

Regional Vitalization through Global Interaction: Lessons from the Snakegourd (Ceylon Uri) Project in the Suzuka City

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Abstract

Snakegourd is famous among the South and Southeast Asian countries for its medicinal and nutritional value and the low calorie content. However, although it has been growing in the Okinawa area since the Meiji era, the dishes prepared by using this vegetable are unpopular in Japan, which may be attributable to the lack of correct information. Snakegourd is not known as a vegetable to the people in general and, it has not being subjected to analysis in the books on food composition in Japan. This implies that the snakegourd is not being treated as a vegetable even among the food-professionals even though it is marginally used for cooking by a small minority of the people in this country.

Suzuka International University (SIU) launched the “snakegourd project” to rectify this situation and to introduce this crop as a new vegetable to Japan from the Suzuka City. SIU used the “Suzuka Consortium of the Industry-University-Government Interaction” as the supporting network for implementing this project. Preliminary research findings of the project show that this vegetable can be grown successfully in this area and the dishes prepared by using snakegourd are quite acceptable for the Japanese taste. In addition, research activities by the project participants showed that this vegetable can also be grown in the form of a “green curtain”, which can be used for shading during the summer. Moreover, a vitalized region can be expected thanks to the increased participation of the people and organizations belonging to different social, economic and industrial categories for this project.

Keywords: Snakegourd, regional vitalization, industry-university-government relations, Suzuka International University, validity of information

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The name of the project was changed in June, 2011 from the “Snakegourd Project” to “Ceylon Uri Project”, with the objective of using that name for commercial purposes. However, the original term was used in this paper in order to deepen the awareness of the reader on this vegetable.

1. The Globalization and the Issue of Information

Globalization has been defined as “a process of interaction and integration among the people, companies, and governments of different nations, a process driven by international trade and investment and aided by information technology”. It is said that this process has effects on the environment, on culture, on political systems, on economic development and prosperity, and on human physical well-being in societies around the world (The State University of New York, 2011). Not only the developed countries, but the developing countries also have viewed the issue of globalization as a mean of promoting economic and social development. Correct data or information may impact a society in many ways and benefits people due to enhanced opportunities that may be arisen by using such data or information.

In the era of globalization, the screening of the unlimited volume of data or information that may be available from countries throughout the world shall be a tedious task. The decision about what is right and what is wrong may also not be an easy task unless sufficient and correct information is available. As the information technology improves, the society may receive increased access to a wide variety of databases and information. The acquired data or information has to be processed correctly and should be presented with care to the people with different cultural backgrounds. Nevertheless, the validity of such decisions will depend on the ability of the information provider, or the decision maker, as well as the type of facts or information used in the decision making process. Likewise, prevailing images about “something” may be changed as more information is considered in the interpretation.

2. “Snakegourd” in Japan and the Issue of “Information”

One good example in the above context may be drawn from the “snakegourd¹⁾”, which is a “vegetable” available in the tropical countries as well as in certain parts of Japan. It is said that the snakegourd had

first cultivated in Japan during the Meiji Era (Weblio Dictionary, 2011). It is grown mainly in the Kyushu and Okinawa area, the southern part of Japan.

In fact, Okinawa is famous for the longest-living people in the world and, the highest percentage of centenarians in Japan lives in Okinawa. The concentration of people over 100-years on Okinawa is five times higher than the rest of Japan²⁾. Okinawan foods which are said to contribute to a long life may include snakegourd as well as bittergourd because these varieties are typical to this area.³⁾ Bittergourd has become popular throughout Japan since recently as the information about its health and nutritional values have been known to the people. However, no such information about snakegourd is available in Japan, or even in the Okinawa area.

Nevertheless, Snakegourd is famous in the Asian countries for its health effects and nutritional value, which are not known in Japan so far. In addition, the common image about snakegourd discourages people from eating it, which we would like to focus in the next section. This situation depicts that the information about snakegourd has not been transmitted to Japan in the correct manner and therefore, a biased and wrong image has been created due to some “error” in the interpretation of information from abroad. This paper is an attempt to rectify some of the wrong information available in Japan relating to the snakegourd. In addition, how a project implemented in the Suzuka city to spread the cultivation and use of this vegetable may contribute to the regional vitalization also will be described.

