



Indonesian Red Cross Society (PMI)

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# Infiltration wells for flood mitigation in Sewu Village

## Keywords

Flooding, mitigation, river, drainage, infiltration wells.

## Introduction

The residents of Sewu Village (Surakarta District, Indonesia) have built infiltration wells to reduce the risk of flooding. Infiltration wells enable water to seep into the ground and can be used, for instance, to tackle flooding in watersheds (Kusnaedi, 2007).

## The problem and its context

Heavy rainfall often causes the Bengawan Solo River to overflow. Because the river basin has slate slopes and rapid surface run-off, water levels can rise quickly. Around 30 per cent of land in the area may be inundated during the monsoon season. This can cause the displacement of thousands of families and severely disrupt the local economy.

Floods typically contaminate water sources, waterlog the land, and cause riverbank erosion, especially in areas close to the main river channels. The project's efforts to mitigate these problems focus on enabling the ground to re-absorb water. Shallow infiltration wells are a practical measure to prevent runoff; they are constructed in vulnerable zones to reduce flood risks. By enabling the rainwater to seep into the soil and replenish the aquifers, infiltration wells help to restore the natural water cycle and prevent flooding.

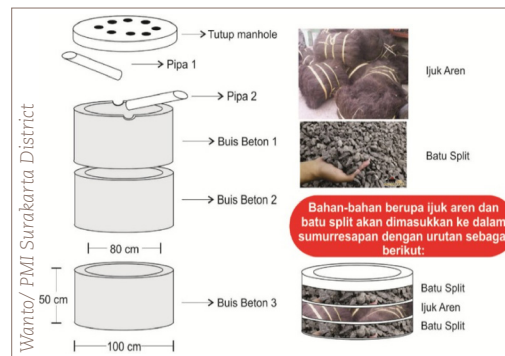


Figure 1. The materials needed for an infiltration well.



Figure 2. An infiltration well constructed in Sewu Village, Surakarta District.

## How

Altogether, 28 infiltration wells were constructed in Sewu. The first step was to identify suitable locations around the village. To do this, the Indonesian Red Cross (Palang Merah Indonesia, PMI) in Solo District and Flood Resilience Programme project staff held focus groups with community members and the local authorities. Based on these discussions, and after mapping risks, plans were drafted and shared with technical experts from the local UNS University. Construction then began. Skilled volunteers from Community Based Action Teams (SIBAT) and local communities worked together under the supervision of technical experts from PMI Solo District and the local government. To construct one infiltration well, a team of four people needs two to three days.

The resources and materials needed to build one infiltration well are shown in the table below.

The well tube has a diameter of 100 cm and is dug to a depth of 150 cm. The concrete walls are lined with coral and palm fibres and finished with a cap of concrete with apertures in it. After completing the wells, PMI Solo explains to the local community how infiltration wells work and how they should be maintained.

Description	Quantity
Fabricated concrete / buis beton Diameter 100 cm / 50 cm x 80 cm	1 unit
Skilled labourer	4 people
Paralon pipes (4 m / 2 inch)	1 unit
Batu split or gravel	0.5 m <sup>3</sup>
Palm fibre	5 kilogram
Sand	0.25 m <sup>3</sup>
Cement	1 bag
Manhole (concrete) Diameter 100 cm / 10 cm x 80 cm	1 unit
Pump to remove sand and sediment	1 unit

## How the project has promoted resilience: case-study

Sewu is among the most flood-prone villages in the Surakarta District. It occupies an area of 0,46 km<sup>2</sup> on the east bank of the Bengawan Solo River. The village has approximately 2,600 households (8,100 individuals) (BBWS, 2009). Hundreds of houses are located close to the riverbank; many are unauthorized settlements that have substandard facilities and infrastructure. The community is regularly affected by flooding. The most significant flood, on 27 December 2007, submerged the entire village to a depth of up to four metres (Zein, 2010).

In early 2017, torrential rain caused the Bengawan Solo River to overflow. It flooded several villages along the riverbank in Surakarta District. In Sewu, more than 300 families (1,313 people) were affected. Similar flooding in 2016 displaced approximately 2,500 people. The losses were considerable, since water inundated several schools and hundreds of houses, and damaged thousands of hectares of farmland. (Data provided by PMI Surakarta.)

The construction of infiltration wells was one of several micro-projects that the Flood Resilience Programme implemented in Surakarta District to mitigate flooding. Infiltration wells benefit the community in Sewu by reducing the impact of flooding in the rainy season and also reducing the risk of drought in the dry season, because they prevent hand-dug community wells from drying up.



Figure 3. Floods hit Sewu Village in early 2017.

## Cost

Based on the case study, each infiltration well in Sewu Village cost USD 185.

## References

BBWS, *Laporan Monitoring Banjir Tahun 2008/2009 Balai Besar Wilayah Sungai Bengawan Solo* (2009. Surakarta).

Kusnaedi, *Sumur Resapan Untuk Pemukiman Perkotaan dan Pedesaan* (2007, Jakarta: Penebar Swadaya).

Zein, M., *A Community Based Approach to flood hazard and vulnerability assessment in flood prone areas* (2010, Yogyakarta: Gadjah Mada University).

## How we work

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