select. This attracts customers in their stores and thus, will gain more selling fee from these mentioned products.

Truckwaale, who is the largest and best local transportation company in India, will be benefit from the project as well. There is a few transportation companies who offer this service at Arunachal Pradesh. And if the company joins and partner up in this project, they will have a strong monopoly power in this area as there are only few players in the market. The company also develop the strong relationship with state government since this project directly cooperate with government.

Moreover, all partnered companies also improve their brand image and brand value as they provide and enhance the services with the local farmers at Arunachal Pradesh who produce the fresh and organic kiwi products.

Apart Pollen Plus that currently develop the kiwifruit pollinator, a company like Jain Irrigation System who manufactures a full range of precision -irrigation products, will increase their market share in India at global scope and expand the product lines. Moncaster Wire that located in the UK will also benefit from the partnership with state government of Arunachal Pradesh because they will enter new market and gain the opportunity to promote their product in other agricultural area in India.

Nabard as the provider of the capital investment will receive interest in return as they investing in the project. Food and Agricultural Organization (FAO) mission is to reduce poverty in every part of the world, by committing to conserve biodiversity for food and agriculture and implement sustainable use for food security and human well-being. Involving in this project is in line with FAO mission.

d) Villager's Perspective (Fenny)

Smart Village Movement has identified the issues from the villagers' view point. By providing possible technology solutions and designing the supply chain, the positive impact from the villagers' perspective would be:

Economic and Productivity Impact

The villagers are used to work in traditional ways from the beginning of the cultivation process that includes pollination, pruning, and harvesting. All these processes are done manually without the intervention of modern machines or technology. By applying in the process of kiwi cultivation, for instance, tools and technology in pollination will increase fruit size and production as well as seed numbers. Pruning and harvesting machines help save time and provide high-quality output. Cold storage is one of the essential equipment that keeps the kiwi fresh which means villagers can sell kiwis without them going to waste. Technology creates sustainable agriculture that produce more high-quality organic kiwi. More high-quality production means more kiwis to be sold in the market to fulfil the demand.

Having access to global market through online retailers and groceries, as well as supermarket chains, will support the farmers to sell and market kiwi locally, across India and internationally. All the kiwi production will be distributed into various marketing channels without any waste. The impact from this process is that the villagers receive a valuable knowledge about digital technology including the online payment and steady growth of income.

Communication channels and online platforms will update and share the vital information regarding the knowledge in kiwi cultivation that will support the farmers in nurturing and growing kiwi effectively. The Villagers can share their problems and inquiries and have the solution immediately. The villagers will also get benefit from the agriculture marketing platform that connects them with businesses and market price information; therefore, they will not sell the kiwi lower than the market price.

Social Impact

As the villagers' income increases, their social life also will be affected. They can buy a smartphone from their income, the tool that will support them to access the technology in production and marketing. Smartphone also opens the new channel for communication and connects with social media. Having an internet connection, villagers can be in touch with the entrepreneurs and farmers' community located anywhere. This opportunity possibly leads to another business relationship. Higher living standard will change the way of life for the villagers in terms of gaining access to good education for children, providing the best and healthy food for their family. These outcomes will improve the villagers' well-being and happiness.

