

# Reconstruction and modernization of reclamation systems as a part of agricultural reforms in Ukraine

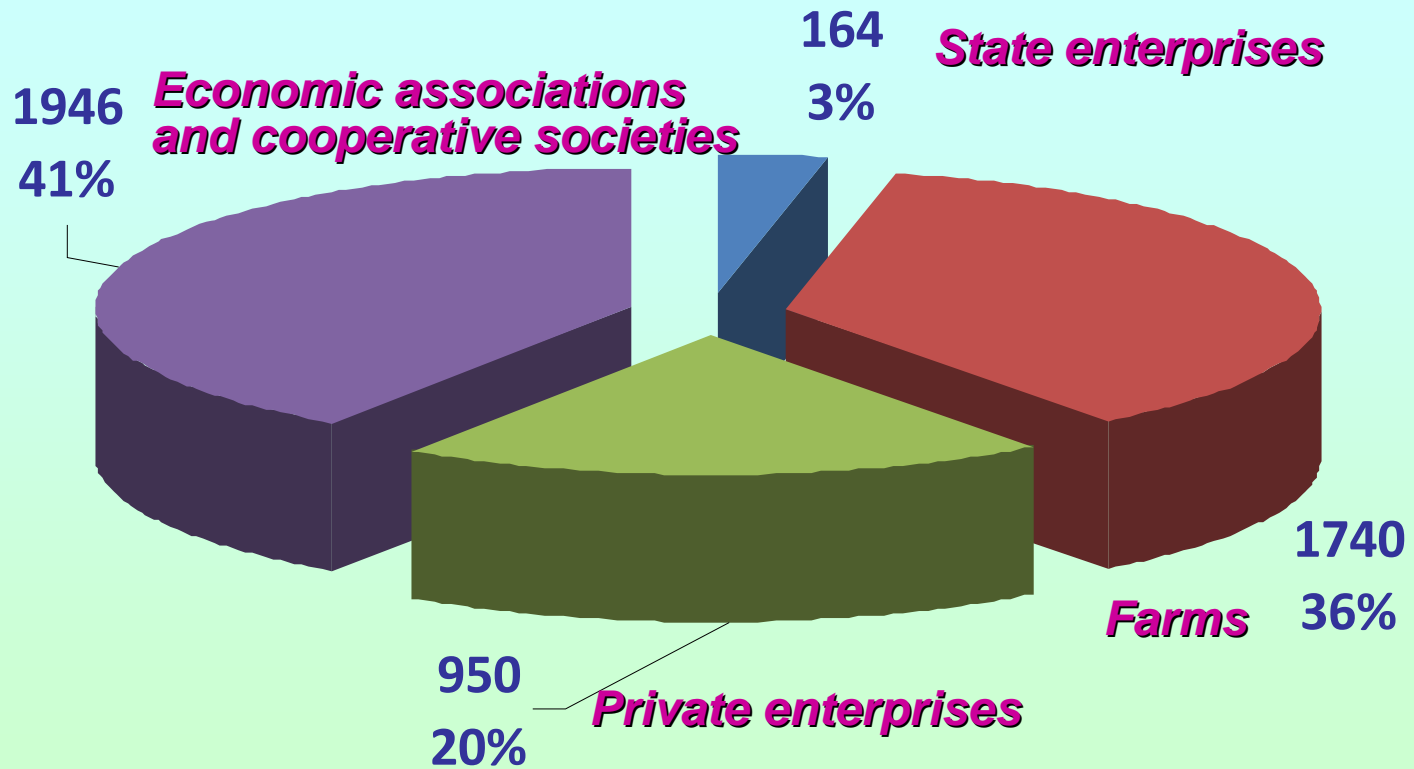
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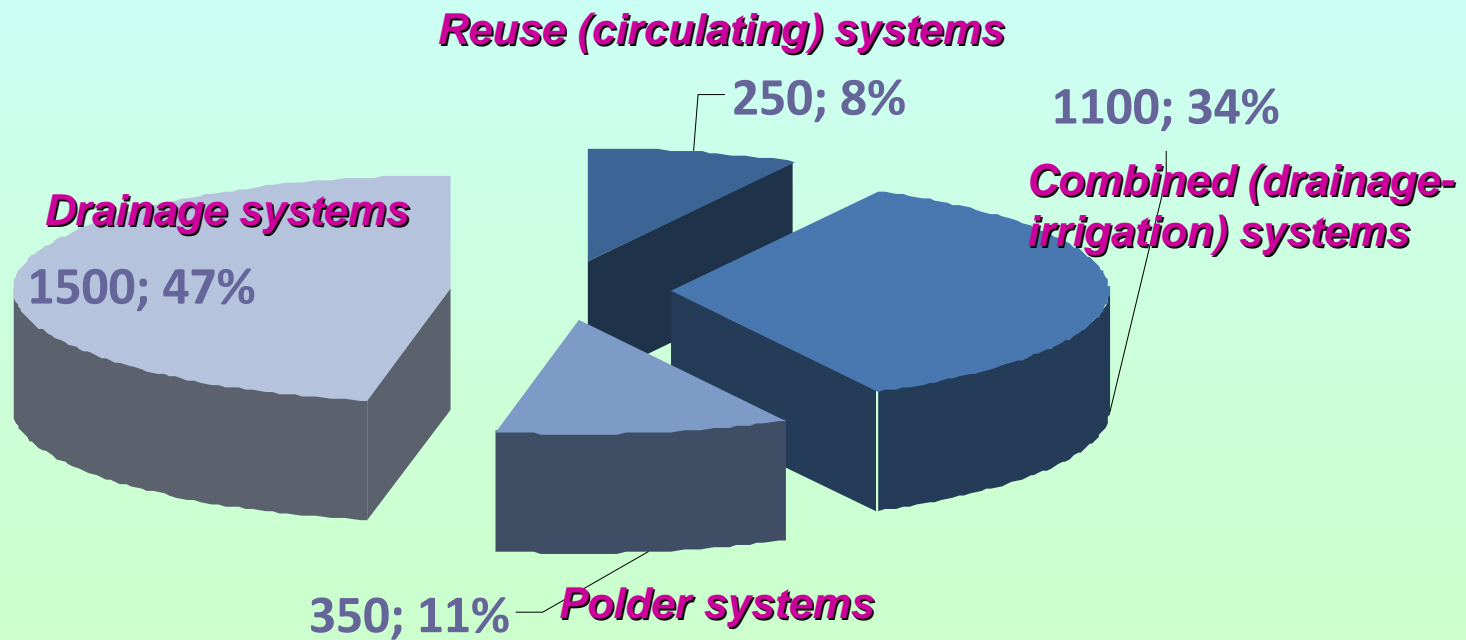
# Map of land-reclamation infrastructure in Ukraine



