Please download
a handout on your PC

00160・・・DDC

http://www.iai.ga.a.u-tokyo.ac.jp/mizo/lecture/noukoku-1/mizo12-2.pdf

June 15, 2012
農学国際特論Ⅰ

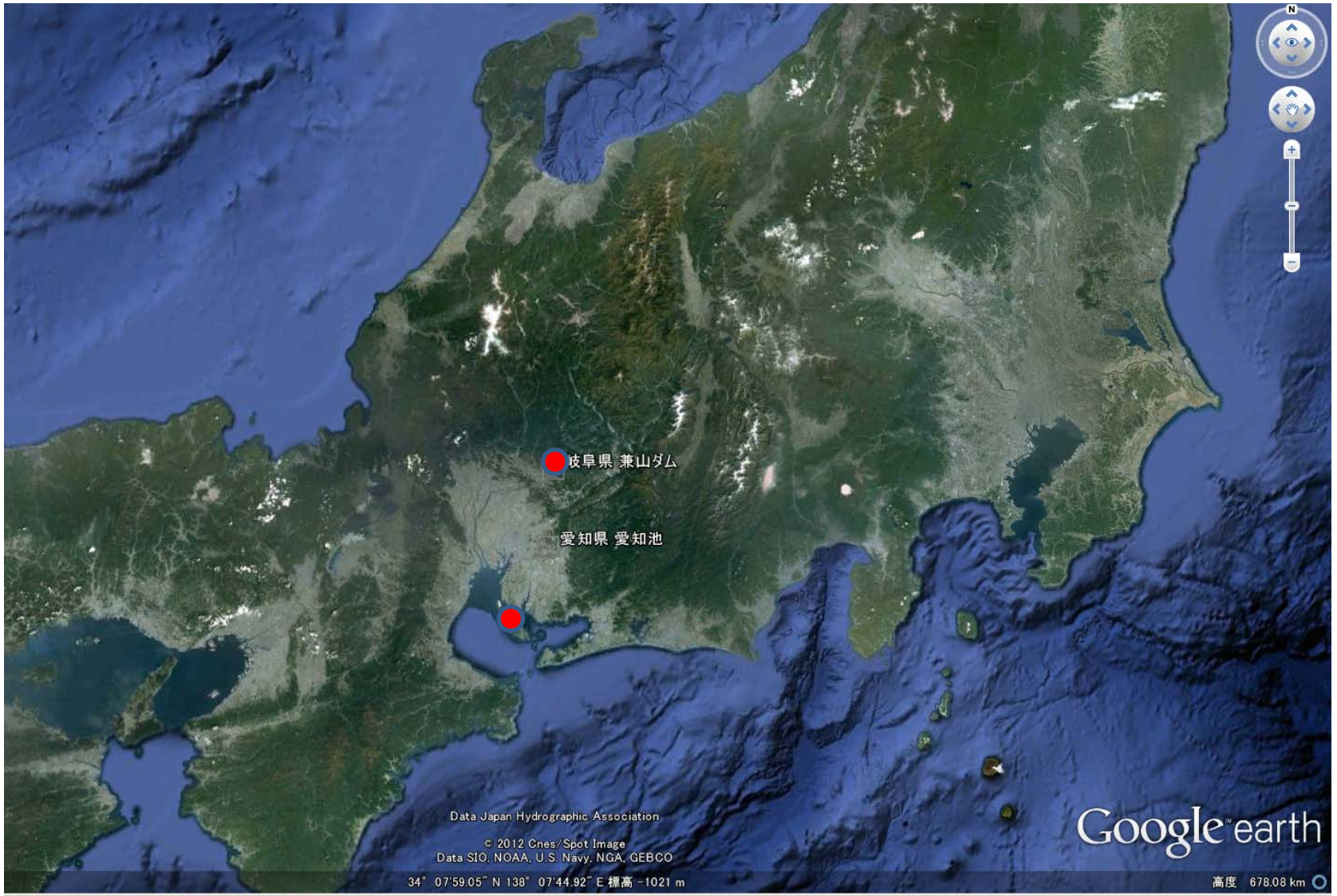
農業生産･基盤整備
Production Technologies (2)
-Production system, Infrastructure, Irrigation-

東京大学 大学院農学生命科学研究科
農学国際専攻　国際情報農学研究室 溝口　勝

Masaru Mizoguchi,
Lab. of International Agro-Informatics, Graduate school of Agricultural and Life Sciences, The University of Tokyo

What is this?

