



Food and Agriculture Organization
of the United Nations

Scaling-up capacity, partnerships and investment to accelerate agrifood systems transformation in the Sahel

ANNEX: Investment plan & opportunities

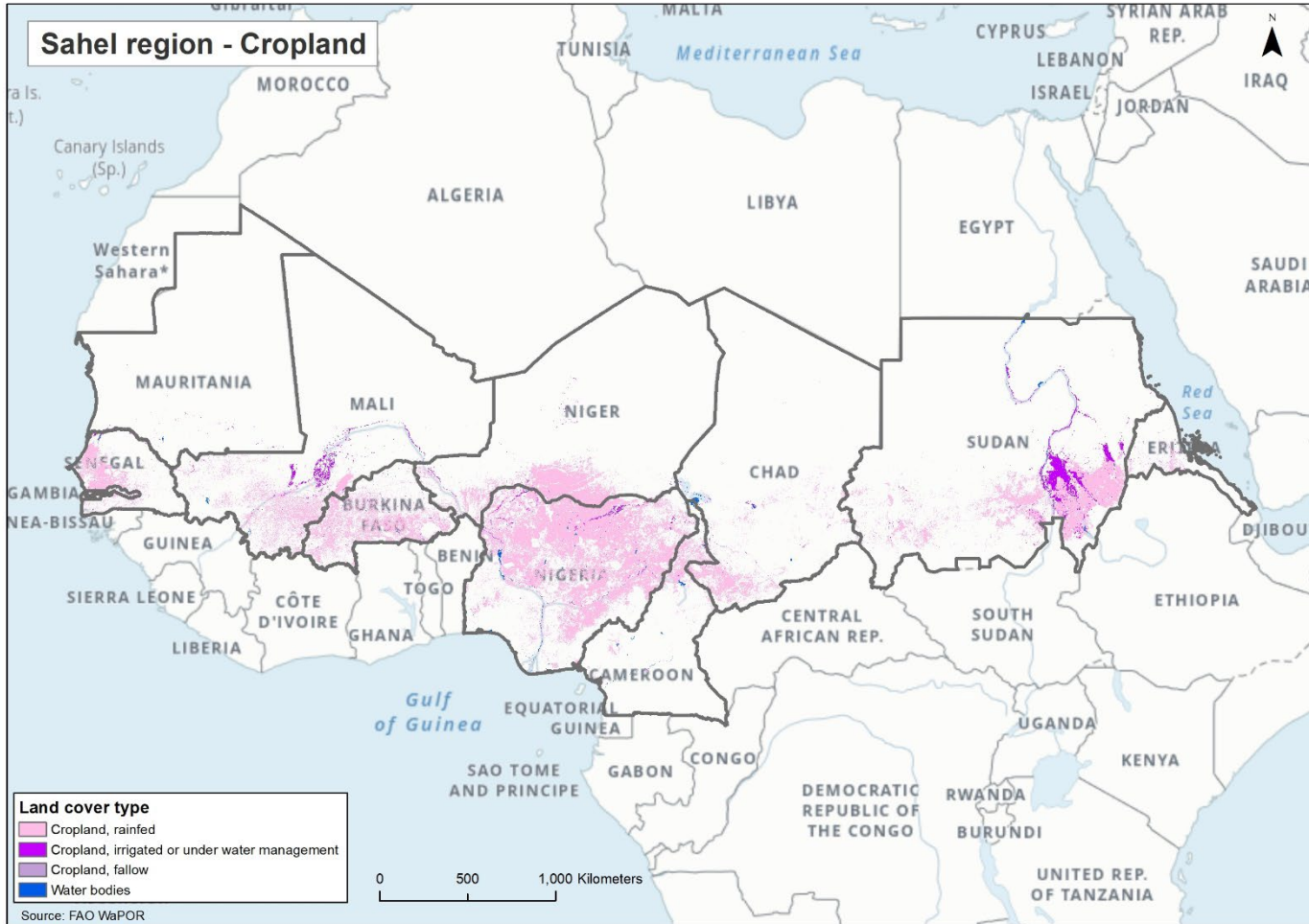


Hand-in-Hand
Initiative

Investment Forum | Rome, Italy | 17-19 October 2022

**Special Session on Sahel
for the HiH Investment
Forum**

Integrated Water management



Importance of water management to contribute to environmental sustainability:

