

INDIA

**PREPARATORY SURVEY ON BOP  
BUSINESS ON THE  
“SMART VILLAGE” IN INDIA**

**FINAL REPORT  
SUMMARY**

March 2013

NEC Corporation  
The Institute of Cultural Affairs Japan  
GRA Inc.

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## 1. Outline of the Survey

To promote collaboration with private companies and NGOs entering base of the pyramid (BOP) business, JICA (the Japan International Cooperation Agency) has started a new scheme “Preparatory Survey for BOP Business Promotion” a framework to support implementation of feasibility studies.

A collaboration team of NEC Corporation, ICA and GRA Inc. were selected to implement a survey under this scheme.

Cooperated entities are as follows:

ICA (the Institute of Cultural Affairs) URL : <http://www.icajapan.org>

- Established in October 1982 (Chairperson: Shizuyo Sato)
- 5-17-33 Soshigaya Setagaya-ku, Tokyo, Japan Phone +81-3-3483-5092
- Operation field: Education for Children and Women, Development of farming area, Environment prevention works tree planting as an axis, Medical treatment for health
- Objective regions: Africa, Asia, South America
- Assistance records:
  - Building emotional ties in the devastated coastal area in Fukushima after the earthquake.
  - Distribution of prevention goods on radiation. Emergency aid for the earthquake.
  - Study on construction of regional assistance center in the Philippines.
  - Village development operation in Bihar in India.
  - BOP business survey on marine foods and clean energy in Cham Island in Vietnam.
  - Participated conservation project of Masai in Kenya.

GRA Inc. URL : <http://www.gra-inc.jp/>

- Established in January 17<sup>th</sup> (President: Hiroki Iwasa) phone +81-223-37-9634
- 48 Sakura Tsutsumi, Yamadera, Yamamoto Town, Miyagi Prefecture, Japan
- Operation fields: Production of agricultural commodity, farmland development, Research and Development of agricultural technology, agriculture communication projects, agricultural analysts, Development of Cultivation Administration system.
- Main products: Strawberry, tomato (cultivating area: 35,000 m<sup>2</sup>)
- Business records:
  - Participated to Cooperation project with the Ministry of Agriculture, Forestry and Fisheries through the application of ICT technology.
  - “South India Project”, to provide tasty and safe foods by the application of facility farming technology of “high-bed nuticulture cultivation) for Indian market.

Shirihari Polyhouses Pvt. Ltd. URL <http://www.shriharipolyhouse.com>

- Established in 1995 (managing director: S.K.Marathe)
- Varale Road, Talegaon Dabhade (Station), Tal. Maval, Dist. Pune, Maharashtra, India.
- Operation fields: Construction of green house

The feasibility study on BOP is to produce high quality strawberry to sell higher socioeconomic groups for the purpose of providing income for farmers in Maharashtra State in India. The cultivation system would be controlled by ICT technology.

In November 2012, the cooperation team started the feasibility study project by building a greenhouse for the purpose of implementing nutriculture cultivation system in the suburbs of Pune City, Maharashtra state, in India.

In the greenhouse, we planted Japanese type sweet strawberry that is not known well in India for the purpose of selling by high prices to gain income for farmers in this area.

Rural areas in India, farmers have been cooperating in their own community to sustain their lives. To assist developing their agriculture technology, it is prerequisite to have a well-respected NGO in the area. ICA has been assisting their rice cultivation, irrigation, and husbandry in their area to be well trusted by farmers. ICA also proved the importance of the empowerment of women for the development of farming areas. The pilot greenhouse was built at the compound of this ICA facility around 50 km from the targeted four farming villages in Mulshi area.

At the pilot project, the team already cultivated planned amount of strawberry and sold them for a five star hotel in Pune city as a model of the BOP business.

