

Group Training Program

Soil Diagnosis Technology for Sustainable
Agricultural Production and Environmental
Conservation

May 7 – July 25, 2014

Participants

- Mr. BAHRAMI Mohammad Naser, Afghanistan
- Mr. TAN Chantara, Cambodia
- Mr. DOMINGUEZ PALACIO Duniesky , Cuba
- Mr. SHALA Shkumbin, Kosovo
- Mr. MSOWOYA Boyd Alexander, Malawi
- Ms. BAYALAS Elvira Bautista, Philippines
- Ms. PEREIRA Maria Clarinda, Mozambique
- Mr. MOHAMMEDALHASSAN Mohammedalhassan Ali, Sudan

Some occasion in this course



History of this course

- Soil Analysis and Soil Improvement (1989-1998)
Prof. Y. Kondo, Y. Matsuda, R. Kondo
- Soil Diagnosis and Environmental Conservation (1999-2003)
Prof. K. Kikuchi
- Soil Diagnosis and Conservation (2004-2008)
Prof. K. Tsutsuki
- Soil Diagnosis Technology for Sustainable Agricultural Production and Environmental Conservation (2009-)
Prof. K. Tsutsuki

Background of this course

- Tokachi is a center of upland crop and dairy agriculture in Japan.
- Various research institutions for agriculture are assembled in Tokachi.
- Tokachi is the most advanced area of the agriculture based on soil diagnosis.
- Advanced technology and sustainability in agriculture are both sought for in Tokachi.

Purpose of this course (1)

- Participants will learn the skills necessary to observe and diagnose the arable soil in the field.
- Learn the skills to perform basic soil analysis (physically, chemically, biologically).
- Learn the skills of using and preparing good quality compost.

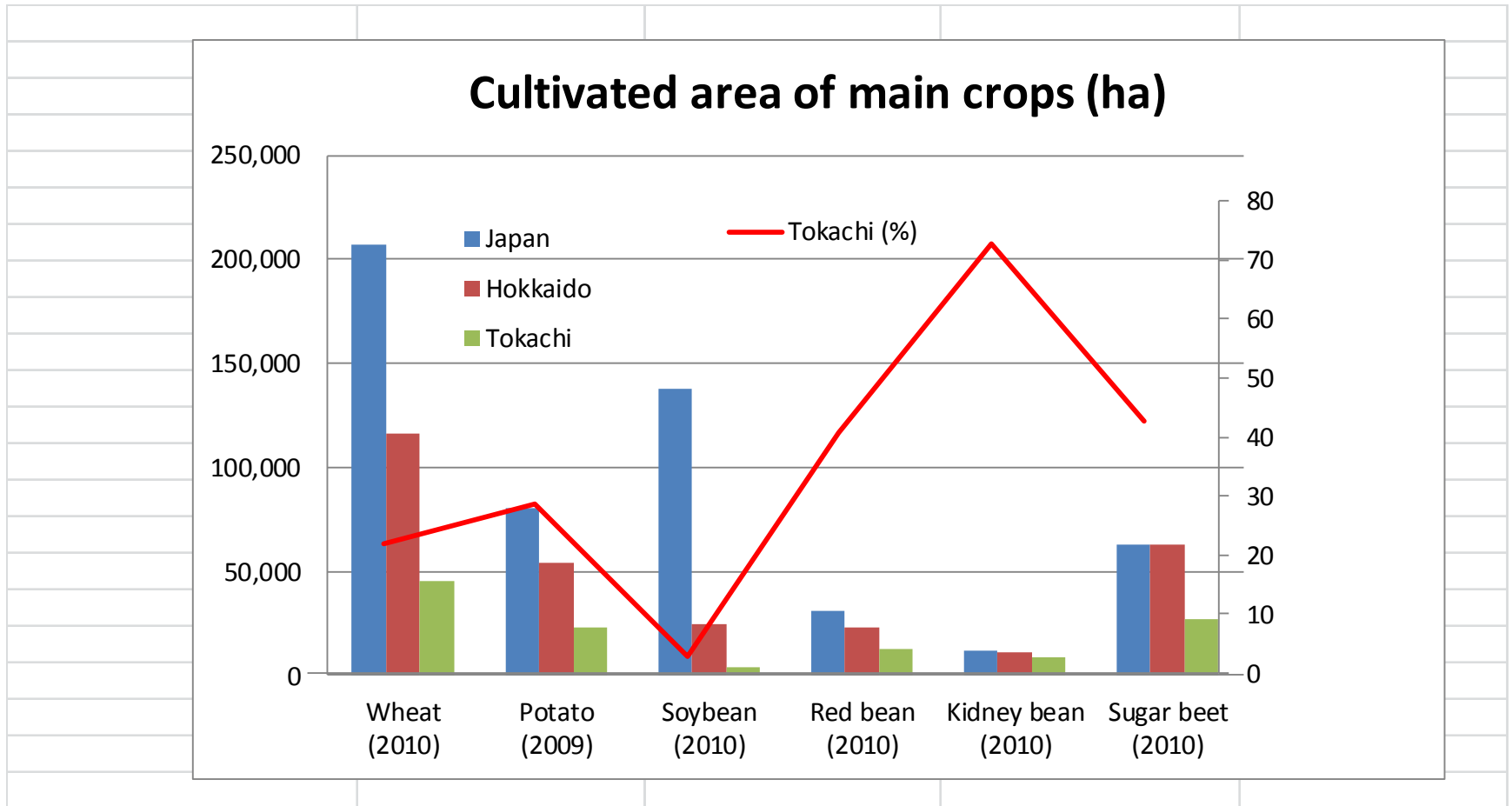
Purpose of this course (2)

