Multidimensional assessment of smallholder farming systems' sustainability

by Shalander Kumar, Soumitra Pramanik, Katrien Descheemaecker, Lakshita Gupta, and Anthony Whitbread

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Abstract:

A holistic systems-oriented approach is strongly recommended to address the intractable challenges of complex smallholder farm and food systems in different ecologies, and cultures. In the present study, we have developed and piloted a multidimensional framework for assessing farming systems sustainability which is easily measurable and comparable. It considers five major sustainability domains: environmental, economic, productivity, social and human well-being. Further each domain is divided into different themes, sub-themes and indicators. The indicators have been finalized with rounds of stakeholders' consultations involving farmers, researchers, development actors from India and Sub Saharan Africa besides literature. We identified 115 measurable indicators: environmental (34), economic (29), productivity (12), social (25) and human well-being (15) in the final framework which are aggregated into an index with a maximum value of 100 representing the level of sustainability and resilience at different scales. The tool then has been developed into an automated dashboard under validation. In our case study the overall sustainability index scores ranged between 42 to 47 across farm types which indicates that the farming systems are under performing. The overall and domain level sustainability scores varied widely across individual households and farm types suggesting potential for different entry points. The final sustainability scores were further validated by the farmers through FGDs. The framework and the automated tool could be very useful for researchers, development actors and institutions to identify entry points and design context-specific strategies to improve sustainability and resilience of farming systems in vulnerable regions.

Keywords: Sustainability assessment, Farming systems, Domains, Indicators, Overall sustainability index

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1. Introduction:

Natural resources are fundamental for the structure and function of agricultural systems and social and environmental sustainability in support of life on earth. Historically, global agricultural development has been narrowly focused on increased productivity rather than on more holistic integration of natural resource management with food and nutritional security. Considering risk and sustainability together is part and parcel of sustainability, in strategic terms it is about realizing resilience. The word Sustainability is originated from the Latin word "sustainer" meaning to keep in existence implying permanence or long-term support (Rigby & Caceres, 2001). In another way, it can also be defined as management and conservation of natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for the present and future generations (FAO, 1989). Sustainability in the context of farming systems as the capability of maintaining their productivity and usefulness to the society, systems which are resource-conserving, socially supportive, commercially competitive and environmentally sound (Ikerd, 1993). Sustainability originally comprises of three pillars i.e. Environment, Economic and Social, however, with the progressive development of this area of research, the experts and literature broaden the scope of sustainability measurement and now the sustainability measurement framework also includes Productivity and Human wellbeing as additional domains (Smith et al 2017). Sustainability assessment (SA) is challenging since sustainability is quite a dynamic concept. Measuring the sustainability of the smallholder farming systems in low and middle income countries (LMICs) especially in challenging agro-ecologies such as semi-arid regions, which suffer from immense problems, could be of great value in designing need based solutions.

However, we have not come across an user friendly and comprehensive quantification framework for farming system sustainability assessment that includes a comprehensive set of indicators presenting a holistic view of sustainability. The framework needs to be designed in such a way that it presents a comprehensive view of the farming systems, is time and cost-efficient, indicators selected are flexible and quantitative in nature; thus, they are easily usable in any other settings and can be used for farm to farm comparison. A sustainability measurement framework that presents a compendious view of the sustainability scenario is the major acceptability criteria and would firmly help various stakeholders in co-designing appropriate interventions for improving sustainability and resilience of farming systems in any agro-ecologically and economically vulnerable region. Therefore, a sustainability assessment framework which considers a holistic, or systems-oriented approach and is flexible to be operationalized would be needed to address the intractable challenges associated with the complexity of farm and food systems in different agro-ecologies, locations and cultures. The available farming system sustainability assessment frameworks have either focused narrowly on certain domains or have limitations to operationalize them in the field condition by development actors (Smith et al., 2017). Thus a comprehensive and easy to operationalize framework will contribute to the literature and help the farming community and development actors as well as various institutions and policymakers providing a detailed and clear picture on overall, domain and theme specific sustainability scenario to design strategies for enhanced resilience of the farming systems and rural wellbeing. In the present study, we have attempted to fill this literature gap and developed and piloted a multidimensional framework for assessing the farming systems sustainability and examine the following questions; (a) Do the available frameworks that measure the sustainability of farming systems are comprehensive and measurable? and (b) what are the best quantitative indicators that can give an in-depth understanding of the various domains of sustainability and are easily measurable?