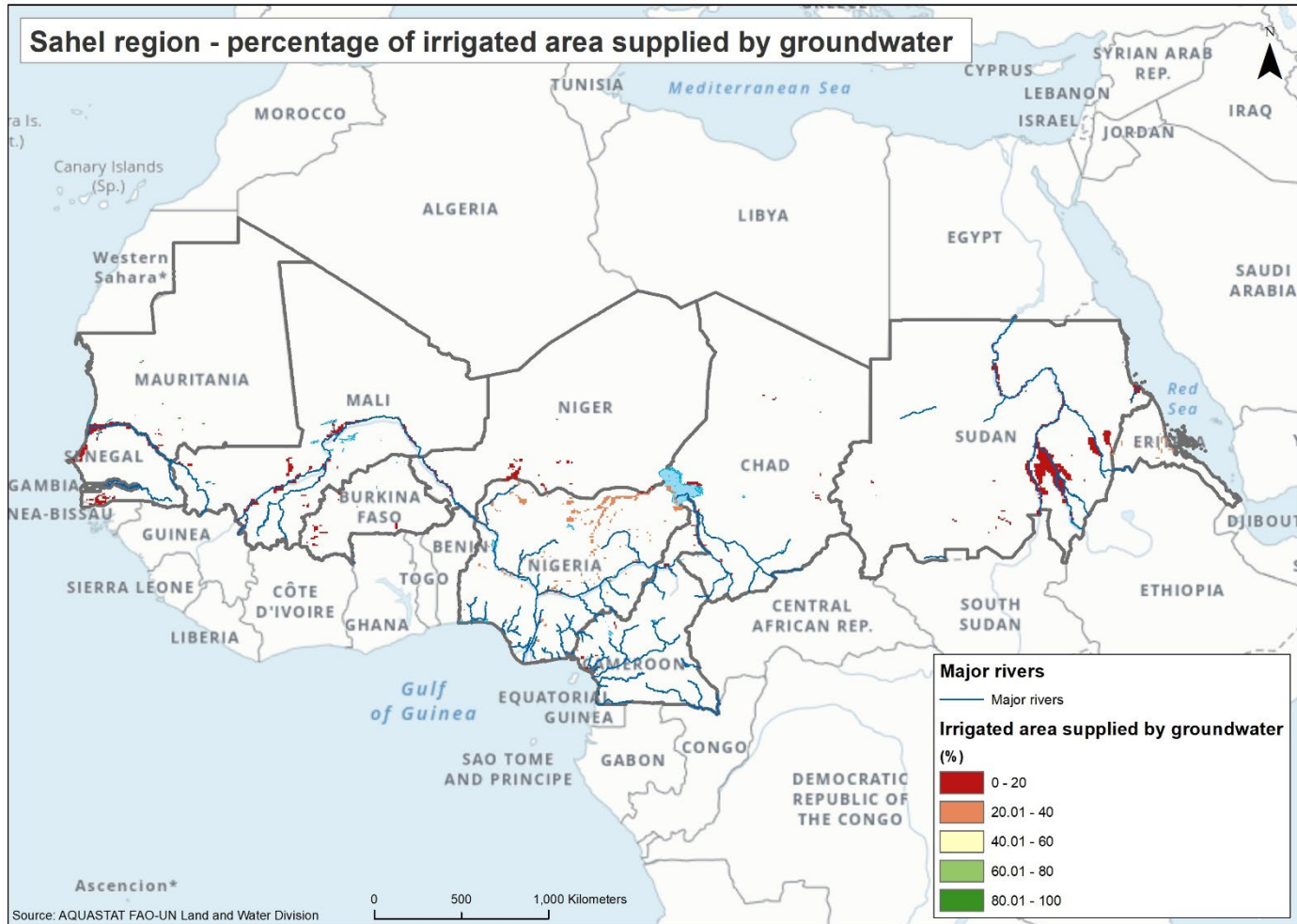
- ✓ Focus on irrigation to increase labour productivity, and food security, promoting climate-resilient agriculture.
- ✓ Decline of groundwater due to climate change, makes saving measures to become more important after 2050
- ✓ Increasing demand for more diversified product and high-value added food crops are increasing in regional markets.
- ✓ Adaptation strategies (i.e. improved seed varieties) must be considered, yet weighed against adverse outcomes.