TOYOTA is leading Japan ?



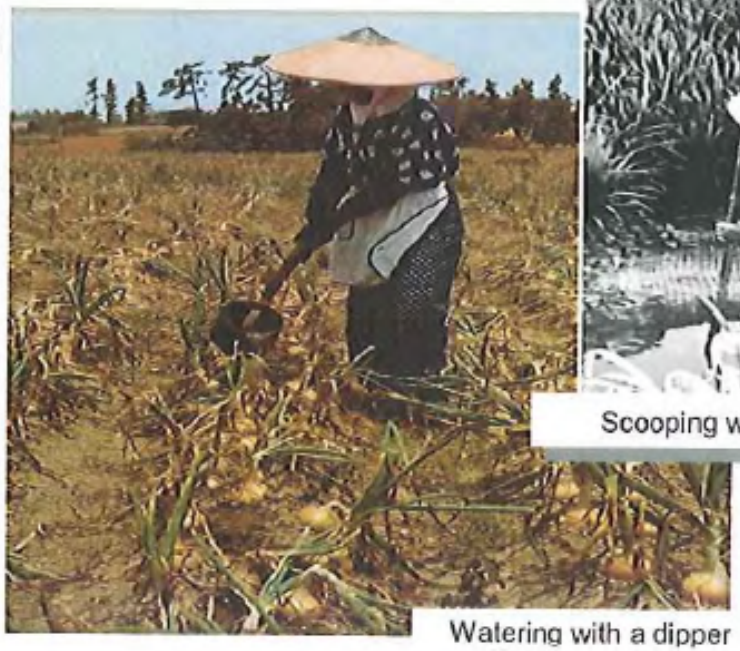
Before the Project

1) Frequent droughts

With no perennial river to draw water from, farmers would depend on unpredictable rainfall and numerous ponds.