Although this vegetable has been cultivated and used for food in the Okinawa area, it was not available for the people in other areas. In addition, the number of recipes seemed to be extremely few. It is said that Japan has been using more than 100 varieties of vegetables of which most of them were brought to Japan from other countries and, the “pure-Japanese-type” vegetables are very few in number. Many books and literature can be found in Japan about vegetables, food recipes and their food composition, but information about snakegourd was not available in such documents. For example, “Standard Tables of Food Composition in Japan⁴⁾” provides food composition data of 119 varieties of vegetables and the “Genshoku Shokuhin Zukan⁵⁾” provides data of 135 vegetables used in Japan. However, none of these two major books on food composition provide information about the snakegourd. In very rare occasions, the term “snakegourd” could be found in certain books relating to the vegetables, but details about its cultivation, the food composition or recipes were not available (Kubo, Fukunaga & Kumara, 2011).

The authors also conducted a survey of literature in Japan by using two major internet search engines, “Yahoo” and “Google”⁶⁾. Surprisingly, the large majority of information provided by the Japanese people about this vegetable in the Japanese language has been negative. Some of the major citations about snakegourd and the recipes include (1) Appearance is unattractive (2) Looks like a snake and one may not want to take it to the kitchen (3) Odor of the vegetable is unpleasant in both raw and cooked form (4) Dishes made from snakegourd are not tasty, and (5) No particular taste can be found in the snakegourd⁷⁾. It was clear that the proper information about the snakegourd had not been transmitted to this country despite the fact that Japan has a strong presence in many Asian countries.

3. Snakegourd in Asian Countries and its Effects: Learn from the Literature

Snakegourd is a vegetable that can be grown throughout the year in the tropical countries. The Asian countries which are famous for the growing and consumption of this vegetable include India, Thailand, Indonesia, Vietnam and Sri Lanka. The optimum average day temperature for growth is 30–35°C with a minimum of 20°C. Snakegourd prefers soil with well drained, rich in organic matter. The pH range is about 5.5 to 7.5. Harvesting can be done after 60-75 days after planting. In large plantations, pods or fruits can be harvested every 4 days. The total yield of young fruits is said to be over 20 tons per hectare. Harvested snakegourd can be kept under the normal temperature for 7-10 days without diminishing the quality (Agrepedia, Sri Lanka, 2011⁸⁾). The average life cycle of the snakegourd plant is about 5 months⁹⁾.

Its botanical name is “*trichosanthes anguiana*”. Synonyms include “*trichosanthes cucumerina*” and “*trichosanthes kirilowii*”. Common names for snakegourd include *serpent gourd*, *Chinese cucumber*, *chichinga* (in Bengali), *pathola* (in Sinhala), *pudalankaai* (in Tamil), and *padavalanga* (in Malayalam). The shoots, tendrils, and leaves are also eaten as greens in the South and Southeast Asian countries, in addition to the commonly used narrow and soft-skinned fruit.

Snakegourd has received this name due to its very long shape, which resembles to a snake. Some pods may be grown to a length of even two-meters and, the diameter varies from 4 to 10 centimeters. It may also be identified as the longest gourd in the world.

According to Leslie Taylor (2005), snakegourd is not only a vegetable, but a fruit which can be used to keep the body healthy and to cure many diseases. Tayler *ibid* describes the medicinal value of snakegourd as follows: "*Snakegourd helps stimulate the production of body fluids thus relieving dryness. It can disperse phlegm, remove pus, expel toxic matter and is anti-inflammatory. Snakegourd can act as a natural antibiotic, expectorant, laxative, and can be used for abscesses boils bronchitis, constipation, jaundice and hemorrhoids. It helps with breast and lung tumors, and can promote lactation. It has been shown to be excellent for diabetes. Perhaps the most interesting news is that the new "AIDS" drug "Compound Q" is a refined protein called trichonanthine which is derived from the trichosanthes (snakegourd) family*" (Tayler, *ibid*).

