

# Smart-Valleys' Effects on Inland Valleys Ecosystem Services: Farmer Insights in West Africa's Sudano-Guinean Zones.



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## 1 Background

- Inland valleys (IVs) are vital wetland ecosystems.
- Smart-Valleys (SV) and Bund-Valleys (BV) are expanding for agriculture in West Africa.
- The effects of SV, BV, and undeveloped valleys (UV) on IV sustainability are unclear.
- Local feedback is crucial for evaluating the sustainability of these management approaches.

## 2 Objectives

- Assess the perceived importance of IV ESs by smallholder farmers.
- Assess smallholder farmers' satisfaction with ESs in relation with SV, UV and BV.
- Assess threats to the sustainability of IV and their relationship with SV, UV and BV.
- Evaluate the influence of socio-economic factors on perceptions of the ESs and sustainability of IV.

## 3 Methods

- Basic literature review on ESs and preliminary survey of 16 key informants (6 in the National Office of IV and 10 local officials)
- 21 Focus Group Discussions (10 with women and 11 with men)
- Semi-structured individual interviews (n=158) in 21 IVs in Savalou (Fig. 1) on IV management approaches, ESs, satisfaction, threats, importance (Likert-scale scores) (Mensah et al. 2017)

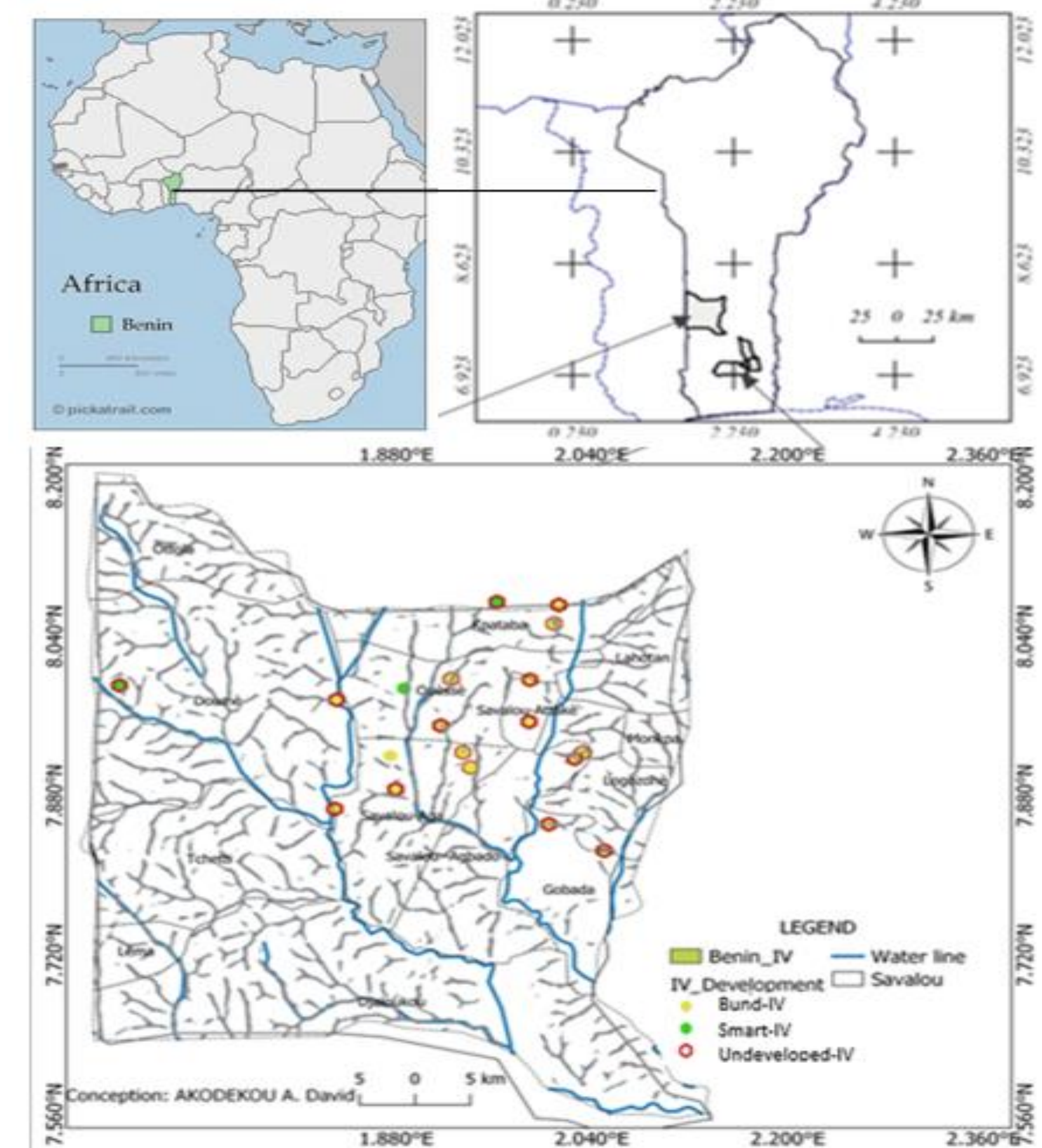


Figure 1. The study area with IVs

## 4 Results

- 04 broad categories of ESs have been identified: Provisioning ES (>34%), Regulating ESs and Cultural ESs
- 34 Sub-Services identified with 09 Provisioning ESs, 14 Regulating ESs, 07 Cultural ESs and 05 Supporting ESs.
- Provisioning and regulating ESs are more important in SV (RII = 0.89 for both) than in BV (RII = 0.78 and 0.66, respectively) and UV (RII = 0.57 for both).
- Gender, education, annual income, primary activity, and IV management significantly affect smallholder farmers' satisfaction with ecosystem services.