13,000 ponds in 33,000 ha of the project area

Watching on the night



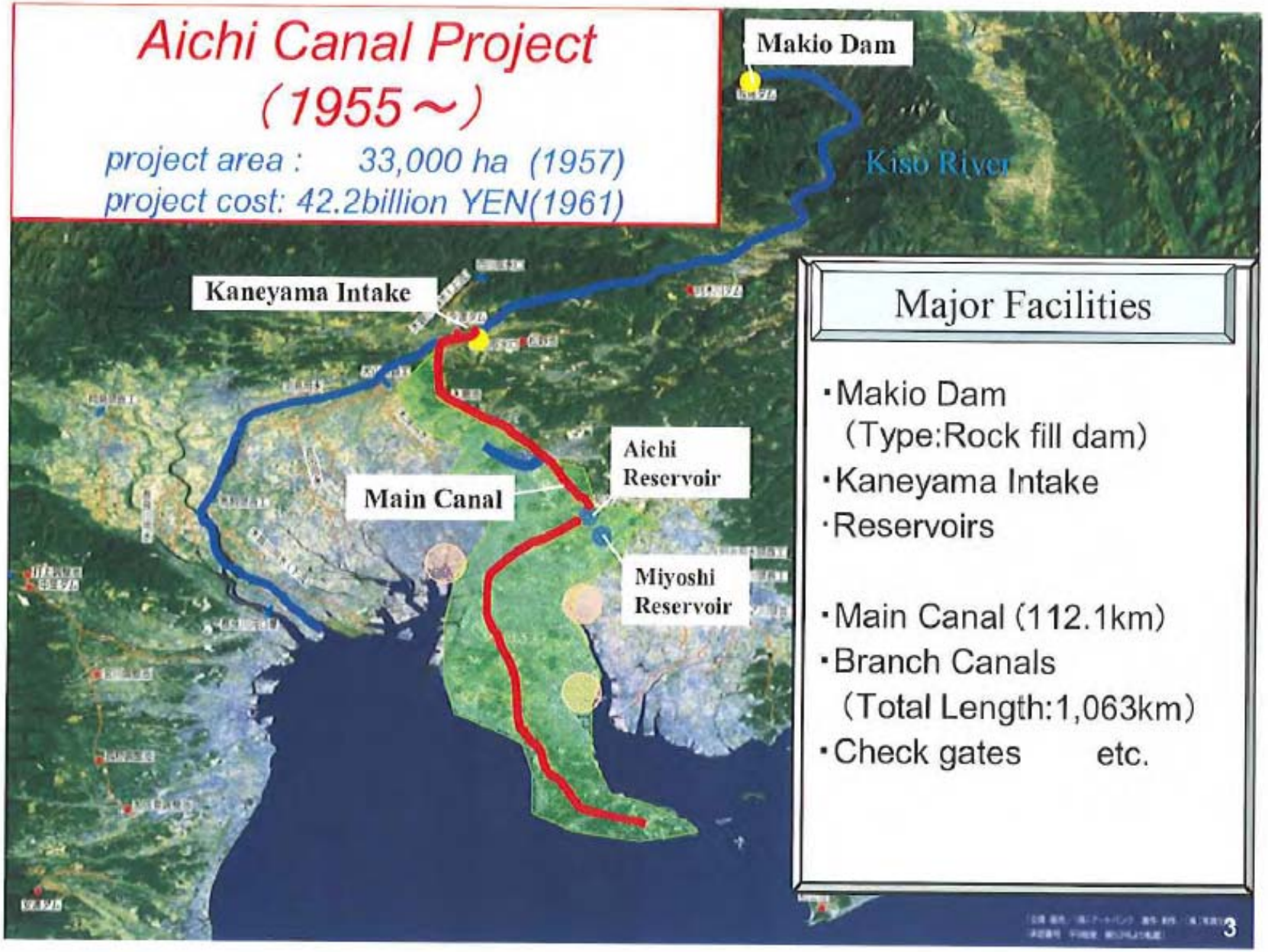
Watering with a dipper

Scooping water from a well

4

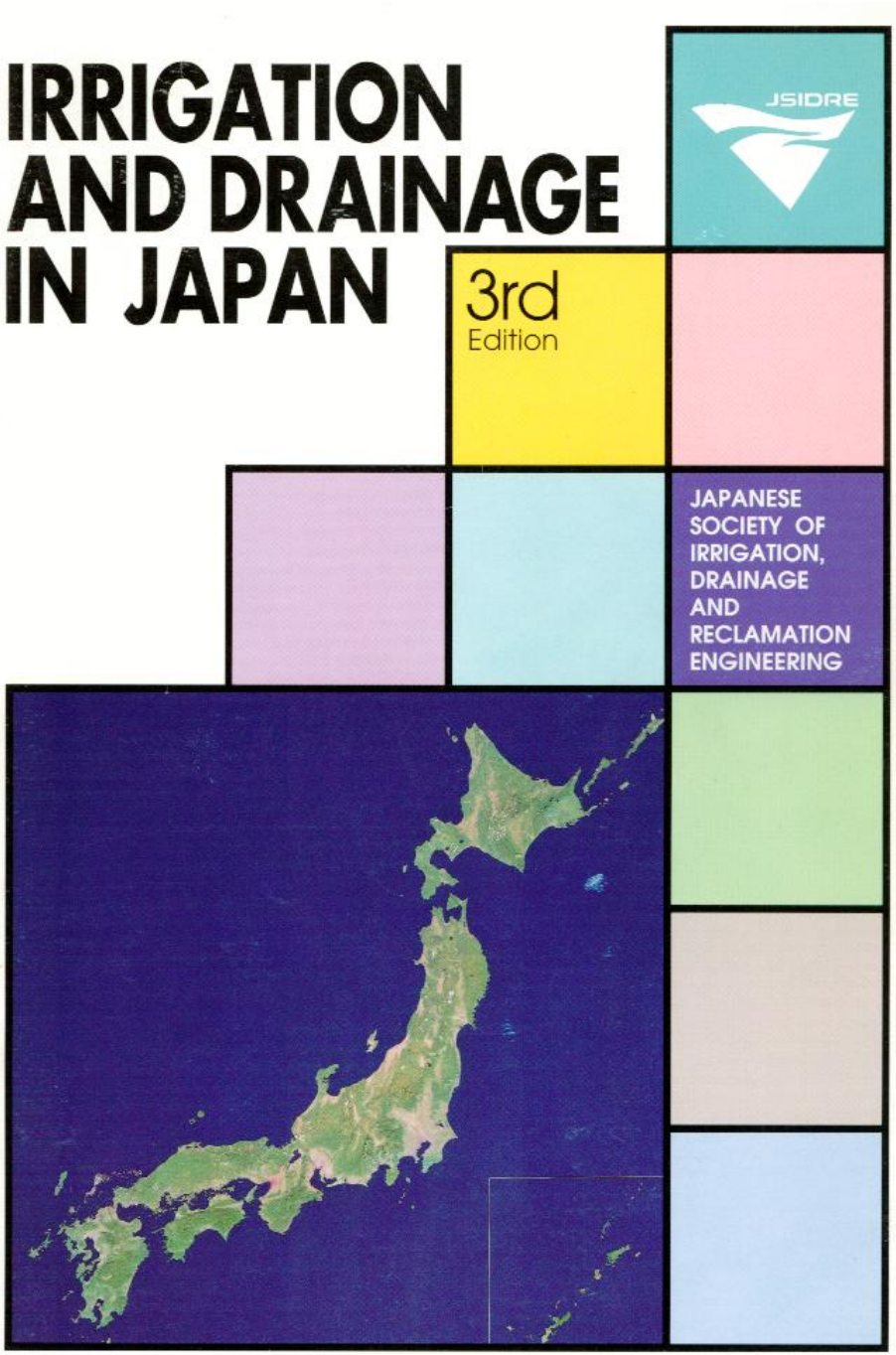
After the web page of 愛知用水総合管理所

Why & how did this area develop?



After the web page of 愛知用水総合管理所

Project-X



Contents (1)

Contents (2)

Contents (3)

IRRIGATION AND DRAINAGE IN JAPAN

- Land Improvement Projects
- Related Organizations
- International Cooperation
- Miscellaneous

JSIDRE (1995)

Definition of Japanese land improvement projects

- MAFF(Ministry of Agriculture Forestry and Fisheries) is responsible for projects to cultivate virgin land, develop agricultural land, consolidate agricultural land plots or construct irrigation and drainage facilities
  - including reservoirs, barrages, pump stations, canals, etc. for improving agricultural productivity
  - constructing infrastructures in rural areas as community roads, domestic water supply systems, sewerage systems

- Such projects are called
  - （土地改良事業）“Tochi Kairyo Project Systems“= “Land Improvement Project Systems”
  - （農業基盤整備事業）“Nogyo Kiban Seibi Project Systems“= “Agricultural Infrastructure Improvement Systems"
  - （農業土木事業）"Nogyo Doboku Project Systems" = "Agricultural Civil Engineering Project Systems"

Land Improvement Project (1)
（土地改良事業）

- Land improvement projects are carried out under a law called the Land Improvement Law.
- This law was initially enacted and enforced in 1949.