## Land tenure within drained lands, 2007



# Types of reclamation systems and their share in the total area of drained lands of humid zone of Ukraine



## **Main technical specifications of reclamation systems:**

- **quantity of pump stations – 288;**
- **total capacity - 563,1 m<sup>3</sup>/sec;**
- **total power - 89,2 thousand of kilowatt;**
- **length of main canals – 43 thousand of kilometres;**
- **number of hydraulic buildings - 25200;**
- **length of collector-drainage network – 123 thousand of kilometres;**
- **length of material drainage – 526 thousand of kilometres.**



## **The functional objectives of reclamation systems**

- **level and moisture control of soil waters according to the requirements of agricultural production;**
- **preservation of surface water quality by use of reclamation systems within flood-lands as buffer ecological zones;**
- **flood prevention and partial accumulation of high water during its passage;**
- **increase of ecological safety in radioactive pollution zone (the territory of "the western track " of the Chernobyl nuclear station).**



## The principal causes of production loss the drained lands

- deterioration of financial conditions of agricultural enterprises;
- recession of machine-tractor fleet renewal of commodity producers;
- absence of predicted market of agricultural products distribution;
- non-observance of sown areas structure and crop rotations;
- insufficient land improvement measures - deep tillage, liming;
- interrelation uncertainty between land users and operational water-management organizations in the case of maintenance service of the farm network;
- absence within 60% of systems of guaranteed sources of irrigation water;
- absence of technical means for operative management of water control processes.



