



Food and Agriculture
Organization of the
United Nations



The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE

**Views, Experiences and Best Practices as an example of possible options for
the national implementation of Article 9 of the International Treaty**

Note by the Secretary

At its [second meeting](#) of the Ad hoc Technical Expert Group on Farmers' Rights (AHTEG), the Expert Group agreed on a revised version of the [template](#) for collecting information on examples of national measures, best practices and lessons learned from the realization of Farmers' Rights

This document presents the updated information on best practices and measures of implementing Article 9 of the International Treaty submitted by Canada 31 July 2019.

The submission is presented in the form and language in which it was received.



Title of measure/practice : The Three Sisters Project

Date of submission : July 31st, 2019

Name(s) of country/countries in which the measure/practice is taking place: Canada

Responsible institution/organization (name, address, website (if applicable), e-mail address, telephone number(s) and contact person):

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Type of institution/organization (categories):

Department of the federal Government of Canada.

Collaborating/supporting institutions/organizations/actors, if applicable (name, address, website (if applicable), e-mail address, telephone number(s))

Agricultural Society for Indigenous Food Products, 380, rue Chef Max Gros-Louis, Wendake (Québec), Canada, G0A 4V0; Email: info@asifp.ca ; Telephone: +1-418-843-2733; Fax: +1-418-843-9074

Description of the example

Mandatory information:

See notes below ¹ ² ³

Short summary to be put in the inventory (max. 200 words) including:

The “Three Sisters” is an agricultural system in which corn, squash and beans are grown together. This type of system is very old and continues to be used in some communities and family gardens. From 2015 to 2018, Agriculture and Agri-Food Canada, which is a Department of the Federal Government, in collaboration with the Agricultural Society for Indigenous Food Products, implemented the Three Sisters project. Its main purpose was to study characteristics of varieties of corn, squash and beans and the products derived from them in order to develop added value for indigenous stakeholders, while also studying health benefits. Research activities included studies of traditional knowledge, e.g. on ancestral lineages of the Three Sister crops and their respective seed keepers, combined with studies relating to production, processing and use. Existing instruments identified in Canada were used in the project to select good practices. The project looked for principles, rules and mechanisms that enable Indigenous people to control the circulation of their resources and knowledge at each step of the research project (access,

¹This mandatory information is required in order for the measure/practice to be included in the Inventory.

² Please select only one category that is most relevant, under which the measure will be listed.

³ Please select one or several categories that may also be relevant (if applicable).



utilization and valorization), and also resulted in new knowledge on health and nutritional benefits and possible ways to protect and preserve genetic material of ancestral crop genetic resources.

(200 words)

- **Implementing entity and partners**

- Implementing entity:

- Government of Canada

- **Start year**

2015

- **Objective(s)**

Agriculture and Agri-Food Canada decided to develop the Three Sisters project with the goal of gathering knowledge about this method, preserving the seeds, improving cultivation methods and using them post-harvest.

- **Summary of core components**

The main purpose of the Three Sisters project was to study characteristics of varieties of corn, squash and beans and the products derived from them in order to develop added value for Indigenous stakeholders, while studying their health benefits. The general objectives of the project were to improve production methods, increase awareness of the importance of preserving ancestral values, develop new products from these crops and support the people interested in reviving them.

Knowledge came from scientific and historical literature, interviews and conversations with Indigenous producers and gardeners. With respect to knowledge transfer, Indigenous partners were involved to ensure a good balance between proposed practices and processes and needs. The knowledge obtained on ancestral lineages and their seed keepers helped identify possible ways to protect and preserve the genetic material of these lineages.

Analysis of the bioactive components of fresh Three Sisters products was conducted by AAFC. Many varieties of squash (including pumpkins) and beans were tested to analyze the carotenoid and antioxidant content. Ingredients were also produced from ancestral varieties, and were characterized for their composition and functionality. Principles of the farming systems of the Three Sisters were explored and potential garden models were proposed; feasibility was established from the perspective of the value chain and to guide the subsequent development and transfer phase.

- **Key outcomes**

Existing instruments identified in Canada were used in the project to select good practices. The project looked for principles, rules and mechanisms that enable



Indigenous people to control the circulation of their resources and knowledge. Such elements can be identified at each step of the research project (access, utilization and valorization).