IC 1: Small-scale irrigation in the Sahel region

A small proportion of land equipped with irrigation

	Agricultural equipped for land (1,000 ha)	Area irrigation (1,000 ha)
Burkina Faso	12,143	55
Cameroon	9,750	29
Chad	50,238	30
Gambia	605	5
Guinea	14,500	95
Mali	41,201	380
Mauritania	39,661	45
Niger	46,597	267
Nigeria	69,450	331
Senegal	8,878	120

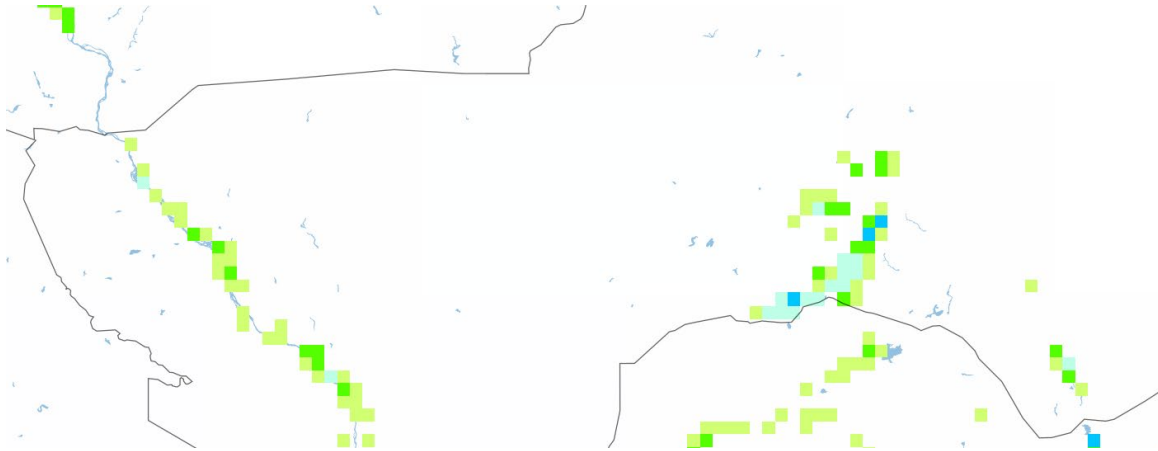
Source: FAOSTAT



Source: HiH-GIS analysis team

IC 1: Small-scale irrigation in Niger

Irrigated areas and water availability



Area

Locations identified for small-scale irrigation (IP) expansion in the western part. Almost all areas are in four of Niger's regions (mainly Tillabery and Dosso).

Activities

- Four types of scalable water collection and/or extraction technologies were identified.
 1. Pedal pump (133 thousand ha)
 2. Motor pump (136 thousand ha)
 3. Small tank; and (98 thousand ha)
 4. Community River Diversion Projects (6 thousand ha)
- All systems use surface water that is collected or diverted for use by smallholder farmers.
- Ten crops: **onion, tomato, cabbage, garlic, cassava, potato, wheat, maize, pepper and moringa**

IC 1: Small-scale irrigation in Niger

10-year plan:

- ✓ Potential to reach up to **4.6 million** people in rural areas
- ✓ Average productivity increase of 10 crops with irrigated systems: **from 568 kg/ha to 1,783 kg/ha.**
- ✓ Generated agricultural value added of **6.1 billion USD.**
- ✓ lift out of poverty **~650 thousand people** (14% of them in urban areas)
- ✓ Contribute 82-86% to poverty reduction in rural areas

Investment

Investment to develop **373,000 ha** for small-scale irrigation

Average investment : **7,433 USD/ha**

- Motor pump: 1,010 million USD;
- Pedal pump: 989 million USD;
- Small tank: 728 million USD;
- River diversion: 35 million USD.

