

# **NANOHANA Project at Contaminated Area by Bio-remedy with Rapeseed Plant in Narodichi, Ukraine: A Challenge of Chernobyl-Chubu Association**

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On April 13, 2007 we sowed seeds of NANOHANA (rapeseed) in the farmland at the Narodichi district. After the Chernobyl Accident, the land has been contaminated with radiation and has not been cultivated for 21 years. We imagined scenes that the rapeseeds were growing, bees were gathering around the flowers and the aroma of the yellow blossoms and sweet honey were everywhere. This was the beginning of our NANOHANA project to revive the Narodichi district.

## **Activities of our NGO, Chernobyl-Chubu Association**

The local residents of Nagoya, Chubu District, Japan founded our organization, Chernobyl-Chubu Association to Help Chernobyl in April 1990. The aim of the organization was to provide relief for the victims of the Chernobyl accident. We sent a letter to democratic newspapers and magazine publishers in USSR (the then) inquiring about relief operation. Soon we received a reply from Ukrainian NGO, Fund Resettlement (the present Fund Chernobyl-Hostage), explaining that its members were journalists in Zhytomyr, Ukraine. In the letter, we offered our help to cooperate with them to help the victims.

In August 1990 our delegation brought relief goods to the disaster area. It was our first relief activity and relief goods as Japanese NGO for the victims of the Chernobyl accident. Since then we have



Rapeseed flower in Narodichi. June 2007

been continuing our relief activity for the victims in Zhytomyr, the area of Ukraine where the worst damage occurred.

At the beginning of our activities we had no idea how we could help them. We decided to send basic relief goods such as powder milk for babies, disposable syringes, and radiation instruments. We also sent a large quantity of Japanese calendars that were collected from Japanese citizens to raise funds so that the counterpart organization could purchase houses for the resettlement of victims to safe areas. Then we sent large amounts of medicine, incubators for newborn babies, as well as medical machinery requested by the local hospitals in Zhytomyr.

We have been also supporting several NGOs in Ukraine. One of them is the Fund Chernobyl-Fireman, an organization of liquidators who were engaged in operations coping with radioactivity just after the Chernobyl accident. They are helping incumbent firemen who are working in contaminated areas. Others are funds for disabled person due to liquidation works of the accident. The Milk- Campaign raises funds in order to send powdered milk to local hospitals. We believe that mental support is also a fruitful relief for suffering people, so we send cards every year at New Year and Ukrainian Christmas, which is called Card-Campaign.

### **Narodichi district, area of the highest contamination**

Province Zhytomyr is located on the west side of Chernobyl NPP. 42 per cent of its land has been affected by radiation, 440,000 people suffered, and 9 out of 22 districts in the province were contaminated. The northern area of the province suffered especially high levels of radioactive contamination.

Based on the Ukrainian law, the level of contamination is classified into 4 categories: the 1st zone-prohibition entry zone (40 Ci/km<sup>2</sup> of Cesium-137 and above), the 2nd zone-obligatory resettled zone(15~40 Ci/km<sup>2</sup>), the 3rd zone-optional resettled zone(5~15 Ci/km<sup>2</sup>), and the 4th zone-radioactive control fortified zone (1~5 Ci/km<sup>2</sup>). The Narodichi district is divided into two parts with contamination:



Contamination map of Narodichi

the northern area where the central town of Narodichi is located and the southern area where the Bazal village is located. Several other small villages surround the two areas. According to the map of radioactive contamination, we can see that the most severely contaminated area was the central part of the district where people cannot live.

Formerly there were 84 towns and villages in this district and now there are only 64. Before the accident there were 27,000 inhabitants in Narodichi district, but after the accident about half of them were resettled in non-contaminated areas. Currently, 10,300 people remain even though the circumstances of radioactive contamination. Almost all areas belong to the 2nd and the 3rd zone where people are better off resettling in other locations. Since the disintegration of USSR and the independence of Ukraine, the economic situation continues to be difficult. The population consists of 1,987 children, 4,330 pensioners and 2,374 working people, while 1,250 people are working outside the district.