### **Maharashtra State, Pune District**

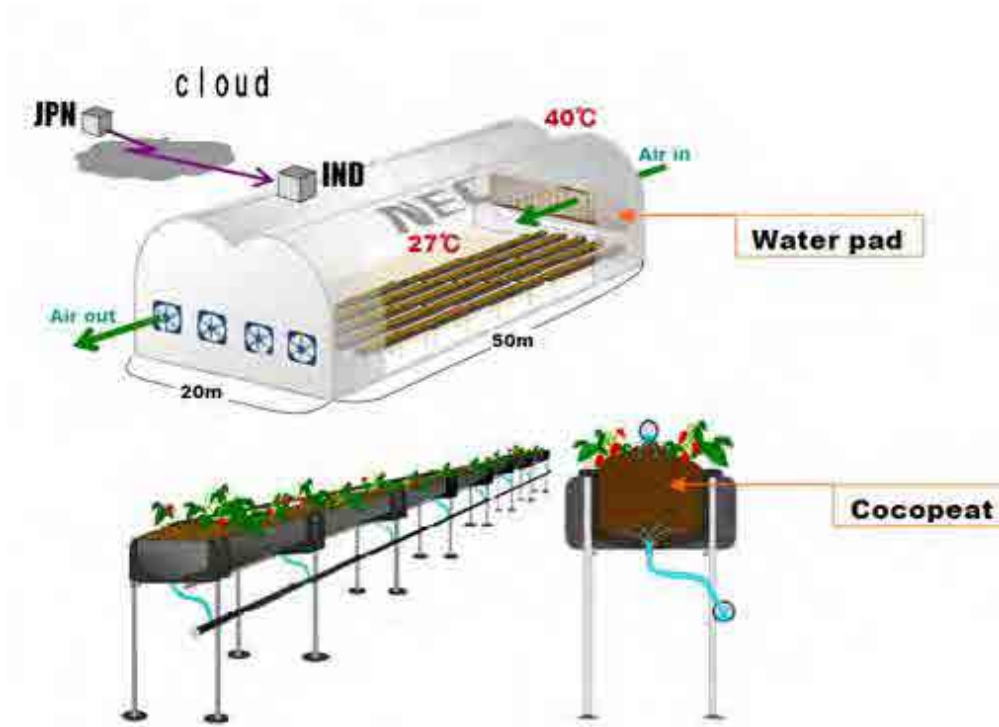


Villages in Mulshi area is not far from the pilot farm. It makes no difficulty to transport the studied technologies into the targeted villages. However, transporting this model into different areas requires following conditions.

- Cooperation with NGOs that is well-respected in the area is prerequisite.
- Infrastructures of water and electricity are not well developed in rural areas in India. In some places malpractices such as bribery have been hindering the development. The targeted areas should be well prepared for the access of at least level of water and electricity.
- To provide cultivated agricultural products through marketing process, freshness is very important. Especially, strawberry requires certain level of cooling and durable system during the transportation. For this purpose, the targeted area should be prepared for at least level of transportation system.

In addition, distribution process in India has been dominated by its traditional system. This traditional system has been disturbing smooth distribution by several folds whole-selling agencies. To provide fresh strawberry for the higher socioeconomic group that willing to purchase them, it is required to put the products on newly equipped marketing system such as foreign supermarket chain or other innovated system. In the case, it should be distributed directly to the consumers.

### NEC nutriculture cultivation system to achieve wealthy life



Strawberry cultivation system with the usage of cocopeat has been widely employed both in India and Japan. Also, large-sized high quality strawberry cultivation through nutriculture already established in Japan. In this feasibility study, we employed technology led by GRA Inc. that could recover the strawberry cultivation only one year after the Great North Japan Earthquake. After the disaster, the strawberry farmers in southern Miyagi prefecture had tried to restore the strawberry cultivation. However, bigotry of “cultivate strawberry by earth” disturbed to find out effective way to avoid salt contaminated soil. There had been no way to solve the problem. GRA is the one which solved this problem.

