THE STATE DEPARTMENT FOR SOCIAL PROTECTION AND SENIOR CITIZENS AFFAIRS

DRAFT
REPORT.

THIRD PARTY QUALITY ASSURANCE

ON HOUSEHOLD REGISTRATION FOR THE **ENHANCED SINGLE REGISTRY**

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ACRONYMS

CHASP	Capacities for Health and Social Policy
CT-OVC	Cash Transfer for Orphaned and Vulnerable Children
DCS	Directorate of Children Services
DSD	Directorate of Social Development
ESR	Enhanced Single Registry
GIS	Geographic Information System
GoK	Government of Kenya
HH	Household
HSNP	Hunger Safety Net Program
HTM	Harmonized Targeting Methodology
IPRS	Integrated Population Registry System
KSEIP	Kenya Social and Economic Inclusion Program
MLSP	Ministry of Labor and Social Protection
MIS	Management Information System
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organization
NSNP	National Safety Net Program
OM	Operations Manual
OP-CT	Older Persons Cash Transfer program
PAD	Project Appraisal Document
PWSD-CT	Persons with Severe Disability Cash Transfer
SDSP	State Department of Social Protection
SDSPS&SP	State Department for Social Protection, Senior Citizen Affairs & Special Program
SP	Social Protection
SPS	Social Protection Secretariat
SR	Single Registry
ToTs	Trainer of Trainers
TPQA	Third Party Quality Assurance
QA	Quality Assurance
UNICEF	United Nations Children Fund
WFP	World Food Program

1. INTRODUCTION AND BACKGROUND

The Government of Kenya has progressively expanded the scope, reach and innovation of social protection interventions within the country. The Kenya National Social Protection Policy (NSPP) serves as a blueprint for developing an integrated social protection system in Kenya, with policies and programmes in the three areas of social assistance, social insurance, and social health insurance. As a result, social protection encompasses government efforts that address income poverty and economic shocks, and social vulnerability, considering the interplay between exclusion and poverty.

The National Safety Net programme (NSNP) in 2013 was established to improve the well-being and resilience of specific disadvantaged groups in Kenya and minimize poverty and vulnerability. Kenya's Government now runs four major cash transfer programmes that reach out to over one million needy households across the country. The 2005 Orphans and Vulnerable Children Cash Transfer program (CT-OVC), the 2007 Hunger Safety Net Program (HSNP), the 2008 Older Persons Cash Transfer program (OP-CT), and the 2011 Persons with Severe Disability Cash Transfer program (PWSD-CT) are the four cash transfer programs.

While the basic components of a social safety net are in place in Kenya, there is indeed, growing recognition that there should be a systematic approach to data and information management across the sector. The countries' Social Protection Policy, comprehensively addresses the need for better coordination, including the necessary institutional framework and management information systems. The policy also envisions the country's Single Registry as a central pillar in establishing a coherent and scalable approach to social protection. This vision is also reflected in the medium-term plan of Kenya's Vision 2030 and is strongly led by the National Social Protection Secretariat (NSPS).

Previously, attempts to establish a unified registry were hindered by unclear methods for incorporating various social protection initiatives, as well as the lack of electronic databases or management information systems (MIS) for certain programs. Additionally, there were standardization-related obstacles across various program-specific databases. As a result, the Single Registry has been designed as an integrated beneficiary registry with a web-based reporting interface. This registry provides a centralized platform where critical and shared information from social assistance programs is stored, analyzed, and reported. The Single Registry allows the Kenyan government to connect the MISs of its major social protection programs.

The integration of the government led cash transfers in 2015 contributed to a more effective delivery of cash transfers to beneficiaries, and to better information systems that collect, process, store and use data to support the social protection delivery chain. The delivery chain constitutes the operational processes including outreach and registration, assessing needs and conditions, eligibility

and enrolment, grievances and appeals, beneficiary management, and monitoring and data analytics. The Single Registry (SR) was developed to provide accurate and analytical reports on the performance of Social Protection space in Kenya.

