Small Scall Irrigation

A better alternative to fulfill the need of agriculgural development in Indonesia

By

Amsal Djunid

Std No.: ID577/89

Introduction

In order to increase rice and other agricultural production, Indonesia needs to upgrade its agricultural infrastructures. Irrigation as an agricultural infrastructure can be built on alternatives of scale, small scale irrigation is a better alternative to fulfill the need of water for agricultural development in most regions of Indonesia, because in terms of costs, construction period, construction program, management, and social impacts, small scale irrigation is more advantageous than large scale irrigation. This paper will analyze the advantages and disadvantages of small scale irrigation by comparing it with large scale irrigation.

Advantages of small scale irrigation

Advantages of small scale irrigation are inherent in characteristics of small scale irrigation itself. Small scale irrigation covers an area not more than 2000 ha (Djojoadinato 1978, 25). Comparing It with large scale irrigation, small scale irrigation is lower-cost, and faster to construct. Furthermore it can be constructed by labor intensive program, and it will be easier to manage. Another advantage is small scale irrigation does not flood any area, the consequences of flooding that large scale

irrigation causes are losing agricultural area as well as uprooting people from their home land settlements.

Total cost for every unit of small scale irrigation is certainly less than large scale irrigation. So small scale irrigation still can be built despite shortage of government funds (budget). Small scale irrigation project is also able to mobilize local resources. The funds from governmental budget are just used as starting capital, then the project is continued by the farmers benefit by the project. This mobilizing of local resources program has been successfully done in some regions in Indonesia, for examples, Desa Camplang West Java and Desa Malino South Sulawesi (Hafid and Hayami 1978, 124). Cost of every hectare of land irrigated by small scale irrigation is also cheaper than by large scale irrigation. Construction cost of small scale irrigation for every hectare rice field is approximately US $ 555 compared to US $ 881 of large scale irrigation (Taylor and Tantigate 1983, 56).

On the other hand, the costs of a series of small scale irrigation projects in one region may be more expensive than the costs of only one large scale irrigation projects, because of the economies of scale. Operation and maintenance costs of small scale irrigation are higher than maintenance and operation costs of large scale irrigation. Maintenance and operation costs of small scale irrigation for every hectare irrigated is US $ 59 compared to US $ 19 per hectare irrigated by large scale irrigation (Taylor and Tantigate 1983, 56). Although maintenance and operation costs of large scale irrigation are lower than small scale irrigation, small scale irrigation is still more beneficial than large scale irrigation.' Savings in maintenance and operation costs seem not to be able to cover the excess of construction costs of large scale irrigation.

Small scale irrigation gives a faster result than large scale irrigation, because to build small scale irrigation just takes one or two years (Djojoadinato 1978, 27). This time is far shorter if compared with the time needed to build large scale irrigation, that is, more than 10 years. A short construction period means farmers do not need to wait for a long time before using irrigation.

A shorter period to build small scale irrigation may be offset by the short life of the irrigation. Small scale irrigation economical life is usually 10 years (Djojoadinato 1978, 29). After 10 years small scale irrigation has to be rehabilitated or -rebuilt again. However rehabilitating or rebuilding small scale irrigation every 10 years probably is better than ‘waiting for 10 years before being able to use irrigation in constructing large scale irrigation project, because we need irrigation for'' agricultural development now, not in 10 years time.

Construction of small scale irrigation is simple, inherent in its scale it can be built by labor intensive program. This labor intensive program has been done successfully in Bengkulu (McKinnon 1987, 56). So small scale irrigation besides improving agricultural facilities, is also a new employment opportunity for the community around the site of the project. However this new employment opportunity is only short term, it is not a permanent employment opportunity. Although working in irrigation project is only short term employment, it is still worthwhile for the community, because after the project is finished the workers may work in agricultural field that is irrigated by the project.

Farmers use the common source of water from the same irrigation, certainly they have to work in a cooperative system. It will be more successful"- in a few number than in a large number.