Cocopeat is capable for avoiding the invasion of germs and viruses. This material worked well for the restoration of strawberry cultivation in devastated Yamamoto town. Staff of GRA assisted to build green house in the pilot plant, by building high piped bed with cocopeat for strawberry, by making nonwoven fabric sheets to protect its roots to be rotten. The green house was built in the same quality of that of Japan’s facility.

One of the important purposes of the project is to boost women’s empowerment through their participation. At the first stage of building the green house, neighboring women in this area had participated the construction works. It was a very good chance for women to know what nutriculture cultivation is. The nutriculture cultivation itself attracts women very much because of its elegant works crouching down on the ground. Also, the strawberry cultivation by women makes good image when ICT comes to marketing process. Because of this, the project decided to call upon women in the targeted Mulshi area to participate during the cultivation works.

The strawberry seedlings from Japan were planted in November 20<sup>th</sup>, 2012. Expectation for the strawberry cultivation lured village women to come and see the cultivation works in the green house. In March 2013, first strawberry was harvested. At the same month, Cool Japan Festival supported by Japanese Consulate General in Mumbai was held in the market center of Mumbai. The harvest of the strawberry was on time for this festival.



The festival was held in the central park of a shopping center in Mumbai. The project team set up a diorama of the green house in the NEC booth made by NEC Design & Promotion Co., Ltd. When uncover the roof of the diorama, visitors are able to see workers are cultivating in the green house. This demonstration lured participants very much. Tens of visitors requested saying “I own a land near Mumbai; I would like to join this strawberry cultivation business”.

When project staff at the booth explained that the purpose of this project is to provide income for poverty groups in the villages, people who requested to join the cultivation business agreed to participate for the BOP business. It shows that upper middle people in India are very aware of contributions for society. Cool Japan Festival brought the possibility of developing this system into other areas.

After the festival, project team held a reception inviting around forty business people, politicians, and academics at a hotel in Pune city. Participants approved the strawberry project positively. Five star hotel who participated this reception offered to purchase the strawberry by 400 Re (672yen) per kilogram. Before the reception, the hotel made special strawberry cakes to provide their customers as a test case. It was successfully well-accepted. This made the hotel to move on coming up with high-class feeling through the high-price strawberry.

## 2. Purpose of the project

In India, there have been a lot of problems caused by poverty. However, there are many possibilities to solve these problems through ICT technology. Since, April 2010, possibilities of resolving problems had been studied by Umezu seminar at Keio University and ICA. They concluded that most of the problems caused by poverty. After these studies, NEC found out the introduction of nutriculture cultivation is effective to develop BOP businesses in India.

To implement nutriculture cultivation, it is prerequisite to be provided stable supply of electricity. In addition to make this new agriculture sustainable, it is required to analyze agriculture market properly. When the agriculture products were distributed through Indian multiple whole selling process, it will make difficult to provide fresh products for consumers. Regarding the administration process of the cultivation, it will be suggested to introduce agricultural technology control through ICT technology and remote monitor via Internet.

Considering these conditions, the project concluded to expand nutriculture community centers in villages in India as smart village scheme, for the purpose of gaining synergic effect through income increase and ICT education.

### 3. Outlook of the implementation area

The targeted area where pilot nutriculture farm would be transplanted is Mulshi area. Mulshi is a widely expanded rice crop area in the suburbs of Pune city. Lakes, dams, and forests are surrounding in the area. Pune city is one of a big city in Maharashtra state, west part of India. It is a second biggest city in the state following Mumbai (population 12.48 million) which has 4.93 million of populations. It is located on the Deccan Plateau 800 meter above sea level, and developed as summer resort for wealthy classes. It is also known as the center of education and research studies to be called “Oxford in India” since British colony era. Indian government had developed ICT industry in this city as a high-tech center along with Bangalore city in the east of India. Pune has No.1 penetration of PC in India, and there are many international institutions in the city. Because of these circumstances, Japanese language study is popular in the city. About ten thousand people said to study Japanese in the city.

Because of the location in the suburbs of Pune city, social infrastructures surrounding Mulshi area are relatively developed to compare with other areas. This advantage makes this area as an ideal place to set up model for “cultivating high price agricultural products to sell wealthy class to provide certain income for farmers”.