- Participants will deepen the fundamental knowledge on characteristics and functions of the soil for agriculture and environment.
- Participants will prepare the activity report (interim) of this course, and extend the acquired knowledge and skills to the colleagues and farmers in their home country.

Cultivated area (ha) of Major Crops

Crop	Japan	Hokkaido	Tokachi	Tokachi (%)
Wheat (2010)	206,900	116,300	45,300	21.9
Potato (2009)	80,100	54,400	22,900	28.6
Soybean (2010)	137,700	24,400	4,010	2.9
Red bean (2010)	30,700	23,200	12,500	40.7
Kidney bean (2010)	11,600	10,800	8,440	72.8
Sugar beet (2010)	62,600	62,600	26,800	42.8

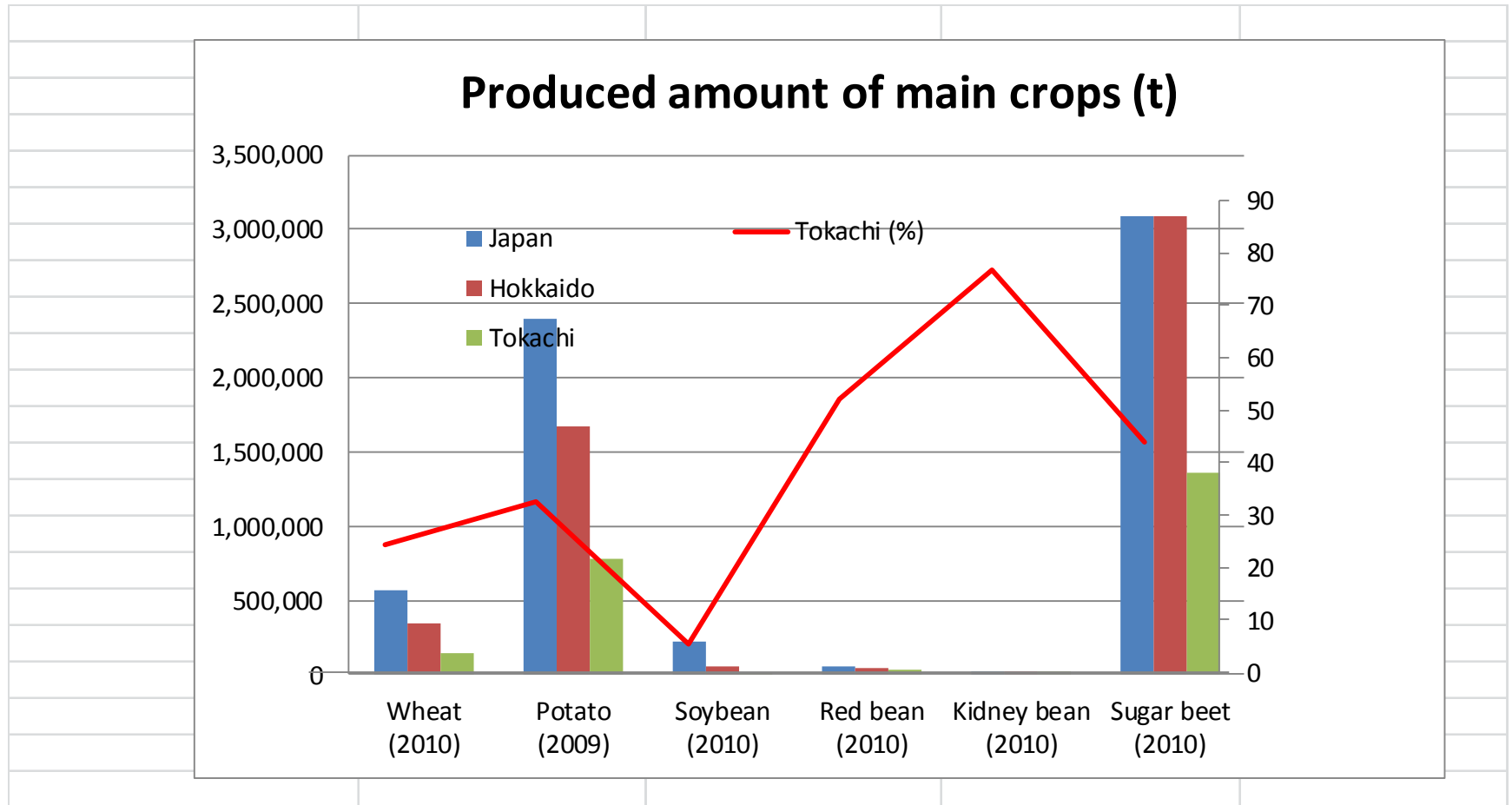
Cultivated area of main crops



Produced amount (t) of Major Crops

Crop	Japan	Hokkaido	Tokachi	Tokachi (%)
Wheat (2010)	571,300	349,400	138,400	24.2
Potato (2009)	2,398,000	1,673,000	776,900	32.4
Soybean (2010)	222,500	57,800	11,900	5.3
Red bean (2010)	54,900	48,700	28,600	52.1
Kidney bean (2010)	22,000	20,700	16,900	76.8
Sugar beet (2010)	3,090,000	3,090,000	1,359,000	44.0

Produced amount of main crops (t)



