

# Irrigation Revisited

An Anthology  
of  
Indonesian-Dutch Cooperation

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1965 – 2014

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Edited by

*PROF. IR. J.H. KOP, DR. W. RAVESTEIJN, K.J. KOP*



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On the cover: Katulampa, fixed weir on the Ciliwung River, built in 1911, with outlet to the Oosterslokan, now called Kali Baru Timur (New Eastern River). Photograph by Jan Kop, 1976

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# I

## Irrigation Revisited

### Introduction and Justification

J.H. Kop

This book is not an all embracing scientific book of reference about irrigation and irrigation projects in Indonesia, for which the need is high by the way.

By its confined content – limited to the description of the rehabilitation and creation of some selected irrigation projects with Dutch assistance during the period 1965 to 2010 – it is yet meant as an additional source of information regarding the birth and development of Indonesian irrigation schemes and it may serve as invitation and challenge to the present-day Indonesian historians to write the complete story of the 1.5 millions hectares of “technically irrigated” areas in Indonesia.

This book owes its existence to dr. ir. Suyono Sosrodarsono, former Director General of Water Management (1966–1982) and subsequently Minister of Public Works (1983–1988).

In February 2013 a delegation of Dutch technicians working in Indonesia<sup>1</sup> handed over the book “For Profit and Prosperity”<sup>2</sup>, a book about the Dutch contribution to public works in Indonesia during the period 1800–2000, to dr. ir. Suyono Sosrodarsono. In that book reference is made to his person, activities and importance to Indonesia.

In his expression of thanks, dr. ir. Suyono noticed that – perforce – important information was missing in the book, especially in the field of irrigation, and he suggested that Dutch participants of the irrigation projects in Indonesia during the era 1965–2010 should provide that information by putting their memories on paper.

1 Messrs. W. Vos, V. Coenen, A. Hekman and L. Valkenburg.

2 Edited by W. Ravesteijn and J.H. Kop. 2008, ISBN 9789059942219.



*Dr. ir. Suyono Sosrodarsono receiving the Delegation*

This suggestion has been adopted. Again – perforce – it does not give the fully needed information. Actually, it is nothing more – but also nothing less – than a representative *anthology*. Moreover, it derives its authenticity to the fact that the authors of the various chapters actually participated (“in the field”) in the described irrigation schemes.

The book “For Profit and Prosperity” merely gives an overview of irrigation and irrigation schemes in Indonesia. In his thesis “De Zegenrijke Heeren der Wateren” (The Auspicious Lords of the Waters) dr. W. Ravesteijn gives special attention to the genesis of the irrigation works on Java and Madura. Unfortunately no English translation of this thesis is available, yet. However, “Fighting an Economic and Moral Depression: Dutch Irrigation Engineering in the Tangerang Plain, West Java” – another product by dr. W. Ravesteijn (in English) – was considered to offer basic information for a chapter about the rehabilitation of the Cidurian irrigation project. The abridged version has, therefore, been inserted in this anthology.

### About the author

*J.H. Kop* was born in 1930 in Djatiroto, East Java. He graduated in civil engineering (irrigation and water power) at the Technical University Delft, the Netherlands, in 1957. He started as a FAO-assistant expert in East Pakistan (Bangladesh) on the Multipurpose Ganges-Kobadak Project and he joined the consulting firm Grontmij from 1961 till 1980, working on numerous projects, including the 1973 Master Plan

for Drainage and Flood Control of Jakarta. From 1980 till 1985 he was Head of the Planning Bureau of the Dutch Association of Drinking Water Companies (VEWIN) and in November 1984 he was appointed as full time professor at the faculty of Civil Engineering of the Technical University Delft covering the discipline of public health engineering (sanitary engineering). He retired in 1993. Together with dr. W. Ravesteijn he edited the book “Bouwen in de Archipel” (2004), about public works with a “Dutch signature” in Indonesia during the period 1800–2000, to be followed by its translation “For Profit and Prosperity” (2008).



# Learning the Art: the Dutch Contribution to Irrigation in Indonesia

W. Ravesteijn

This chapter has been mainly derived from Wim Ravesteijn's dissertation "*De zegenrijke heeren der wateren. Irrigatie en staat op Java, 1832-1942*" (The Auspicious Lords of the Waters. Irrigation and the Colonial State on Java, 1832-1942); Delft University of Technology, Delft University Press, 1997.

