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Sustainability in domestic defluoridation

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Padmasiri, J.P.. 2019. "Sustainability in Domestic Defluoridation". figshare. <https://hdl.handle.net/2134/30061>.



Sustainability in domestic defluoridation

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IN THE NORTH Central Province of Sri Lanka, prevalence of dental fluorosis is in the range of 55-75 percent in the 7-20 year old school children. This has been further established by testing wells in these areas and it has been found that nearly 40 percent of these wells have fluoride rich water of more than 1.0 mg/L of fluoride. Thousand domestic defluoridators have been introduced in 50 villages in the north central province during 1994 to 1997. The first batch of 300 defluoridators are in operation for more than three years. These defluoridators have advantages such as simple in design, easy operation by villagers, absence of any maintenance, availability of the freshly burnt bricks in the locality and frequency of changing bricks in an average of four months for a fluoride content of well of 2.5mg/l.

The performance and efficiency of these defluoridators are very good in the first two years thereafter lack of interest was shown if regular visits are not made to beneficiaries. Organisational structure is necessary to follow monitoring and evaluation of these units for a minimum period of five years to get the best from this locally developed technology.

Discussion

Some of these defluoridators were given to mothers having fluorosed teeth so that this ugly stained teeth development could be eliminated from their children. But still after 2-3 years of operation of these units they show lack of interest in continuing unless field visits are done more regularly.

On the other hand the female children of age group 12-18 years having psychological impact displayed their agony by painting the teeth of smiling children in calendars in their households.

Table 1 shows the details of the defluoridators introduced at different dates in four villages in Polonnaruwa

district. The duration of operation varies from eight months in the recently introduced ones to three years in the initial lot. The village which has the longest duration of operation of defluoridators have been visited at last 04 times per year showing the need of regular visits in achieving sustainability.

In the first village these units were distributed with the involvement of chief priest while in the other three villages women leadership took active part. Thereafter the same leadership continued in guiding the maintenance operations. The expenditure of maintenance was only for the replacement of bricks every three months which cost less than one US Dollar.

Table 2 shows the current status of the units in the four villages. The outlet pipe in some of these units were broken due to bad handling. This was found to be the only repair required in these units.

The seventh column shows the number withdrawn after the beneficiaries showed lack of interest in few months of operation. In some instances the beneficiaries clean the filter to change the bricks but is not conscious enough to restart immediately due to other involvements. This is mainly due to bad planing as they do not make the bricks ready prior to cleaning. The number of such units are given in column 5. The relatively high success rate of villages 2 and 3 are mainly due to the active role played by the women leaders of these villages.

Case studies of three randomly selected filters are discussed below to highlight the sustainability of these filters. Figure 1 gives the performance of defluoridators No. 52, No. 54 and No. 79. The thick lines indicate the fluoride contents of the well water used in filtration. The thin lines indicate the fluoride contents of the defluoridated water. The breaks in the thin line denote the replacement of the filter medium. Filter No. 54 had performed very success-

Table 1. Details of defluoridators

Table 2. Sustainability of defluoridators

fully in all four cycles. Filter No. 52 had a bad cycle to start with. The fluoride removal was very poor due to high consumption rate. Since this was a novel item in the household they started drawing out water frequently without giving much concern for the optimum quantity to be withdrawn. The optimum withdrawal should be about 15 litres per day whereas 20 litres were removed during 1st cycle. After further guidance the filter unit was used correctly resulting in efficient removal of fluoride thereafter. In filter No. 79 the performance was poor during the first cycle due to the use of larger brick pieces, instead of the recommended size of 10 - 15mm. This was corrected during the second cycle but was repeated in the third and fourth cycles showing the lack of commitment. In this unit consumption too was above optimum level.

Conclusions

- Close monitoring and evaluation at least once in three months will help in successful use of defluoridators.
- Holding competitions such as dramas, essays, street plays to highlight the benefits of defluoridation will enhance the usage of defluoridators.

- Active involvement of grass root level health workers is necessary to educate the villagers on the benefits of defluoridation.