In addition, the ICA has been assisting agriculture development in this area since 2008. The organization is to be trusted well by villagers through its continuous assistances on dairy husbandry, tree plants, and irrigation implementation. It also has been developing women’s empowerment programs in the area. In India, farmers never open up for outsiders without very strong trust. To develop BOP business in India, it would be prerequisite to cooperate with well trusted NGOs in the area. In this project, the cooperation between ICA made it possible to implement all works.

Previous plan was that besides providing income for farmers, electricity generating operation would be started for the introduction of cellular phones and personal computers. However, legal provisions and infrastructures for cellular phones and electrical generation are not yet provided in India. Original plan of the “smart village” should be postponed into a long term basis by expanding nutriculture factories.

In addition, the standard of the most cellular phones in India is still based on the second generation (2 G); it would be difficult to activate interactive communication of Internet or shooting and saving of pictures and movies by a cellular phone.

According to the 2012 survey that was made by NEC by the request of NEDO (New Energy and Industrial Development Organization) founded that 86.% of cellular phone in India are based on 2G standard. And only 13.4 % the cellular phone are satisfying 3G standard. However, dissemination rate of cellular phone is explosive. So far, the amount of cellular phones is 850 million in India. To



satisfy this huge demand, to secure the electricity for cellular phone is becoming urgent problem in India.

In India, cellular phone companies are just offering to sell their machines. They do not set up mobile towers. Instead, mobile tower companies are responsible for building and providing radio wave services. Presently, in India, there are 400 thousands of mobile towers (base stations) in India. Most of the electricity to transmit radio wave was generated by diesel engines, and charged in the lead battery for covering the energy during the recess of the engine. Most of the mobile towers are located in urban dense area. Only 20 % farming areas are seemed to be covered by mobile towers. In this regard, India only reached the entrance gate to implement smart village idea that is popular in other developing countries. .

The project's primary idea to secure the electricity in the pilot farm was to introduce lithium ion battery for auto mobile that was developed by NEC Corporation. By the usage of this effective battery, it planned to employ sensor-equipped photovoltaic generation system to support the required energy, for implementing integrated ICT system for farming. After the study, the project team found that legal measures that ensure the employment of NEC led lithium ion were not provided yet. In this stage, it is impossible to promote experimental studies in the pilot farm. MoEF (Ministry of Environment & Forests) have been ruling the operation of lead battery through its regulations, but there have been no measures to rule the operation of lithium ion battery. Even the experimental measures are not started yet.

Main purpose of this project is to provide certain income for farmers, to solve problems caused by poverty. Following is the national average poverty line (monthly) issued by Indian central government.

- 2009-2010 urban area 885.96 Re ( 1.410 yen), farming area 672.8 Re (1.094 yen)
- 2011-2013 urban area 1,000 Re (1,627), farming area 816 Re (1,329 yen)

People under the poverty line in Maharashtra state are: 4,376 thousand (9/12%) in urban areas, and 15 million 60 thousand (24.22 %) in farming areas. Targeted Mulshi area is located in 35 km from Pune city, and said it is the most poverty stricken area in the state. Most residents have been engaged in agriculture by plowing narrow farm lands that are scattered between steep hills. Most of the farming fields are within 2 ha on the sloped or rugged lands. In these rigid lands, they have been farming rice, barley, and beans. Because of this sloped land, it is difficult to introduce irrigation and agricultural machines, still many farmers are using oxen to till the fields, or harvesting rice by hands.

Also the problems caused by poverty have been striking this area. According to the Economic survey made by the Maharashtra state, installing rate of toilet is 53.1 % in whole state. It seems that most households in urban area such as Mumbai and Pune have toilets, it indicates that most

household in farming areas do not have toilets from this figure.