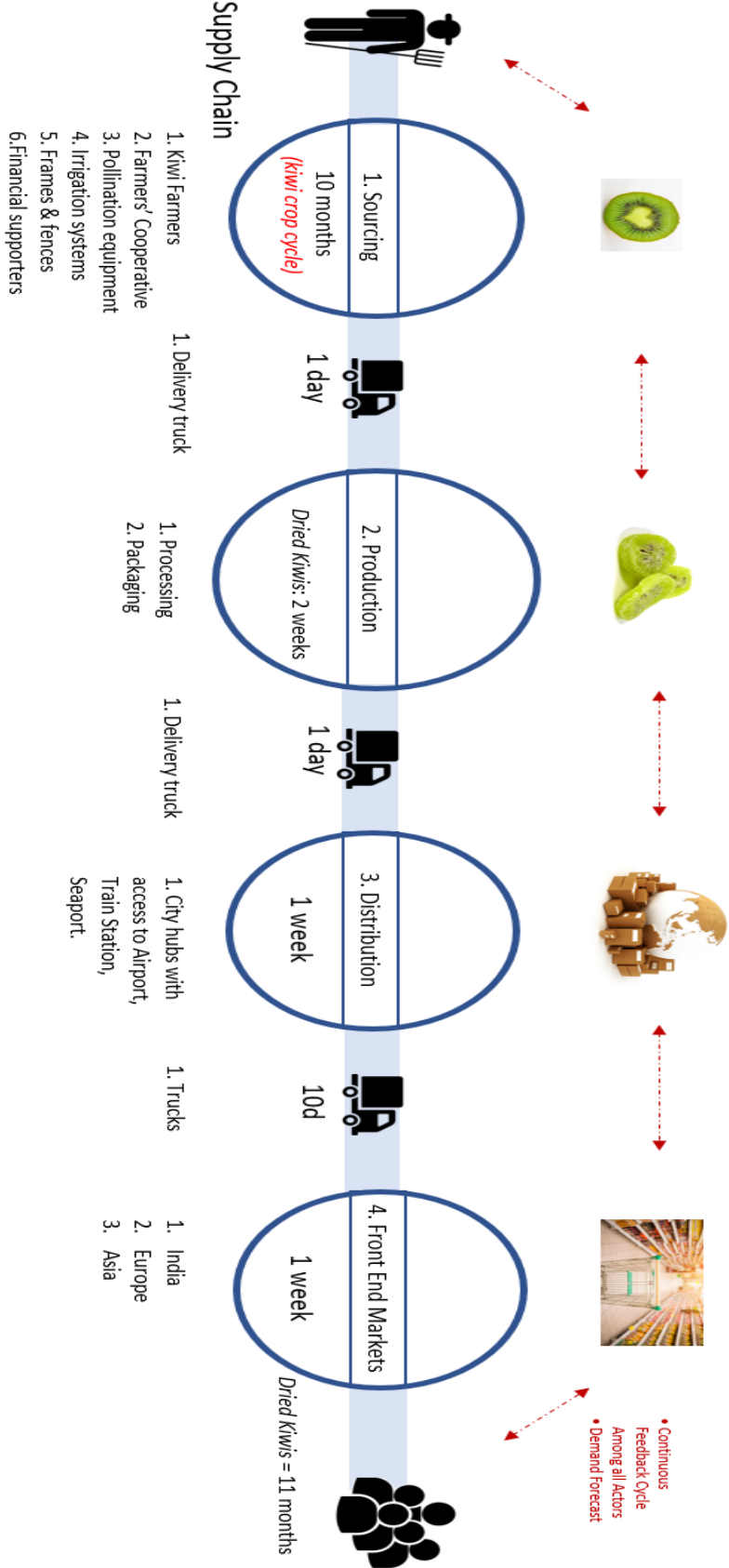
The villagers' higher income has a significant effect on the buying habits and attitudes toward saving as well as investment. Direct access to online platform enables the villagers to order anything from the internet to meet needs of the families. With the involvement of financial institutions, the villagers will have information about saving and investment programs for their future that will lead to the changes of social status and trend in society.

Through time-saving technology and modern machine assistance, villagers will have more time to spend time together with their family and socialize with friends in the village, internet and social media also make the communication possible for them to connect with distant friends and relatives.

Having a quality life with steady good income, young villagers will be encouraged to stay and develop kiwi plantation instead of going to big cities to have a well-paid job.