References

- PADMASIRI, J P and FONSEKA, W S - C.A, 1994. Low cost fluoride removal filter - Proceedings of the 20th WEDC.pp 295,296 and 300.
- PADMASIRI, J.P, WICKREMASINGHE, N I 1997. Participatory role in rural water treatment. Proceedings of 23rd WEDC pp 171 - 173.
- PADMASIRI, J P, 1997 Low cost domestic defluoridation. Pre - prints of the 2nd International workshop on fluorosis and defluoridation.

J.P. PADMASIRI, National Water Supply and Drainage Board.

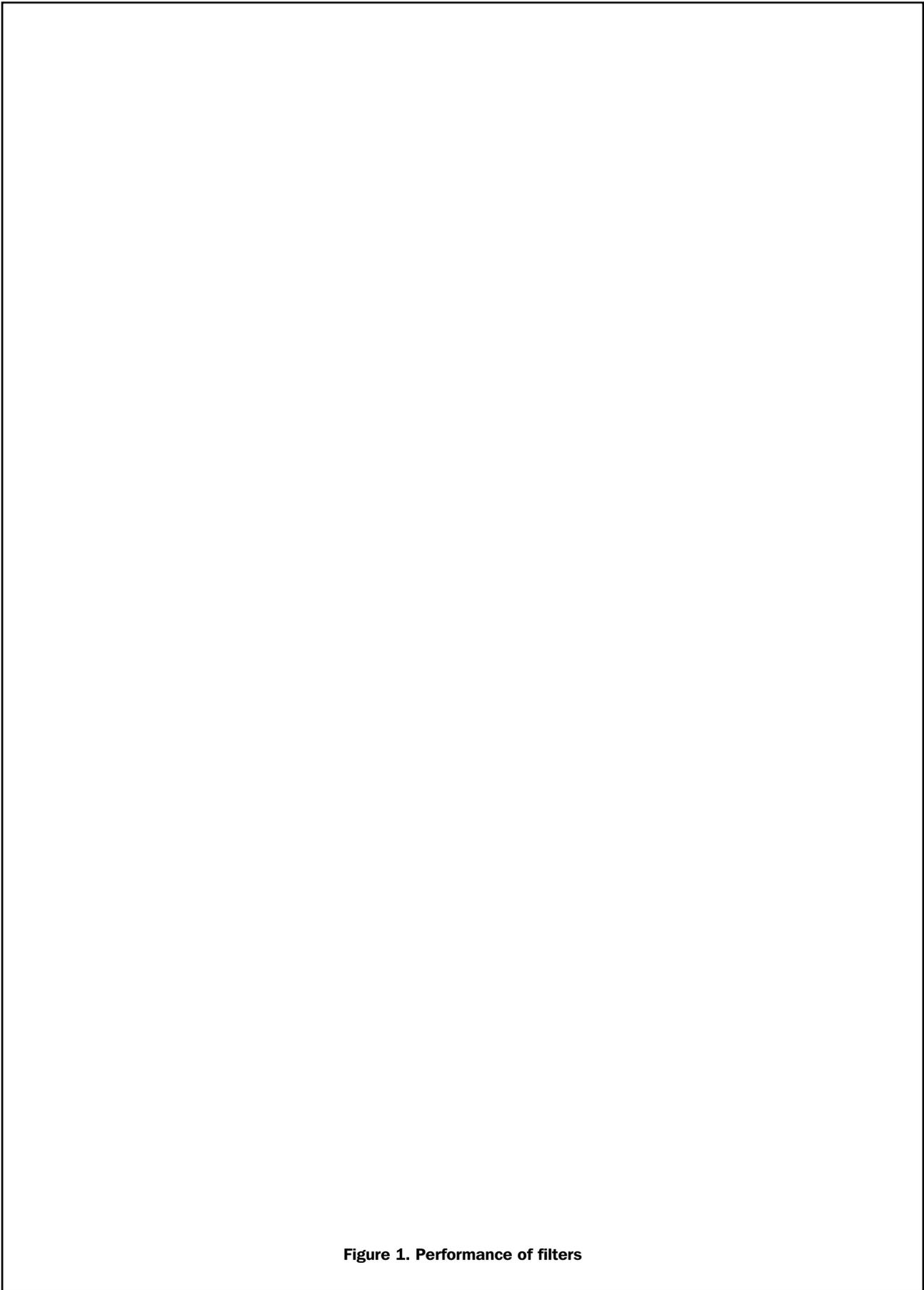


Figure 1. Performance of filters