Farming is the economic foundation of this district since before the accident. Today living conditions are difficult as the population suffer from health problems caused by radiation exposure and high unemployment. These conditions have led to a dysfunction of social structure. Inattention to these systemic problems has left people feeling of hopeless about their future.

People continue to suffer from internal radiation exposure due to the high level of radiative contamination in food sources. Subsistence farming produces most of the food that nourishes the Narodichi population. In addition to these cultivated food sources of crops, milk and domesticated animals, the Narodichi also gather wild mushrooms and berries from the woodlands surrounding the community. The high levels of radiation found in these local sources of food continue to cause internal radiation of the people. Substituting this local supply of food with cleaner food would entail a radical change in traditional eating habits and culture. As a part of its research efforts, the local government is measuring the level of radioactivity found in the foods that people occasionally bring into the regional health center laboratory.

According to the heads of local government and local hospital, researchers discovered high internal cesium readings by measuring the radiation levels in these patients' environments, including farmland, firewood, and foods, etc. In the last 10 years (1996 – 2006), morbidity of this district has risen by a factor



Ruined houses and goats

of two and the incidence of cancer is increasing 1.5 times faster than the decade before the accident. Tuberculosis also remains at a high level due to continued poverty. Anxiously, no children is healthy, they have some health problems.

Our assistance in Narodichi district includes repairing the hospital boiler, water infrastructure in a few villages and so forth. We have also sent medical equipment to hospitals. Despite our efforts, we could not help realizing that there remained a chain of problems: Radioactive contamination → Internal exposure → Radiation injury → Poverty → Need of aid. Therefore, we thought of a novel approach that could cope with the principal roots of these problems.

### **The purpose of the project**

The principal concept of this project is to use bio-remedial technology to reduce the number of patients in Narodichi suffering from radiation exposure. This technology depends on cultivating oilseed rape plants that can absorb cesium-137 and strontium-90 from the contaminated soil. The products of rapeseed and biomass are used for making bio-energy useful to agricultural and other purposes.

This project has been developed as a collaborative work of Chernobyl-Chubu Association with six Ukraine organizations: Narodichi Local Administration, The Local Assembly, National Agro-Ecological University in Zhytomyr, Narodichi Regional Specialized Station of the Land control in the Obligatory Resettling and Chernobyl Hostage Fund.

### **The first step to the land rehabilitation**

Our job is to remove radioactive materials from the contaminated soil by growing rapeseeds. Rapeseed absorbs cesium-137 and strontium-90 from soil, but does not distinguish them from potassium (kalium) and calcium because of their similar nature. We can remove radiation gradually. The following explains the process of cleaning up the land.

First, we grow rapeseeds in Stare Sharne village located at the east end of Narodichi town, categorized 2nd zone (Cs-137 10~15 Ci/km<sup>2</sup>). One of our members, a scientist of ecological-biology, collaborates with researchers at National Agro-Ecological University. During the first year of the project, we grew rapeseed dividing the field into 4 parcels according to the soil conditions and the amount of used fertilizer. We found that cesium-137 was accumulated mostly in seed; while strontium-90 was mostly in stalks. We are preparing a detailed report on this work.

**Radioactivity concentration in different section**

	Root	Stalk	Hull	Seed
Cs137	190	121.9	148.8	570.
Sr90	197	289	220.7	153

Mean on parcel of full fertilizer unit: Bq/kg

The work was shared as follows; the researchers of the Agro-Ecological University measured and analyzed radioactivity in the field and rapeseeds, and the agricultural technologists and workers of Narodichi Regional Specialized Station were responsible for growing rapeseed. They have to protect themselves by the guard manual to prevent exposure to radiation.