It was during the first half of the nineteenth century that Dutch engineers started constructing irrigation works, notably by creating barrages (mainly fixed weirs) in rivers with existing irrigation systems. Often, these works replaced Javanese structures or those constructed by the local colonial administration with the help of forced labor. The local people used to make their dams from wood and stone, and their structures were, therefore, temporary. Each year, when the rainy West Monsoon season came, these dams would either be washed away or seriously damaged. The works constructed by the colonial authorities, though bigger than the traditional structures, were just as vulnerable, and so, they also had to be perpetually renovated and reconstructed.

The engineers aimed to erect permanent works. At first, they also used wood, but gradually, they introduced more durable materials, such as brick and concrete. However, a large part of the early engineering works failed. In the monsoon season, the rivers had to cope with a sudden increase in discharge, and therefore, overflowed, making them difficult to control and often causing "permanent" dams to be swept away. The building of a dam in the Sampean River in East Java illustrates this point well. Construction started in 1832. The dam, which was made of wood and stone, was the first piece of irrigation engineering work on Java, and it was not until the turn of the century that the dam in the Sampean Irrigation Area, of some 9,500 ha, finally took shape.



The construction of the Sampean Dam and other similar types of works was a direct result of colonial development policy. In the 1830–1870 period, the so-called Culture System, which dictated that the Javanese should cultivate certain cash crops, was in force. One of the chief crops was sugar cane. This was grown in sections of the rice fields (*sawah*), located in designated areas, also including the Sampean Delta.

In the 1840s, it was the Culture System, together with all the other obligations that had been imposed on the Javanese, that led to famine in Central Java. Irrigation works were therefore set up to help improve the population's agriculture. The crises also led to the foundation of the Public Works Bureau in 1854. In 1866, its name was changed to The Department of Civil Public Works. Where previously the maximum number of engineers in service was 10, the new service provided work for 35 engineers.

The civil service was responsible for water management and the resident, who was in charge of a region (a residency), was always a key figure, who made most decisions as far as irrigation was concerned. Only occasionally, when faced with complicated tasks, did residents call upon engineers for help. In general, residents and other civil servants considered irrigation improvement as a luxury rather than a necessity. The Dutch East Indian Public Works Authority was able to initiate little change, due to the fact that Public Works simply only answered to the Civil Service.

The Public Works Department was, furthermore, short of finance and personnel, which meant that it was not always able to meet requests for technical support. The engineers, who, in the first place, had been militarily educated and had later received a civil education, had little relevant knowledge. They were highly critical of the irrigation works that had been constructed by the indigenous people and by administrators, but, despite their “scientific” knowledge, their works were not much better, at first.

The engineers aspired to improve their position, and thus, became entangled in a competitive struggle with civil servants. Notably, the engineer H. de Bruyn, who, in the 1861–1877 period was director of the Civil Public Works Department twice, made himself heard. De Bruyn was educated at the Royal Military Academy in Breda (the Netherlands). He linked the creation of modern irrigation works to profit, but also to affluence, progress and civilization. Under his regime, the number of engineers within the Public Works Department rose to 75. Modern irrigation works remained scarce, but qualitatively, they did improve and, partially because of this, the engineers' quest for emancipation finally brought success.

The turning point came in 1885 when, with the introduction of new regulations, the Public Works Department virtually became an independent service. At the same time, however, personnel numbers were reduced and the number of engineers dropped to 39. Public Works was divided into two departments: the General Division and the Regional Division. The residents only kept authority over the engineers in the insignificant Regional Division. The General Division included two already well-known components: the Technical Section and a number of public works departments (set up in 1855). The Technical Section was later broken down into five separate sections for each of the various types of public works. The new verve was apparent from the installation of a third component: the Irrigation Brigade. The Brigade's task was, among others, to pave the way for modern irrigation systems for all rice fields by collecting information on rainfall, drainage and water requirements. A few years later, the brigade was integrated into the Technical Section.