2. Analytical framework:

2.1. Review of Existing Sustainability measurement frameworks:

Measuring sustainability is quite a difficult task, selecting relevant measurable indicators and defining them is a challenge too. Many efforts have been taken to measure sustainability at various levels still there tends to be various shortcomings in the frameworks like a complete set of indicators for sustainability measurement tends to be missing, a number of indicators used by various frameworks involve a lot of time and cost in their measurements, are qualitative seem quite broad and cannot be easily quantified thus making it difficult to measure and compare sustainability; thereby making it difficult for the stakeholders like policymakers, farmers and research and development institutions for rational decision making. Sustainability was first defined in 1987 by the United Nations Brundtland commission[1] as "meeting the needs of the present without compromising the ability of future generation to meet their own needs". Sustainability originally comprises of three pillars i.e. Environment, Economic and Social; however, with the progressive development of this area of research, the experts and literature broaden the scope of sustainability measurement and now the sustainability framework also includes Productivity and Human wellbeing as additional domains (Smith et al., 2017). One of the significant frameworks is the 4Agro model (Bertocchi et al., 2016) where 42 quantitative indicators were used to measure the sustainability of the farms considering the three pillars i.e. Environment, economic and social. The framework is based upon a farm ranking approach and is being divided into four phases which start from collection of farm data, elaboration of 75 sub-indicators and scoring them which ranges from positive to negative values. The results are usually being presented through radar charts where a comparison is being drawn on the sustainability of conventional vs organic farming, non-multifunctional vs functional farms, small, large and medium farms, no livestock vs livestock availability and much more. The framework aims to provide easy to read results for the farmers as well as policymakers which help to characterize the various farming practices as sustainable or unsustainable. The other framework is Response- inducing sustainability evaluation (RISE) developed by the School of Agricultural, forest and food sciences -Swiss college

[1] For details about the commission please follow "http://www.environmentandsociety.org/mml/un-world-commission-environment-and-development-ed-report-world-commission-environment-and"

of Agriculture[2]. The RISE methodology was developed in 2000 and is a globally applicable tool to evaluate and compare the sustainability of farm operations which define 12 indicators across economic, social and environmental dimensions (Hani et al, 2003). It consists of a total of 508 questions which are distributed as 131 under the social dimension, 84 under the economic and 293 under the environmental dimension (Olde et al, 2016). It considers both qualitative and quantitative indicators. The RISE methodology covers several aspects such as energy and climate which are measured through greenhouse gas balance or energy intensity; animal welfare being measured through livestock management, livestock health; farm management measured by supply and yield availability, indebtedness; quality of life measured through social relations, work and education etc (FAO, 2015). It includes indicators such as energy; state parameters like the environmental impact of energy carriers used and measured through the driving force parameters like energy input per unity agriculture land. The degree of sustainability is measured through the differences in the state and the driving forces. The framework is quite comprehensive however it lacks indicators such as empowerment, accessibility to various Institutions such as market, poverty levels etc. The framework is a bit complex and a lot of indicators used like soil sampling, water quality and stability of quality involve usage of scientific tools for measurement which is both cost and time consuming (Grenz et.al. 2009). Sustainability assessment of farming and environment (SAFE) is another such framework that works towards the measurement of farming sustainability (Cauwenbergh et al. 2007). It is a hierarchical framework designed for the parcel, farm and higher spatial level. It has tried to address problems of indicator selection, scale problems for implementing a framework. It is found that the criterion defined by the SAFE framework like Quality and taste of food is quite difficult to be measured and many criteria would require a greater investment of time, energy and technology for measurement and comparison. The need to collect data over time to assess the changes like pollution levels, equity and biodiversity make the assessment difficult (Alba &Werf, 2011). The Indicateurs de

[2] It is an interview-based method for assessing the sustainability of farming operations across the economic, social and environmental dimension and for more details please follow the link "https://saiplatform.org/uploads/Modules/Library/What%20is%20RISE%202.pdf"

Durabilite des Exploitations Agricoles (IDEA)[3] method is another measure for assessing farm sustainability. Designed as a self-assessment tool for farmers this method is structured around 16 objectives grouped under the three sustainability scales with a total of 41 indicators. The measurement of sustainability is quantified with a numerical score being provided to each indicator. A maximum score is also set for each indicator in order to set an upper limit, each scale goes from 0 to 100, the higher the score the more sustainable is the farm (Zahm &Vilain, 2008). The tool gives practical content to sustainability but lacks a comprehensive list of indicators and certain indicators are ambiguous and difficult to quantify and compare, for example, quality of work, isolation, etc. In addition to the frameworks mentioned above, several other methods have been used to measure the sustainability of farming systems like an Indicator of sustainable agricultural practices (IASP), a Monitoring tool for integrated farm sustainability (MOTIFS) etc. Not just the frameworks but organizations have come up with applications, one of which is Sustainability assessment of food and agriculture systems (SAFA) a smallholder's mobile app focusing on four domains i.e. social, economic, environment and governance (FAO, 2015). This mobile app introduced by the Food and agriculture organization of the United Nations and other partners allows filling up of quantitative and qualitative information on different indicators and provides results of sustainability assessment. It is a self-assessment tool, the technology usage and the complexity of questions which include multiple choices, numbers and geo-points can be an intricate task, thus has not become popular with the stakeholders. Hence there is a need for a more comprehensive, simple, measurable and easy to use sustainability framework to be used as an effective decision support tool.

