



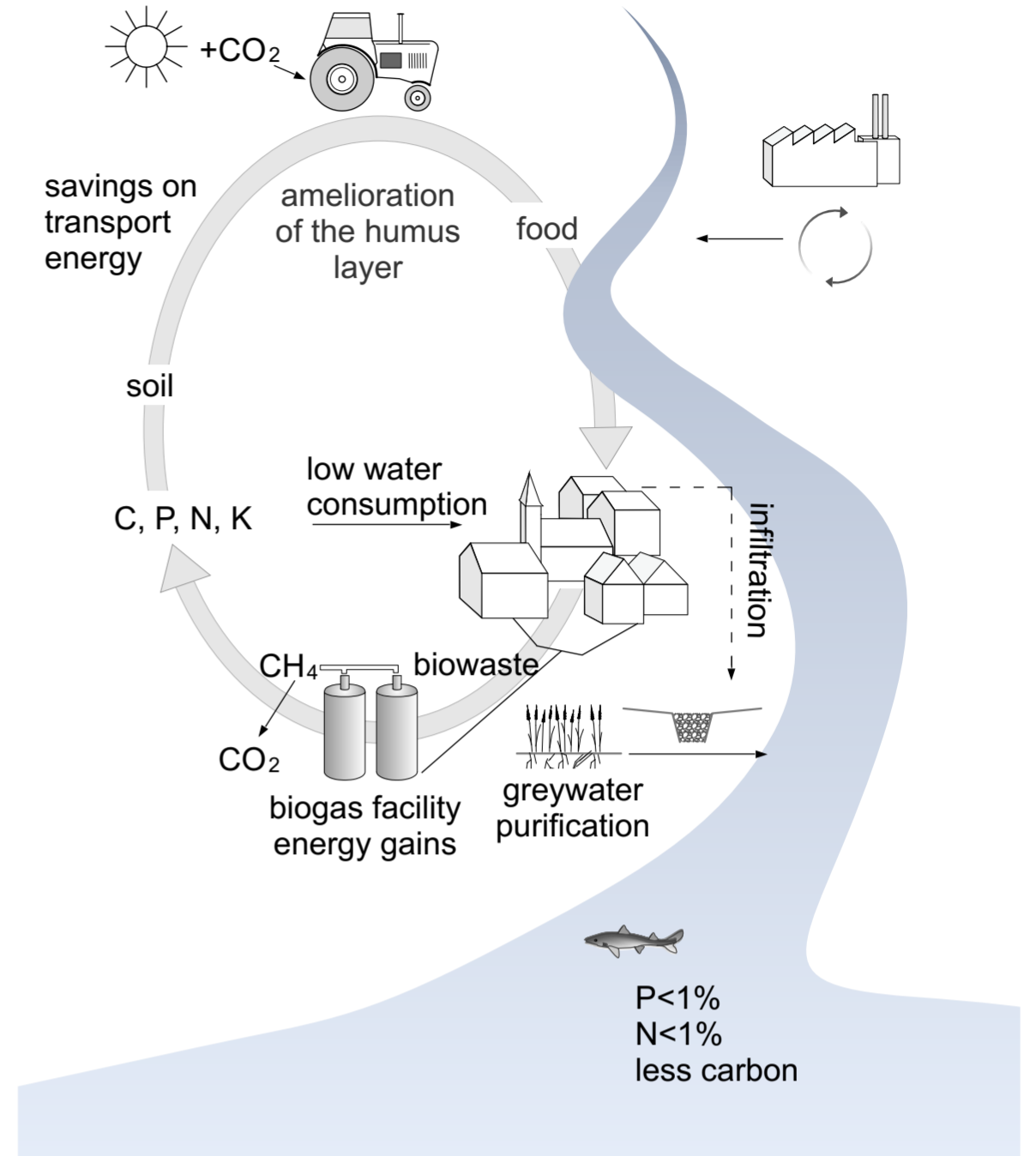
ADMINISTRATION BUILDING: ARCHITECTURE AND ECOLOGICAL WATER MANAGEMENT AND CYCLING CONCEPT