Purposes and Benefits:

(1) increase land and labor productivities

(2) increase total agricultural production

(3) improve the agricultural structure by diversification

Land Improvement Project (2)

Menu of land improvement:

1. Irrigation and drainage
2. Agricultural land consolidation（圃場整備事業）
3. Farm and rural roads
4. Comprehensive development of non-paddy agricultural land
5. Comprehensive development of rural areas
6. Disaster protection
7. Reclamation of agricultural land（開拓）
8. Reclamation from sea or lake bottom（干拓）

Characteristics of Land Improvement Project in Japan

- Various menus are provided in term of contents and benefits of facilities
- The main body to implement a land improvement project is either the national government, a prefecture, or a Land Improvement District
- The costs of land improvement projects are paid by the beneficiaries
  - Part of the costs is paid by the farmers who are the direct beneficiaries
- Facilities to be constructed by projects of the same type have to be standardized throughout the country
- "Cost Benefit Ratio" (BC Ratio) is used as the criterion to judge the economical feasibility of land improvement projects

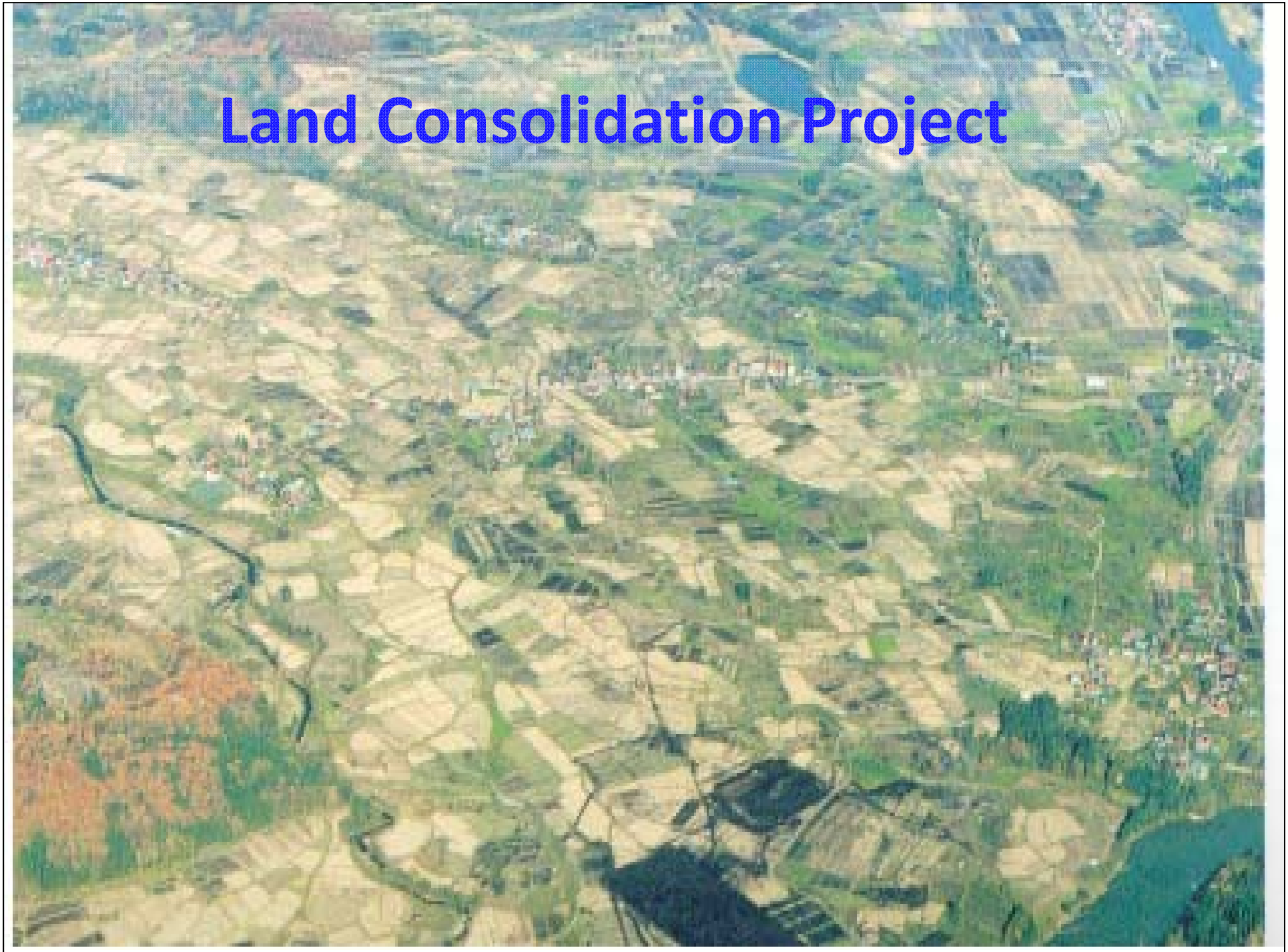
Water rights

progress of urbanization and diversion of water rights

- The economic growth and progress of urbanization have caused diversion of a large number of paddy fields into housing, office or factory land lots.
  - As a result, it was thought best to divert some of the water for irrigation to water for the newly born cities.
  - In Japan an approval from the Ministry of Construction has to be obtained under the River Law to divert water rights.

- Diversion for irrigation prior to 1896 when the River Law was enforced was considered a traditional water right (慣行水利権), already approved at the time of enforcement.
  - The water rights of irrigation groups with a long history have been legally recognized.
  - In view of the definition under the River Law that river water is a public asset, irrigation groups are prohibited to directly sell their water rights to cities

Land Consolidation Project



Standard Plot Size
（標準区画）

- Plot Size：
- From around 1965 to recent years, a plot of 0.3 ha（3反区画）has been considered a standard size for paddy land consolidation projects.
- Basic size is 100 meter long and 30 meter wide. With a farm ditch, farm drain and farm road along the shorter side.
- Recently, land consolidation projects have started to make plots of at least 0.5 ha in order to use farming machinery more effectively and also in order to improve capital and labor productivities.