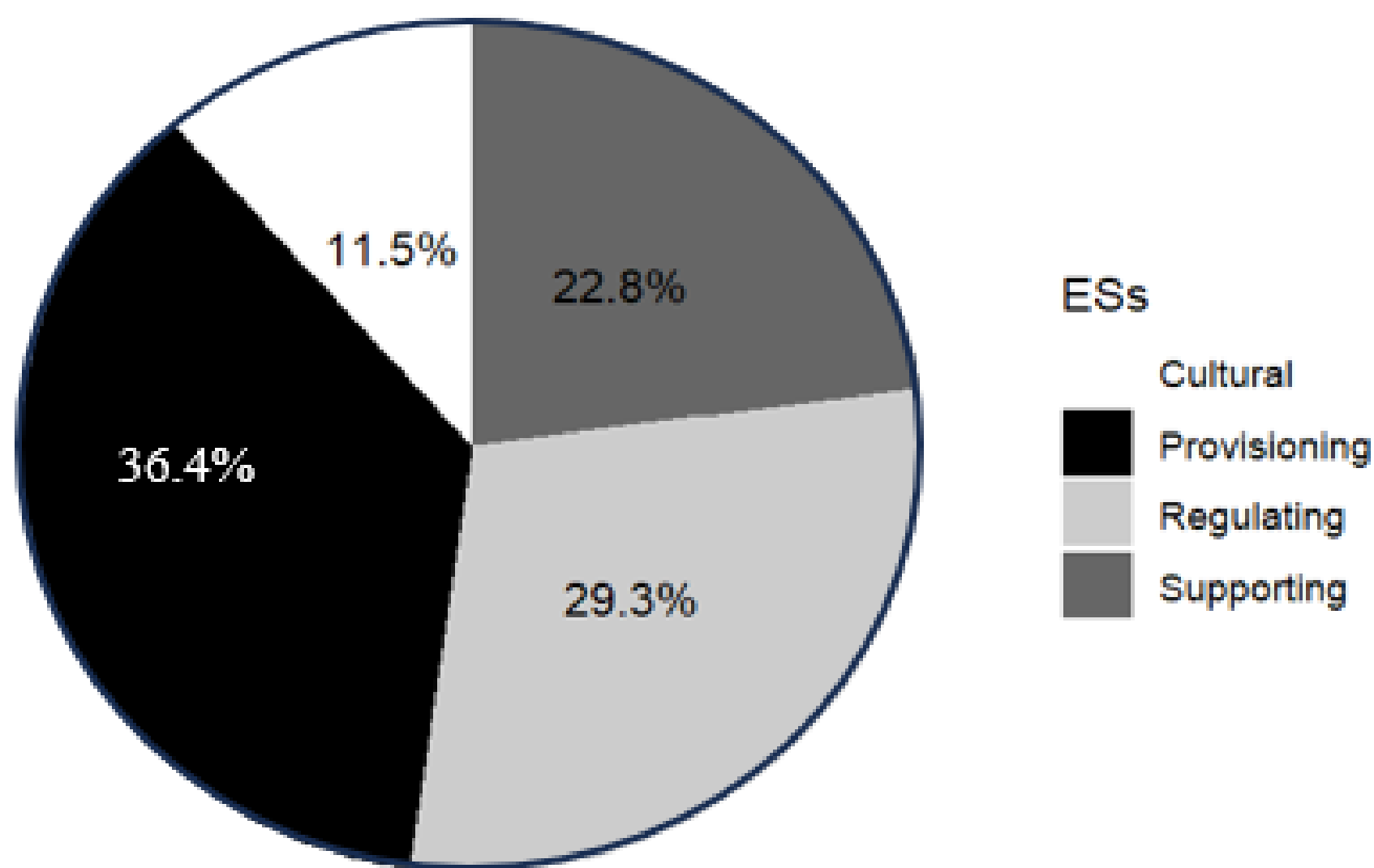