Administration building - ecological water management and cycling concept

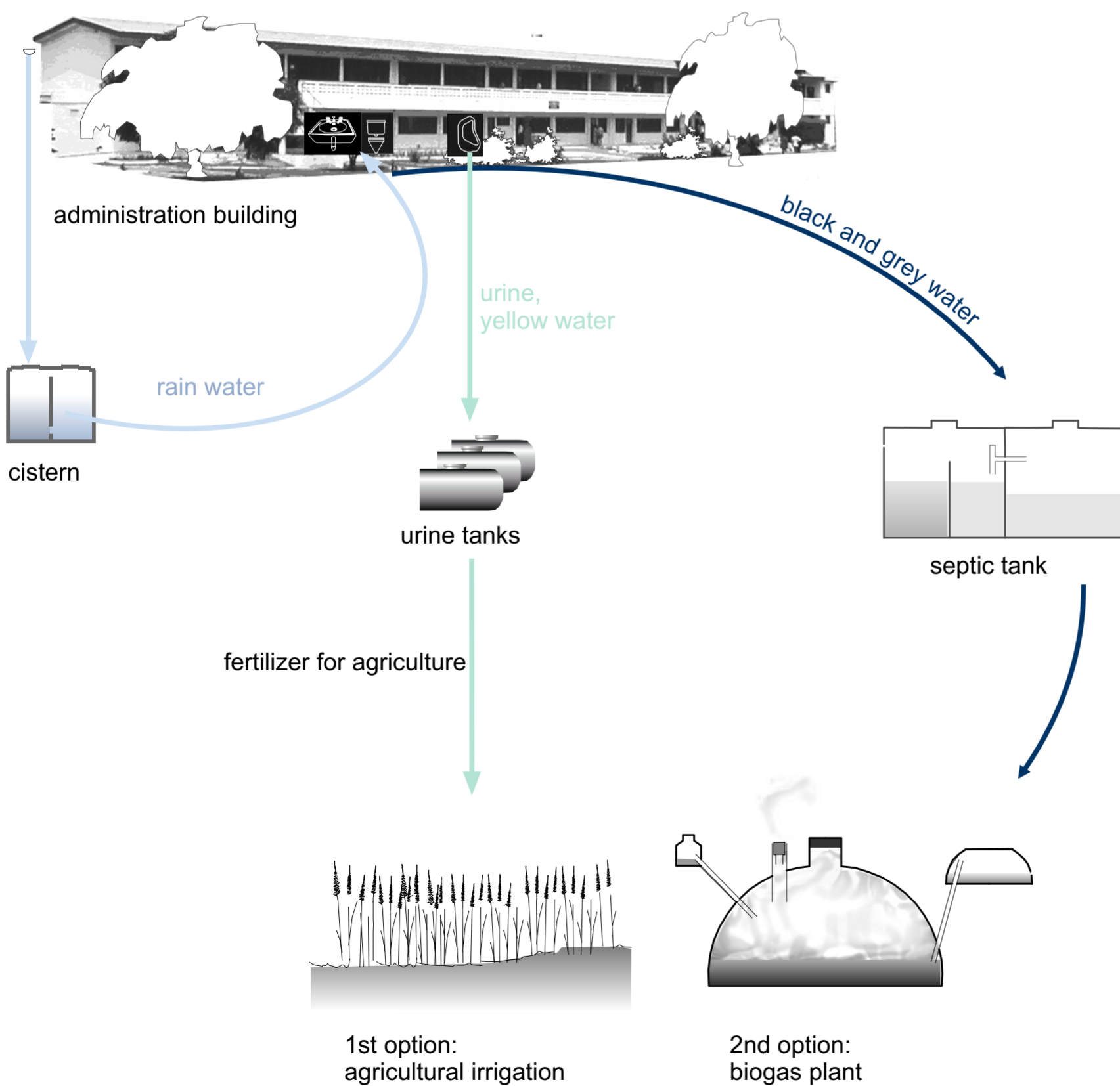
In keeping with the water and nutrient concept, the existing sanitary facilities on the ground floor of the administration block were replaced by ecological sanitary techniques. Installation work was completed in November 2003. At the same time, information and training courses were held to inform users about the new techniques and to train university employees in maintenance and service. An element of the preliminary project was to plan and install a division into flow streams that allowed a sensible utilization suitable to the local climate and conditions. As expected, the separated urine is a particularly valuable fertiliser due to its high nutrient concentration and quite simple hygienisation. Because there is an insufficient amount of drinking water on campus and toilets do not require potable water, underground rainwater cisterns were erected. The collected rainwater from the roofs is used for flushing toilets and washing hands. Pure urine that accumulates from the use of waterless urinals is piped into a yellow water tank made of polyethylene. There it is collected for four weeks and then transported to a

central collection and conditioning site within the agricultural area for further treatment. As part of the research and demonstration project, a direct agricultural application was implemented on maize fields. The urine-water mixture resulting from the use of separation toilets can be piped, stored and treated separately. Yellow water is divided into these two types to discover more about the different qualities and nutrient concentrations and to identify appropriate storage and treatment methods in accordance with these findings. The black water (toilet water without yellow water and faeces, grey water from wash-stands) is piped into the existing and expanded volume of the septic tank, where an initial purification takes place. One research objective of the preliminary phase of the project was to determine which treatment process and duration is most effective in the climatic conditions in the south of Ghana. The sewage sludge from the first chamber can be taken out of the septic tank, treated and used as fertiliser on the farmland. Overall, the administration block cell is an exporting cell that exports treated and purified wastewater and urine to the agricultural land.

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Main advantages of implementing ecological sanitation (source: Mall GmbH, Donaueschingen)



Schematic water- and nutrient concept for the administration building



January 2004, opening ceremony of the new sanitary installations



Maize field experiment on VVU campus