The central government and state government are providing subsidy for toilet build up in households. However, the state economic survey suggests that the amount of newly built toilets in the state are 60 thousand in a year, it is far behind the completion to compare with its 97 million of population in the state. Most people in farming areas are not able to make money for toilet building in their houses. Residents in farming areas still have bowel habits to do in the grass fields surrounding their houses. Sanitary education is not well developed to prevent epidemics or diseases caused by this condition. Shipping works of crops are made under the eaves of their houses, and there are no consolidating stations that have clean toilets and washing spaces.

Because of these sanitary reasons, agricultural products are tendency to be sterilized by agrichemicals before shipping them. It would be very important to implement sanitary training to cultivate high-valued chemical-free vegetables. Recent trend of awareness on environment issue brought strong desire to Indian consumers to eat chemical-free safe vegetables. Farmers should open their mind to provide safe products on marketing network through education works.

#### 4. Investment outlook

Once domestic demand-led Indian economy was well improving before backlash started in 2012. Private consumption that supported the domestic market was slumbered. Many unknown problems under the economic boom were revealed. Those problems are: financial deficit, inflation, steep rise of labor cost, depreciation of Rupee, stagnancy of foreign investment, and the delay of infrastructures. Especially, the unprecedented plunge of Rupee after May 2013 affected much on prices and making performances. The central bank of India had took several measures to defense Rupee and to control inflation by observing international market, besides it has to make consideration on domestic monetary measures.

These two years, the economy in India is stagnant. Even after the Lehman shock, economic performance in China and India are the spots in the global market. However, recent Indian economy is not growing well.

### **Economic growth in India**

IMF: World Economic Outlook Database (Oct.2013)

2005	9.29%
2006	9.26%
2007	9.80%
2008	3.89%
2009	8.48%
2010	10.55%
2011	6.33%
2012	3.24%
2013	3.80%

To recover its economic situation, India had changed its policy by seeking foreign investments including that of Japan. Two years before, it had closed its doors to foreign investors. Now ICT hanged the foreign investment policy widely. It is a very good chance for foreign companies to invest in India. Especially, investment from Japan is trusted very much and India is willing to paving the way for Japanese industries.

Regulation measures by the Indian government already started in the fields of marketing infrastructures such as on distribution and transportation. The infrastructure that guarantee the purpose of this project to provide fresh fruits as fast as possible, is gradually improving. In the starting point of the open market for new paradigm, it would be a good time to start BOP business in India.

## **5. Marketing strategy**

Key point of marketing strategy of the project is to provide high-quality agricultural products for upper middle class in India for the purpose of providing income for rural farmers.

Strawberries that have been distributed in the Indian market are solid and not juicy, and cultivated by outdoor culture system. Local strawberries were shipped in a different variety of qualities, and reached to retail shops through seven ranks of whole sellers. Half of the strawberries are getting moldy or rotten. Strawberry prices in picking season from March to April are from 60 Re to 80 Re per kg. It would be difficult to gain required income for farmers from these prices.

Targeting customers in the future are: (1) Five star hotels (2) Mail-order sales for upper middle class, and (3) Major supermarkets that deals with high-end food item (including foreign companies)

Regarding the five star hotels, in addition to Marriott group that already starting the deal, Taj group, Leela grope, and Shangrila groups have possibilities to purchase the products. After

expanding the farming plots near their hotels, they have possibilities to make dealing contracts. In India, high-class hotels construction is in a boom. Present 160 five star hotels would be expanded into nearly 300 until 2015.

When home delivery system was developed in India, it has a possibility to start mail-order selling for upper middle class. In India, home delivery system has been developing in a unique style. For instance, in Mumbai, many salaried people working in the office areas are using private lunch delivery system called “Dappa”. This is an effective system to deliver fresh lunch by street cars or bicycles. Salaried people are welcoming this dappa system because of its exact timing of the delivery. If new delivery agriculture system were developed in this way, it would be possible to develop urban style mail-order selling system.

Next possibility would be the cooperation with supply chain such as major supermarkets to deliver for upper middle class customers.