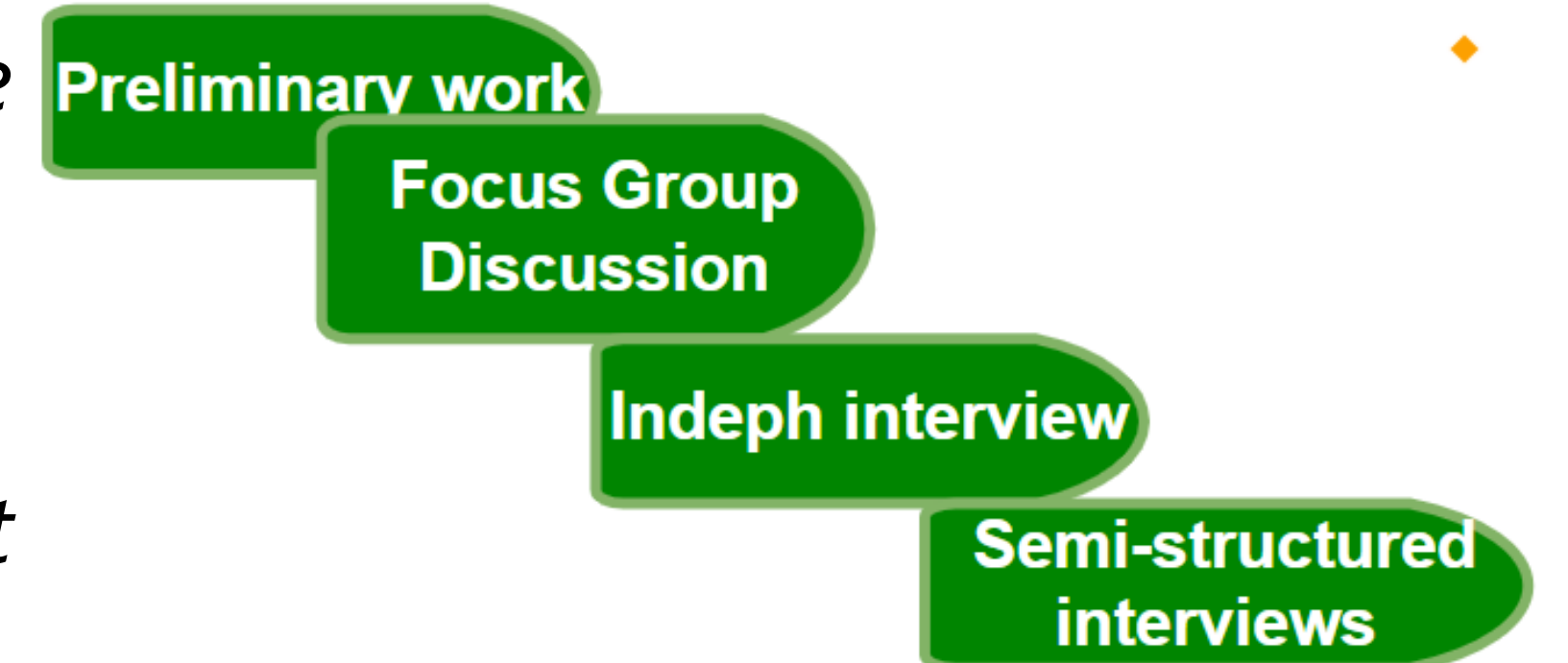


