Transboundary water management in the Amudarya adaptation to climate change uncertainties (PEER project)

Scientific-Information Center of ICWC

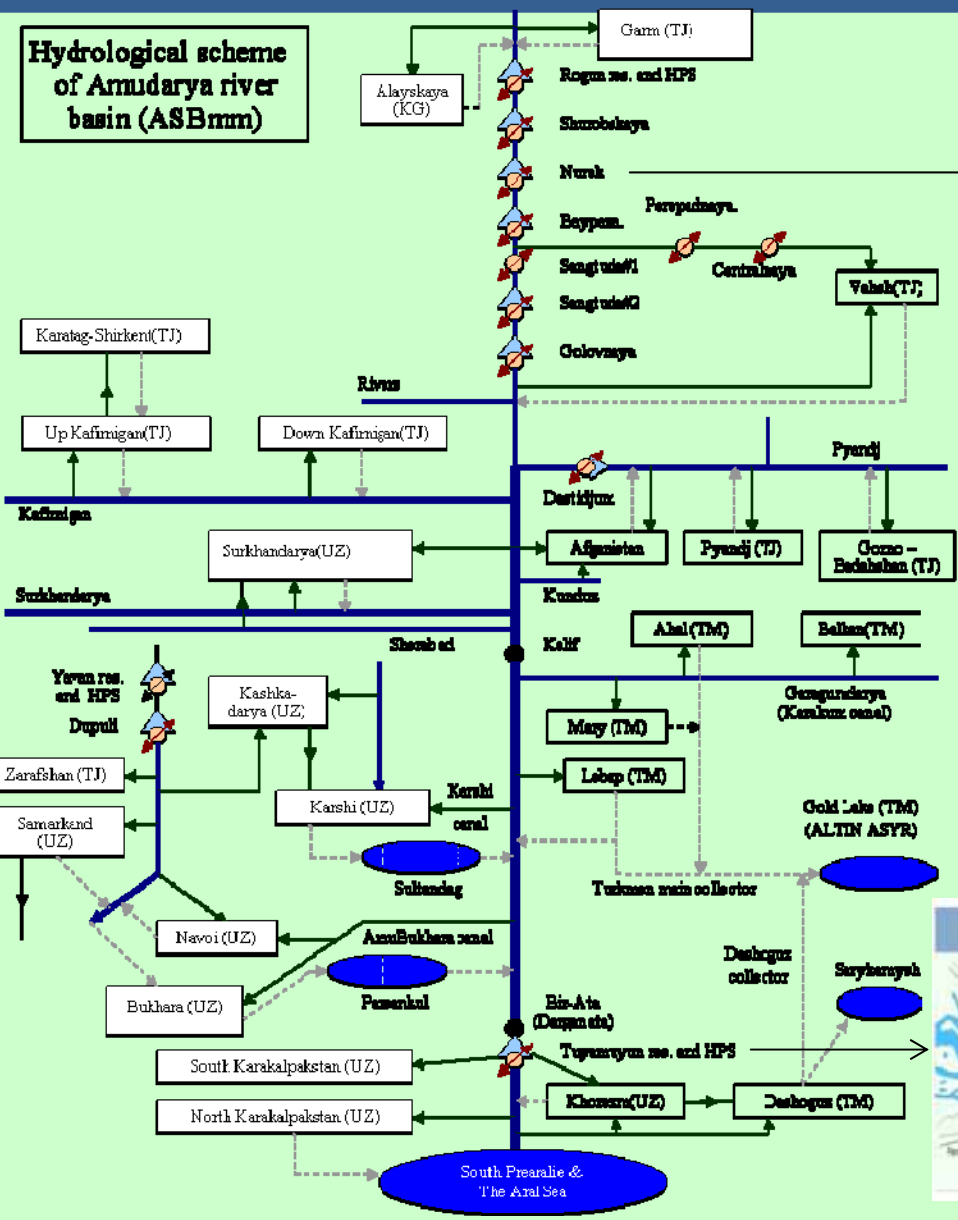
2017, February, 23

Prepared Anatoly Sorokin

An overall goal of the PEER Project is to build adaptive capacity of the countries sharing the Amudarya basin to manage effectively their transboundary waters under climate change (CC) & other uncertainties.

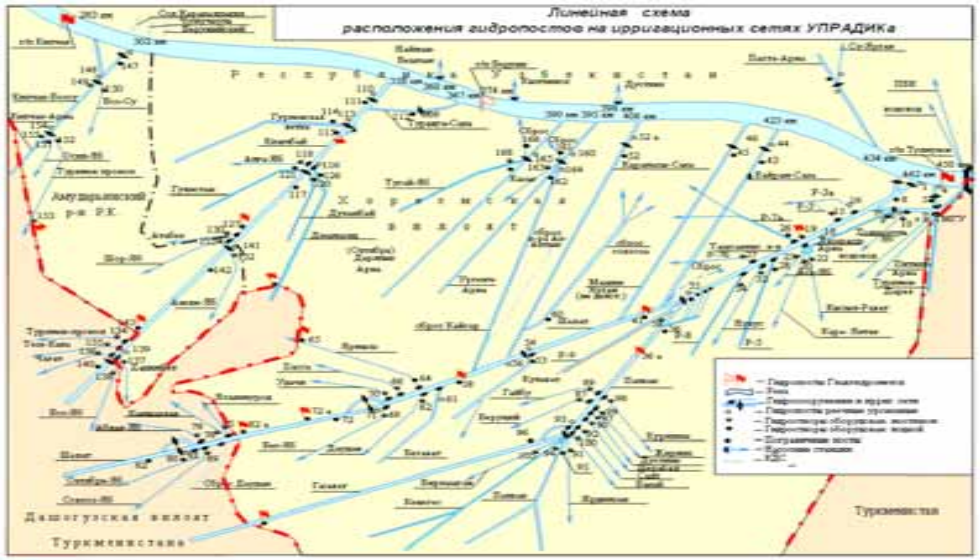
This goal is to be achieved by studying in a holistic manner transboundary water management (TWM) issues in the Amudarya basin for the long run under conditions of climatic & other changes along with national plans on irrigated agriculture & hydropower development.