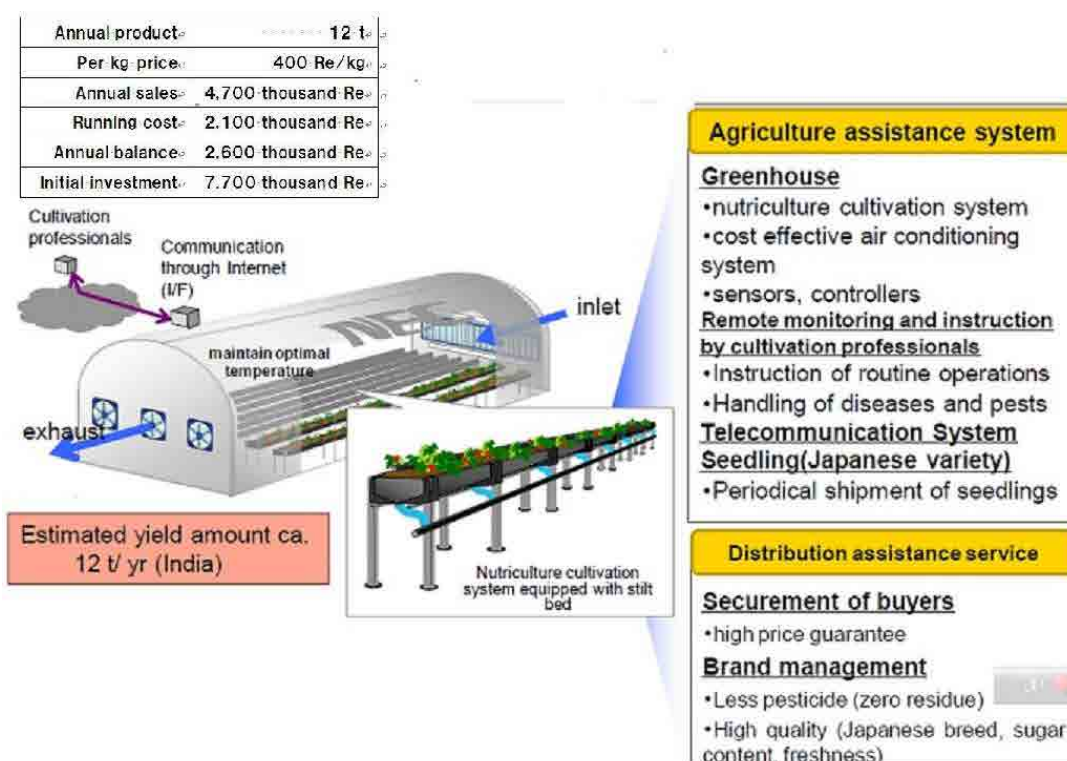
In India, only 8 % of products were systematically distributed by major supermarkets. Rest of the products is distributed through thousands of small sized middle agents. The government of India decided to improve these inefficiencies to ease regulations by improving the foreign investment limitation into 51% at the end of 2011. The project is going to launch and develop the distribution strategy on this trend.

Present dimension of the pilot farm is 8 are. The seedlings planted at the end of 2012 were 3200. These seedlings made 98.48 kg strawberry from April to June in 2013, and sold JW Marriot by 39,393 Re (66,180 yen).

Regarding the expansion plan, further dimension unit of the farm would be 1/2 acre (20a). This size facility would be called “standard package”. From 20a green house, it would be estimated 12 tons of strawberry are going to be harvested. Presently, the pilot plant has been providing the strawberry for the JW Marriott by 400 Re per kg regularly. Leela group is mentioning “If we can make a CSR program to assist a BOP business, we are possible to afford 600 Re (1,080) per kg”. By considering this mansion, the deal would be 400 to 600 Re (620 yen to 1,008 yen) per kg.

When a standard package begins to deal with a five star hotel, the annual performance will be 2,360 thousand Re (3.96 million yen) at the inaugural year. Performance of the subsequent year will be 4,720 thousand Re (7.92 million yen). By setting off expenditures, benefit of after the second year will be estimated to 2,580 thousand Re (4.33 million yen).

