



Name	AATKA JAMIL
Current workplace	Pakistan Agriculture Research Council (PARC)
Current position	Scientific Officer

## A. Introduction

### 1. Could you mention about your responsibilities at current workplace?

I am working as Scientific Officer at National Agriculture Research Center (NARC) and my main responsibilities are related to research in the field of animal sciences/biotechnology which are as following.

- Designing and execution of different experiments/projects to present/submission to funding sources.
- In-hand practical research trainings in the form of internship to the graduate and post graduate students from various universities on microbiological, molecular biology and animal cell culture techniques.
- Preparation of presentations and posters to illustrate different research activities carried out.
- Writing of research reports and articles for communication and dissemination of research findings.
- To follow any other activity assigned from time to time by the deppt / institutional incharge

### 2. Could you describe the implementation situation of acquired knowledge from Japan at your workplace?

Although my research was not according to my research area at my workplace but overall, I have learned many work ethics from Japan. I have learned the time management and planning is very important before execution of any idea or project. I am now trying to follow these at my workplace.

### 3. Could you explain how your study field in Japan fits with the current development issues in Pakistan?

My research field in Japan was organic farming and enhancement of water efficiency used for plant growth, especially vegetables. While we adopt new methodology in agriculture it is also important that these methods should be safe for human as well as for environment. My study field in Japan was directly related food security because we need to adopt different methods to improve production of agriculture products.

## B. Summary of Master Thesis

Field of Study in Japan : Advanced Life Sciences

University Name in Japan : Ritsumeikan University

Title of thesis: Efficiency of functional water on soil environment and plant growth

### Summary

There are about 1.5 million species of organisms on Earth, and water is an essential substance for all of them. Due to growing population, development, and ecological changes competition for water resources is increasing day by day, among all sectors agriculture is the main consumer of water resources, which is about 70% of total useable water. For survival of plants most important factors are light, air, proper temperature, soil fertility and good quality water. Inorganic substances dissolve in the water contained in the liquid phase of this soil and are absorbed by plants through the roots, so it is thought that there is a difference in plant growth by changing the water.

Due to water scarcity scientists are now trying to improve the productivity of irrigation water by treating it by different methods. This type of special treated water called functional water. Examples of functional water include electrolyzed water, ozone water, nanobubble water, sonic water, laser irradiation water. They are classified into various types according to the method of water treatment and activation. When functional water is treated and activated by various methods, its properties such as pH, dielectric constant, and dissolved oxygen (DO) amount change. It is said that this change in water quality may impart features such as strong bactericidal activity, high detergency, and crop growth promoting action. Previous studies have demonstrated that the use of functional water, is more effective than groundwater in controlling soil microorganisms, controlling diseases and pests, and promoting plant growth. Water and soil both play important role in quantity and quality of food produced by plants, but soil environment is also very important. Subsequently, we should try to improve our irrigation and soil management system for the maintenance of soil environment and material circulation.

Therefore, the purpose of this research was to verify the effect of functional water on the plant growth and microorganisms, while another objective was to evaluate the soil environment and soil health by analysis of samples from agricultural fields of Pakistan. For this purpose, soil samples from agriculture fields were compared to the Japanese SOFIX (soil fertility index) standards.

The findings of research indicated that functional water have good impact on plant growth (spinach, bell pepper and Japanese mustard) and also it enhanced the microbial growth in soil as well as in culture medium. The other experiment revealed that the soil samples from Pakistan, agriculture field were low in eDNA, nitrogen and phosphorus circulation, which may be due to intensive use of chemical fertilizers.



### C. Future Plan

As I previously mentioned my research area in Japan was little bit different from my current job, but the methods or approach used or learned from Japan will be very helpful for me. Being JDS fellow, I got a chance to interact with multidisciplinary and multinational fellows. In future I am planning to write a research project by utilizing the knowledge I gained from Japan. I have also plan to purse my PhD studies.

### D. Photo

Please send **your best two** pictures on your academic and daily life in Japan (JPG format)