Research objects are river network, large canals and collectors, lakes, reservoirs, HEPS, and planning zones (provinces) of the riparian countries in the Amudarya basin



Upper reaches of the Amudarya River Basin: Tajikistan planning zones

Middle reaches of the Amudarya River Basin: Uzbekistan and Turkmenistan planning zones



Lower reaches of the Amudarya River Basin: Uzbekistan and Turkmenistan planning zones

Main tasks :

- Assess possible changes in the hydrologic regime of Amudarya Basin rivers & future crop water requirements due to climate change
- Study scenarios of long-term flow regulation by a system of large hydropower reservoirs on the hydrology of rivers, available water supply for irrigated lands and for sustaining aquatic ecosystems in the basin

Main tasks:

- Evaluate future crop water requirements for irrigated lands of the riparian countries under an array of future climate change & river flow regulation
- Elaborate possible tradeoff between national priorities & requirements at the basin level inter alia on the basis of legal analysis of transboundary water management in Amudarya basin

Updated research schedule - TWM in the Amudarya adaptation to climate change uncertainties

1 November 2015 – 1 November 2016	
Activities	**Milestones**
1. **Preparation (planning & design)**	
1.1 Study of TWM in the basin	Logical model for WM
1.2 Development of research methodology	Scheme for scenario combinations, methodology
1.3 Data collection & analysis (climate, water & land resources, HEPS operation regimes, etc)	Evaluation of existing climatic scenarios, data
	Prices for agricultural products & electricity for 2050
1.4 Working meeting	Plan to coordinate activities
2. **Research**	
2.1 ASBmm adjustment	Adjustment of the components of water balance
2.2 Analysis of national development programs	Data on development strategies for sector of agriculture, irrigation, hydropower and ecosystems (until 2050)
2.3 Modeling crop water requirements in light of CC	Crop water requirements by province for 2020-2050
2.4 Modeling runoff series in light of CC	Runoff series for 2020-2050
2.5 Study HEPS operation regimes	Alternative scenarios of HEPS operation for 2020-2050
2.6 Study limitations for development	Required water supply to Afghanistan, lakes of the Amudarya delta & the Aral Sea
2.7 Study legal & institutional framework	Legal and institutional assessment
2.8 Hold a seminar-training	Seminar to discuss results of stage 1&2 & train research team & students on modeling approaches for Stage 3

1 November 2016 – 1 November 2017	
Activities	**Milestones**
3. **Numerical experiment**	
3.1 Conduct serious of simulations for different scenarios (climate, water resources, HEPS operation, innovations, water requirements)	Assessment of impact of CC & & HEPS operation on water availability for provinces and aquatic ecosystems for 2020-2050
	Assessment of CC impact on water resources & water balance
3.2 Develop proposal on WM under CC	Principles of WM for 2020-2050, including legal issues
4**. Dissemination**	
4.1 Maintain the project page on the web-site	New knowledge & data on web-site
4.2 Organize a final workshop	Workshop to disseminate results, present web-site with project data, futuretarining plaln discussion
4.3 Prepare policy briefs, scientific articles & other publications	Policy briefs, articles, other publication
4.4 Present results & repare project's follow-up dissemination plan	Report. Plan for dissemination of the results upon completion of the project.

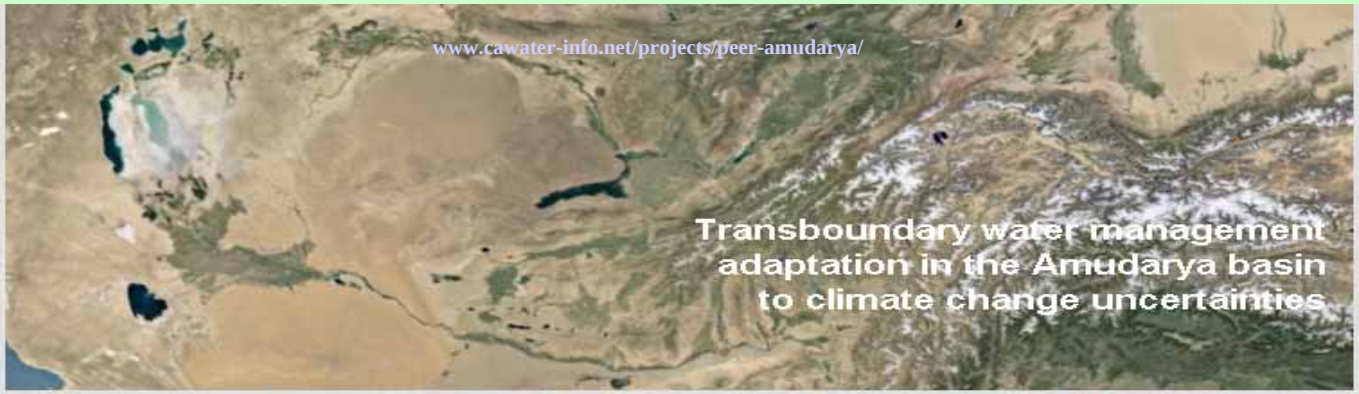
Information resource

•The project PEER created database and interface to water indicators in the context of planning zones
•Filling the data (1 October 2016): Khorezm, North and South Karakalpakstan

•Information resource located on the SIC ICWC servers and available in the internet:

http://cawater-info.net/peer

Project web-site



HOME | ABOUT | DATA BASE | KNOW. BASE | РУССКИЙ

The United States Agency for International Development (USAID) is the U.S. Government's preeminent foreign assistance agency. The agency is dedicated to helping nations meet the needs of their citizens by providing health-care, education, and economic opportunity to end extreme poverty and promote democratic, resilient societies. The U.S. Global Development Lab (The Lab) at USAID is bringing together a diverse set of partners to discover, test, and scale breakthrough solutions to address critical challenges in international development. A key element of this strategy is the support of scientific and technological research through the Partnerships for Enhanced Engagement in Research (PEER) program. PEER is a competitive awards program that invites scientists in developing countries to apply for funds to support research and capacity-building activities on topics of importance to USAID and conducted in partnership with U.S. Government-funded and selected private sector partners.

The goal of this project is to build adaptive capacity of the countries sharing the Amudarya basin to manage effectively their transboundary waters under climate change climate changeand other uncertainties.

Objective to study in a holistic manner transboundary water management issues in the Amudarya basin for the long run under conditions of climatic and other changes along with national plans on irrigated agriculture and hydropower development.

