EXECUTIVE SUMMARY

I.0 INTRODUCTION

The work of conducting the "Pilot Study on Water Use Efficiency of (i) Western Yamuna Canal (Haryana) and (ii) Upper Ganga Canal (U.P.)" was awarded to WAPCOS (I) Ltd. by the Planning Commission, Govt. of India vide their Letter No. 0-15012/94/2000-SER dt. 13.3.2001 and office order No. 0-15012/94/2Y-SER dt. 26.3.2001. The basic objective of the Pilot Study was to ascertain the percentage of the total releases of canal water at headworks, being gainfully utilized for raising of crops. These two systems were specially selected because the two canal systems are amongst the oldest in the country. The irrigation network in the northern India, specially in the commands of river Ganga and Yamuna, is traditionally secure and advanced in respect of wide spread distribution network having one of the oldest prevailing northern India canal and drainage act and rich level of productivity. Given such favourable conditions, better water management and eschew of avoidable losses can make available additional waters to bring far more dividends in foodgrain production in the fertile tracts of these two older canals than other systems. Study on water use efficiency is aimed to assess the efficiency and to pin point maladies in the system and usher in reforms for which there is ample room.

The Terms of reference interalia included an overall evaluation of the performance of the two projects vis-à-vis the benefits envisaged, review of past studies, if any, and carrying out Pilot Studies on Water Use Efficiency and overall project efficiency of the project taking into consideration water losses (i) in the conveyance and distribution network of canals, (ii) below the outlet into water courses and (iii) on the field. Recommendations have been sought on steps and measures to tone up system efficiency.

1.1 APPROACH

History : In case of Western Yamuna Canal, the study has been taken up tracing the history of project formulation, availability and use of water, the basis of water allocation, system of distribution network, the regulating structures, sequential improvement, modernisation and renovations leading to present level of performance. Schematic diagram of Western Yamuna Canal System is enclosed (DRG.1.5). Also irrigation map showing command area of Western Yamuna Canal is attached (DRG 1.1).

Data Collection : Available data have been collected, field visits have been made and discussions held with the officers of the Irrigation Department, Haryana from time to time. Actual releases from headworks, augmentation and distribution of supplies for various crop seasons, water account of a large number of channels vis-à-vis irrigation achievement, transit losses on conveyance system, distribution network and losses in water courses below the outlet, on the chaks of outlets in field and field application losses have been studied in detail. Gauge -Discharge data of selected canals along with actual discharge observation at Dabodha Minor have also been collected. (See Annex 4.0).

Identification of Wasteful Leakages : Study has also been done for ascertaining the performance of channels in the head reach, middle reach and tail reach separately. The avoidable significant wasteful leakages occur through (i) old Karri system of regulation, (ii) irregular pattern of release of canal water over various months of cropping season and (iii) very irregular delta on system. Another significant aspect is non-commissioning of New Barrage at Hathnikund (HKB) despite its completion in 1999, resulting in avoidable losses. Enormous losses due to routing of part supplies from unlined WJC rather than running lined augmentation canal to the designed capacity of 4500 cusecs (128

cumecs) (recently renovated and rehabilitated under World Bank Project) are also avoidable.

Study of Losses : The study of transit losses along conveyance and distribution network has been systematically analysed and given in Chapter 4 . The loss between various control points on the main canal, branch canal, distributary and minor system as well as below the outlet in the field water course & command chak has been represented on the schematic diagram of Western Yamuna Canal (Fig. 1.5). The critical significant loss occurring after application of irrigation water is the amount of water applied beyond the consumptive use of crop (cu), crop water requirement or essentially the transpiration and unavoidable evaporation. This too has been estimated based on PET values making use of daily meteorological variables and the estimate of diffusive resistance of crop canopy (Annex 4.14.1).

1.2 WATER USE EFFICIENCY

The emerging water use efficiency in Western Yamuna Canal System (Haryana) works out in the range of 95 to 97.5 percent at the end of main canal, 88 to 95% at end of main branch, 81 to 88% at the termination of branch distribution system, 72 to 79% at the end of sub branch and distributary system, 60 to 69.5% at the end of field water courses and 47 to 57% after field application. This efficiency is based on entire lined network with watercourses lined between 5 to 10 years back. Where watercourses are not yet lined, the efficiency is still lower. Statement showing improvement in water conveyance efficiency after lining of canal is enclosed (Annex 4.14).

Net water use efficiency after taking into account the actual consumptive use of crop & that applied is the true indicator of WUE i.e. the percentage

water gainfully utilised, of the amount of water released at the head of canal, from the reservoir or intake structure. This efficiency works out to mere 36 to 43% on the Western Yamuna Canal System. Details have been discussed under chapter 4 "Analytical Study of the Losses".

1.3 CONCLUSION & RECOMMENDATIONS

Recommendations made to improve overall Water Use Efficiency by eliminating avoidable losses, reducing wastage by rationalization of water allowance, curbing overuse, discipline on cropping pattern, integrated water management by bringing in micro-irrigation practices as also reclamation of degrading and degraded lands by subsurface or bio-drainage would be some of the broad measures. The detailed conclusion & Recommendations have been outlined in Chapter - 5 & Chapter - 6.