Analysis of the bioactive components of Three Sister products was conducted by AAFC. A number of varieties of pumpkins and beans were tested to analyze their carotenoid and polyphenol content and to assess the antioxidant capacity of these crops. Ways of developing Indigenous products were then considered. For example, many types of bread were prepared from pumpkin, bean and corn flour. Bread was particularly judged in terms of its industrial potential. Methods were studied to determine whether all the parts of a pumpkin can be used (skin, flesh and seeds as well as the leaves and stem). Each part had some promising properties. The juice extracted was rich in Vitamins A and C and antioxidants, while the skin was rich in pectin and carotenoids, and the pulp can be used as flour. The antioxidant potential of ancestral lineages was promising. Some commercial ancestral lineages of maize, beans and pumpkin have demonstrated potential to be processed into ingredients in certain recipes.

A consent form was developed, which can be amended based on comments from local players. The form would be signed by the participants in the project to ensure they were informed about the project's goals and their rights. The form provided information about the Three Sisters project (team, methods, goals, benefits, potential risks, etc.). It also specified participants' rights. For example, they have a right to withdraw from the project at any time and without any consequences if they were not comfortable with the goals of the research or any other aspect of the research. Their anonymity would be protected if they request it. No intellectual property application would be considered or made without participants' prior informed consent. The seeds shared by the participants were entrusted to Agriculture and Agri-Food Canada for the purpose of the Three Sisters project, but participants retained ownership over the seeds. As a result, they cannot be shared with any third party without the prior informed consent of the participants.

○ **Lessons learned (if applicable)**

Numerous research projects focus on traditional knowledge which is developed to identify resources and uses. The Three Sisters project is only one example. What all these projects show is that the integration or use of traditional knowledge is significantly increasing the chances of finding promising resources and uses. That is not surprising considering the years of experience of Indigenous people.

Because of their properties, products made from different parts of the pumpkin are already on the market. Pumpkin oil, powder and seeds, which can be eaten, are already on the market, as well as masks and other beauty products.



Brief history (including starting year), as appropriate

Long title: “Three Sisters value-chain: characterization of attributes and functionalities of aboriginal corn, squash and bean varieties, preservation of genetic material and prefeasibility of new culture models”

The Three Sisters project is a multidisciplinary initiative that brought together participants from different backgrounds, including scientists and Indigenous people. A number of Agriculture and Agri-Food Canada (AAFC) scientists worked to improve agri-food production resulting from the Three Sisters system. The project started in 2015 and ended in 2018.

The project began to take shape in the summer of 2015 with the planting in cultivated parcels of ancestral varieties of beans, corn and squash. The germplasm was purchased from artisanal seed growers and one sample was provided by the Plant Gene Resources of Canada, the Canadian national genebank. During the winter of 2015, analysis protocols were developed, fresh products were characterized and the production of ingredients was analyzed. At the same time as these analyses were being performed, AAFC staff began meeting with seed keepers in the following indigenous communities: Akwesasne, Kahnawake, Tyendinaga and Six Nations of the Grand River.

In May 2016, as part of the “Three Sisters Project”, the United States, Mexico and Canada /participated in a collaborative workshop on the “Conservation and Development of Ancestral/Indigenous Plant Genetic Resources: Challenges, Tools and Perspectives Sharing the Canadian, Mexican and American Experiences”. Agriculture and Agri-Food Canada, the University of Laval and the PROCINORTE/NORGEN Taskforce on Genetic Resources organized this workshop. At this workshop best practices were shared on the preservation of indigenous traditional knowledge in agriculture. The report can be found at: www.procinorte.net/Documents/Workshop_Report_Conservation_Plant_Genetic_Resources_May_10-11_2016.pdf.

Core components of the measure/practice (max 200 words)

The core component of the measure was to enshrine, in PBR legislation, a voice for farmers and public and private breeders to advise government on how to best administer the intellectual property regime that benefits the value chain as a whole. Inclusion of members of the value chain facilitates consensus based recommendations and advice to government. The role of each committee member is to represent their respective organizations interests on the Advisory Committee. In many cases, information must first be disseminated through the various organizations prior to consensus based advice being given to the Minister of Agriculture and Agri-Food.

Description of the context and the history of the measure/practice is taking place (political, legal and economic framework conditions for the measure/practice) (max 200 words)

Refer to “Brief history” above



To which provision(s) of Article 9 of the International Treaty does this measure relate

| | |
|---------------|----------|
| Article 9.1 | X |
| Article 9.2 a | X |
| Article 9.2 b | |
| Article 9.2 c | |
| Article 9.3 | |