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Management:

Categories

- Water withdrawal in PZ
- Water discharge in PZ
- Water withdrawal from the river

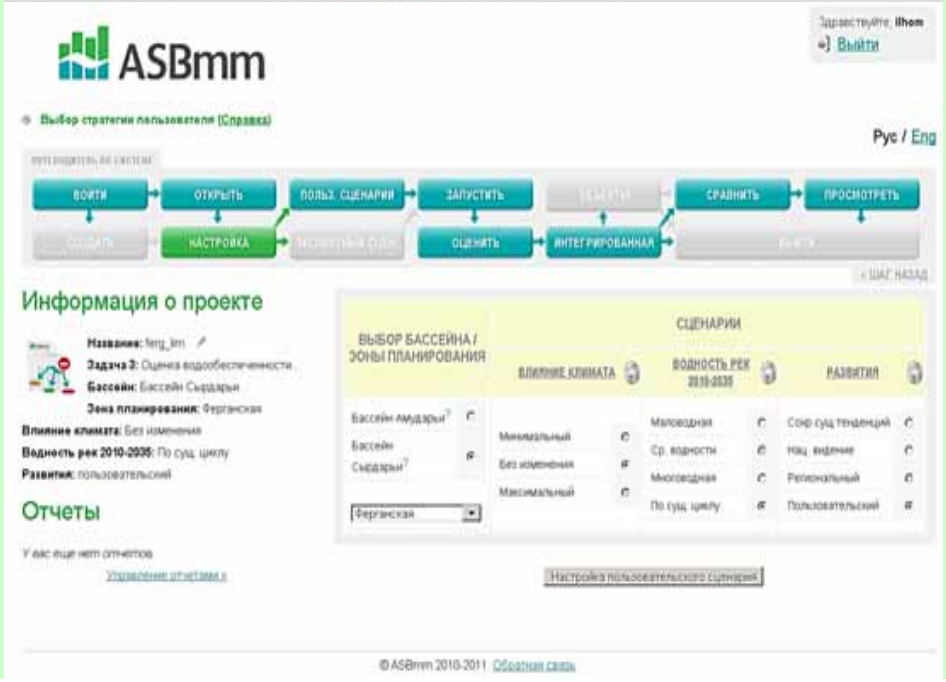
Indicators on categories (2010-2015)

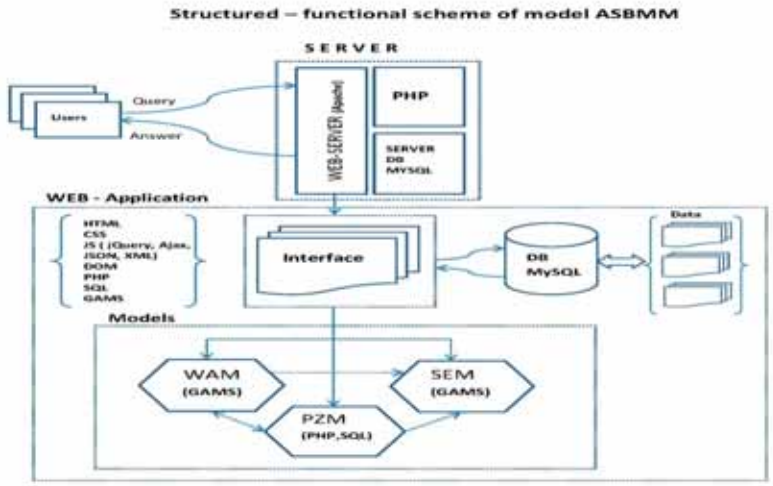
Water withdrawal in PZ: total, for agricultural needs, irrigation, residential use and industry

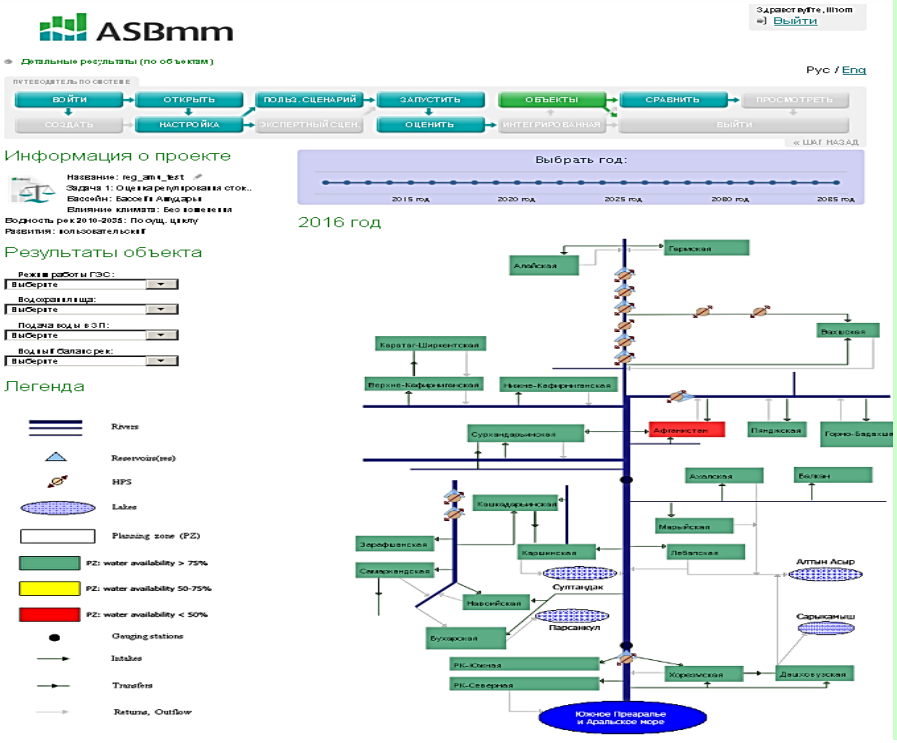
Water discharge in PZ: total, in agriculture, residential use and industry