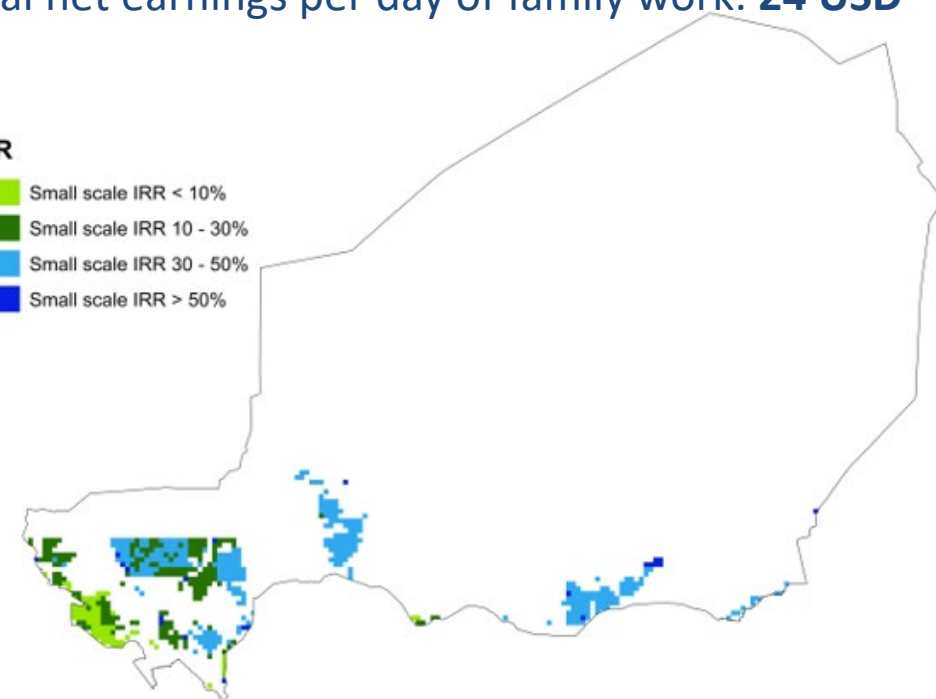
Average **IRR 27%**

Additional net earnings per day of family work: **24 USD**

	Motor pumps	Pedal pumps	Community River Diversion Project	Small tank
Application area (thousands ha)	136	133	6	98
Economic benefits (billions of US dollars/year)	0,11	0,11	0,004	0,07
Affected rural population (millions of people)	1,0	1,6	0,04	2
Water consumption (billion m ³ /year)	0,12	0,12	0,02	0,15
Net income, (US\$ per ha per year)	808,82	827,07	666,67	714,29
Net income, (US\$ per 100M ³ of water)	91,67	91,67	20,00	46,67

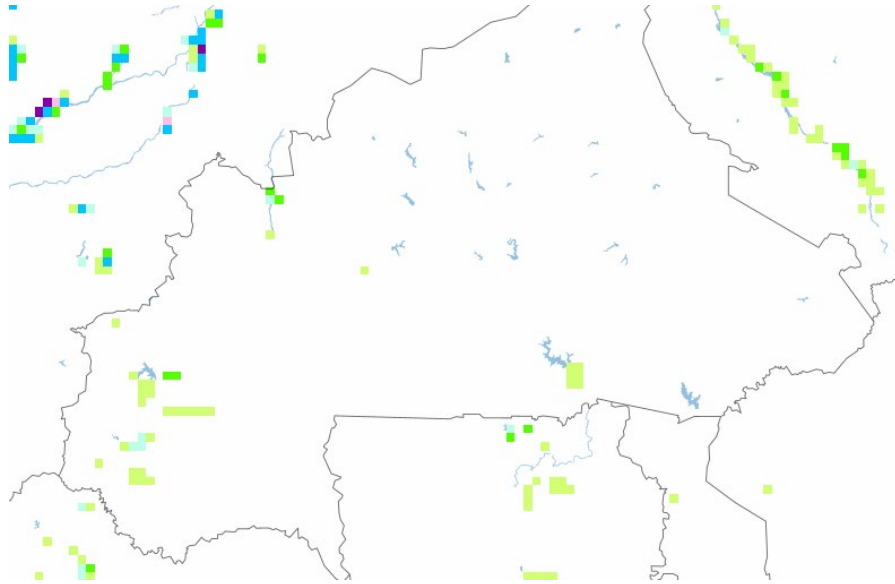
IRR

- Small scale IRR < 10%
- Small scale IRR 10 - 30%
- Small scale IRR 30 - 50%
- Small scale IRR > 50%



IC 1: Small-scale irrigation in Burkina Faso

Irrigated areas and water availability



Area

Most of the areas that can be developed for small-scale irrigation using surface water are located in four regions: Boucle du Mouhoun, Centre-Ouest, Hauts-Bassins and North

Activities

- Four types of scalable water collection and/or extraction technologies were identified.
 1. Pedal pump (849 thousand ha)
 2. Motor pump (1066 thousand ha)
 3. Small tank; and (572 thousand ha)
 4. Community River Diversion Projects (632 thousand ha)
- All of these systems use surface water that is collected or diverted for use by smallholder farmers.
- Nine crops: **rice, sugarcane, maize, onion, tomato, French bean, potato, pepper, black-eyed pea.**

IC 1: Small-scale irrigation in Burkina Faso

10-year plan:

- ✓ Potential to reach up to **37.8 million** people in rural areas
- ✓ Average productivity increase of 9 crops with irrigated systems: from **1656 kg/ha to 3,414 kg/ha**.
- ✓ Increase in agricultural value added of **1.4 billion USD**.
- ✓ lift out of poverty ~**320 thousand people** (97% of them in rural areas)

Investment

Investment to develop **3.2 million ha** for small-scale irrigation

Average investment: **19,373 USD/ha**

- Motor pump: 20.7 billion USD;
- Pedal pump: 15.6 billion USD;
- Small tank: 11.1 billion USD;
- River diversion: 9.7 billion USD.