Other information, if applicable

Please indicate which category of the Inventory is most relevant for the proposed measure, and which other categories are also relevant (if any):

| No. | Category | Most relevant | Also relevant |
|-----|--|---------------|---------------|
| 1 | Recognition of local and indigenous communities', farmers' contributions to conservation and sustainable use of PGRFA, such as awards and recognition of custodian/guardian farmers | X | |
| 2 | Financial contributions to support farmers conservation and sustainable use of PGRFA such as contributions to benefit-sharing funds | | X |
| 3 | Approaches to encourage income-generating activities to support farmers' conservation and sustainable use of PGRFA | | X |
| 4 | Catalogues, registries and other forms of documentation of PGRFA and protection of traditional knowledge | | X |
| 5 | In-situ/on-farm conservation and management of PGRFA, such as social and cultural measures, community biodiversity management and conservation sites | | X |
| 6 | Facilitation of farmers' access to a diversity of PGRFA through community seed banks ⁴ , seed networks and other measures improving farmers' choices of a wider diversity of PGRFA. | | X |
| 7 | Participatory approaches to research on PGRFA, including characterization and evaluation, participatory plant breeding and variety selection | | X |
| 8 | Farmers' participation in decision-making at local, national and sub-regional, regional and international levels | | |
| 9 | Training, capacity development and public awareness creation | | |

⁴ Including seed houses



| | | | |
|----|--|--|--|
| 10 | Legal measures for the implementation of Farmers' Rights, such as legislative measures related to PGRFA. | | |
| 11 | Other measures / practices | | |

- **In case you selected ‘other measures’, would you like to suggest a description of this measure, e.g. as a possible new category?**

NA

- **Objective(s)**

See above Objective(s)

- **Target group(s) and numbers of involved and affected farmers⁵**

Target groups were Iroquoian communities from Quebec and Ontario provinces, including Haudenosaunee and Huron-Wendat peoples.

- **Location(s) and geographical outreach**

The project took place mainly in AAFC research centres in Quebec, Saskatchewan and Ontario. Outreach activities allowed the team to meet with people from Akwesasne, Kahnawake, Kanesatake, Tyendinaga, and Six Nations of the Grand River and Wendake.

- **Resources used for implementation of the measure/practice**

The Three Sisters' project required the expertise of research teams from several AAFC research centers across Canada (Quebec City, St-Hyacinthe, St-Jean-sur-le –Richelieu, Ottawa and Saskatoon). It also involved the collaboration of Indigenous peoples from different communities in Quebec and Ontario to help the research team to better understand the current status of the Three Sisters culture system and plant varieties.

- **How has the measure/practice affected the conservation and sustainable use of plant genetic resources for food and agriculture?**

The Three Sisters project gathered knowledge on plant genetic resources pertaining to the Three Sisters, including varieties of corn, squash and beans. Based on processing research and development, it led to better characterization of post-processing attributes and functionalities (nixtamalization, bioproducts, flours and breads) from Indigenous corn, squash and bean varieties. Another important outcome of the project was the development of an approach respecting Indigenous people's rights over the genetic resources and associated knowledge they hold. Some other project outcomes included: a literature review on Three Sisters cropping models, outreach and networking activities with members of First Nations, especially seed keepers, the implementation of demonstration plots on AAFC research and development centre farms, the assessment of agricultural

⁵ Any classification, e.g. of the types of farmer addressed, may be country-specific.



potential of Indigenous communities' lands. The project has thus led to significant advances in understanding the Three Sisters culture and the food produced, as well as building relationships with Indigenous people.

- **Please describe the achievements of the measure/ practice so far (including quantification) (max 200 words)**

Refer to section “key outcomes” listed above

- **Other national level instruments that are linked to the measure/practice**

NA

- **Are you aware of any other international agreements or programs that are relevant for this measure/practice?**

NA.

- **Other issues you wish to address, that have not yet been covered, to describe the measure/practice**

NA

Lessons learned

- **Describe lessons learned which may be relevant for others who wish to do the same or similar measures/practices (max 250 words).**

While the objectives were initially oriented toward economic development, discussions with Indigenous people from diverse communities highlighted the need to approach Indigenous agriculture and agri-food based on community needs, particularly from nutrition and cultural revitalization perspectives. For this reason, future work will aim at understanding and valuing the Three Sisters polyculture system in connection with nutrition.

- **What challenges encountered along the way (if applicable) (max 200 words)**

It is sometimes still surprising for some researchers to realize that the integration or use of traditional knowledge is significantly increasing the chances of finding promising resources and uses.

- **What would you consider conditions for success, if others should seek to carry out such a measure or organize such an activity? (max 100 words)**

The establishment of a relationship of trust among the various stakeholders is the key to the success of such an initiative. When working with Indigenous people, it is important to become familiar with and respect their culture. The relevance of the Three Sisters project



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is largely due to the fact that throughout the project, Indigenous people have been involved to identify their needs and jointly identify research avenues

Further information

- **Link(s) to further information about the measure/practice**
http://www.procinorte.net/Documents/Workshop_Report_Conservation_Plant_Genetic_Resources_May_10-11_2016.pdf