Construction activities increased and, in 1890, were given definite form when the General Irrigation Plan for the island of Java, covering nineteen large projects, was introduced. It was also decided that water management should be classified as "technical". As of 1888, the irrigation departments that were set up were designed chiefly to deal with the operation and maintenance of works. At the same time, water distribution methods were devised.

A good example of this was the implementation of activities in the Pemali area. The engineer A.G. Lamminga, who studied at the Polytechnic School in Delft (founded in 1842 and a forerunner of present-day Delft University of Technology) and went to the Dutch East Indies on the basis of a special regulation to stimulate Dutch engineers to leave for the colony, gave this region a complete irrigation system. He provided 32,500 ha of land with so-called "technical irrigation". An operational plan, that was headed by a water manager who was able to function independently from village authorities, was incorporated. The Pemali Works, with its form of water management became a model for later works. Lamminga, who made his reputation as the founding father of modern irrigation technology in the Dutch East Indies, was professor in Delft from 1910 to 1911, and his subject area was Dutch East Indian hydraulic engineering.

Little attention was given to the economic side of all the irrigation projects, but all that changed in 1897, when the Rentability Commission, which was made responsible for examining the economic feasibility of projects, was established.

This period also marked the beginning of the end of relative autonomy as far as the Public Works Department was concerned. It was not only the engineers that were represented in the Rentability Commission, but also the civil servants, who, because of this, managed to have a big say in irrigation matters again.

The rentability criterion was further extended when, in 1901, the so-called Ethical Policy was introduced. This emanated from the population's situation of "diminished prosperity", a situation that became evident towards the end of the nineteenth century. The new policy was aimed at improving people's welfare, mostly by improving irrigation. The Ethical Policy was connected to a "modernization mission", in which modern technology stood central.

Despite everything, engineers were, once again, required to scale-down. Irrigation endeavors were incorporated into the activities aimed at stimulating small farmers, and this permeated through to rentability considerations. A new group of experts then appeared on the irrigation stage: the agricultural experts, who, after 1905, were accommodated within the Department of Agriculture. They too, had a representative in the Rentability Commission.

The question of the rentability of irrigation works became a sensitive issue at the time of the Solo Valley Works project in East Java. This project was a program concerning the irrigation of no less than 156,000 ha of land, as well as a major river diversion to protect the navigational routes of Surabaya from silting up. After five years, the project was suspended, because budget limits had been exceeded. Due to the fact that the engineers were unable to agree on the economic aspects of the plan and because technical aspects were giving rise to questions, work on the project was later halted altogether. The alternative program focused on reinforcing dikes and excavating reservoirs.

After 1900, because of the Solo incident and because of the Ethical Policy drive, a preference developed for smaller irrigation works. More attention was also paid to irrigation control. In practice, three-cornered discussions started to take place between engineers, administrators and agricultural experts. Another effect of both these things was that public works affairs became decentralized. In the wake of the political-administrative reforms that had been set in motion after the turn of the century, three provinces were formed in Java. Each of these provinces had its own public works service.

In the end, the engineers learned how to work effectively in terms of technique, control and yield-wise. Much of the construction work was carried out in the second

decade of the twentieth century. By about 1920, most of the General Irrigation Plan projects had reached completion and the cost of new projects (including projects outside of Java) had reached an all-time high of around ten million guilders a year. At that time, more than 200 engineers were working for the Public Works Department. Engineers were able to concentrate on perfecting management and specific works.

In order to comply with the increased demand for fulfilling local needs and the availability of local expertise on a scientific level, the Bandoeng Technical University (Bandoengse Technische Hoogeschool) was founded in 1920. The curriculum of the university encompassed civil engineering in general and irrigation in particular. The university had a full professional staff and possessed various technical facilities, such as laboratories. Moreover, a special hydraulic laboratory was founded in Semarang, under the directorship of ir. H. Vlugter, with the main goal to design and improve hydraulic structures in the field of irrigation, such as measuring weirs (the Romijn gate), hydraulically operated upstream control gates and deep stilling basins.

The economic problems of the 20s and 30s inevitably led to expenditure cuts, but also further intensified the perfectionist tendencies of the engineers. A new generation of large irrigation projects started to take shape, ultimately leading to the technical irrigation of about 1.2 million ha of land.

The Dutch contribution to the rehabilitation and renovation of the irrigation projects, during the period 1965–present, was evidently based on research and newly acquired scientific knowledge since 1945.