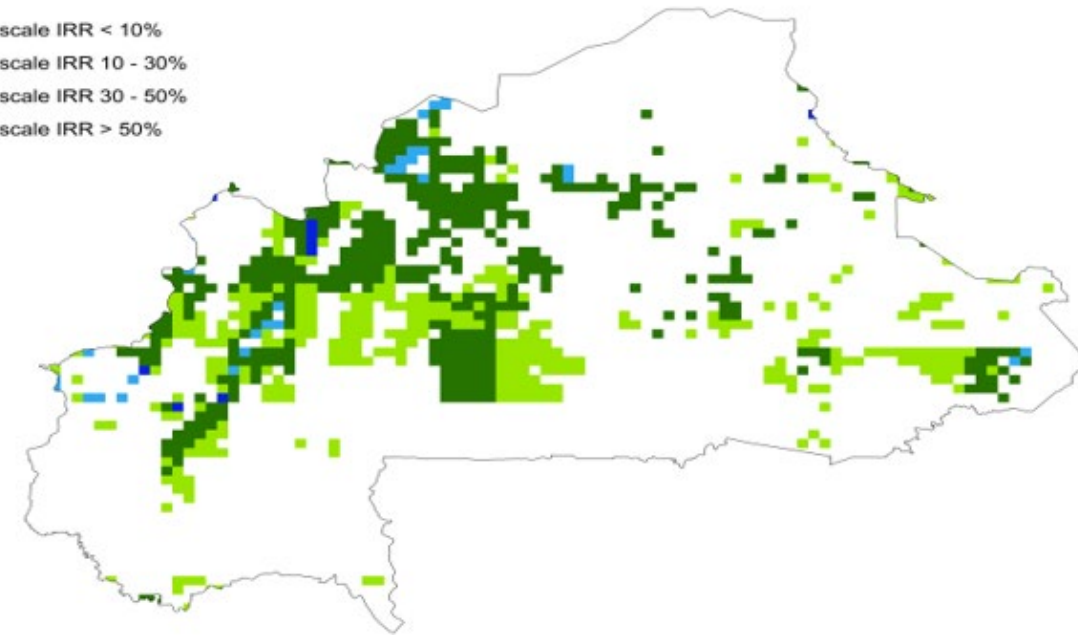
Average **IRR 16%**

Additional net earnings per day of family work: **12 USD**

	Pedal pumps	Motor pumps	Small tanks	Community river diversion projects
Application area (thousands ha)	849	1066	572	632
Economic benefits (billions of US dollars/year)	0,45	0,54	0,37	0,12
Affected rural population (millions of people)	11,4	8,9	12,8	4,7
Water consumption (billion m ³ /year)	2,13	2,59	1,77	1,82
Net income, (US\$ per ha per year)	530,04	506,57	646,85	189,87
Net income, (US\$ per 100m ³ of water)	21,13	20,85	20,90	6,59

IRR

- Small scale IRR < 10%
- Small scale IRR 10 - 30%
- Small scale IRR 30 - 50%
- Small scale IRR > 50%