To enhance the capabilities of the Single Registry, the Kenyan government, under the State Department of Social Protection (SDSP), is implementing an upgraded version called the Enhanced Single Registry (ESR). The goal of this effort is to unify and integrate data collection by introducing a standardized questionnaire for all Cash Transfer programs, known as the Harmonized Targeting Questionnaire. Unlike the previous approach where individual programs conducted their own registrations, the ESR will streamline the process and improve efficiency.

This undertaking is implemented as part of Component 1 of the Kenya Social and Economic Inclusion Program (KSEIP) - *Enhancing institutional capacity and social protection delivery systems, particularly the coverage and functionality of the Social Registry, as well as continuing to improve the efficiency of other delivery mechanisms.*

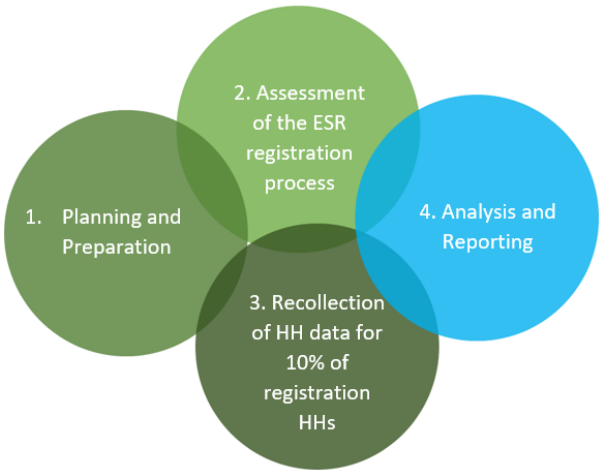
In realization of this component, the Government of Kenya has established the need to implement the Enhanced Single Registry (ESR). **The objective of the ESR is to collect, update, link, and ensure the quality of data on households and persons in poverty and with other vulnerabilities. The ESR is also meant to support the expansion and scalability of social assistance programs.** As a result, the government has commissioned a three-year ESR data collection exercise in all the 345 sub-counties in Kenya.

The purpose of the Third-Party Quality Assurance process is to ensure that the household (HH) registration process and the resulting data are of high quality. If any areas are found to have substandard data quality during the quality assurance exercise, they may be re-enumerated.

As a part of the beneficiary registration process for ESR, the third-party monitoring firm conducted a data quality assurance exercise that involved re-collecting data from a sample of households to assess the overall registration process and analyze any variability. The first phase of this monitoring exercise has been completed in six counties, namely Makueni, Vihiga, Isiolo, Samburu, Garissa, and Tana River Counties.

2. THE APPROACH

The set up and operationalization of the Third-Party Quality Assurance process was quite complex, considering the level of diligence required in ensuring household data is accurately recollected and subsequently used to determine accuracy scores. This Quality Assurance process was undertaken in four interconnected stages. The first stage was the planning and preparation, the second stage was the assessment of the registration process through qualitative interviews, the third stage was the recollection of household data from 10% of Households (HH) registered in each location, while the final stage was the data analysis and reporting. These stages (as illustrated in the Venn diagram below) were modelled around the set TPQA objectives and aligned to the ESR Operations Manual.



2.1. PLANNING AND PREPARATION

The planning and preparatory stage involved tasks aimed at gathering the support of different actors, providing guidance to teams at the national and county levels, recruiting enumerators, and implementing logistical plans. The activities carried out during this stage comprised of.

2.1.1. Document Review

The team carried out a document review of key program documents such as the ESR MIS Operations Manual, the System Requirement Specifications for ESR MIS (with an interest in the TPQA Module), the Project Appraisal Document (PAD) for KSEIP, the breakdown of registered beneficiaries, the ToT Training Plan, and activity reports for the HH registration. The document review helped in generating information useful in the development of the inception report and provided the consulting team with an overall understanding of the program and the QA assignment.

2.1.2. Trainings of ToTS

The ToT training was undertaken in two phases, the first involving Makueni and Vihiga counties while the second phase included four NDMA counties- Tana River, Garissa, Isiolo and Samburu. The first phase ToT training, was facilitated by the NSPS through the ESR unit with CHASP staff being part of the trainees. The training covered topics on the ESR MIS, procedures for gathering data as well as the anticipated challenges and lessons during the training. The second phase ToT training was conducted by the NDMA with a focus on the MIS to be deployed and experiences from the data collection exercise in the respective counties. Notably, the NDMA and NSPS trainers joined the CHASP ToTs in the field for backstopping during the training of quality assurance officers and field monitors and helping solve any technical issues that may have been experienced by field teams.