2.2.Development of a comprehensive framework:

Review of existing literature, focus group discussions with the farmers and rounds of interactions with various major stakeholders: researchers, development actors and mid-level policy makers contributed to the process to develop a comprehensive and easily measurable SA framework which

[3] For details please follow "https://idea.chlorofil.fr/idea-english-page.html"

is presented in this paper. The quantification framework is easily measurable and comparable across farm households, farming systems and beyond. It considers five major domains of the farming systems namely environmental, economic, productivity, social and human well-being. In the subsequent stages of measurement each domain is divided into different themes, then sub-themes and indicators. The indicators in our study have been finalized with rounds of stakeholders' consultations involving farmers, researches, development experts besides literature. Under this multidimensional framework for the assessment of farming systems sustainability the main focus of different domains could be described as below;

1. Environmental sustainability- It focuses on the natural resource base that supports agriculture and the environmental services which are directly affected by agricultural practices.

2. Economic sustainability – It takes into consideration the profitability of agricultural activities and returns to factors of production.

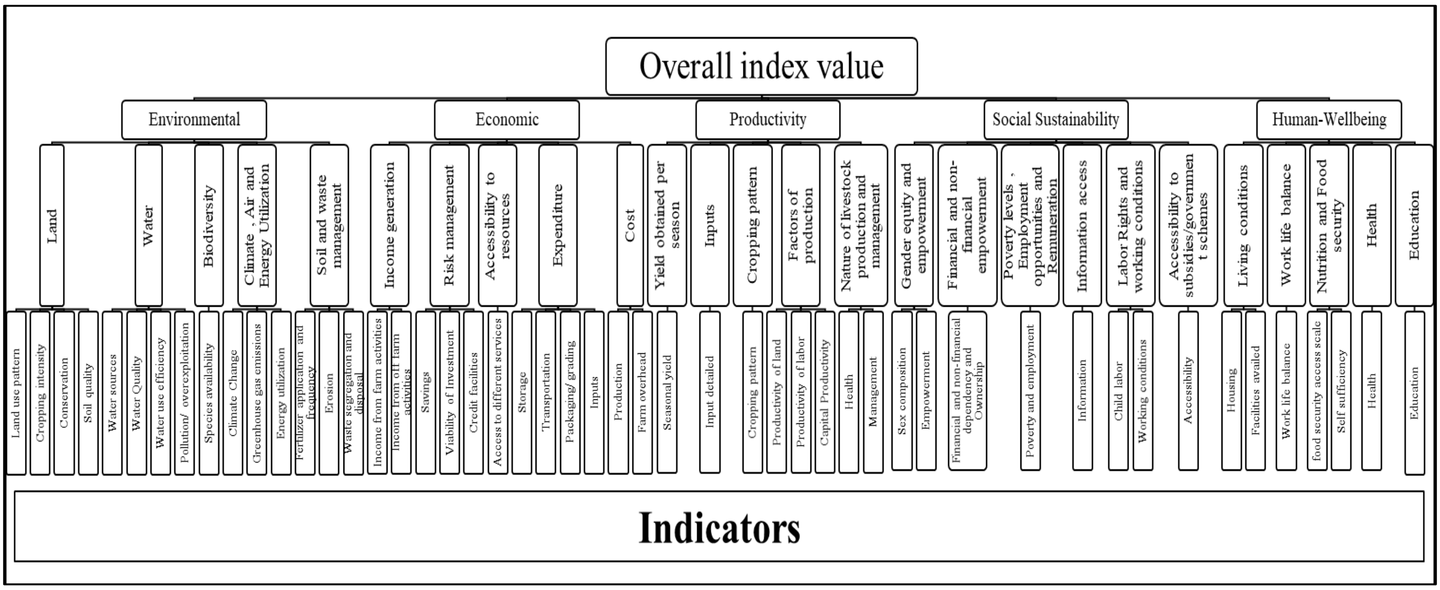
3. Productivity domain -It includes the Input and the Output per unit time, yield achieved, input efficiency etc.

4. Social sustainability- Focuses on the social interactions, relationships across social groups in a community or landscape, collective action, natural resource management etc.

5. Human wellbeing - It pertains to individual and household factors like food security, living conditions, nutrition status etc. These indicators affect an individual and do not require any social interaction or interpersonal relationships

The flow of the framework as, each domain breaks into several themes, each theme divided into several sub-themes and each sub-theme divided into many indicators and detailed flow chart of the framework has been provided in figure 1.

Figure 1: Flow chart of the sustainability assessment framework



3. Data and Methodology:

To test and validate the framework we conducted a case study using the household-level data collected from two villages namely Kotha Thanda and Boring Thanda of Suryapet district in Telangana State of India. The people in the study villages were mainly dependent on agriculture and livestock activities for their livelihoods. A well-structured questionnaire was developed to collect the information from the households which covers all the domains through all the indicators to measures the sustainability indicators estimation. The data from a total of 50 farm households (25 from each village) were collected covering all relevant dimensions of farming systems including the farm, off-farm, non-farm and non-agriculture activities, social and environmental dimensions, etc. The data collected was a holistic representation from the livelihood activities to market and other institutional engagements and the characteristics of farming systems also in general covering different sustainability domains. Some basic information of the sample households has been introduced in table-1.