Commercialization Cycle

Product: KIWI

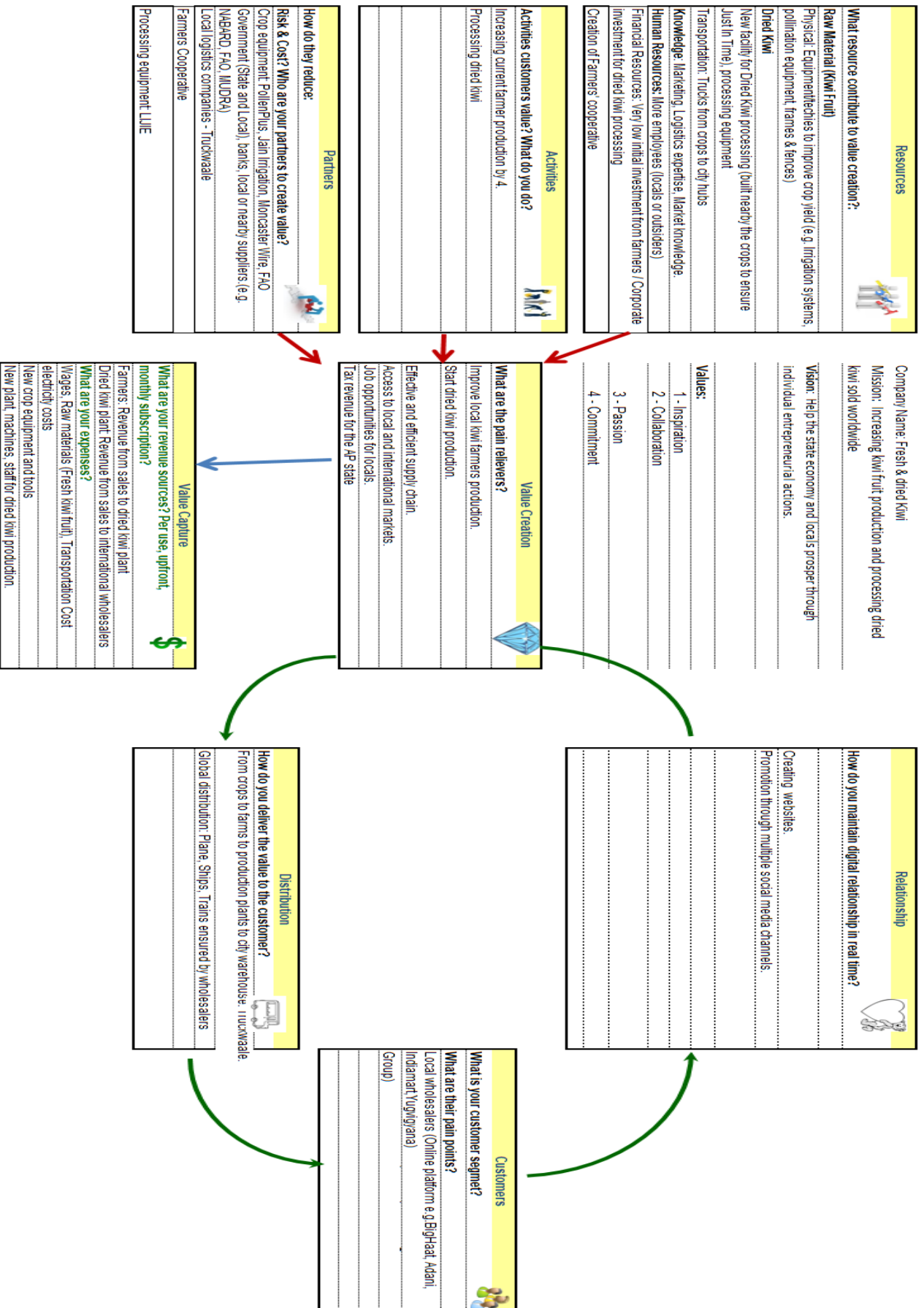


Corporate/Tech Partners

1. Pollinators (<u>PollenPlus</u>)	1. Local transportation Companies(<u>Truckwaale</u>)	1. Processing equipment firms (<u>LIJE</u>)	1. Local transportation firm (<u>Truck Waale</u>)	1. Global wholesalers warehouse (<u>Indiamart</u> , <u>Yueviyana</u>)	1. Local truck firm (<u>Truck Waale</u>)	1. Online global retailers (<u>Alibaba group</u>)
2. Irrigation systems (<u>Jain Irrigation Systems</u>)						2. Local retailers (<u>Farm-pik</u> , <u>Adani</u> , <u>Indiamart</u> , <u>BigBasket</u> , <u>Yueviyana</u>)
3. Frames & fences (<u>Moncaster wire</u>)						
4. Financial supports (<u>NABARD</u> , <u>FAO</u>)						

a) Supply chain

BUSINESS MODEL



d) Answers to research questions

1. What should the supply chain ecosystem look like? Did my group create a value proposition to each member in the supply chain?

