

Rainwater Harvesting

For two years southern Sri Lanka suffered a prolonged drought, described by locals as "the worst in 50 years". Some areas didn't see a successful crop for four or five consecutive seasons. Livestock died, water in wells dropped to dangerously low levels, children were increasingly malnourished and school attendance has fallen. An estimated 1.6 million people were affected.

A Muthukandiya is a village in Moneragala district, one of the drought-stricken areas in the "dry zone" of southern **Sri Lanka** (斯里兰卡), where half the country's population of 18 million lives. Rainfall in the area varies greatly from year to year, often bringing extreme dry spells in between **monsoons** (季风). But this drought was much worse than usual. Despite some rain in November, only half of Moneragala's 1,400 tube wells were in working order by March. The drought devastated supplies of rice and freshwater fish, the staple diet of inland villages. Many local industries closed down and villagers headed for the towns in search of work.



B The villagers of Muthukandiya arrived in the 1970s as part of a government resettlement scheme. Each family was given six acres of land, with no irrigation system. Because crop production, which relies entirely on rainfall, is insufficient to support most families, the village economy relies on men and women working as day-labourers in nearby sugar-cane plantations. Three wells have been dug to provide domestic water, but these run dry for much of the year. Women and children may spend several hours each day walking up to three miles (five kilometres) to fetch water for drinking, washing and cooking.

C In 1998, communities in the district discussed water problems with Practical Action South Asia. What followed was a drought mitigation initiative based on a low-cost "rainwater harvesting" technology already used in Sri Lanka and elsewhere in the region. It uses tanks to collect and store rain channelled by **gutters** (水槽) and pipes as it runs off the roofs of houses.

D Despite an indigenous tradition of rain-water harvesting and irrigation systems going back to the third century BC, policy-makers in modern times have often overlooked the value of such technologies, and it is only recently that officials have taken much interest in household-level structures. Government and other programmes have, however, been top-down in their conception and application, installing tanks free of charge without providing training in the skills needed to build and maintain them properly. Practical Action South Asia's project deliberately took a different approach, aiming to build up a local skills base among builders and users of the tanks, and to create structures and systems so that communities can manage their own rainwater harvesting schemes.

E The community of Muthukandiya was involved throughout. Two meetings were held where villagers analysed their water problems, developed a mitigation plan and selected the rainwater harvesting technology. Two local masons received several days' on-the-job training



in building the 5,000 litre household storage tanks: surface tanks out of **ferro-cement** (钢丝网水泥) and underground tanks out of brick. Each system, including tank, pipes, gutters and filters, cost US\$195 - equivalent to a month's income for an average village family. Just over half the cost was

provided by the community, in the form of materials and unskilled labour. Practical Action South Asia contributed the rest, including cement, transport and payment for the skilled labour. Households learned how to use and maintain the tanks, and the whole community was trained to keep domestic water supplies clean. A village rainwater harvesting society was set up to run the project. To date, 37 families in and around Muthukandiya have storage tanks. Evaluations show clearly that households with rainwater storage tanks have considerably more water for domestic needs than households relying entirely on wells and ponds. During the driest months, households with tanks may have up to twice as much water available. Their water is much cleaner, too.

F Nandawathie, a widow in the village, has taken full advantage of the opportunities that rainwater harvesting has brought her family. With a better water supply now close at hand, she began by growing a few vegetables. The income from selling these helped her to open a small shop on her doorstep. This increased



her earnings still further, enabling her to apply for a loan to install solar power in her house. She is now thinking of building another tank in her garden so that she can grow more vegetables. Nandawathie also feels safer now that she no longer has to fetch water from the village well in the early morning or late evening. She says that her children no longer complain so much of **diarrhoea** (腹泻). And her daughter Sandamalee has more time for school work.

G In the short term, and on a small scale, the project has clearly been a success. The challenge lies in making such initiatives sustainable, and expanding their coverage. At a purely technical level, rainwater harvesting is evidently sustainable. In Muthukandiya, the skills required to build and maintain storage tanks were taught fairly easily, and can be shared by the two trained masons, who are now finding work with other development agencies in the district.

H The non-structural elements of the work, especially its financial and organizational sustainability, present a bigger challenge. A revolving fund was set up, with households that had already benefited agreeing to contribute a small monthly amount to pay for maintenance, repairs and new tanks. However, it appears that the revolving fund concept was not fully understood and it has proved difficult to get households to contribute. Recovering costs from interventions that do not generate income directly will always be a difficult proposition, although this can be overcome if the process is explained more fully at the outset.

I The Muthukandiya initiative was planned as a demonstration project, to show that community-based drought mitigation through rainwater harvesting was feasible. Several other organizations have begun their own projects using the same approach. The feasibility of introducing larger tanks is being investigated.

J However, a lot of effort and patience are needed to generate the interest, develop the skills and organize the management structures needed to implement sustainable community-based projects. It will probably be some time before rainwater harvesting technologies can spread rapidly and spontaneously across the district's villages, without external support.



Questions 1-6

Answer the questions below.

Choose **NO MORE THAN THREE WORDS AND/OR A NUMBER** from the passage for each answer.

1 What is the major way for local people make barely a support of living in Muthukandiya village?

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2 Where can adult workers make extra money from in daytime?