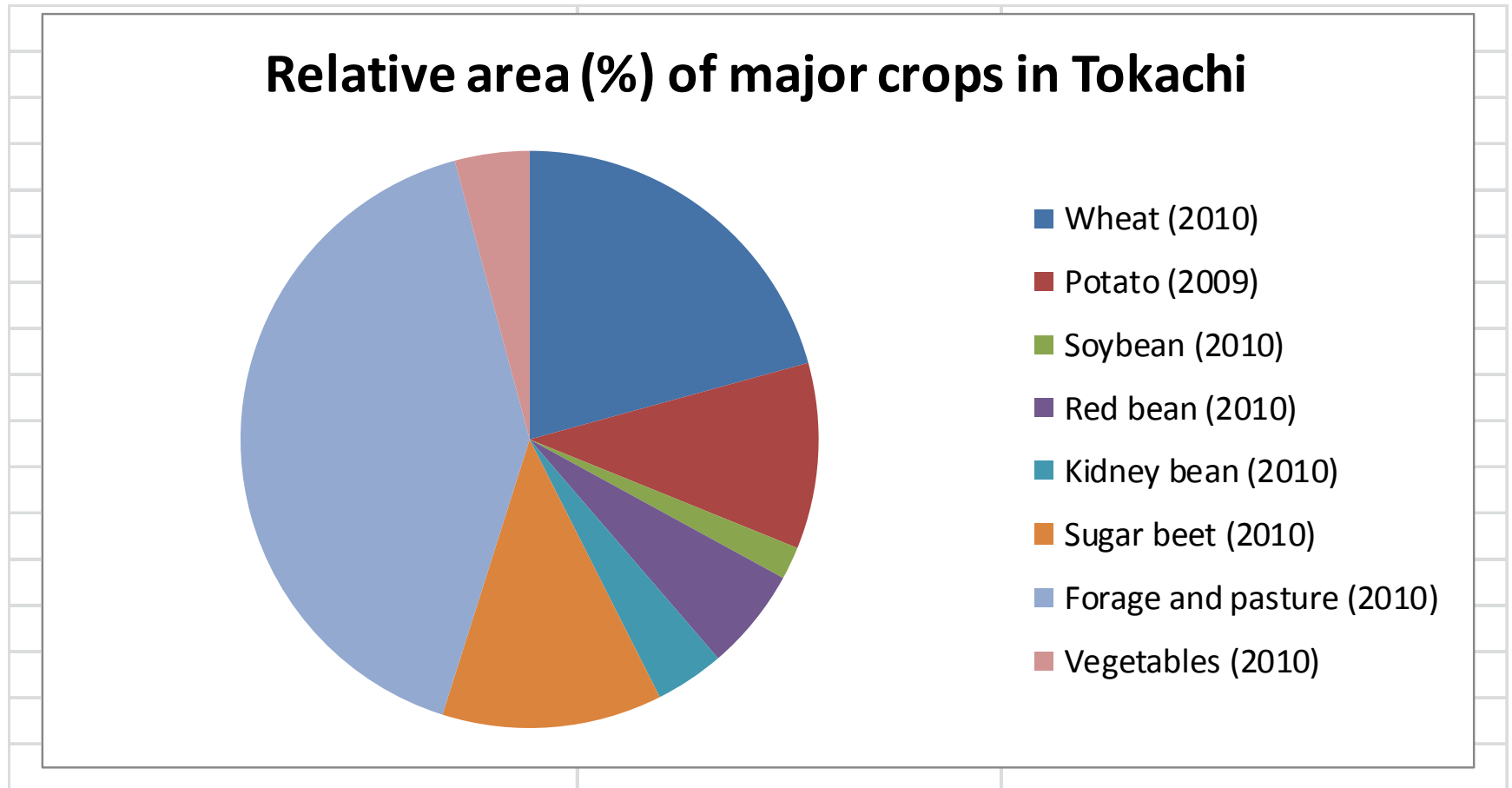
Wheat field in April



Cultivated area (ha) of major crops in Tokachi

Crop	Tokachi	%
Wheat (2010)	45,300	20.7
Potato (2009)	22,900	10.4
Soybean (2010)	4,010	1.83
Red bean (2010)	12,500	5.72
Kidney bean (2010)	8,440	3.86
Sugar beet (2010)	26,800	12.3
Forage and pasture (2010)	89,500	40.9
Vegetables (2010)	9,120	4.17
total	218,570	100

Relative area (%) of major crops in Tokachi



Planting Potato (April 30, 2007)



Planting sugar beet (April 30, 2007)



What is Soil Diagnosis

- We diagnose physical and chemical problems and constraints in the crop production by the method of field soil investigation and laboratory analysis of soils.

Practice of Soil Diagnosis



Field



Laboratory

Environmental conservation

- Environmental conservation has become another purpose of soil diagnosis, because environmental pollution as a result of agricultural practice has become serious.

Negative Effects of Agriculture

- Pollution
Chemical fertilizers, Animal feces,
Pesticides
- Decrease in natural environments and wild lives
- Decomposition of organic matter in soil and vegetation
- Increase in atmospheric CO₂
- Soil compaction

Prevent soil pollution and ground water pollution by soil diagnosis

- By soil diagnosis, we can clarify the actual nutrition status of soils.
- Then we can plan the application rate of fertilizers according to the carrying capacity of the environment in order to prevent soil pollution and ground water pollution.

Various Curriculums

- So that you can learn the principle and application of soil diagnosis, we provide you various curriculums by many lecturers.

Lecturers

- Lecturers are from various universities (Obihiro, Kyoto, Tokyo), national, prefectural, and municipal research organizations, agricultural co-operatives, private companies, private institutes and farmers.

Sponsors & Supporters

- Japan International Cooperation Agency (JICA)
- Hokkaido International Center (Obihiro)
- Universities and Institutions
- Private Companies
- Obihiro City
- Obihiro Citizens and Farmers

Let's do our best together

- We will do our best in teaching and supporting you.
- So, please absorb the best from us.

Goals



1

1) Relationships between agriculture and weather, terrain, and soil conditions.



2

2) Soil diagnosis to achieve the stable production of high-quality agricultural products.



3

3) Proper management and dissemination toward sustainable agriculture.



4

4) Formulate extension plan (Interim Report) on dissemination of technology.