2.1.3. County and Sub-County level Consultations

The teams-initiated discussions with officials at both county and sub-county levels, which assisted in developing customized work plans and field movement strategies. This also helped in introducing field teams to the respective counties and sub-counties. The stakeholders involved in this phase included National Government Administration Officers (NGAO), community health volunteers (CHVs), county and sub-county officers of the National Drought Management Authority (NDMA), the Directorate of Social Development, and the Directorate of Children Services, among others.

2.1.4. Development of Assessment Tools

To facilitate the Process Assessment, the consulting team created interview guides such as the KII Question Guide and the FGD Question Guide (attached). The team also developed a set of Control Questions for the Household Data recollection, which were used to moderate the accuracy scores derived from the Harmonized Targeting Tool (HTT). These tools were subjected to input from the Social Protection Secretariat, and World Bank teams, and were pre-tested at the field level through internal quality assurance measures outlined in the Operations Manual.

2.2. ASSESSMENT OF THE ESR REGISTRATION PROCESS

The Third-Party Quality Assurance exercise included both a process review and a data quality review. This work stream focused on the process review, whose aim was to determine the efficiency of strategies/plans, understand challenges and experiences and draw lessons from the initial data collection process – for possible application in the subsequent phases of data collection. Some of the specific aspects subjected to the process assessment included overall planning, community mobilization and sensitization, listing, beneficiary registration, and overall coordination among involved actors.

The process assessment applied the use of qualitative techniques where Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) were undertaken with stakeholders involved in the process at the national, county, sub-county and community levels. The respondents consisted of relevant officers of the state department of social protection, NDMA program managers and program officers, county commissioners, selected chiefs as well as representatives from other stakeholders, like CSOs, within the specific counties. Focus Group Discussions were conducted at the Community level to obtain the demand-side perspectives on the ESR data collection process.

The key informant interviews and focus group discussions were distributed across the six counties as follows.

COUNTY	NUMBER OF KIIs	NUMBER OF FGDs
Vihiga	6	2
Makueni	5	6
Tana River	3	1
Garissa	3	2
Samburu	3	1
Isiolo	7	7
TOTAL	**27**	**18**

2.3. RECOLLECTION OF DATA FROM 10% OF REGISTERED HOUSEHOLDS

The recollection of data from 10% of the total number of households registered was indeed the main component of the TPQA process. The 10% sample for recollection was autogenerated form the MIS by system administrators at SPS (for Makueni and Vihiga counties), and NDMA (for Tana River, Garissa, Samburu and Isiolo counties). The processes discussed below were followed in the data recollection process.

2.3.1. Recruitment of Quality Assurance Officers and Field Monitors

To ensure high-quality data collection from the field, the initial step was to secure the recruitment of qualified quality assurance officers and field monitors. Consequently, minimum personnel requirements were established for the recruitment process, and priority was given to recruiting personnel from the communities where data collection would occur. In partnership with local partners in the target counties and locations, we successfully recruited sufficient and qualified personnel who were tasked with the actual data collection process.

The number of QAOs to be hired was determined based on two factors: the total number of households requiring data collection and the assumption that each enumerator could complete a minimum of eight tasks per working day. However, the primary difficulty faced during this stage was finding QAOs who met the necessary qualifications within the designated areas. To address this, we utilized online advertisements to attract potential candidates, conducted a shortlisting process, conducted interviews to select the most suitable individuals, and distribute the successful candidates in ways aligned to their locations, and in numbers consistent with the sample sizes drawn from the respective locations.

The table below shows the distribution of the QAOs and the Field Monitors/Supervisors.