Table-1: Household wise some basic information in the study region

Particulars	Descriptions
Respondent age (years)	38

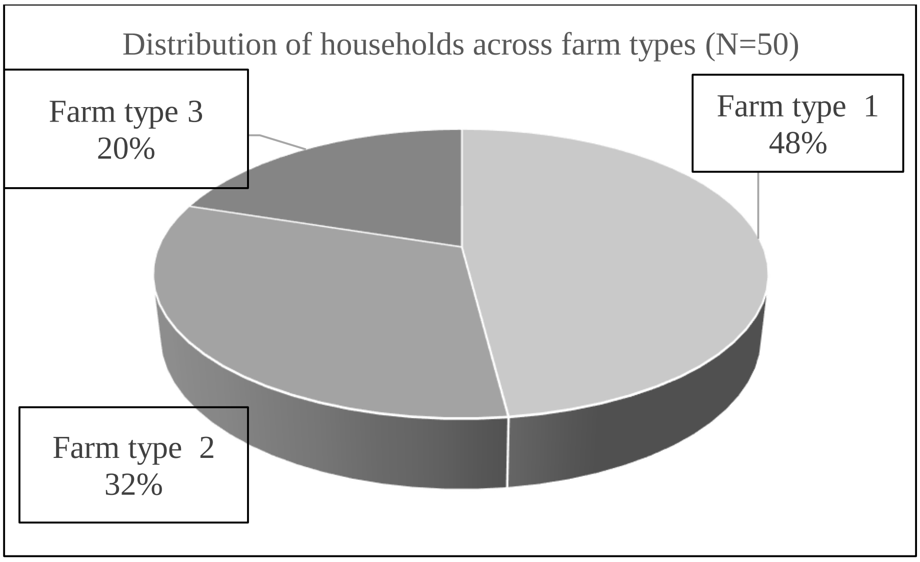
HH head age (years)	53
Respondent education (years)	6
Adult members in the hh	3
Land ownership (ha)	5.42
Percentage of farm land irrigated	31
Fertilizer cost (Rs/ha/annum)	8759
Number of cattle	2
Number of small ruminants	2
Credit access- amount borrowed (Rs/hh)	83181
Major crops	Cotton, Paddy, Redgram, Sorghum, Chilli

Note: hh household

With a rigorous process and round of discussions with different stakeholders from India and Sub Saharan Africa finally we identified a total of 115 indicators from five domains (figure 1): environmental (34), economic (29), productivity (12), social (25) and human well-being (15) in the final framework, which is easily measurable, and would provide an index value representing the level of sustainability of farming systems at different scales.

To undertake a comparative analysis, we classified the sample farm households into relatively homogeneous farm typologies. We have used principal component analysis (PCA) and k-cluster mean to develop farm typologies based multiple livelihood assets such as family size, number of cattle, number of small ruminants, technology adopted, land size and access to formal credit. The farm typology analysis categorised the households into three homogeneous household types. The distribution of the farm households is presented in figure-2.

Figure-2: Distribution of households across farm types, Telangana, India



To make the indicators measurable and comparable, the indicators scores were normalized to ranges between 0 to 1 using below equation-1;

$$Z = \frac{(Actual\ Value) - (Minimum\ Value)}{(Maximum\ Value) - (Minimum\ Value)} \quad \text{---} \ (1)$$

where, Z refers to the normalized score for each indicator.

In the next step, the normalized score of each indicator was multiplied with the respective weight. The weight of each indicator would depend on the number of sub themes and themes and the weight of the relevant domain, which was arrived at based on the review of existing literature and number of stakeholder's consultation (like researcher, policy makers, development agency members etc.) in India and Sub Saharan Africa and the sum of all weights should be equal to 100. In the first step, we have decided the weight of each domain, then the weight of each domain was equally distributed to each of the theme and then sub-theme and in the same process the weight finally perpetuates to the indicators (the details weight distribution have been provided in Appendix I). The weight of each indicator which was derived from the domain's weight is flexible and could be changed based on the regions, stakeholders' recommendations and other factors. Finally, the Overall Sustainability Index (OSI) value is calculated as presented in equation-2. The framework thus considers multiple dimensions and describes the level of sustainability and resilience of the farming systems.

$Overall\ Sustainability\ Index\ (OSI)\ value = \sum_{i=1}^{5} Domain\ index\ value$ ------------------ (2)

Further the sustainability measurement framework has been developed into an automated dashboard (tool) which is under validation.