History of Agriculture in Tokachi

- By Prof. K. Tsutsuki
- May 9 (Fri., morning)

Obihiro Centennial Musium



May 9 (Fri, afternoon)

Contents of this course



Courtesy Call on the Mayor of Obihiro City (May 12)

Presentations (12. May)

- Inception Report

What is your responsible job in your country.

What problem do you want to solve?

- Country Report

Feature of Agriculture in your country.

Characteristics of soils in your country.

Soil related problems in your country.



Theory of soil diagnosis



- Purpose
- History
- For Sustainable Soil Diagnosis
- Understanding the situation of agriculture in your country

by Prof (emer.) K. Kikuchi (Obihiro University), Dr. Y. Yokoi, Mr. H. Inamura

13. May – 16. May at OBIC



4 Project Cycle Management

- **PCM method** is a tool for managing entire cycle of a development project – from planning and implementation to evaluation – by means of a project format termed the **Project Design Matrix (PDM)**.
- **19 – 20 May**

PCM

- PCM training will help you make your problem and purpose clear.
- It will guide you how to achieve your goal.
- This will also help you preparing **the Interim Report** which is required to fulfill the training course.

PCM



Introduction of the actual methods in soil diagnosis projects

By Dr. Yoshio Yokoi and Mr. K. Ohbuchi

May 26 – May 30



1

Characteristics and problems of tropical soils

- Agriculture and Soil in Africa
by Prof. Araki (Kyoto Univ.)

May 21

Lecture by Prof. Araki



Prof. Araki

1

2

Characteristics and problems of tropical soil

- Characteristic and Problems of Tropical Soil
- Soil diagnosis and Environmental Conservation in Tropical Region

by Prof. Kosaki,
Kyoto Univ. at OBIC

May 22-23.



1

2

Discussion on the agriculture in each participants' country

- Discussion Adviser:
Prof. Kosaki, Kyoto
Univ. at OBIC

May 23





2

Application of soil diagnosis

- Soil Survey Method
- Soil Map Making
- Soil Profile Survey (Field Training)
- Discussion
- Lecture on soil pollution by agriculture

by Dr. K. Kikuchi , Dr. Y. Yokoi, Mr. K. Ohbuchi

May 26-30 in farmers fields and in OBIC

Laboratory Practices

- Soil Physical Analysis
 - (1) Principal
 - (2) Applicational
- Aquatic Environment Analysis
(Lecture and Practice)
- Soil Chemical Analysis
- Organic Analysis



Physical properties of soil and its application

- Importance of physical properties in soil diagnosis
- Three phases distribution and density
- Soil water permeability
- Soil erosion
- Meteorology and Agriculture

Lectures and Practice by Profs. Tsuji, Muneoka, and Kimura (Lab. Agricultural Engineering, Obihiro Univ.)

June 2 -6

Soil Physics Experiment



Visit Dairy Farm



Hirose Farm in Obihiro, July 9
(morning)

Visit Soil Diagnosis Lab

- Briefing on Soil Diagnosis Project in Tokachi (by Mr. H. Inamura)
- Visit Tokachi Federation of Agricultural Cooperatives (by Mr. T. Okazaki)
- June 9, afternoon



Advanced Facilities for Soil Diagnosis (June 9)





2

Chemical Analysis and Evaluation of Compost

- pH, EC, CEC, available phosphate,
- Exchangeable cations

by Assoc. Prof. M. Tani

(Lab of Soil Science, Obihiro Univ.)

June 10-13 at Obihiro Univ.

Soil Chemistry Experiment





Interim Report Preparation Guidance and Discussion- 1

- By the course leader,
K. Tsutsuki
- 16. June
- Interim Report =
Manageable plan to
extend soil diagnosis
in your country
- Using PCM
methodology





Physical properties of soil and its application

- Soil Analysis Method for Physical Properties
(Application Training)

Lectures and Practice by
Dr. K. Niwa
(Zukosha Co. Ltd.)

June 17

Dr. Niwa, Zukosha Co.





2

Soil analysis method for chemical properties and its application

- Analysis of C/N ratio for manure
by Assoc.Prof. Tani
(Lab of Soil Science, Obihiro Univ.)
at Collaborative Research Center, Obihiro
University

June 18 – 20

Sample weighing for CN analysis



Party with soil lab members