### About the Author

*Wim Ravesteijn* is an Associate Professor within the Department of Values, Technology and Innovation at TU Delft, and he is affiliated as a Visiting/Contract Professor to both Harbin Institute of Technology and Beijing Information Science & Technology University. He teaches Technology Dynamics, Innovation Management & Impact Assessment from historical, international, socio-cultural and ethical perspectives. His present research is focused on Responsible Port Innovation in China and North-Western Europe. He has published, among others, on water resources development & management in Europe, Indonesia and China.



# The Role of the Legal Framework in Implementing Water Resources Development Projects during the Second Part of the 20th Century

H.H.A. Teeuwen

## 1. Introduction

This book deals with the Indonesian-Dutch cooperation regarding the implementation of water resources development projects in general and irrigation projects in particular during the second half of the 20th century. Almost all authors have a technical background and their contributions are mainly technically oriented. This particular contribution deals with the legislative dimension and it will focus on the legal framework that was developed from the early 1970s with the goal to create a proper legal basis for the planning and implementation of these projects. It concerns the Water Management Act of 1974 and the various implementing government regulations that elaborate on various issues addressed in the act in broad terms only. I also pay attention to the Water Resources Act of 2004 with the goal to outline the new legal framework that was developed in the beginning of the 21st century. My contribution focuses on the following four legal questions:

1. Why was the existing General Water Regulation of 1936 (Algemeen Waterreglement 1936) no longer suitable and was the development of a new act necessary?
2. Was the new legal framework a real alteration of the previous legislation or was there also continuation?
3. What was the role of the new water legislation in the decision-making process concerning water resources development projects in practice? To what extent

was the rule of law-principle (embedded in the new act) guiding the practice of the implementation of the projects?

4. Why was the development of a new legal framework necessary at the end of the 20th century and what are the main features of the new Water Resources Act of 2004?

The assessment of questions 2 and 3 was only partly possible through document analysis. Therefore, I also interviewed some Indonesian officials who were in charge at the Ministry of Public Works during that time. The persons interviewed, were: dr. ir. Suyono Sosrodarsono<sup>1</sup>, mr. (SH) Budiharto<sup>2</sup>, dr. ir. Mohammad Amron<sup>3</sup>, and ir. Budi Santoso<sup>4</sup>. Furthermore, I interviewed ir. Willem van Diest<sup>5</sup>. All of them have provided very useful information for getting a good picture of the legal questions to be addressed in this contribution with regard to the period 1965 to 1998.

The structure of this contribution is the following. It starts with some general background information with the goal to explain the project development approach in the beginning of the second half of the 20th century (Section 2).

Then the Algemeen Waterreglement 1936 will be outlined (Section 3). This is important for answering the question why the establishment of a new legal framework for the water resources was necessary to guide the implementation of the water resources development projects in that period.

The next section (Section 4) outlines the essence of the Water Management Act 1974 and the corresponding implementing government regulations. It then pays attention to the question to what extent there is continuation between the Algemeen Waterreglement and the new water legislation. Section 5 is about the role

- 1 Dr. ir. Suyono Sosrodarsono was the first director-general of the Directorate-General Water Resources, established in 1966. Under his responsibility the DWWR was built up. From 1982 to 1983 he was secretary-general of the Ministry of Public Works, and from 1983 to 1988 he was the minister of Public Works.
- 2 Mr. Budiharto started his legal profession at the Ministry of Public Works in 1963. From 1985 to 1992 he was head of the legal department of the DG-Water Resources. From 1992 to 1996 he was head of the legal department of the Ministry of Public Works.
- 3 Dr. ir. Mochammad Amron started his career at the Ministry of Public Works in 1970. He was involved with swamp development and river basin planning. From 2010 to 2012 he was director-general of the D.-G. Water Resources.
- 4 Ir. Budi Santoso started his career at the Ministry of Public Works in 1982. His work focused almost all the time on river planning and design; in the beginning at the operational level and, from 2005 to 2010, at the management level.
- 5 Ir. Willem Jan van Diest is an engineer from the University of Wageningen. He has worked in Indonesia since 1982. He is still working in the Indonesian water sector, especially in the irrigation sector.