

## 技术类成果

# 农田排水控盐关键技术 研究及应用

### 【创新性】

创建了暗管除涝降渍控盐、排水资源利用评价及土壤水盐定向迁移的理论与方法，提出了多种运动条件下的农田排灌渗流理论计算方法；构建了农田土壤水盐信息的实时、高效、动态获取“点-小区-区域”的多尺度监测诊断技术，研发了明暗结合排水排盐技术及其工程规格布局设计方法、土壤水盐模拟技术、盐碱地排水洗盐技术、农田水盐盐分上移地表排灌新技术、排水再利用灌溉模式和工程技术模式；建立了考虑排水沟水质、作物耐盐性、盐渍化控制要求的作物灌溉模式和高效节水的排水洗盐技术模式，形成了从规划设计、管材管件、工程模式、施工技术及运行管理的系统的农田排水控盐工程技术体系。

### 【影响力】

研究成果紧密围绕国家科技需求，解决了旱区节水与生态环境不相协调的矛盾，推动了农田排水学科的发展，丰富和发展了我国盐碱地治理理论与方法，有效促进了农田排水技术的推广和农田土壤盐渍化防治技术的更新，提高了灌区抵御涝渍盐碱灾害的能力，降低了农田盐渍化风险水平，研究成果纳入农田排水行业规范，并广泛应用于涝渍碱地区，为我国盐碱地治理和农田除涝减灾提供了有力的技术支撑，成果应用后的社会经济和生态环境效益显著，对保障国家粮食安全和生态安全发挥了重要支撑作用。研究成果获国家科技进步特等奖，省部级科技奖励 6 项，出版专著 9 部，发表学术论文 100 余篇，授权国家发明专利 10 项，软件著作权 2 项。

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受奖单位：水利所



## RESEARCH AND APPLICATION OF KEY FARMLAND DRAINAGE AND SALT REDUCTION TECHNOLOGIES

### 【Innovation】

The research has created the theories and methods for waterlogging control, stain reduction and salinity control with concealed pipes, drainage resource utilization evaluation and directional migration of soil water and salinity, and put forward the calculation method for the farmland drainage and seepage theory under various motion conditions; built the “point-community-district” multiscale monitoring and diagnosis technology for the real-time, high-efficient and dynamic acquisition of farmland soil water and salinity information, and developed water and salt discharge technology in combination with exposed and concealed pipes and its design method for engineering

### 【Influence】

Surrounding the national demand for science and technology, the research achievements have solved the contradiction between water conservation in arid areas and the inharmonious ecological environment, facilitated the development of the farmland drainage discipline, enriched and developed the theory and method for saline-alkali land treatment in China, effectively promoted the promotion of farmland drainage technology and the upgrading of farmland soil salinization prevention and control technology, improved the waterlogging and salinity resistant capability in irrigated areas, and reduced the farmland salinization risk. The research achievements have been included into the specification of the farmland drainage sector, and widely applied in the waterlogged alkali areas, thus providing strong technical support

specification layout, soil water and salinity simulation technology, drainage and salt washing technology for saline-alkaline land, the drainage reuse irrigation mode and engineering mode; established the crop irrigation model that considers the water quality of drainage ditches, salt tolerance of crops and salinization control requirements as well as the high-efficient and water-saving drainage and salt-washing technology model, and shaped a farmland drainage and salinity control engineering technology system from planning & design, pipe & fittings, engineering mode, construction technology and operational management.

for the saline-alkali land management and farmland waterlogging control and disaster relief, generating remarkable social and economic benefits as well as eco-environmental benefits, and playing an important role in guaranteeing the food and ecological security in China. The research achievements have won the special prize of the National Science and Technology Progress Award and six science and technology awards at provincial and ministerial levels. The research group has published nine monographs and nearly 100 academic papers, and obtained 10 national invention patents and two software copyrights.

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Award-winning Unit : Department of Irrigation and Drainage