Figure 2. Inland valleys ESs categories perceived by Smallholder farmers.

Table 1. Binomial logistic regression results showing the determinant socio-economic variables influencing the satisfaction to the perceived ESs. Standard errors are shown in brackets.

	Provisioning ES Est (Std)	Regulating ES Est (Std)	Supporting ES Est (Std)	Cultural ES Est (Std)
<b>Gender:</b> Male (ref = female)	-0.46* (0.28)	-0.45 (0.29)	0.42(0.64)	1.32* (0.49)
<b>Education:</b> Secondary (ref: Primary)	1.96* (1.02)	1.65(0.91)	-0.43 (0.08)	1.2*(0.52)
<b>Religion:</b> Traditional (ref: Non-religious)	-	-0.84** (0.32)	-0.60 (0.31)	1.07* (0.28)
<b>Annual Income:</b> (USD): 830-1,660 (<830 as ref)	1.53*** (0.36)	1.14** (0.36)	-	0.84 (0.46)
<b>Annual Income</b> (USD): >1,660 (<830 as ref)	1.50*** (0.45)	2.17*** (0.51)	-	1.12*** (0.33)
<b>Main activity:</b> Tradipractitioner(ref: farmers)	-	-	-	1.03* (0.44)
<b>IV Management:</b> SV (ref = BV)	0.53*(0.41)	1.94*** (0.45)	-	-0.82 (0.41)
<b>IV Management :</b> UV (ref = BV)	-1.09*** (0.30)	0.04 (0.30)	-	1.30*** (0.31)

Ref = reference, Est. = Estimate, SE = Standard error, z = Z-statistics, p = p-value

- Intensive use of fertilizers and chemicals, drought, and flooding were the threats most perceived
- In BV ----> High fertilizer and chemical use;
- in UV ----> Drought and flooding;
- in SV ----> Sedimentation and high fertilizer use.