Sandhya, Vinod et al (2010) reports that "... *The plant (snakegourd) is rich in flavonoids, carotenoids and phenolic compounds. Trichosanthes cucumerina has a promising place in the Ayurvedic and Siddha system of medicine due to its various medicinal values like antidiabetic, hepatoprotective, cytotoxic, antiinflammatory, larvicidal effects*".

China has prepared medicines from snakegourd to treat congestion, constipation, diabetes (Tayler, *ibid*). Recent research in Japan suggests that *cucurbitacin D* isolated from *Trichosanthes kirilowii* (snakegourd) could be a valuable candidate for anti-tumor drug (Takahashi, Yoshida et al, 2009).

Since data about the composition of snakegourd is not available for the public in Japan, we acquired the data for basic understanding by contacting "The International Network of Food Data Systems", Thailand¹⁰, and the details are provided in the Table 1 below. According to this data, it is clear that the snakegourd contains several varieties of minerals including potassium, magnesium, calcium and phosphorous, while the calorie content is extremely low (less than 20 kcal per 100g). In addition, the fiber content also is known to be quite high. Even though we may put aside the potential of developing medicines by using the snakegourd, the value of this vegetable for edible purposes seem to be very clear.

Table 1: Food Composition of Snakegourd (Unit: Per 100g edible portion)

Content	Value	Content	Value
● Energy	(Kcal) 18	● Potassium	(mg) 34
● Moisture	(gm) 95	● Magnesium	(mg) 28
● Protein	(gm) 0.6	● Calcium	(mg) 22
● Fat	(gm) 0	● Phosphorous	(mg) 15
● Fiber	(gm) 1	● Sodium	(mg) 8.0
● Carbohydrates	(gm) 3	● Iron	(mg) 0.30
● B Carotene equivalents	(µg) 140	● Zink	(mg) 0.12
● Vitamin B6	(mg) 15	● Copper	(mg) 0.07

Source: Food and Nutrition Research Institute, Department of Science and Technology, Manila, The Philippines, 1997. Data provided by “The International Network of Food Data Systems”, Thailand, 2011.

According to such information, although Snakegourd had not received the proper attention from the general public in Japan, the findings of the research activities indicate that this vegetable may be used not only for eating green or in the cooked form, but for producing medicines as well¹¹⁾.

4. Suzuka Consortium of the Industry-University-Government Interaction (SCIUGI) and the Snakegourd Project in the Suzuka City

4. 1. About the Industry-University-Government Relations

The expansion of the role of knowledge or know-how in society and of the university in the economy can be analyzed in terms of a Triple Helix of industry-university-government relations. An expanding network system of interactive spirals is generated as the industry, university and government engage to promote economic development and academic research. Using the Triple Helix Model, the roles of government or the university are no longer fixed, because interaction between the different functions is needed in order to generate and sustain the specific configuration of an innovation system. Innovation is no longer a function of a single institutional sphere such as industry (Leydesdorff & Etzkowitz, 2001).

The industry-university-government relations seem to generate meaningful results especially when the university represents the science and technology disciplines. Joint research between the industry and the university, coupled with a government network conducive for economic vitalization may appear as a typical example in this context. However, such relations may not be confined to the universities in the science and technology sector, but in other academic disciplines as well. The snakegourd project in the Suzuka City may be taken as a good example in this context.

4.2. Relationship between the Suzuka Consortium of the Industry-University-Government Interaction and the Introduction of the Snakegourd Project

The **SCIUGI** was established in the year 2000, with the participation of the higher education institutions and, the industrial and the government sectors in the Suzuka City. The major objective of its establishment is related to what is expected by the Triple Helix of the industry-university- government relations, as described above.