- Kiwi production performed by farmers → sell yield at a fixed price (\$200 greater than current one) to dried kiwi plant
- Transport from crops to dried kiwi factory. → profits for Delivery Company
- Dried kiwi processing → Sold to international wholesalers (profits for International Corporation).
- Transport from factory to city hub. → profits for Delivery Company
- City hubs to end customers → Wholesalers

2. Which firms should be included to help farmers through the crop cycle that the farmer can afford (are they willing to sign-up for this opportunity?)

The Food and Agriculture Organization (FAO): Providing farmers with tools and seeds.

National Bank for agriculture and rural development (NABARD): credit facilities and infrastructure support to farmers and small business owners in setting up farms.

Pollen Plus: Specialized in Kiwi fruit pollination. Supplying pollen, artificial pollination products and services to kiwifruit growers nationwide. Providing artificial pollination solutions worldwide.

Jain irrigation: Indian irrigation systems provider.

Moncaster wire: British Frames and fences supplier.

Truckwaale: Indian Delivery Company (trucks).

3. Will the farming be done by local contract labour or outside contract labour? – What equipment and assets are need and how will the farmer get access?

Kiwi cultivation: Pollination equipment, irrigation systems, and frames and fences are required to boost crops yield.

Dried kiwi plant: Washing & Peeling machine, Slicing machine, Drying machine, Cold storage room.

4. Will the product be packaged at the source? By whom?

Yes, it will be packaged at the dried kiwi plant by employees with unbranded bags provided by our B2B customers (international wholesalers)

5. Who will brand and market the product?

Selling dried kiwi to international wholesalers (e.g. FarmPik and BigBasket) allows us not to spend any money on marketing and branding as those wholesalers brand them themselves.

6. How will stuff be transported from source to the end consumer? I.e. Drones, Cable Ways, Aerial tramway, Sky trams, cable cars, Ropeways, Ships, Rail, and Bus transport etc.

From the crops to dried kiwi plant: Trucks. We identified a local truck firm called 'Truck Waale' that is operating in Arunachal Pradesh.

From Dried kiwi plant to city hubs: Trucks. We identified a local truck firm called 'Truck Waale' that is operating in Arunachal Pradesh.

From the central warehouse to end retailers: If international wholesalers: Planes/Ships...

7. How will funding happen – who will pay for what from start to finish?

Farmers for the crop equipment. (\$475/farmer). This will be supplemented by NABARD support which offers schemes that take in charge 33% of initial investment for agricultural projects. This could reduce the initial investment per farmer to \$370!

International corporations for the dried kiwi factory. (\$45K)
FAO will help providing irrigation systems.

8. Will the proposed model scalable and sustainable? What are the driving forces?

The proposed model is scalable and sustainable as many times as wanted.

9. What are the critical success factors – what are the Pros and Cons of your proposal?

Critical success factors:

A willingness to adapt the new knowledge to current cultivation process.

Cooperation between farmers and government.

Big amount of funding from international corporations.

List of partners

Company	Detail	Contact person	Email	Contact no.
Adani	Agriculture products online Platform	Basanta Kumar Nayak	Basant.nayak@adani.com	+919999310892
Alibaba	Agriculture products online Platform		Premiummember@alibaba-inc.com	
BigBasket	Agriculture products online Platform		Customerservice@bigbasket.com	
MVB Yugvigyana	Agriculture products online Platform	Yeshpal Singh	Yugvigyana@gmail.com	+919999382518
PollenPlus	Pollinator company		Orders@pollenplus.co.nz	
JAIN	Irrigation system company			+91 257 225 8011
MWP	Frames & Fences company		sales@moncaster.co.uk	(+44) 01507 600 666
LIJIE	Dried kiwi provider	Vivien Liu	Admin@lijiefoodmachinery.com	+86 15053602588
Truckwaale	Logistics service provider	Amit Balkara	Info@truckwaale	+7915407015
FAO	Credit lending institution		FAO-HQ@fao.org	(+39) 06 57051
NABARD	Credit lending institution	Dr. Gyanendra Mani	ltanagar@nabard.org	+91-03602215967

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