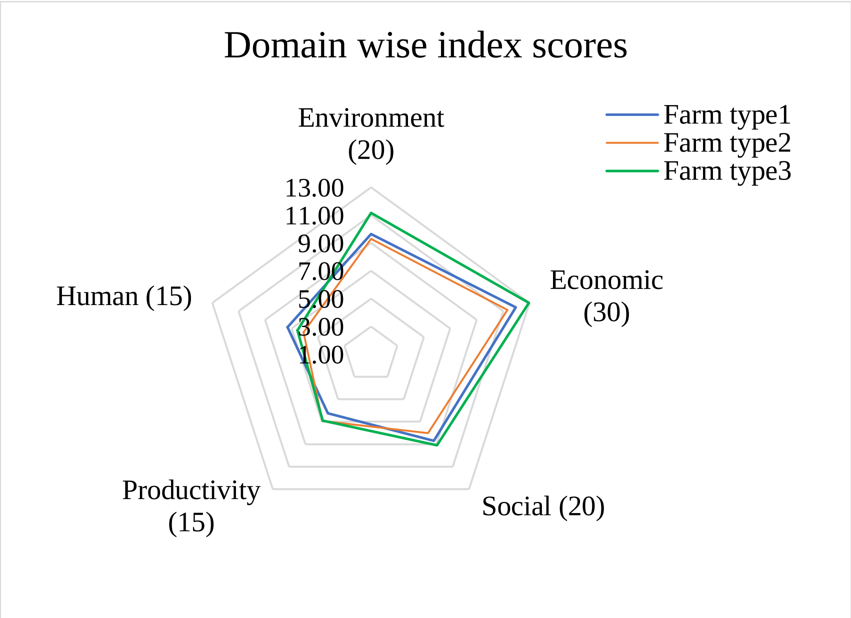
4. Results and discussion:

Quantifying farming systems' sustainability is quite a difficult task, therefore, selecting relevant measurable indicators and defining them is challenging too. In the present analysis, we have developed a comprehensive framework which enables easy quantification of sustainability at farming systems level. Attributing appropriate weight for each domain and distributing the weights up-to indicators level could vary in different approaches. In the present framework the weightage to the sustainability domains were decided based on stakeholder's discussions and final decisions were taken through consensus. The weightage of domains of the sustainability assessment tools may vary from one setting to another as per the stakeholders' priority and the bio-physical environment and other factors. In this study the weights of different domains were considered as follows; Environmental sustainability was given a weight of 20, Economic sustainability as 30, Social sustainability as 20, Productivity and human well-being 15 each as the total weight should be 100.

4.1.Estimating the index value:

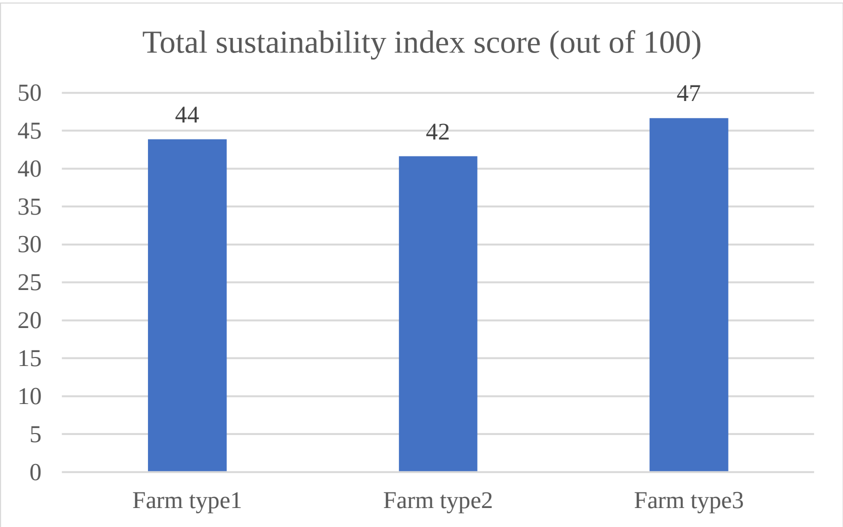
The main objective of the present paper was to estimate the index value of each domain and overall sustainability index value across farm types using the multidimensional framework that has been developed and discussed in the previous section. Firstly, the index value of each domain has been estimated and presented in figure 3. In terms of environment domain, the average value in farm type 3 was found highest (11.17 out of 20) followed by farm type1 and farm type 2. The economic domain measures the economic activities of the households and which was divided into 5 themes and 13 sub-themes, the average index values of economic domain ranged from 11.32 to 12.94 out of 30 and distribution across farm types was similar to the environment domain. In the remaining domains, farm type 2 score highest in productivity (6.92 out of 15) and farm type1 scored highest in human wellbeing (7.30 out of 15). The overall sustainability index score is the summation of scores of all the five domains and presented in figure 4. It is found that the overall sustainability index score of farms type 3 was 47, farm type 1 was 44 and for farm type 2 it was 42. The average composite index score revealed that none farm household type was able to reach even half of the maximum index score. This sustainability analysis clearly indicates a strong need to find solutions to improve sustainability and resilience of the farming systems.