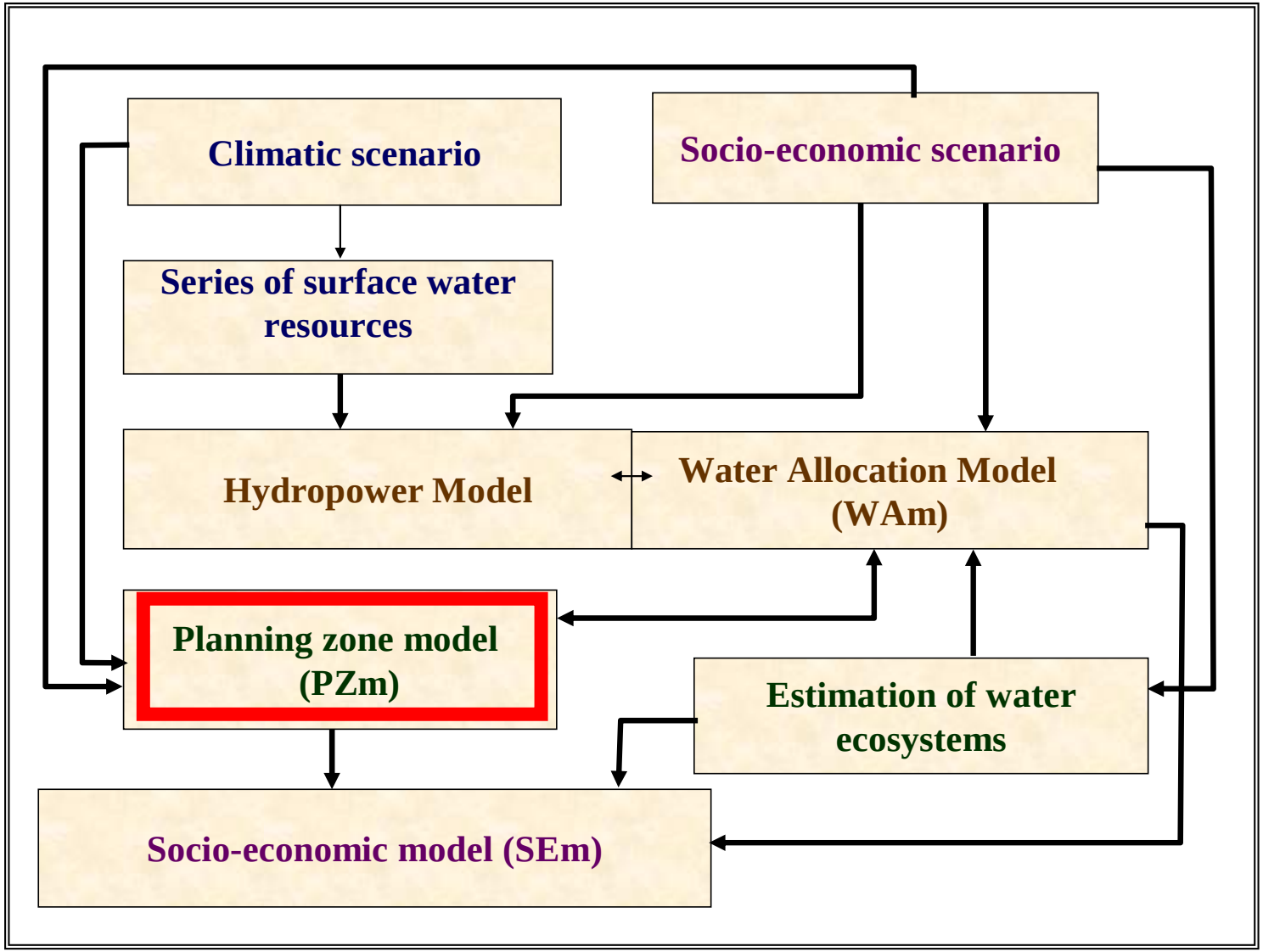
Water withdrawal from the river: limit for water withdrawal, actual withdrawal


ASBmm
Login to the interface
Registration
HOME
PROJECT DESCRIPTION
HELP
NEWS
HISTORY
FAQ
DEVELOPERS
FORUM
Рус / Eng
ASBmm – integrated model for assessment of aral sea basin development scenarios
Authorization
Navigation system
Long-term forecasts
See also
Aral Sea Basin


ASBmm
Здравствуйте, Ilhom
Выйти
Выбор стратегии пользователя (Справка)
Рус / Eng
ВОЙТИ
ОТКРЫТЬ
ПОЛЬЗ. СЦЕНАРИЙ
ЗАПУСТИТЬ
СРАВНИТЬ
ПРОСМОТРЕТЬ
СОЗДАТЬ
НАСТРОЙКА
ЭКСПЕРТНЫЙ СЦЕН.
ОЦЕНИТЬ
ИНТЕГРИРОВАННАЯ
ВЫЙТИ
« ШАГ НАЗАД
Информация о проекте
Название: ferg_tm
Задача 3: Оценка водообеспеченности
Бассейн: Бассейн Сырдарьи
Зона планирования: Ферганская
Влияние климата: Без изменения
Водность рек 2010-2035: По сущ. циклу
Развитие: пользовательский
Отчеты
У вас еще нет отчетов
Управление отчетами »
ВЫБОР БАССЕЙНА / ЗОНЫ ПЛАНИРОВАНИЯ
СЦЕНАРИИ
ВЛИЯНИЕ КЛИМАТА
ВОДНОСТЬ РЕК 2010-2035
РАЗВИТИЕ
Бассейн Амударьи
Бассейн Сырдарьи
Ферганская
Минимальный
Без изменения
Максимальный
Маловодная
Ср. водности
Многоводная
По сущ. циклу
Сохр сущ тенденций
Нац. видение
Региональный
Пользовательский
Настройка пользовательского сценария
© ASBmm 2010-2011 Обратная связь


Structured – functional scheme of model ASBMM
SERVER
Users
Query
Answer
WEB-SERVER (Apache)
PHP
SERVER DB MYSQL
WEB - Application
HTML
CSS
JS (jQuery, Ajax, JSON, XML)
DOM
PHP
SQL
GAMS
Interface
DB MySQL
Data
Models
WAM (GAMS)
SEM (GAMS)
PZM (PHP,SQL)


