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Supplement of

Linking governance awareness and community participation for sustainable water management: evidence from the Gambia River (West Africa)

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Supplementary Material S1: Sampling Design and Population Structure

S1.1 Study Population and Village Selection

The parent population consists of 1,347 households distributed across fifteen villages located in the rural communes of Dialacoto, Missirah, and Nettéboulou in the middle reaches of the Gambia River. Five villages were selected in each commune to ensure balanced spatial representation.

Village selection was guided by three main criteria:

(i) **hydrological relevance**, with villages located along or near the main channel of the Gambia River;

(ii) **socio-economic dependence** on water resources, particularly for irrigation, livestock, and domestic use; and

(iii**) accessibility** to ensure feasibility of field data collection.

In addition, the selected villages reflect diverse settlement histories, including long-established communities and those formed through migration or resettlement processes. This diversity was considered important for capturing variations in governance awareness, participation, and water-use practices across the study area.

S1.2 Population Characteristics

Table S1 presents the distribution of households and population characteristics across the selected villages.

Table S1. Distribution of households and population in the study villages

MUNICIPALITY	VILLAGES	NUMBER OF HOUSEHOLDS	POPULATION
DIALACOTO	BADY	49	466
DIALACOTO	NIONGHANI	32	184
DIALACOTO	OUASSADOU DEPOT	256	1649
DIALACOTO	OUASSADOU VILLAGE	20	310
DIALACOTO	DAMANTAN II	15	158

MISSIRAH	GOULOUMBOU	201	1,887
MISSIRAH	KOAR III	189	1,494
MISSIRAH	NGUENE II (NGUENE SERERE)	102	580
MISSIRAH	SAAL	103	653
MISSIRAH	SANKAGNE I	142	895
NÉTTÉBOULOU	BANTANTINTI	115	977
NÉTTÉBOULOU	FARABA	59	572
NÉTTÉBOULOU	GUENETTO	17	145
NÉTTÉBOULOU	KOULARE	33	473
NÉTTÉBOULOU	TOUREMANE MAWADOU	14	213

S1.3 Sample Size Determination

The sample size was determined using **Cochran's finite population correction formula**:

$$\boldsymbol{n = \frac{Z^2 Np(1-p)}{d^2(N-1) + Z^2 p(1-p)}}$$

where:

n = sample size

N = total population (1,347 households)

Z = standard normal value at 95% confidence level (1.96)

p = estimated proportion (0.5, for maximum variability)

d = margin of error (0.05)

This resulted in a required sample size of approximately 300 households, representing about 22% of the total population.

S1.4 Sampling Procedure

A proportional allocation approach was used to distribute the sample across the fifteen villages, based on the number of households in each village:

$$\frac{\boldsymbol{Number\ of\ households\ in\ the\ village\ x\ 300}}{\boldsymbol{Total\ number\ of\ households\ in\ the\ 15\ villages}}$$

Within each village, simple random sampling was applied to ensure that all households had an equal probability of selection.

S1.5 Sample Distribution

Table S2. Distribution of sampled households across villages

Municipality	Villages	Number of Household	Sampling	Percentage
DIALACOTO	BADY	49	11	3.6
DIALACOTO	NIONGHANI	32	7	2,4
DIALACOTO	OUASSADOU DEPOT	256	57	19,0
DIALACOTO	OUASSADOU VILLAGE	20	4	1,5
DIALACOTO	DAMANTAN II	15	3	1,1
MISSIRAH	GOULOUMBOU	201	45	14,9
MISSIRAH	KOAR III	189	42	14.0
MISSIRAH	NGUENE II (NGUENE SERERE)	102	23	7.6
MISSIRAH	SAAL	103	23	7.6
MISSIRAH	SANKAGNE I	142	32	10.5
NÉTTÉBOULOU	BANTANTINTI	115	26	8.5
NÉTTÉBOULOU	FARABA	59	13	4,4
NÉTTÉBOULOU	GUENETTO	17	4	1.3
NÉTTÉBOULOU	KOULARE	33	7	2.4
NÉTTÉBOULOU	TOUREMANE MAWADOU	14	3	1.0
Total		1347	300	100

S1.6 Representativeness

This sampling strategy ensured:

- **proportional representation** across villages,

- **coverage of different socio-ecological contexts**, and
- **statistical reliability** at a 95% confidence level.

The use of random sampling within villages further minimized selection bias and enhanced the representativeness of the findings.