Suzuka International University (SIU), which is the only “International University” in the Tokai area, is located within the Suzuka City. SIU offers courses relating to the issues on the international society. This university has recruited foreign staff as well as the local staff who have been familiar with societies outside Japan. In addition, the higher intake of the foreign students also is a special characteristic of the SIU. These characteristics of the SIU imply that this university is in a stronger position to gather proper information from abroad and disseminate to the society as necessary, and/or to rectify wrong images or misinterpretation related to the issues on the international society.

SIU has been participating to the Suzuka Consortium of the Industry-University-Government Interaction since its establishment, and took the initiative for introducing the snakegourd as a “new vegetable” to Japan due to the following reasons: (1) the general image in Japan about this vegetable is not appropriate (2) basic facts about this vegetable are not known to the Japanese society (3) food composition of the snakegourd is not recorded in Japanese books (4) how to use this vegetable for food is not known to the Japanese people in general and, (5) snakegourd is highly nutritional and can be used as a healthy food.

4.3. Outline of the Snakegourd Project

Although some people in the areas like the Southern Japan have been growing the snakegourd and used it for eating, its awareness and the popularity as a vegetable is almost negligible in this country. Most of the people have been growing this plant for ornamental purposes due to its “strange” or interesting shape and the length. Accordingly, a plan was prepared by the SIU to re-introduce this vegetable to Japan on the research basis through the SCIUGI activity in the Suzuka City.

A project team was formed by selecting participants from the industry and the agriculture sector (including farmers), the city government and, schools in the primary, secondary and the higher education sector. In addition, some individuals including housewives were selected to serve as monitors. Currently, the total number of participants to the project exceeds forty in number. The SCIUGI acted as a pivotal agent in the spread of information relating to this project through its regular meetings, events and information networks. Table 2 summarizes the participants and their role in the project. It is interesting to note that a wide variety of organizations and individuals have participated on the continued basis to this project with a common objective of making the project a success.

Table 2 : Participants in the Snakegourd Project and their Roles

Details of the Participants	The Role in the Project
JA Suzuka	Advisory service to farmers, assistance for sales
Professional Farmers	Experiments on the cultivation of the snakegourd on the commercial basis, green curtain, development of food recipes
Individuals/Housewives	Experiments on the cultivation of the snakegourd on the domestic level, preparation of food recipes, green curtain
Primary and Secondary Schools & the Educational Committee of the Suzuka City	Study on foreign crop cultivation, development of food recipes, preparation of green curtain and, study on foreign culture and food habits
Suzuka Junior College (SJC)	Development of food recipes, research on the suitability of prepared food for the Japanese taste
Suzuka Consortium of the Industry-University-Government Interaction (SCIUGI)	Supporting the project by assisting the Coordinator (SIU), dissemination of information, match-making between the project and the potential participants (individuals/organizations)
Suzuka International University (SIU) (Coordinator)	Provision of basic data/information from the foreign literature, supply of seeds, test cultivation under different conditions, green curtain project, advisory service to the project participants, monitoring of the progress and corresponding analysis, management and dissemination of information, overall coordination

Note: Prepared by the Authors based on the record of the Snakegourd Project activities.

The project team selected Sri Lanka for importing seeds to be cultivated in Japan. Snakegourd is served in Sri Lanka as a major dish in the hospitals relating to western and indigenous medicines. In addition, this vegetable is used for cooking and for serving raw as salads. Some of the project team members made a field visit to Sri Lanka for basic research activities, to acquire the basic knowledge on the cultivation and food preparation from this vegetable. Two varieties of seeds were imported from Sri Lanka.

Series of activities relating to this project include the following:

(1) May to December, 2010: Initial research on the possibility of cultivating snakegourd in the Central Japan area; preparation of food recipes; consultation with the SCIUGI regarding the concept of “new vegetable¹²⁾”, and with the SJC regarding the food recipes.

(2) February, 2011: Forming of the Snakegourd Project at the Suzuka International University. 20 participants.