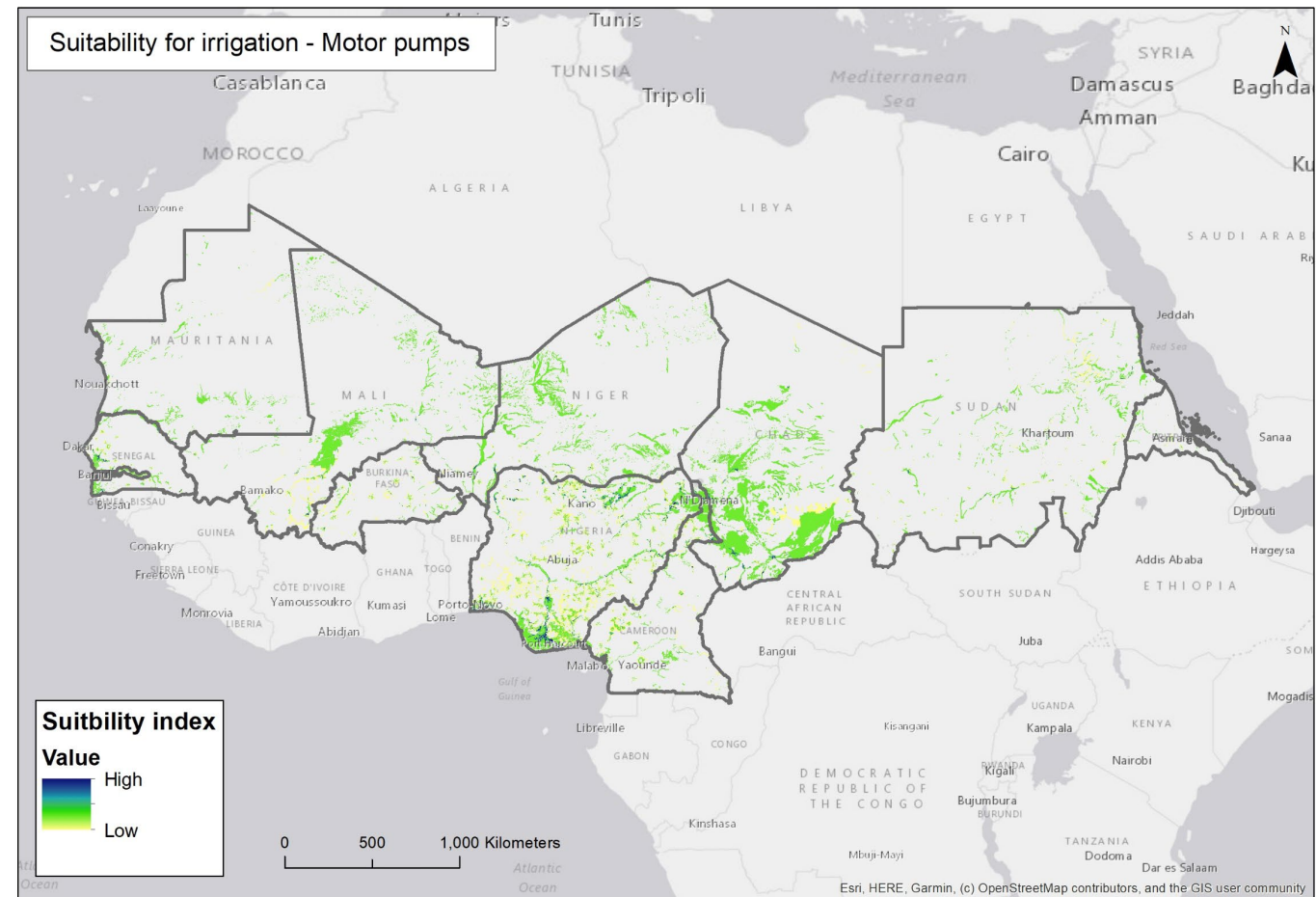
Small-scale irrigation in Sahel: Motor or Treadle pumps

➤ About 73 million hectares have potential for **Motor – Treadle** pumps in Sahel

Investments for small-scale irrigation (2022 estimates)

Country	000 Ha	Net revenue per ha in US\$	Investment cost in millions of USD
Burkina Faso	1,645	1,082	3,291
Cameroon	4,537	2,984	9,073
Chad	19,927	13,106	39,853
Gambia	448	295	896
Mali	8,172	5,375	16,344
Mauritania	2,914	1,917	5,829
Niger	9,256	6,088	18,513
Nigeria	18,112	11,912	36,224
Senegal	1,865	1,226	3,729
Sudan	6,633	4,362	13,266

Source: FAO and ACADEMIYA2063



Sources: Slope (SRTM), Runoff data (GRDC), Population (GPW3), Access to markets (FAO), AWS (FAO), Water bodies (WWF)