ASBmm
Здравствуйте, Ilhom
Выйти
Детальные результаты (по объектам)
Рус / Eng
ВОЙТИ
ОТКРЫТЬ
ПОЛЬЗ. СЦЕНАРИЙ
ЗАПУСТИТЬ
ОБЪЕКТЫ
СРАВНИТЬ
ПРОСМОТРЕТЬ
СОЗДАТЬ
НАСТРОЙКА
ЭКСПЕРТНЫЙ СЦЕН.
ОЦЕНИТЬ
ИНТЕГРИРОВАННАЯ
ВЫЙТИ
« ШАГ НАЗАД
Информация о проекте
Название: reg_amt_test
Задача 1: Оценка регулирования сток..
Бассейн: Бассейн Амударьи
Влияние климата: Без изменения
Водность рек 2010-2035: По сущ. циклу
Развитие: пользовательский
Выбрать год:
2015 год
2020 год
2025 год
2030 год
2035 год
2016 год
Результаты объекта
Режим работы ГЭС:
Водохранилища:
Подача воды в ЗП:
Воды в Сарыкамышскую впадину:
Выберите
Легенда
Rivers
Reservoirs(res)
HPS
Lakes
Planning zone (PZ)
PZ: water availability > 75%
PZ: water availability 50-75%
PZ: water availability < 50%
Gauging stations
Intakes
Transfers
Returns, Outflow
Амударья
Сурхандарьинская
Кашкадарьинская
Зарафшанская
Самаркандская
Каршинская
Бухарская
Навоийская
Джизакская
Сырдарья
Ферганская
Наманганская
Андижанская
Ташкентская
Чирчик-Келесская
Верхне-Сырдарьинская
Нарынская
Каратау-Ширкентская
Верхне-Кафирниганская
Нижне-Кафирниганская
Сурхандарьинская
Афганистан
Пянджская
Горно-Бадахшанская
Ахангаранская
Бозсуйская
Кашкадарьинская
Мирзачульская
Зарафшанская
Каршинская
Лявлянская
Самаркандская
Султандаг
Навоийская
Алтын Асыр
Парсанкул
Бухарская
Сарыкамыш
РК-Южная
РК-Северная
Хорезмская
Дашховузская
Южное Приаралье и Аральское море



ASBmm–PEER research tool

Scenarios

1. Climate change by 2050 and its impact on:
- river flow regime
- crop water requirements (water demand)

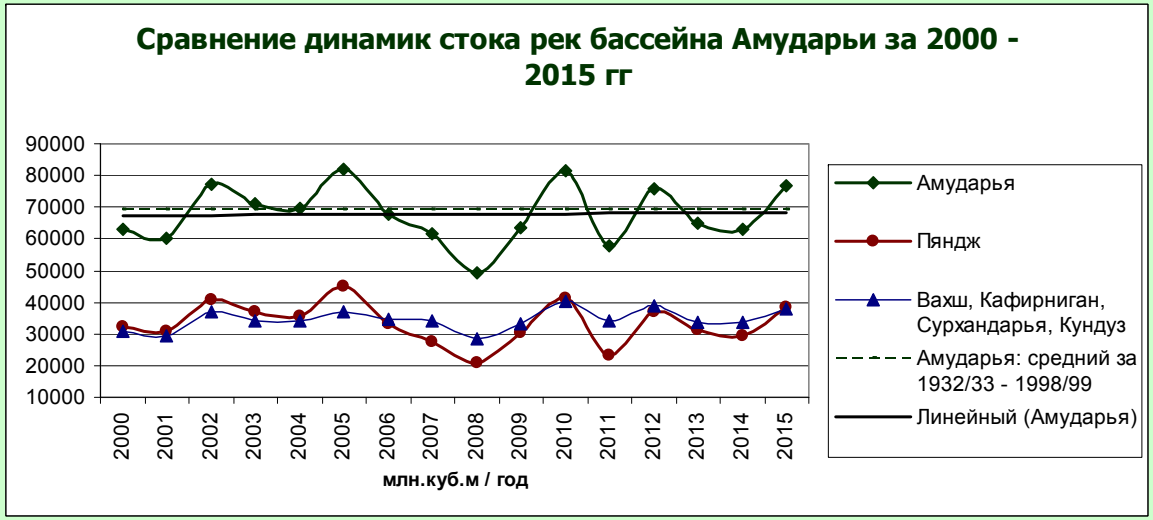
2. Socio-economic (scenarios of country development 2020…2050)
- Agriculture (BAU, food security, export oriented)
- Energy (growth of energy consumption, putting new hydropower into operation), industry, municipal sector (BAU)

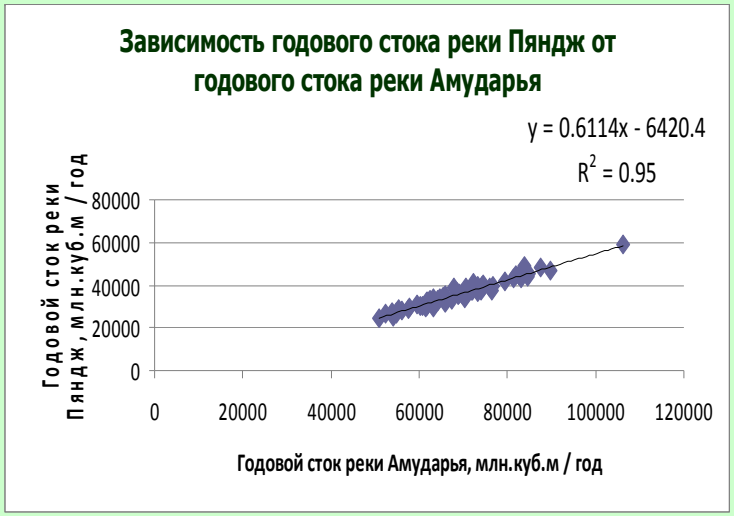
3. Distribution of crops by PZ according to national agricultural development scenarios by 2050, criterion optimization

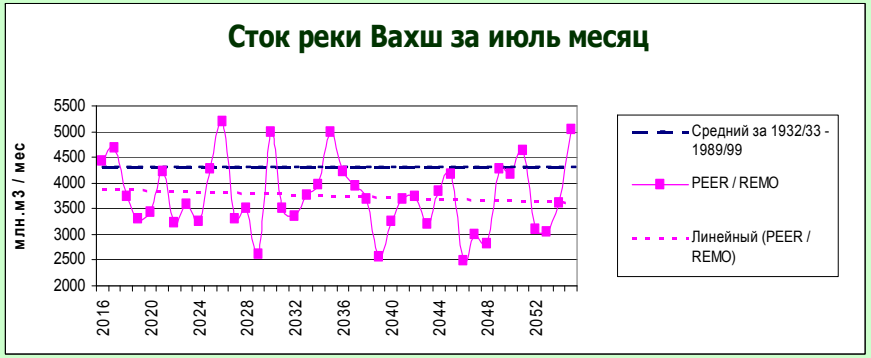
4. Innovations in PZ – water conservation and yield improvement based on national agricultural development scenarios by 2050