Figure 3: Domain wise index scores across farm groups



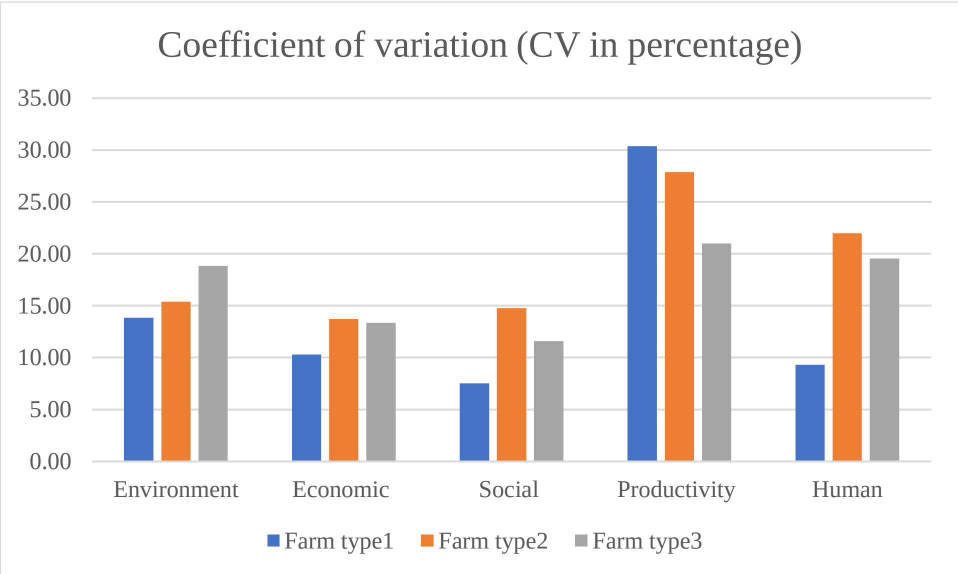
Note: Values in the parentheses indicate the total weight assigning for each domain

Figure 4: Average Overall Sustainability Index (OSI) value of different farm groups of households



We also examined the level of dispersion across households for each domain within each farm type by estimating the coefficient of variation (CV) for each domain across households (figure 5). The CV values revealed that the distribution of sustainability scores of productivity domain for each farm type was uneven across households therefore the CV of this domain was highest for all the farm types compared to other domains. Domain wise lowest CV values did not show uniform trend and was found that CV was lowest for the social domain for farm type 1 and farm type 3 and for farm group2 it was lowest for the economic domain.

Figure 5: Households wise dispersion of index scores across domains and farm types



4.2.Level of score achievement:

In the next critical step, we analyzed that how much score the individual households were able to achieve out of the total score of each domain. To better understand the level of achievement of each household across domains, in a two-way analysis firstly we have plotted the achievement score of each household for each domain as a scatter plot (figure 6) and secondly the achievement levels of each household were categorized into 6 different categories based on their sustainability scores (table 2). It is evident from both the figure 6 and table 2 that most of the households fall under either the category of achievement of sustainability scores 30% to 40% or between 40% to 50% level of achievement across domains except productivity domain. The distribution of households in the productivity domain was quite scattered and the extent of dispersion is quite high.

Figure 6: Scatter plot matrix of households' sustainability score achievement level – across domains and farm types