Standard Paddy Field Layout after Consolidation

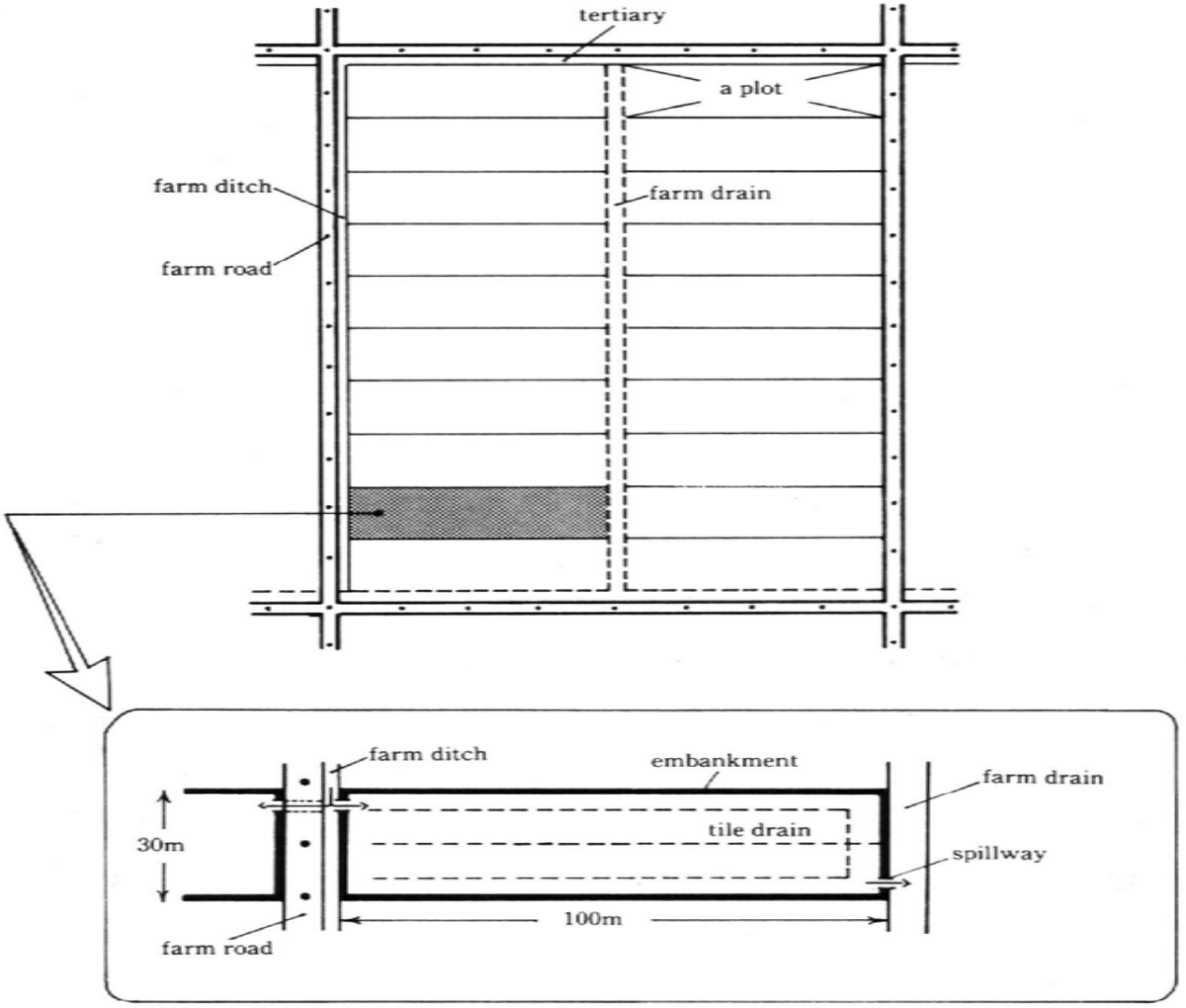


Figure 7 Standard paddy field layout after consolidation.

講義の要点

- Agricultural Infrastructure Improvement s are public work projects
  - Application projects
  - Need Consensus building
  - Take a long time

- Fundamentals of Agricultural Engineering
  - Comprehensive agricultural development technology
  - Management of soil and water
  - Improvement of QOL supported by the technology
  - Interaction between urban and rural areas

References
参考書

- http://www.water.go.jp/chubu/aityosui/a(jyouhou-sub)/06(english)/a_06.html
- IRRIGATION AND DRAINAGE IN JAPAN (3rd Edition), International Affairs Commission of The Japanese Society of Irrigation, Drainage and Reclamation Engineering (1995)

Homework
レポート課題

- Summarize today's lecture within 200 words and write your impression of the lecture.
- Deadline: June 20
- To : report@iai.ga.a.u-tokyo.ac.jp
- Subject: your name (Mizo)

- 本日の講義を400字以内に要約し、講義の感想を書きなさい。

Paddy Rice Varieties (1)

Rice Varieties:

- The paddy rice varieties being grown in Japan are the Japonica varieties, grains of which are short, roundish and sticky.
- Owing the improvement of varieties, more than 10 t of unhulled rice（籾米）yield per hectare can be harvested.
- Yield is measured by brown rice（玄米）yield in Japan, though it is generally measured by unhulled rice yield internationally.
- The conversion rate unhulled : brown : milled
  - Indica rice 100 : 72 : 65
  - Japonica rice 100 : 80 :72

Paddy Rice Varieties (2)

- During the past one hundred years, the paddy yield has achieved a drastic increase from 4 t /ha to 10 t/ha.

Reasons:

- Improved quality and increased application of fertilizer and pesticides.（肥料と農薬）
- Modified and improved varieties, which are not collapsed by a heavy application of fertilizer（耐肥）and produce a higher yield, or which are highly resistant to low temperatures（耐寒）.
- Implementation of land improvement projects, which are effective against drought, flood and water logging（湿田）.