

唐山市沙流河镇水资源供需平衡优化分析

Optimization of supply and demand balance of water resources at Shaliuhe Town of Tangshan city

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中文摘要:

运用系统论和线性目标规划法, 结合唐山市沙流河镇实证研究, 构建小城镇水资源供需平衡优化数学模型, 剖析该镇水资源供需矛盾, 提出水资源供需平衡优化方案。结果显示, 沙流河镇水资源补给总量为 $1490.55 \text{万m}^3 \cdot \text{a}^{-1}$, 若对水资源利用量不加约束, 2001、2005和2010年沙流河镇用水总量分别达到 2352.73万m^3 、 2429.73万m^3 和 2491.72万m^3 ; 水资源超采量分别达到 862.18万m^3 、 939.18万m^3 和 1001.17万m^3 ; 其中农业用水量最大, 占90%以上。鉴于农业用水比重大、利用效率低, 提出沙流河镇实施、推广节水灌溉技术和积极退耕还林等节水措施。经过逐年逼近平衡的办法, 到2010年沙流河镇水资源量可以节余 63.32万m^3 , 基本实现全镇水资源供需平衡。

英文摘要:

Applying system theory and linear objective programming, a reliable mathematical optimization model for supply and demand balance of water resources for small towns was developed, the contradiction of supply and demand of water resources for Shaliuhe town of Tangshan city was analyzed, and an optimization measure of water utilization was put forward. Results showed that the total water supply was $14.9055 \text{ million m}^3$, while the total demands more than 90% of which were used in farming rose to $23.5273 \text{ million m}^3$, $24.2973 \text{ million m}^3$, $24.9172 \text{ million m}^3$, with an excessive exploitation of $8.6218 \text{ million m}^3$, $9.3918 \text{ million m}^3$, $10.0117 \text{ million m}^3$ in 2001, 2005, 2010, respectively if consumption was not restricted. Taking the high rate and low efficiency of agricultural water utilization into account, water saving measures, such as conducting and spreading water saving irrigation techniques, reforesting on farmland, were put forward. By means of year-by-year balance approximation, the amount of water exploitation surplus of the town would be $0.6332 \text{ million m}^3$ in 2010, and the supply and demand balance of water resources would be ultimately realized basically at the town.

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