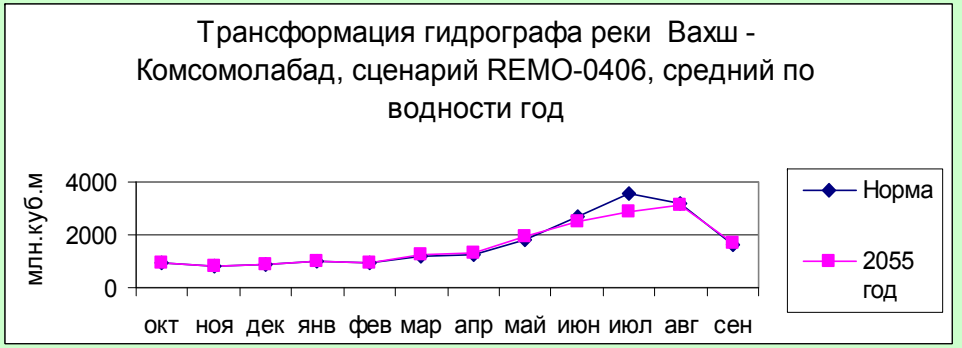
5. River flow regulation by reservoirs and HEPS by 2050:
- energy-generation operation regime,
- energy-irrigation operation regime.

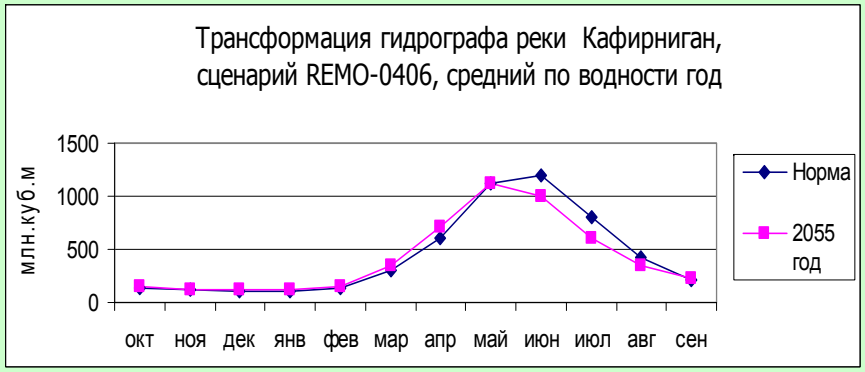
Reconstruction and analysis of river flow series in the Amudarya River Basin, Mm³ : PEER / ASBmm