Source: FAO-HiH-GIS analysis team

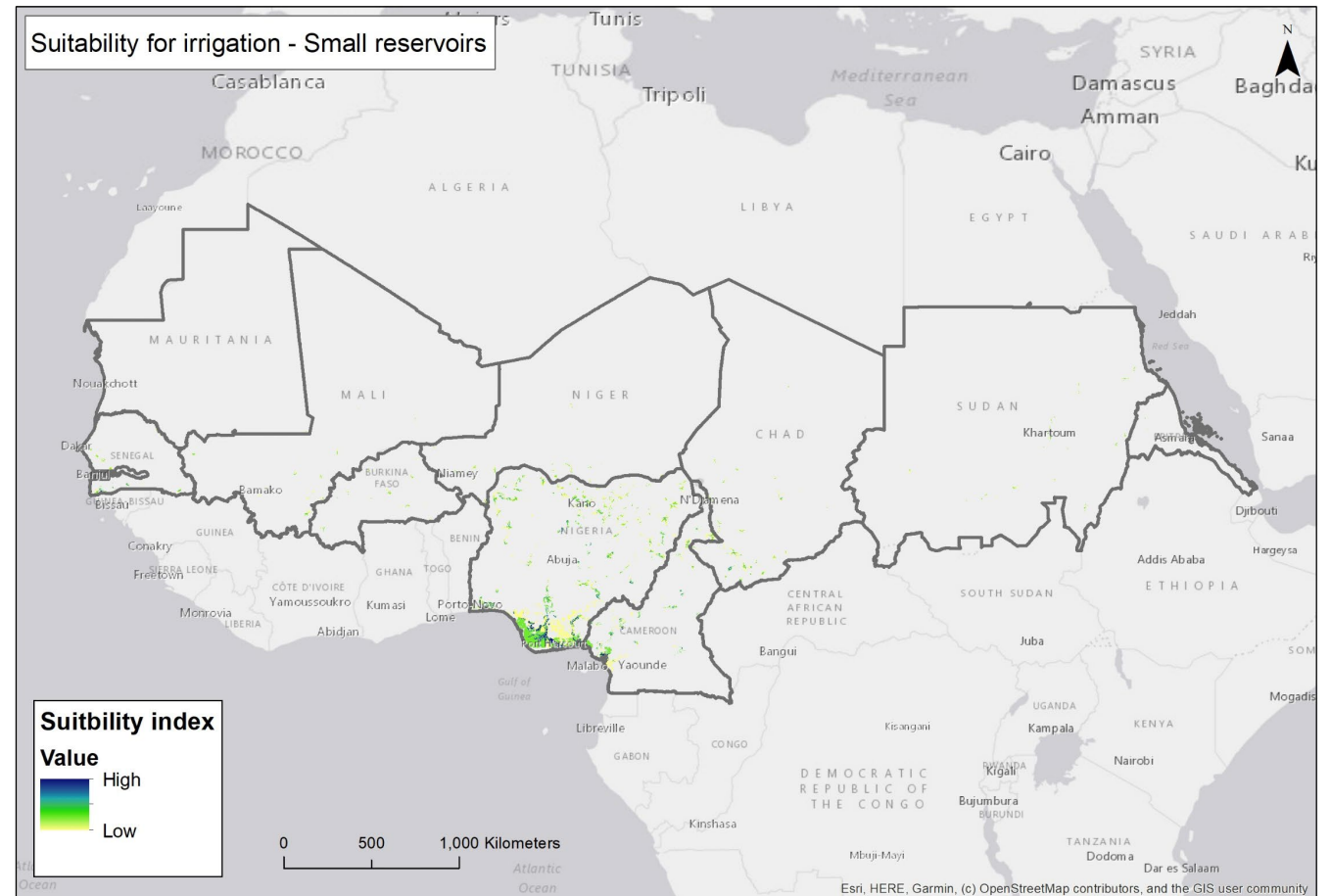
Small-scale irrigation in Sahel: Small reservoirs

➤ About 10 million hectares have potential for **Small reservoirs** irrigation in Sahel

Investments for small-scale irrigation (2022 estimates)

Country	000 Ha	Net revenue per ha in US\$	Investment cost in millions of USD
Burkina Faso	139	95	278
Cameroon	1,338	910	2,676
Chad	588	401	1,177
Gambia	102	69	203
Mali	174	119	349
Mauritania	29	20	59
Niger	225	153	450
Nigeria	7,276	4,952	14,552
Senegal	285	194	571
Sudan	211	143	421

Source: FAO and ACADEMIYA2063



Sources: Slope (SRTM), Runoff data (GRDC), Population (GPWv3), Access to markets (FAO), AWS (FAO), Water bodies (WWF)