### **The second step: producing bio diesel fuel**

After the first harvest, we planed to produce bio diesel fuel (BDF) from oil seeds. Our research data showed that the extracted oil was not contaminated with radioactivity, therefore, we can convert

the oil to bio diesel fuel like the economic policy in Germany and other European countries. We believe the use of fuel will be very effective for the local residents in the region because it could be used for the agricultural tractors, cars, and public transportations like school buses.

In the meantime, a Japanese company, MSD Co., Ltd. in Tendo city, constructed a bio diesel fuel plant in Yamagata prefecture. The company showed a great interest in our project and decided to help us. However, we are worried about several problems. For example, it will be a long journey from Japan to the port Odessa, Ukraine, sending the BDF plants and other relief goods by ship might meet with any accident. Also, we hope to pass through the law and customs of Ukraine without taxation as a relief.

### **Producing Biogas**

The other purpose is to produce biogas. After producing BDF, there will remain oil cake and botanical mass. These materials can be used to make biogas such as methane for fuel or electricity, which will be self-sufficient energy in the district. After producing biogas, we have to deal with the residue that contains a hint of radioactivity as radioactive waste. The experimental plant for that purpose was already designed in Japan by one of our members, a specialist of bio-energy. This is a starting stage before constructing a plant with our colleagues in Narodichi. Because very few biogas plants exist in Ukraine; there are a lot of problems we have to tackle with.

If the project progresses well, it will contribute to the regional economy, not only the agriculture section but also the industry in general. It will be obviously good also for the ecological problems such as global warming. We aim to make good use of bio energy for the victims to improve their lives. We should strive to develop our research and discuss with the local people how to use the new energy. We are going to continue this project for 5 years. Then after the project the equipments will be passed to the Ukrainian side.

### **Social and Economical Reconstruction and Development Programs of Narodichi District**

The local economy in Narodichi district greatly depends on the subsidy from the central government. There is a program “Social and Economical Reconstruction and Development Program of Narodichi District” to improve the self-governing economic capabilities. The crucial problems are stable employment, improving and reconstructing the lives of the people.

It is proposed that the contaminated land should be divided into 3 areas; preservation area, forest-land, and farmland by radioactive contamination. In the farmland, new job opportunities will be created for growing rapeseed and producing BDF. Creating new economic opportunities is not our main purpose, but we are heading, as a result, toward the same direction of improving the peoples’ lives.

The problems about social infrastructure are to repair of schools, kinder gardens, clinics, gas equipment in villages and so on. They are problems partly once we have supported. The head of administration said, “We are not unhappy and not poor in this district basically.” They have some ideas and plans by themselves, but they are appealing for economic assistance for the resource. The stagnation of this district for these 21 years did not turn around, so it is difficult to do everything at a burst.

We hope that our project will become a model for the step to revival of Narodichi district. We believe it will be able to open up a hopeful vista in the future for the local administration as well as for the people.

### **With the same dream of revival in Narodichi district**

So far we, Chernobyl-Chubu Association have supported the people in Narodichi by the ways as we thought better at the time. So our organization was occasionally requested for our activities like a



Farmer family and horse carriage

relief store. At the same time, we could not have a good grasp of the local situation nor the proper process of assistance. Frankly speaking, we experienced stresses with counterparts. Sometimes our relationship was not understandable each other. Recently, partly because of business recession, donation from Japanese citizen to our finance is decreasing. It brought us relying on official subsidies to maintain our activities. This tendency is not good both for our mentality and financial balance for retaining our identity and autonomy as a non-governmental organization.

In such a situation, the NANOHANA project is now attracting interests of many Japanese citizens who want to share the same dream of the project reviving Narodichi district as well as helping the people to find hope in their future.

The project is going on for 5 years, and it needs finance about 43,000 thousands yen. We could already collected half of it as donations from many citizens and as a subsidy from Japan Postal Office in 2007. But we have to continue raising donation, always appealing to people to share the dream of NANOHANA project. Instead of the current scenery with sparse people on the street and lots of ruined houses, we wish to revive Narodichi district as it was in the previous days where people come and go lively and children are cheerfully smiling.