(3) February to December, 2011: Expanded research on the cultivation, food preparation; test on the green curtains; conduct of field visits, series of discussions with the project members and the officials of the SCIUGI; organization of events for food recipes and tasting (February, April, July, August, September, October, December).

(4) June, 2011: Selection of a new commercial name for this vegetable as “Ceylon Uri” (Ceylon Gourd) instead of the “snakegourd”. Re-named the project as “Ceylon Uri Project”. Number of participants exceeded 40 persons.

(5) July, 2011: On-site press release and introduction about this project to the mass media (participated by Mie TV, Suzuka Cable TV, Chunichi Newspaper, Mainichi Newspaper, Ise Newspaper, Japan Agriculture Newspaper, JA Suzuka Magazine etc.)

(6) August, 2011: On-site press release on the preparation of food recipes by using snakegourd by the project participants (participated by the NHK, Mie TV, Suzuka Cable TV, Chunichi Newspaper, Ise Newspaper, Japan Agriculture Newspaper, JA Suzuka Magazine etc.)

(7) October, 2011: Press release about the introduction of the new curry dish “Kumara Curry” which used snakegourd. Produced by the Tsuruya Foods Company at the Suzuka International University. 250 plates were sold to the public. Snakegourd Replica was also made by the Suzuka Junior College.

(8) November, 2011: Participation to the “Exhibition of Leading Industries in the Mie”. Display of

harvested snakegourd, distribution of related documents and explanation about the project. More than 250 persons visited the booth for inquiry.

Newspapers and TV companies have been providing a wide publicity to this project on the regular basis. It is interesting to notice that the project team has been quite active in the research activities and also in the gathering and disseminating information relating to this project. The number of participants for the project has been on increase over the time. Although snakegourd is a vegetable that can be grown under a tropical climate, a pilot test is already underway for the greenhouse cultivation during the winter in Japan.

5. On the Regional Vitalization through the Snakegourd Project: A Discussion

The introduction of a new product, whether it is a manufactured or an agricultural product, is usually done by a specific organization/individual engaged in similar activities. For commodities, trading companies or agricultural societies may take the initiative in introducing new products. Patents or trademarks restrict the use of the new idea or the subsequent products by the general mass, unless they acquire permission from the corresponding organization or the individual. This is a well-known fact relating to the economic and regional development.

However, the “Snakegourd Project” in the Suzuka City is somewhat different from the above cases. The idea about the “new vegetable” came from the “university”, and the participants for the project consist of individuals and organizations belong to the industrial sector (including the restaurants and food processing sectors), agricultural sector, educational sector and the government sector, in addition to the community members who are interested about contributing for the regional development on voluntary basis. All participants voluntarily involved in the research activities on the cultivation, food preparation, processing of harvested gourds and, sharing and disseminating information relating to this project.

A major objective of the project is the vitalization of the “region” through the introduction of this project. The farmers, both professional and domestic, will be benefitted as they will be able to produce this “new” vegetable which was not known earlier. The food processing companies including the restaurants will be

benefitted as new opportunities for processing will be available. Sales outlets, including retail outlets and supermarkets, will be benefitted due to the possibility of increased sales outcome from this new product. The students¹³⁾ and/or the academics in educational institutes will be benefitted due to the new opportunities for research. The government sector also will be benefitted due to the increased regional income which is coupled with the vitalized economic activities in the region. In the future, the snakegourd will accompany the name of the Suzuka City as the origin of the new vegetable to Japan when it is commercialized. Accordingly, the Suzuka City will be benefitted due to its new image thanks to the introduction of this new vegetable, “snakegourd”.

The year 2011 was considered as the “Year for Research”, and the record of the activities so far has proved that the snakegourd can be grown successfully in the soil in and around the Suzuka City. More than 20 dishes prepared by the project members on the research basis were readily accepted not only for the project members, but for the general public who have tasted those recipes for the first time in their life. Altogether five events were conducted for tasting the snakegourd dishes and, surprisingly, nobody had complained about a “bad odor” or a “bad taste”. Instead, those who have tasted the dishes had overwhelmingly expressed their willingness to use snakegourd for food when it is commercially available.

