Evaluation of the Performance of Surface Irrigation Methods in Melka Werer, Middle Awash Valley

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Knowledge of the performance of existing irrigation methods can help improve the design and management of these systems, and provide information for the design of future irrigation systems.

This study was conducted to determine the performance of surface irrigation methods, i.e. furrow, border and basin irrigation. It was based on performance indices, such as application efficiency, storage efficiency, distribution uniformity, and uniformity coefficient in combination with other irrigation water loss indicators, e.g. deep percolation and run-off fractions that were determined using a computer program, SURDEV. Field parameters and variables were either measured or estimated for the fields that were considered to be representative of the irrigated farms in the study area.

The response of each dependent irrigation parameter to variations in inlet flow rates has been evaluated. It was found that the maximum possible attainable application efficiency under present practices was in the order of 62-64 %, 52-58 % and 78- 86% for furrow, border and basin irrigation systems respectively. Irrigation water loss due to deep percolation and run-off was considered to be the main cause for low application efficiency. Total irrigation water losses for furrow, border and basin irrigation were recognised to be 56-62 %, 35-48 % and 18-22 % respectively. Yet,, irrigation uniformity was observed to be relatively better for border and basin irrigation systems than for furrow irrigation systems.

The results of this study show that the design and management of surface irrigation systems in the Middle Awash Valley should be reconsidered and methods of improvement are required to be devised.