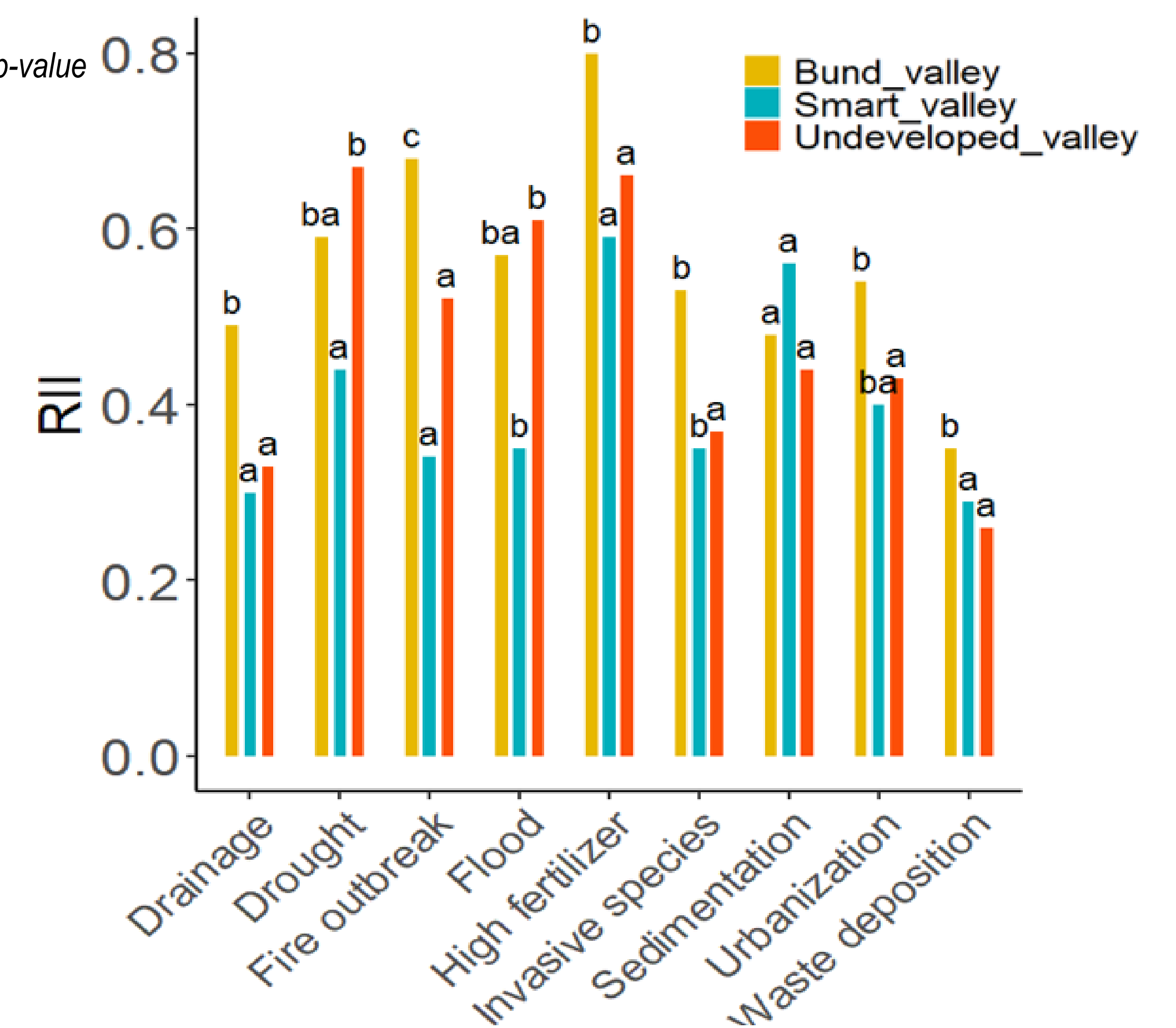


Figure 3. Perceived threats to IV sustainability for each management approaches (Threat with the same are not significantly different)

## 5 Conclusion

- (i) smallholder farmers are mainly interested in provisioning ESs, neglecting cultural ESs;
- (ii) the SV approach addresses their needs for provisioning and regulating ESs;
- (iii) the socio-economic profile of local communities is vital for sustainable involvement in IV conservation;
- (iv) perceived threats to IV sustainability must be mitigated;
- (v) sustainable conservation approaches should be promoted.

## Institutions