## Actual ecological and reclamative condition of the drained lands in a zone of the Ukrainian Polissia (1000 ha)

Parameter	Administrative and territorial unit				
	The Chernigiv region	The Zhitomyr region	The Rivne region	The Volyn region	The Lviv region
<b>Total area of the drained lands</b>	<b>272,0</b>	<b>357,8</b>	<b>321,0</b>	<b>346,7</b>	<b>490,0</b>
<b>In satisfactory condition</b>	<b>194,1</b>	<b>317,4</b>	<b>258,3</b>	<b>314,1</b>	<b>432,8</b>
<b>In unsatisfactory condition:</b>					
•of the catch-water	<b>5,8</b>	<b>-</b>	<b>6,3</b>	<b>-</b>	<b>6,5</b>
• of the drainage network:					
- interfarm;	<b>18,0</b>	<b>1,2</b>	<b>2,7</b>	<b>-</b>	<b>17,1</b>
- farm	<b>27,5</b>	<b>19,0</b>	<b>42,9</b>	<b>11,1</b>	<b>7,3</b>
<b>In unsatisfactory ecological and reclamative condition of lands due to:</b>					
-subsurface water levels;	<b>17,7</b>	<b>0,1</b>	<b>1,2</b>	<b>5,9</b>	<b>6,8</b>
- terms of surface water elimination;	<b>-</b>	<b>20,1</b>	<b>3,7</b>	<b>8,5</b>	<b>5,9</b>
- depths of subsurface water levels and terms of surface water elimination;	<b>2,7</b>	<b>-</b>	<b>2,3</b>	<b>7,1</b>	<b>5,9</b>
- average or high level of soil acidity	<b>6,2</b>	<b>-</b>	<b>3,6</b>	<b>-</b>	<b>7,7</b>



# Ecological and reclamative monitoring

on the drained  
lands

on adjacent territory  
(in drainage influence  
zone)

on adjacent territory  
(out of drainage  
influence zone)

**Control for:**

- regime, balance and chemical compound of water;
- hydro-physical soil condition;
- plant cover condition;
- radio-ecological condition of an environment;
- technical condition of reclamation system



## Block-diagram of decision-making on substantiation of reconstruction and modernization of reclamation systems

### **RETROSPECTIVE INFORMATION COLLECTION**

- economic efficiency of reclamative agriculture;
- social and economic indices;
- soil-ecological parameters and evolutionary soil processes;
- estimation of water control efficiency on reclamation systems

### **MODERN CONDITION ESTIMATION OF RECLAMATION SYSTEMS**

- expeditionary investigations;
- on-line methods

### **EXPERT ESTIMATION ACCORDING TO THE PARAMETERS SYSTEM AND DIRECTION**

- organizational;
- technical;
- technological;
- agro-ecological;
- social and economic

### **CONSIDERATION OF THE PERSPECTIVE ALTERNATIVE SCENARIOS**

Gradation of expert estimation of modern condition  
1 . . . . . N

### **OPTIMIZATION SIMULATION ON DETERMINATION OF COMPLEX RECONSTRUCTION DIRECTIONS**

- considering of the interests of interested parties;
- investment regime;
- modern requirements on ecological reliability increase of reclamation systems

Gradation of regime of the further land use on reclamation systems  
1 . . . . . N

### **DECISION-MAKING ON COMPLEX RECONSTRUCTION AND MODERNIZATION OF RECLAMATION SYSTEMS**

## Conclusions:

### I. Principles of reconstruction and modernization of reclamation systems

- **creation of the block-modular type reclamation systems adapted for environment and requirements of land users;**
- **creation of resource-saving technologies of water control, constructions of reclamation systems with bilateral control of water regime and management facilities of technological processes;**
- **securing of water and land resources rational use, reproduction and increase of soil fertility;**
- **securing of ecological balance within the reclaimed areas;**
- **introduction of scientifically-sound technologies on restoration and agricultural use of the territories polluted with radiation.**



## **II. For legal support of highly productive use of reclaimed lands it is necessary to develop the following normative documents**

- the Procedure of drained lands use and reclamation funds of farm systems;**
- the Procedure of financing costs for maintenance service of farm systems;**
- the Rules of field observation, certification, estimation of technical condition of reclamation systems and ecological condition of reclaimed agro-landscapes and determination of the extent of reclaimed lands renaturalization;**
- the Methods on normalization of anthropogenic load on the reclaimed agro-landscapes in the basins of small rivers-water intakes;**
- Specifications on technical condition estimation of reclamation systems.**





**Thank you for attention**