This project has been able to create a new enthusiasm among the people and organizations in and around the Suzuka City to use the snakegourd for various purposes including growing and processing as well as for conducting further research at the schools and research institutes, and for using as green curtains. Many new organizations and enterprises as well as schools and individuals have shown their interest to participate in this project.

Plans are already on the way to commercial farming, introducing a “green curtain kit”, distributing and selling the snakegourd on the commercial basis, organizing events and contests relating to the snakegourd, thereby enhancing the social, economic and industrial activities of the region. Accordingly, it may not be an exaggeration to say that the snakegourd project has been contributing to the regional vitalization of the Suzuka City thanks to its ability to integrate people and organizations belong to different social, economic and industrial categories.

However, there are many topics to be addressed for the commercial use of this vegetable including (1) the dissemination of information and the provision of publicity to this vegetable and food recipes in areas outside the project area (2) standardization of the products (3) pricing (4) establishment of a distribution system (5) possibility of supplying snakegourd throughout the year (6) conduct of basic experiments on the food composition of snakegourd cultivated on the soils in Japan and, (7) conduct of research on the further processing of this vegetable. The authors also expect to assist the snakegourd (Ceylon Uri) Project to make the team's effort a success.

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Notes

- ¹⁾ Botanical name: *Trichosanthes cucumerina*
- ²⁾ Data refers to the year 2005.
- ³⁾ Jeffrey Hays, “Elderly in Japan: World’s Oldest Man and Woman, Long-live Okinawans and Active Retirees” in “Facts and Details: Japan”, <http://factsanddetails.com/japan.php?itemid=621&catid=18>, 2009
- ⁴⁾ Standard Tables of Food Composition In Japan, (*Nihon Shokuhin Hyoujun Seibun Hyo*). Fifth Revised and Enlarged Edition, Ministry of Education, Culture, Sports, Science & Technology in Japan, 2005
- ⁵⁾ *Genshoku Shokuhin Zukan*, (An Illustrated Reference Book for Food), Sugawara Tatsuyuki and Inoue Shiro, Kenpakusha Publisher, 2001
- ⁶⁾ The Japanese name of the Snakegourd “Hebiuri” was used in the search, and it was conducted in the Japanese language to know how the Japanese people have looked at this vegetable.
- ⁷⁾ The above are some citations of the Japanese people about the snakegourd and its food preparations. The original opinions were written in the Japanese language. Only a very few people had mentioned that the taste of snakegourd is “tolerable”, in contrast to the large number of people who indicated that it cannot be accepted to Japan. The preliminary literature survey through the internet was conducted between March to August, 2010.
- ⁸⁾ A Free Encyclopedia on Sri Lankan Agriculture, Agrepedia, HP <http://www.goviya.lk/enwiki/>, access in November, 2011.
- ⁹⁾ The first author and some other project members conducted a preliminary interview survey regarding snakegourd in Sri Lanka during April – May, 2010 by visiting agricultural instructors of the Agriculture Department of Sri Lanka.
- ¹⁰⁾ Data was provided by Dr. Prapasri Puwastien, The International Network of Food Data Systems, Institute of Nutrition, Mahidol University of Salaya, Thailand, 2011 August, upon the written request of the First Author of this paper.
- ¹¹⁾ Although the purpose of this paper is not to explain the medicinal value of this fruit, the fact that it is not known to the general public appeals for the provision of dated and valid information available in and outside Japan.
- ¹²⁾ Snakegourd is a vegetable in other countries, but the Japanese people in general are not aware that this “plant” is a vegetable. Therefore, the project team decided to introduce snakegourd as a “new vegetable” to Japan, by disseminating required information for its spread in the society.
- ¹³⁾ The first student dissertation relating to the snakegourd was compiled and submitted to the Suzuka International University by Masayuki Ihara, an undergraduate student of the Department of International Study, Suzuka International University, in December, 2011.