**Standard Package** 1/2 acre=20a=2,000m<sup>2</sup>



The project is going to implement following businesses:

1. Construction of agriculture factories (procurement from vendors)
2. To provide Initial training, ICT facilities and maintenance.
3. To provide seedlings and cultivation know-how.

The structures of most BOP businesses are to disseminate low price products targeted to low-income class for the purpose of activating the economic situations in the area for generating job opportunities. However, this project is different from those bricks-and-mortar approaches. It is to cultivate high-quality and high-price agricultural products for upper middle class consumers. By improving farmers' quality of life directly, and to develop smart village scheme in the targeted area to solve problems with the surplus of the income. In this way, the model would be expanded in other areas.

Women leaders working in the pilot farm welcome the working style that allows workers to do standing works the field. And also the new strategy to sell the products by five times to seven times price is highly appreciated not only by Indian people but also by Japanese parties.

One of a strong aspect of the project is that it is using cocopeat instead of earth. Usage of cocopeat can produce ideal environment that is not vulnerable for insects and viruses. In addition, the usage of ICT technology made the cultivation system the way of scientific. It would be a dramatic change from experience-based traditional agriculture to everybody who wants to participate to agriculture works after training certain level of farming know-how.

Other strong aspect is that when farmers are able to have partnership with local entrepreneur, they do not need to buy or borrow farming land. With the agricultural know-how and ICT system, it made capable for them to continue agriculture business.

Empowerment of women in the farming area has possibilities to improve following situations.

1. Dissemination of toilet building in their houses.
2. Development of awareness on sanitary and prevention of epidemics.
3. Improvement of school enrolment and continuance ratio.
4. Expansion of medical access.
5. Decreasing labor burden through the introduction of laborsaving equipment.
6. Securement of transportation instruments such as bicycles or /motorbike.

Because of disclosure of the dealing with the local hotel to purchase strawberry by 400 Re (875 yen) per kg encouraging women leaders to see their future agriculture business.

During the dissemination of this model into other areas in India, benefits in farming areas are going to use mobile phones and PCs more often. Increasing the numbers of ICT users in farming areas make ICT services easier. Gradually, smart village scheme is going to develop. This ICT usage makes the villages as follows:

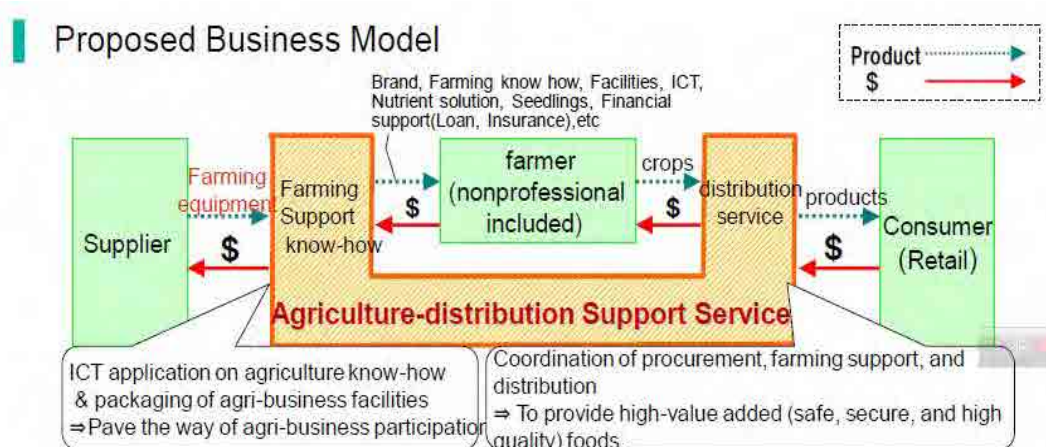
1. Expanding the marketing chances through Internet.
2. Establishment of remote medical treatment and emergency medicine.
3. Enhancement of education through e-learning.
4. Vocational trainings and obtaining certifications for further jobs.