COUNTY	QUALITY ASSURANCE OFFICERS	FIELD MONITORS/SUPERVISORS
Makueni	84	17
Vihiga	82	16
Tana River	6	1
Garissa	7	1
Samburu	6	1
Isiolo	11	2
TOTAL	**196**	**38**

2.3.2. Training of Quality Assurance Officers and Field Monitors

To ensure that the QAOs and Field monitors recruited for the project collect high-quality data, a three-day training was conducted in all six counties. The training sessions were led by CHASP ToTs, with support from government officials from SDSP and NDMA. The training covered a range of topics, including an overview of social protection programs in Kenya, a comprehensive understanding of the ESR and its importance for Kenya, basics of social research with a focus on data collection processes, installation of necessary software, in-depth orientation on the ESR and HSNP registration modules, development of a field movement plan, team roles, communication protocols, quality control measures, use of mobile data collection technology and laptops for data collection. An additional fourth day was utilized for a field pre-test.


Left frame; QAOs training in Garissa. Right Frame; QAOs training in Tana River

2.3.3. Household Data (re)collection

Before data collection began, efforts were made to mobilize the community and inform them about the exercise. The purpose of the mobilization was to ensure that community members understood that not all households would be visited and that there were no negative consequences for not being visited. Mobilization was conducted through meetings between CHASP teams and the county officials at the county level, along with village elders in the target locations. The elders then shared the information with the rest of the community and later served as guides during data collection to assist QAOs in locating the selected households for interviews.

The QAOs were assigned specific locations and required to visit 8 to 10 households per day. To ensure high response rates and quality data, the QAOs followed clear protocols for household recall, replacement, and internal quality checks. The supervisors ensured that the enumerators adhered to the QA protocols specified in the inception report and the QA protocol. Community guides assisted the QAOs in locating sampled households, however, there were instances of households that could not be reached, despite following recall procedures. To meet the set threshold of 10%, these households were replaced with another random sample from the MIS. The households that could not be reached were due to numerous reasons including migration in search of fodder for their animals. Some could not be found at home as they had either gone to the market, or to a fetch water.

The field monitors provided on-site supervision to confirm that QAOs were gathering data according to expectations and to assist in addressing any difficulties they encountered. Additionally, field monitors had a responsibility to track the progress of data collection in real time and ensure that QAOs met their daily objectives.

QAOs interviewing respondents across counties.

2.4. CHALLENGES AND MITIGATION STRATEGIES

During the third-party monitoring exercise, several challenges were experienced. Below is a breakdown of the challenges that were experienced during the data recollection process and their **mitigation** measures included.

2.4.1. Operational challenges

- During the electioneering period, local hostilities emerged in Makueni and Vihiga. However, we successfully navigated these challenges through NGAO structures, which helped raise awareness and reassure communities about the confidentiality of the documents collected.

- The exercise's delayed commencement led to a significant dropout rate among the recruited and trained QAOs, causing financial and operational implications. To mitigate this, QAOs were given more time to cover additional enumeration areas.

- The vast geographical coverage areas presented challenges to the QAOs, who had to manage large enumeration areas. A well-organized registration plan was necessary to cover the allocated areas, though non-responses still required recalls.
- Tracing sampled households proved difficult; some could not be found even with community guides' help. Consequently, additional households were generated to compensate for non-response cases and reach the 10% target.

- Data recollection was significantly delayed, collected almost a year later than the Operations Manual's recommended 4-week period. This led to wider margins of variance and lower accuracy scores.

- In NDMA counties, communities experiencing drought initially mistook household visits for relief support. This issue was resolved through ongoing sensitization efforts led by community champions.

- Technical issues with the laptops used for data collection, particularly on the first day, were addressed by NDMA technical teams in the field. Laptop incompatibility with software caused time lags during county-level training for QAOs and field monitors. Replacements were sought, and training time was extended to cover the necessary content.

2.4.2. MIS related challenges

Considering this was the first field-based application of the TPQA Module of the ESR-MIS, the challenges below need to be understood in the context of learning and should contribute to efforts in improving the effectiveness and efficiency of the applicable components of the ESR-MIS.

- **Onboarding of the QAOs:** The onboarding of QAOs was delayed because they could not register themselves and their details had to be sent to the ESR unit for centralized registration. In many cases, the QAOs couldn't use their registered emails and had to register new emails. Without mapping the QAOs to a registration plan, they couldn't be assigned households for registration. This led to significant delays in the data recollection process for up to 8 weeks.