Source: FAO-HiH-GIS analysis team

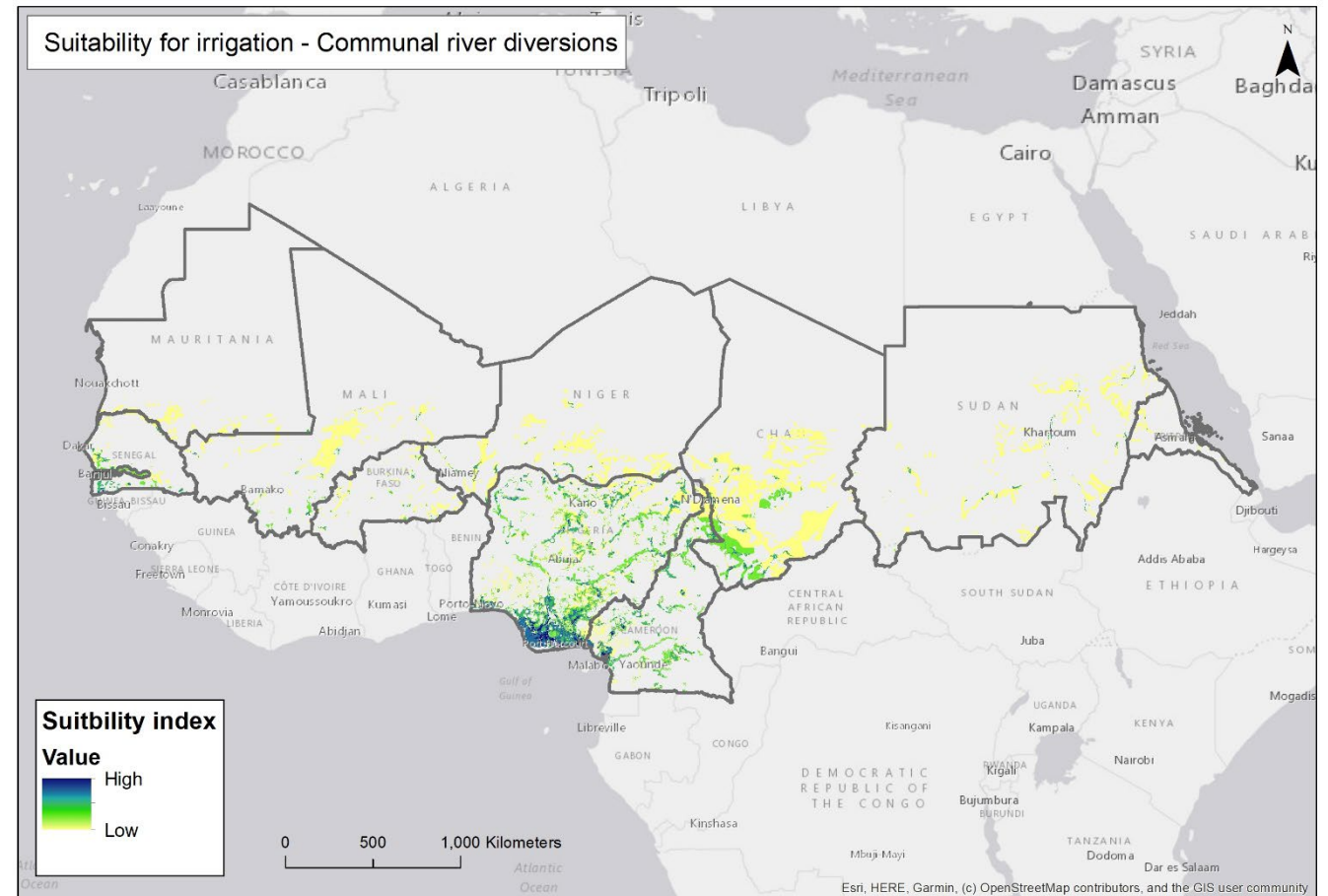
Small-scale irrigation in Sahel: Communal river diversions

- Nearly 90 million hectares have potential for **Communal river diversions** in Sahel
- Significant potential in Nigeria

Investments for small-scale irrigation (2022 estimates)

Country	000 Ha	Net revenue per ha in US\$	Investment cost in millions of USD
Burkina Faso	2,182	934	10,909
Cameroon	8,205	3,514	41,028
Chad	22,972	9,838	114,858
Gambia	741	317	3,704
Mali	6,369	2,728	31,845
Mauritania	2,398	1,027	11,991
Niger	7,591	3,251	37,956
Nigeria	25,485	10,914	127,425
Senegal	2,457	1,052	12,283
Sudan	9,352	4,005	46,760

Source: FAO and ACADEMIYA2063



Sources: Slope (SRTM), Runoff data (GRDC), Population (GPWv3), Access to markets (FAO), AWS (FAO), Water bodies (WWF)

Source: FAO-HiH-GIS analysis team