Host farmers in Indonesia are holding small field, the average crop farming size in Indonesia is just 0.936 ha Woelke 1978, 13)• It is easier to organize farmers in small scale irrigation than in large scale irrigation, because in large scale irrigation, there will be so many people to manage.

Experiences cite that large scale irrigation projects flood agricultural area and create several social problems. As an example, Kedung Ombo Dam flooded 5898 ha land that is settled by 5359 families or 29.000 people (Nusantara 1988, 15). It is very difficult to resettle the people who have lived at the project site for a long time. Large scale dam. projects usually create conflict between project administrators and people who live in the project site to determine land compensation. Some experiences cite that many of them did not receive any compensation for their land, as an example, Asahan dam project North Sumatera, 60 % of them, who have been resettled were not compensated for their land at all (Ecologist Briefing Document 1984, 3). However for some regions in Indonesia agricultural field loss may be offset by widening irrigated area, and resettlement, pro-extern- might be solved by transmigration scheme. The people have to be involved from the planning stage of the project to minimize the conflicts. If agricultural area is still potential to be expanded and the projects must be planned carefully, large scale irrigation might be acceptable.

Disadvantages of small scale irrigation

Comparing with large scale irrigation, disadvantages of small scale irrigation are; It is usually for a single purpose, while large scale irrigation is multi purpose. Large scale irrigation

besides providing water for irrigation, also supplies hydro-electricity and regulates river flow (Ecologist Briefing Document 1984,1).

All of large scale irrigation in Indonesia is aimed to fulfill these three purposes. For example, Kedung Ombo dam besides irrigating 55,000 hectare of rice field, is also aimed to control river flow to protect agricultural area, industrial area and community settlements, and to provide 22.5 million megawatt hydro electricity (Nusantara 1938,1).

These three objectives are not always mutually inclusive. There is conflict between irrigation purpose and river flow purpose and providing hydro electricity purpose (Ecologist Briefing Document 1984, 10). In order to control river flow it is needed to keep low reservoirs of water, but to "generate electricity and to provide irrigation it is needed to keep high water reservoirs. Using reservoirs to generate hydro electricity also will decrease available water for agriculture. Probably large scale irrigation is only appropriate in regions needing multi-purpose dams where have large water reservoirs.

Conclusion

In conclusion, based on the above discussion, it is clear that multi purpose large scale irrigation may be acceptable in some regions of Indonesia. The project must be planned carefully to avoid the negative impacts of the project. Although small scale irrigation is single purpose, in order to fulfill the need of agricultural development small scale irrigation is more appropriate to most part of Indonesia. Costs of small scale irrigation are cheaper and it gives faster result than large scale irrigation. Small scale irrigation may be constructed by labor

intensive program, and it is also more manageable than large scale irrigation. Another advantage of small scale irrigation is it does not flood agricultural area, nor create social problem.

BIBLIOGRAPHY

Djojoadinato, Oesman. 1978. "Indonesia's Simple (Sederhana) Irrigation Program". *Irrigation Policy and Management in Southeast Asia*. Philippines: IRRI. 25-30 "The

Ecologist Briefing Document: The Social and Environment Effects of Large Dams. 1984. *The geologist* Vol 14. No.5-6

Goldsmith, Edward and Nichola Hildyad. 1984."The Politics of Damming". *The Ecologist* Vol 14-. No.5-6: 221-51 Hafid, Anwar

and Y. Hayami. 1978. "Mobilizing Local Resources for Irrigation Development: The Subsidi Desa Case of Indonesia". *Irrigation Policy and Management in Southeast Asia*. Philippines: IRRI. 124-33

McKinnon. E. Edwards. 1986. "Small Scale Irrigation in Bengkulu: The PDP Experience". *Prisma* No. 45 : 56-61 Nusantara,

Abdul Hakim G. 1988. "Membangun Waduk dan Masa Depan Sebuah Komunitas : Studi Kasus Pembangunan Waduk Kedung Ombo". *Andal* Dec. : 15-17

Woelke, Manfred. 1978. *Statistical Information on Indonesia Agriculture*. n.p: German Agency for Technical-Co-operation Ltd.