3 What have been dug to supply water for daily household life?

4 In which year did the plan of a new project to lessen the effect of drought begin?

5 Where do the gutters and pipes collect rainwater from?

盗版复印的母书很可能是老旧的版本（存在错误，遗漏）

6 What help family obtain more water for domestic needs than those relying on only wells and ponds?



Questions 7-14

Do the following statements agree with the information given in Reading Passage 1?

In boxes 7-14 on your answer sheet, write

YES	<i>if the statement is true</i>
NO	<i>if the statement is false</i>
NOT GIVEN	<i>if the information is not given in the passage</i>

- 7 Most of the government's actions and other programmes have somewhat failed.
- 8 Masons were trained for the constructing parts of the rainwater harvesting system.
- 9 The cost of rainwater harvesting systems was shared by local villagers and the local government.
- 10 Tanks increase both the amount and quality of the water for domestic use.
- 11 To send her daughter to school, a widow had to work for a job in rainwater harvesting scheme.
- 12 Households benefited began to pay part of the maintenance or repairs.
- 13 Training two masons at the same time is much more preferable to training single one.
- 14 Other organizations had built tanks larger in size than the tanks built in Muthukandya.

1

Version 26105

主题 斯里兰卡蓄水工程

1	Cropproduction	2	sugar-cane plantations	3	three wells
4	1998	5	roofs of houses	6	rainwater storage tanks.
7	NOT GIVEN	8	YES	9	NO
10	YES	11	NO	12	YES
13	NOT GIVEN	14	NO		

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参考答案和难题解析：

1-6 问答题

1. crop production.
【原文参考依据--B段第三行】
Because crop production, which relies entirely on rainfall, is insufficient to support most families, the village economy relies on men and women working as day-labourers in nearby sugar-cane plantations. 种植作物对于多数家庭来说，不足以支持生活，于是他们才去附近的甘蔗种植园做日工的。题干中的“barely”有否定意思“几乎不，勉强”，因此“barely a support”替代了文中的“insufficient to support”。因此答案是crop production。
2. sugar-cane plantations.
【原文参考依据--B段第五行】the village economy relies on men and women working as day-labourers in nearby sugar-cane plantations.
3. three wells
【原文参考依据--B段倒四行】
Three wells have been dug to provide domestic water, but these run dry for much of the year. 在字数允许的情况下，建议完整写下“Three wells”作为答案。
4. 1998.
【原文参考依据--C段首句】
In 1998, communities in the district discussed water problems with Practical Action South Asia. What followed was a drought mitigation initiative based on a low-cost “rainwater harvesting” technology already used in Sri Lanka and elsewhere in the region.
5. roofs of houses.
【原文参考依据--C段末句】
It uses tanks to collect and store rain channelled by gutters and pipes as it runs off the roofs of houses.
6. rainwater storage tanks.
【原文参考依据--E段倒五行】
Evaluations show clearly that households with rainwater storage tanks have considerably more water for domestic needs than households relying entirely on wells and ponds.

7-14 判断题

7. Not Given
【原文参考依据--D段第五行】 Government and other programmes have, however, been top-down in their conception and application, installing tanks free of charge without providing training in the skills needed to build and maintain them properly. 题干中的“most of the government’s actions”指“大多数政府行动”，包含有其他行为，而非特指文中所提的工程。不够严谨，因此为Not Given。
8. Yes
【原文参考依据--E段第四行】 Two local masons received several days’ on-the-job training in building the 5,000 litre household storage tanks: surface tanks out of ferro-cement and underground tanks out of brick.
9. No
【原文参考依据--E段第十二行】
Just over half the cost was provided by the community, in the form of materials and unskilled labour. Practical Action South Asia contributed the rest, including cement, transport and payment for the skilled labour.
10. Yes
【原文参考依据--E段倒九行】
Households learned how to use and maintain the tanks, and the whole community was trained to keep domestic water supplies clean. Evaluations show clearly that households with rainwater storage tanks have considerably more water for domestic needs than households relying entirely on wells and ponds.
11. No
【原文参考依据--F段】 首先，这名寡妇并没有在rainwater harvesting scheme工作，而是自己种了蔬菜，并用卖蔬菜的钱开了一个小店；其次，她这么做并不是为了送她女儿去上学，因为她女儿已经在上学了。有了rainwater harvesting之后，她女儿有更多的时间上学了。因此题干与原文内容不符。
12. Yes
【原文参考依据--H段第二三句】
A revolving fund was set up, with households that had already benefited agreeing to contribute a small monthly amount to pay for maintenance, repairs and new tanks. However, it appears that the revolving fund concept was not fully understood and it has proved difficult to get households to contribute. 那些已受益的家庭同意每月支付一小部分用于维护、维修以及建造新的水槽。但那些家庭并未完全理解这个这个概念，且从他们那里获得捐款已被证实十分困难。文中“has proved”说明受益家庭捐款给该基金会的行为已经启动，他们已经开始捐款了，只不过从他们那里获得捐款十分不易。并不是说他们丝毫没有捐赠。题干虽未表达“获得捐款不容易”，但“开始捐款”与原文意思相符。
13. Not Given
【原文参考依据--无】 原文未提及相应内容。
14. No
【原文参考依据--I段末句】 The feasibility of introducing larger tanks is being investigated. 目前正在研究引进更大型水箱的可行性。 Feasibility: 可行性，可能性。