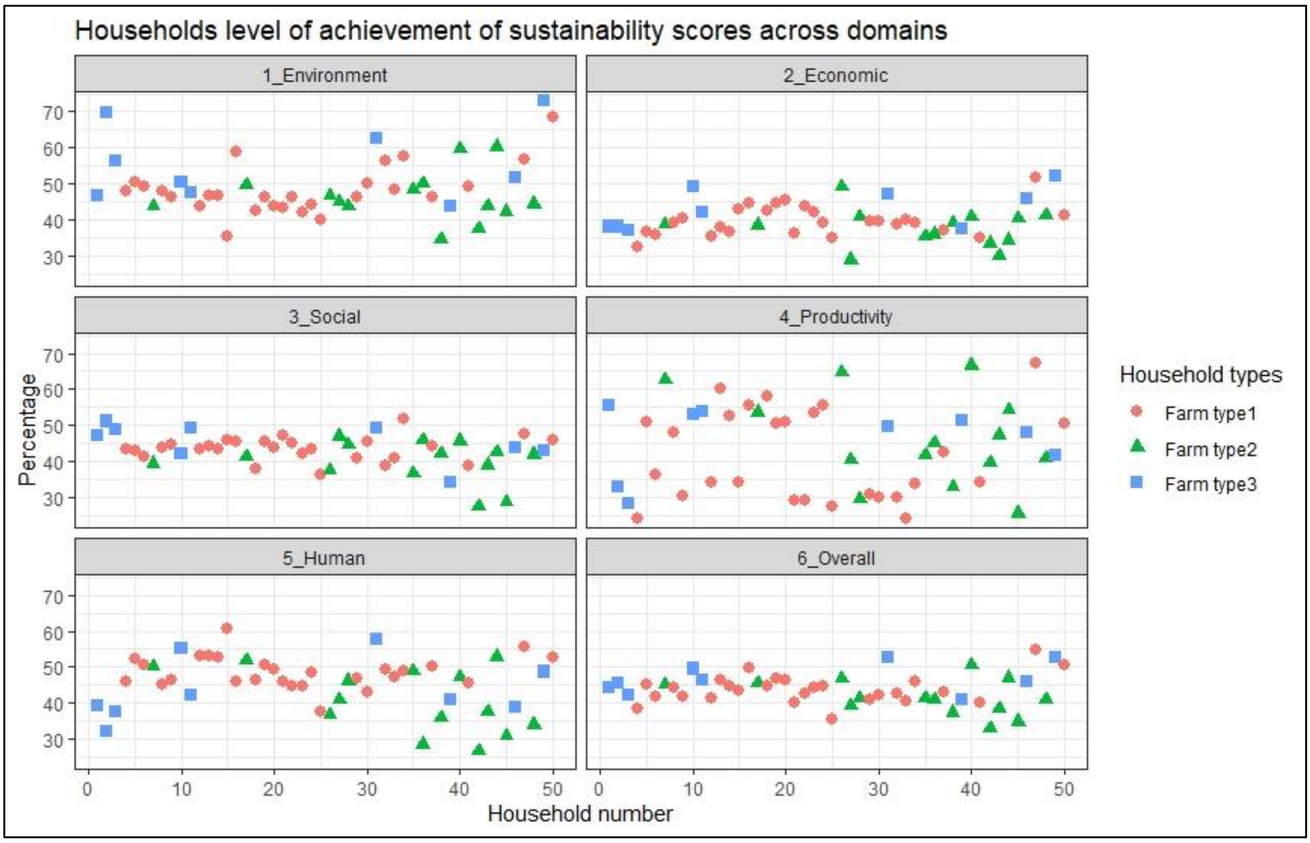


Table 2: Distribution of households in terms of their sustainability score achievement level (%) – across domains and across farm groups

Farm type	Domains	0 to 30%	Greater than 30% to 40%	Greater than 40% to 50%	Greater than 50% to 60%	Greater than 60% to 70%	Greater than 70%
Farm type1	Environment	0.00	3.70	74.07	18.52	3.70	0.00
	Economic	0.00	59.26	37.04	3.70	0.00	0.00
	Social	0.00	14.81	81.48	3.70	0.00	0.00
	Productivity	22.22	29.63	7.41	33.33	7.41	0.00
	Human	0.00	3.70	59.26	33.33	3.70	0.00
	Overall	0.00	7.41	85.19	7.41	0.00	0.00
Farm type2	Environment	0.00	14.29	64.29	14.29	7.14	0.00
	Economic	7.14	57.14	35.71	0.00	0.00	0.00

	Social	14.29	28.57	57.14	0.00	0.00	0.00
	Productivity	14.29	14.29	35.71	14.29	21.43	0.00
	Human	14.29	35.71	28.57	21.43	0.00	0.00
	Overall	0.00	35.71	57.14	7.14	0.00	0.00
Farm type3	Environment	0.00	0.00	33.33	33.33	22.22	11.11
	Economic	0.00	44.44	44.44	11.11	0.00	0.00
	Social	0.00	11.11	77.78	11.11	0.00	0.00
	Productivity	11.11	11.11	33.33	44.44	0.00	0.00
	Human	0.00	44.44	33.33	22.22	0.00	0.00
	Overall	0.00	0.00	77.78	22.22	0.00	0.00

5. Conclusions:

The conventional idea of sustainable development has several conceptual limitations and does not sufficiently capture number of spatial, temporal, and personal aspects. This study focuses on measuring the sustainability of farming systems considering its all possible dimensions in a comprehensive way and has develop a easy to use multidimensional framework for assessing farming systems sustainability. The framework so developed is quantitative in nature and measures the sustainability of different farming systems and thereby representing a farm to the farm comparison tool. The identification of theme-based indicators and measurement tool framework has been driven by an intensive stakeholders' process. The indicators and measurement tool proposed thus consider the stakeholders' perspective and understanding of the real scenarios of the farming systems. Assigning appropriate weights is the most important element of the framework which has been kept flexible allowing the users a flexibiity to adjust the weights if needed as per the context. The weights in the tool could be assigned considering the perspective and understanding of major stakeholders in the study region. To make it more user friendly the tool has been developed into an automated dashboard which is under validation.

The Sustainability measurement framework is an attempt to quantitatively measure the sustainability of farming systems in semi-arid tropics and thereby help various stakeholders like policymakers, agriculture researchers, development actors, farming communities to identify entry points and take steps to build resilience and sustainability of the farming systems in a holistic sense. The study has tested and validated the tool by estimating farming households' sustainability using the framework piloted on 50 households' information collected from the Suryapet district of Telangana state. The case study results for which the overall sustainability index scores ranged between 42 to 47 across farm types indicates the utility of the framework to understand the performance of different domains of the farming systems. Such quantification of sustainability scores at the farming systems and its domains level for different farm household types would help in identifying context specific potential entry points. The final validation of sustainability scores by the farmers through FGDs also helped in establishing the appropriateness of the selected indicators and the quantification framework.