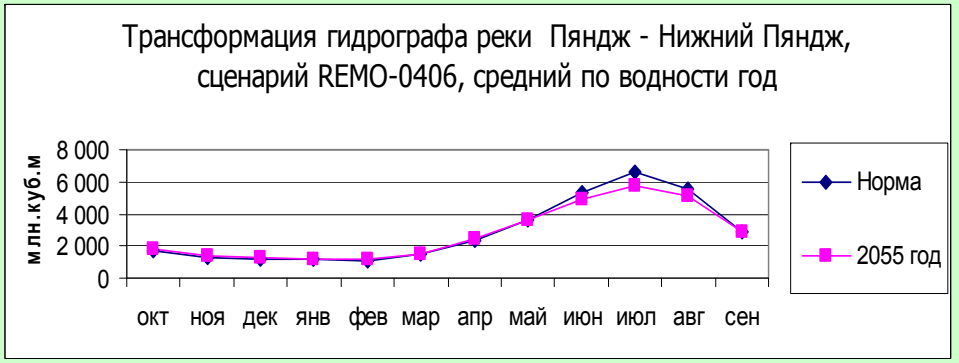


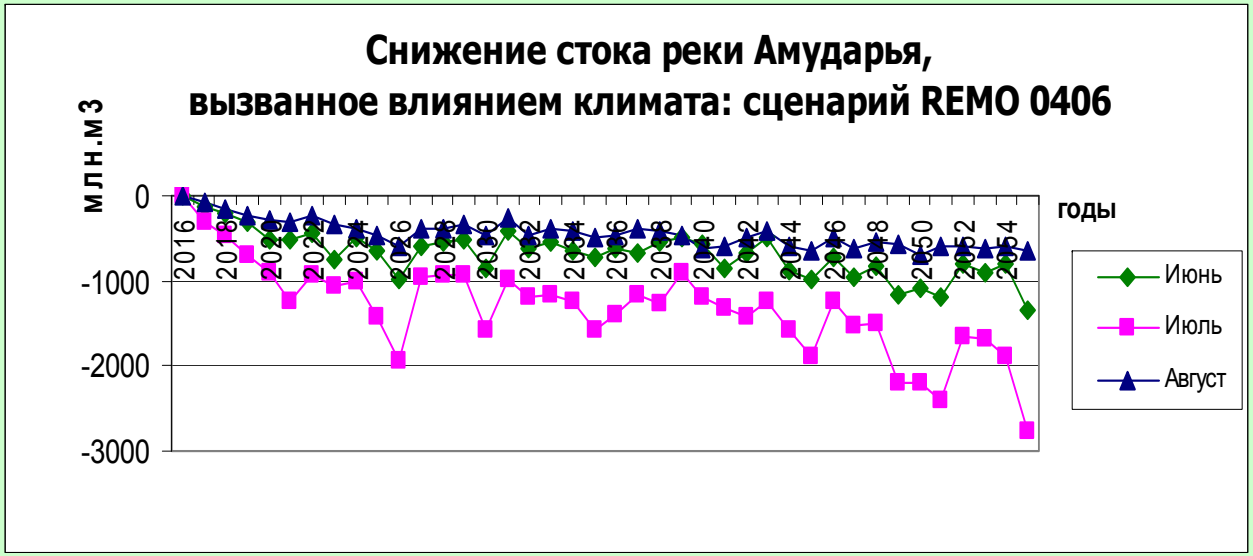






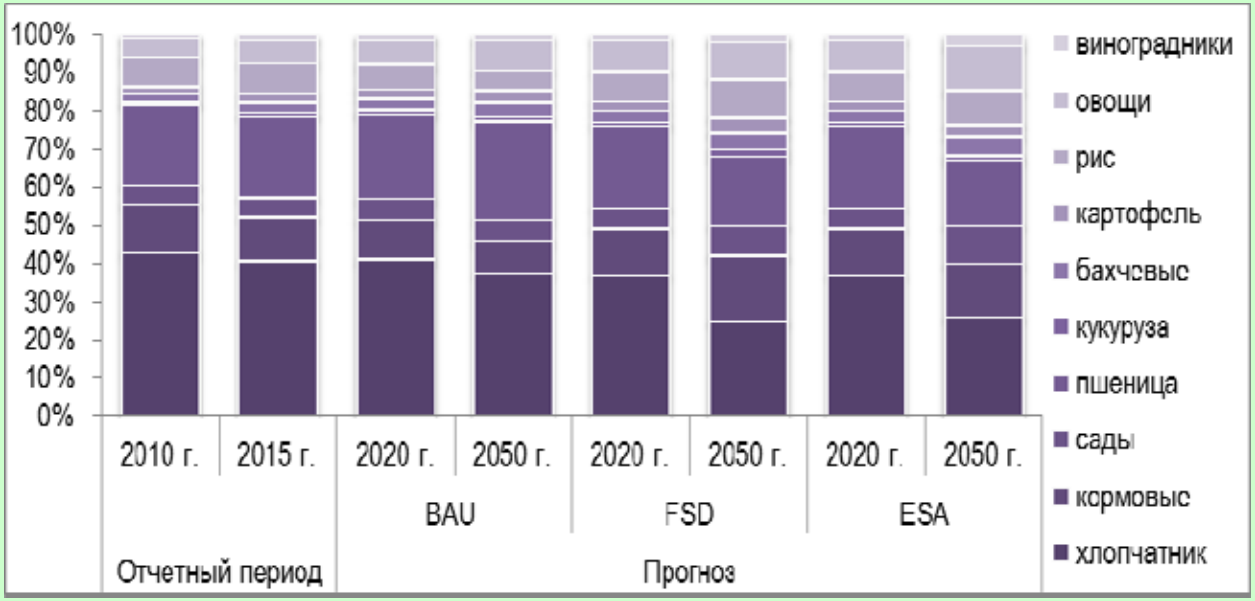




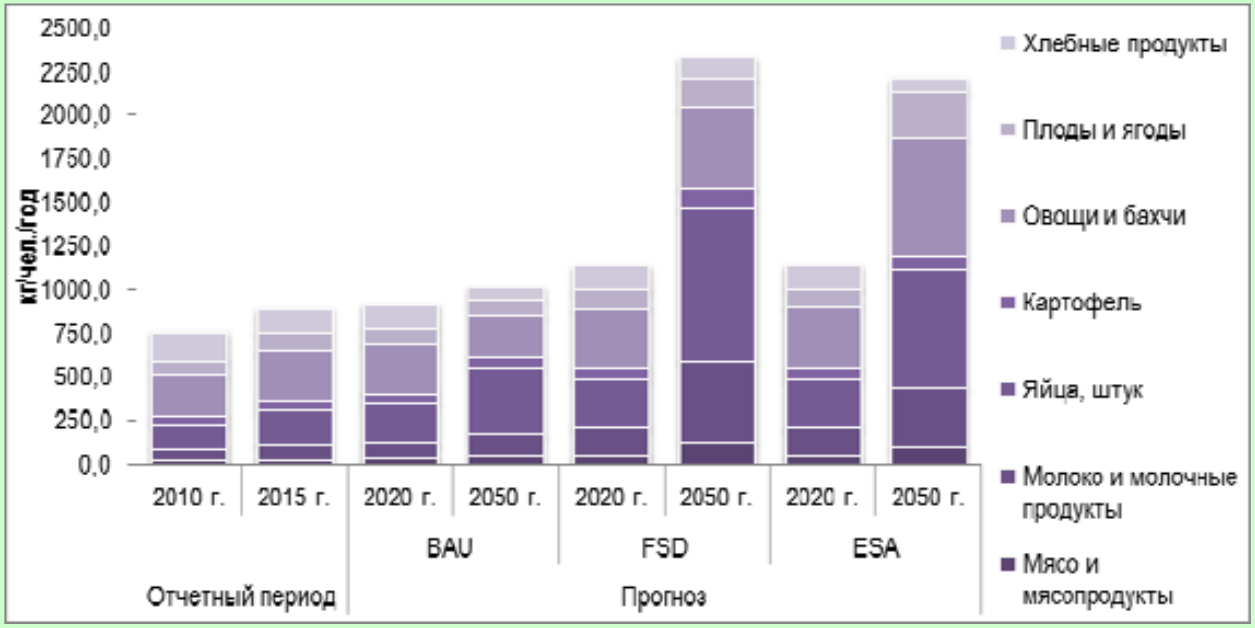


Assessment of climate change effect on river flow and plotting of river stream flow hydrographs for the Amudarya basin for 2016—2055: PEER / ASBmm – REMO 0406