This project already started seeking business and marketing strategies from last half of 2013. In the spring of 2014, it will start shipping as premises for full business. Further marketing studies would be done until the end of 2014 to ensure the further operations. From 2015, NEC is going to sell standard cultivation package targeting other areas such as Mumbai, Delhi, Hyderabad, and Bangalore.

The project team researched the possibility of loaning money to farmers from local micro credit banks. It was found that the size of required fund does not fit the scheme of micro credit. However,

many local entrepreneurs have interests for participation this BOP business after the Cool Japan Festival, and also local economic men and intellectuals are interested in this project. The project is going to contract with local SPCs (special purpose company) regarding the initial investment and administration, and making membership scheme to form business alliance for further marketing.

To make this move fast, the project has been studying further targeted areas to expand this model Cooperating with local firms and staff of Maharashtra state. The project plans to implement 40 cultivation sites and 50 to 60 purchasers (hotels and supermarkets) in 2016. Until 2018, it plans to gain 1.1 billion Re to 1.2 billion Re (1.85 billion yen to 2 billion yen) sales performance, and 60 million Re to 70 million Re (100 million yen to 120 million yen) for benefit of SPCs.



## 6 Structure of the business

Strawberry is capable to cultivate through the year. However, to avoid certain level of replant failure, it is said that it is better to change the seedlings. In this project, 1/3 of the seedlings would be changed in one time. Importing seedlings from Japan is not effective from the view point of costs and time. For the further operation, the project plans to set up seedling nursery at the same place of the pilot farm in ICA. Also the nursery farm will be a center to provide liquid fertilizer.

Most of the equipment's were brought from Japan at the construction of the pilot farm. In India, important part of water dripping system for nutriculture has been imported from Israel. However, the project concluded that other equipment such as iron pipes is available from local iron factories in low cost.

The project is going to employ local made equipment step by step and gradually it plans to include local iron factories into the SPC scheme for the purpose of expanding income making opportunities for farming areas.

The benefits would be administrated by the local community; however, for avoiding imbalanced distribution of benefits, NEC is going to negotiate with village heads beforehand and try to supervise for their future. It is estimated that around 100 women workers are able to get income from one village (4 acre); it will be increased around 2,000 women workers in five years later. It is expected that the income would be three time higher than average income of the village.

For further operation, NEC is going to train targeted BOP farmers. In the training, strawberry cultivation, packing, shipping would be included. Training term will be estimated about six months. The incentive of participating the training would be informed that the adequate benefit from strawberry sales is divided to all workers. At the initial stage, trainers would be provided from NEC or GRA. However, in the near future, local administrators are expected to train local farmers.

## 7 Further possibility of collaboration with JICA project

GRA Inc.'s new plan on “Pilot Survey for Disseminating SME's Technologies” was signed by JICA on February 2014. This will be a new corroboration work of the project.

The project already proved that Japanese-type strawberry is acceptable with high-price in Indian market. And it could start selling strawberry to five-star hotel in Pune city as a model case. In this regard, it was also able to prove the possibility of providing income for farmers.

It is required to be built a new nutriculture farm at the targeted area of Mulshi by applying the data obtained from the feasibility study at the pilot farm. Also it is required to be verified the possibility of year-round cultivation and sustainable strawberry marketing. In addition, for the purpose of cost curtailment, cooperation with local green house contractor is needed.

Proposed “Pilot Survey for Disseminating SME's Technologies” by GRA is going to continue these works for the dissemination of further nutriculture cultivation farms studied by the project to ensure further BOP business to provide income for farmers.

To implement further BOP business, it is important for local farmers to obtain strawberry cultivation technology before disseminating this nutriculture cultivation system in other areas. The training centre will be set up at the ICA. Also training at the new nutriculture farm in Mushi will be used as a place for field-training. At the occasion of training, not only agriculture technology but also empowerment of women, sanitary and education related issue will be included.

End