We conclude that the sustainability levels differed significantly across households and farm types within the same village. The overall and domain level sustainability scores for individual households and farm types helped in objective assessment of multidimensional vulnerabilities and to identify entry points to design context specific and more effective interventions and policies for building resilience in smallholder vulnerable farming systems. Also, the indicators and measurement tool is framed in such a way that it provides a clear view of existing realities of farming systems. Finally, the proposed multidimensional framework and the automated tool for farming sustainability assessment would make it much easier for the researchers, development actors and institutions to measure the farming system sustainability, and that could allow policymaker to The framework could be very useful to identify and plan entry points and design context-specific strategies to improve sustainability and resilience of farming systems in vulnerable regions.

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Appendix I:

Distribution of weights – from domains to indicators[#]

Domains	Themes	Sub-themes	Indicators
Environmental sustainability (20)	Land (4)	Land use pattern (1)	4 indicators (0.25 each)
		Cropping intensity (1)	1 indicator (1)
		Conservation (1)	2 indicators (0.5 each)
		Soil quality (1)	1 indicator (1)
	Water (4)	Water sources (1)	1 indicator (1)
		Water Quality (1)	1 indicator (1)
		Water use efficiency (1)	3 indicators (0.33 each)
		Pollution/ overexploitation (1)	2 indicators (0.5 each)
	Biodiversity (4)	Species availability (4)	2 indicators (2 each)
	Climate , Air and Energy Utilization (4)	Climate Change (1.33)	2 indicators (0.67 each)
		Greenhouse gas emissions (1.33)	3 indicators (0.44 each)
		Energy utilization (1.33)	2 indicators (0.67 each)
	Soil and waste management(4)	Fertilizer application and frequency (1.33)	2 indicators (0.67 each)
		Erosion (1.33)	4 indicators (0.33 each)
		Waste segregation and disposal (1.33)	4 indicators (0.33 each)
Economic Sustainability (30)	Income generation(6)	Annual Income from different activities (3)	5 indicators (0.6 each)
		Annual Income from off farm activities(3)	2 indicators (1.5 each)
	Risk management (6)	Savings (2)	1 indicator (2)
		Viability of Investment (2)	2 indicators (1 each)
		Credit facilities (2)	3 indicators (0.67 each)
	Accessibility to resources (6)	Access (6)	6 indicators (1 each)
	Expenditure (6)	Storage (1.2)	2 indicators (0.6 each)
		Transportation (1.2)	1 indicator (1.2)
		Packaging/ grading (1.2)	1 indicator (1.2)
		Inputs (1.2)	3 indicators (0.4 each)
		Household (1.2)	1 indicator (1.2)
	Cost (6)	Production (3)	1 indicator (3)
		Farm overhead (3)	1 indicator (3)
Productivity (15)	Yield obtained per season (3)	Seasonal yield (3)	1 indicator (3)
	Inputs (3)	Input detailed (3)	3 indicators (1 each)
	Cropping pattern (3)	Cropping pattern (3)	1 indicator (3)
	Factors of production (3)	Productivity of land (1)	1 indicator (1)
		Productivity of labor (1)	1 indicator (1)
		Capital Productivity (1)	1 indicator (1)
	Nature of livestock production and management (3)	Health (1.5)	2 indicators (0.75 each)
		Management (1.5)	2 indicators (0.75 each)
Social Sustainability (20)	Gender equity and empowerment (3.33)	Sex composition (1.66)	2 indicators (0.83 each)
		Empowerment (1.66)	2 indicators (0.83 each)

	Financial and non-financial empowerment (3.33)	Financial and non-financial dependency and Ownership (3.33)	5 indicators (0.66 each)
	Poverty levels , Employment opportunities and Remuneration (3.33)	Poverty and employment (3.33)	5 indicators (0.66 each)
	Information access (3.33)	Information (3.33)	2 indicators (1.67 each)
	Labor Rights and working conditions (3.33)	Child labor (1.66)	4 indicators (0.42 each)
		Working conditions (1.66)	3 indicators (0.55)
	Accessibility to subsidies/government schemes (3.33)	Accessibility (3.33)	2 indicators (1.67 each)
Human-Wellbeing(15)	Living conditions (3)	Housing (1.5)	2 indicators (0.75 each)
		Facilities availed (1.5)	2 indicators (0.75 each)
	Work life balance (3)	Work life balance (3)	1 indicator (3)
	Nutrition and Food security (3)	food security access scale (1.5)	1 indicator (1.5))
		Self-sufficiency (1.5)	1 indicator (1.5))
	Health (3)	Health (3)	6 indicators (0.5 each)
	Education (3)	Education (3)	2 indicators (1.5 each)

Note: Values in the parentheses indicating respective weights

The framework provides a flexibiity to the users of the tool to adjust weights if needed as per the context.