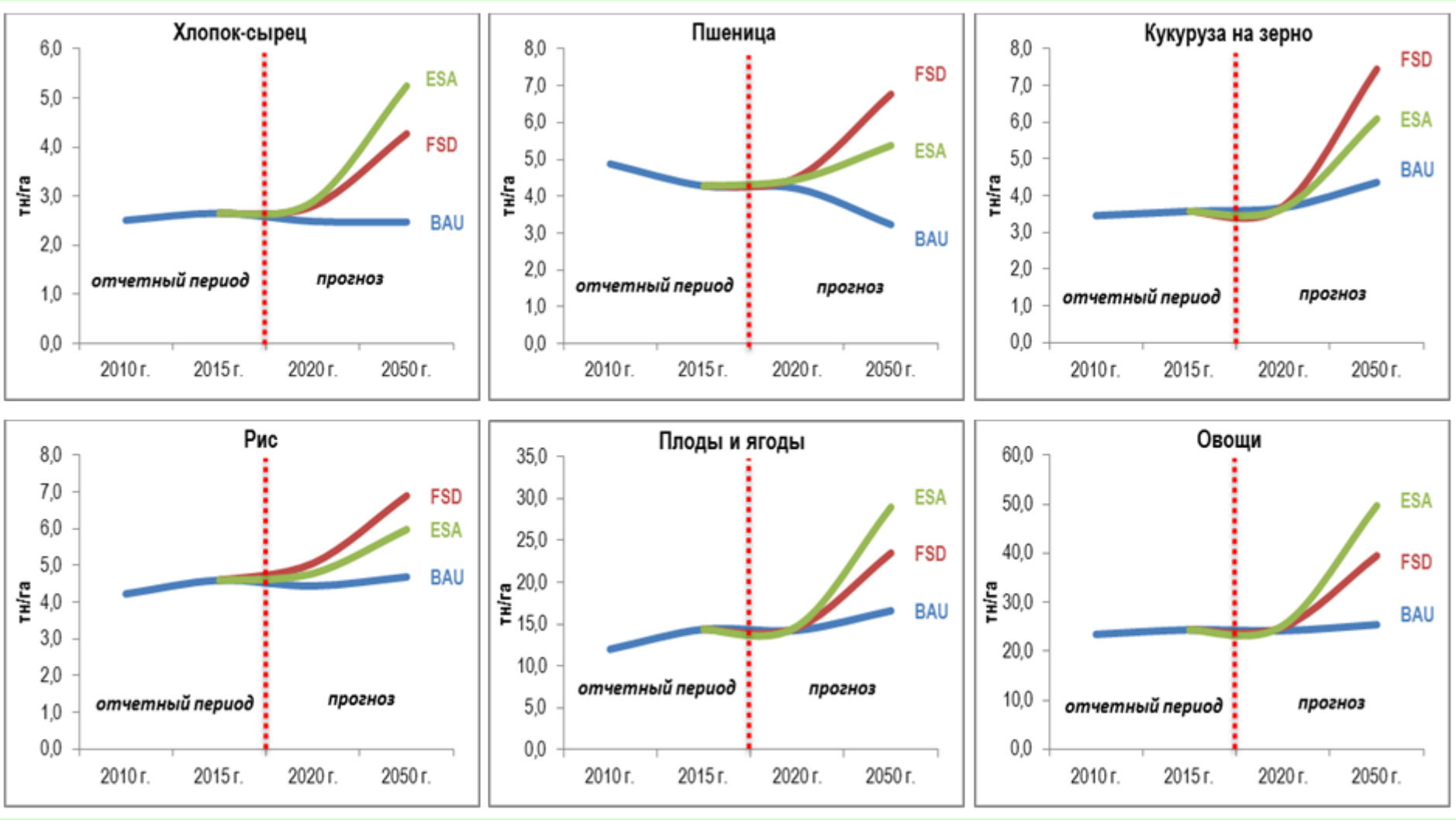
Forecast of change in crop land areas in the Khorezm planning zone by 2050



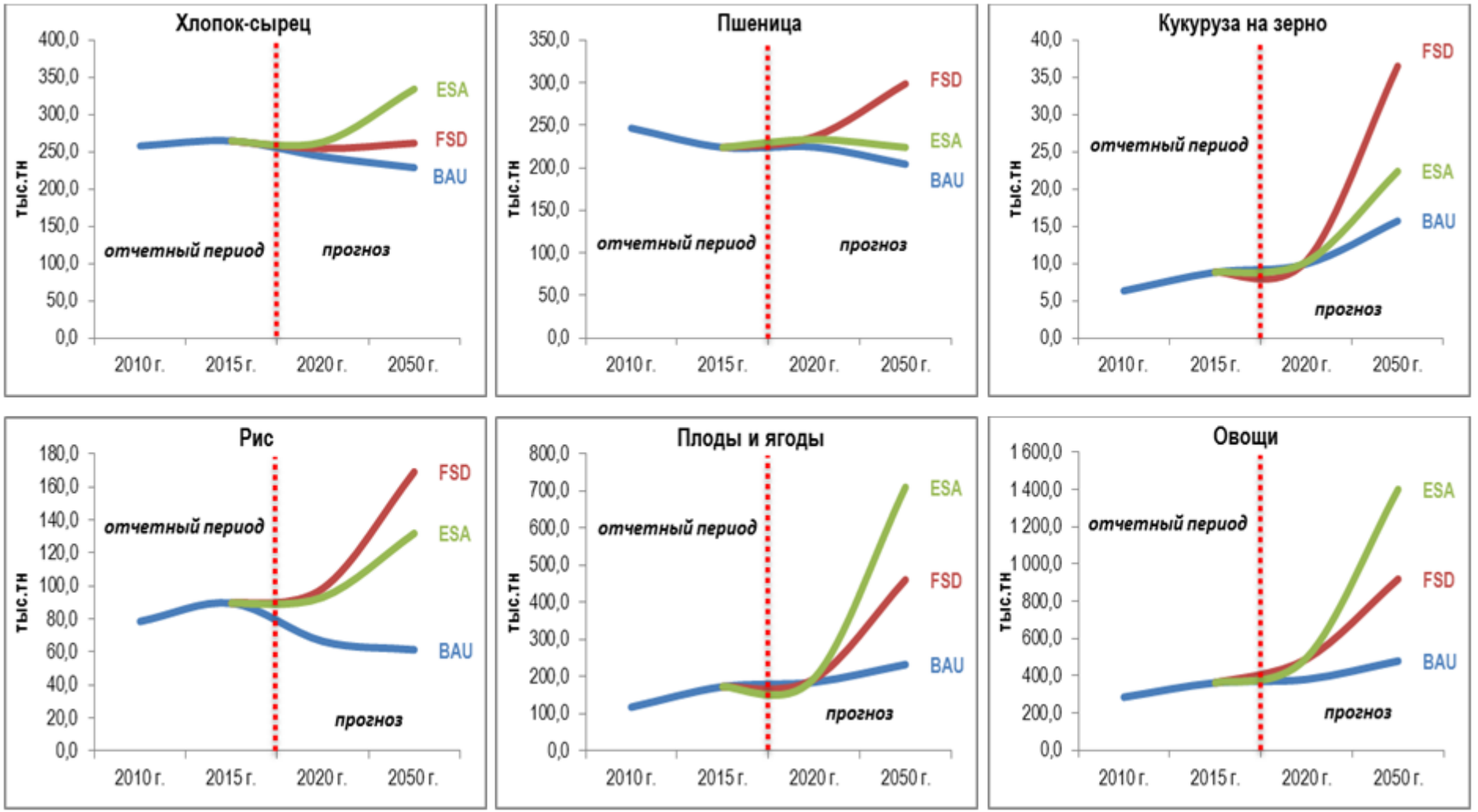
Forecast of per capita production of basic foodstuffs in the Khorezm planning zone by 2050



Forecast of changes in main crop yields in the Khorezm planning zone by 2050



Forecast of changes in crop production output in the Khorezm planning zone by 2050



Department of Earth and Planetary Sciences, the Johns Hopkins University; Baltimore, Maryland, USA

THANK YOU FOR ATTENTION

Scientific-Information Center of ICWC