- **MIS downtimes and Upload Challenges during the process of data collection:** The data collection process was interrupted by frequent MIS downtimes, causing QAOs to sometimes stay in the field for an entire day without having to recollect any data. This resulted in high operational costs, as enumerators had to be reimbursed for transport for days they didn't work. The issue was escalated to the ESR unit and the process in many instances halted wait until the downtimes were resolved. In addition to the downtimes, the MIS sometimes failed to load the data required for QAOs to undertake data recollection. These issues were also escalated to the ESR unit for resolution.

- **Generation of Household Sample:** In some cases, QAOs downloaded the 10% of households' data preloaded for recollection but found out that the households did not belong in their allocated areas of registration. In most cases, the households were in the nearest sub-counties and the QAOs liaised with chiefs to get directed to the correct households. Some downloaded data for recollection only had one name or two names with a phone number, which made tracing households difficult. Enumerators had to engage with administrative officers, CHVs, and sometimes community members to find the correct households.

- **MIS-based Data Validation:** The MIS-based data validation process didn't provide the anticipated validation checks in real-time, such as logical checks and double data entry of 3 to 5 random fields from a pre-selected set of variables. The third-party monitoring firm didn't have any access to the database, which limited their ability to validate the quality of the data collected. Moving forward, the TPQA firm should have additional access rights to confirm data quality.

- **MIS-based Variability Test:** The ESR operations guide indicated that variability tests would be handled within the system, but this turned out to be challenging to achieve. Manual analysis of variability tests was required, and their accuracy scores had to be generated manually.

3. THE FINDINGS

This chapter provides the TPQA findings based on the two main objectives of the exercise. It provides detailed information on how the process of the Enhanced Single Registry was undertaken thus providing an in-depth understanding of the planning, sensitization, household mobilization, listing, and registration processes as were undertaken - Objective 1. It also speaks to the results of recollected household data from l0% of the total number of households registered in the earmarked locations – Objective 2. The findings compare the recollected data collected (QA data) with the sets of data initially collected by the SDSP thus providing location-based accuracy scores. The TPQA findings are thus discussed based on the 2 objectives below.

3.1. OBJECTIVE 1 | PROCESS ASSESSMENT EXERCISE

The evaluation of the HH registration procedures aimed to identify the primary concerns regarding the execution of the registration process. This section summarizes the effective strategies employed by stakeholders to attain registration objectives, as well as highlights any significant shortcomings that could be mitigated to achieve improved outcomes.

3.1.1. Gains and Best Practices (National Level Perspectives)

- **Preparedness:** The training of National Level TOTs was properly organized with good plans that guided the entire process. The facilitators were scheduled in a way that allowed the activities to run smoothly, and they trained the stakeholders on the ESR operations manual, which was improved with their contributions to ensure standards that meet the requirements and capacities for the registrations.

- **The Operations Manual:** The development of the operations manual was consultative, with all relevant players providing adequate discussions and input. After its finalization, county officers received orientation on the tools. The operations manual provided clarity and guidance on the respective roles of various stakeholders.

- **Stakeholder Involvement:** The planning and execution of the HH Registration leveraged the efforts of stakeholders across departments and agencies. Several meetings and trainings were conducted to ensure the active participation of different stakeholders.

- **Clear communication channels:** Communication between the national and county teams were well-coordinated through physical and online meetings, with several platforms available for easy communication among those responsible for implementing the registration exercise.

- **Alignment with other projects:** The registration was aligned with the GoK's pursuit of achieving universal health coverage, reflecting its importance and potential to utilize the registered data to achieve the said goals at the national level.

3.1.2. Gains and Best Practices (County Level Perspectives)

- **Sufficient MIS Training:** As the actual execution and assistance for the registration activities were managed by the County and Sub-County groups, it was crucial to guarantee that these teams received proper training. They confirmed that they had been provided with ample opportunities to learn about the MIS system at every level, ensuring they were prepared and equipped to assist enumerators during the data collection phase. The majority of county and sub-county officers also verified having access to pertinent documents related to the task. Overall, the guidelines were comprehensive, and in the rare instances where participants were uncertain about procedures, there was always an option to ask for clarification.

- **Sufficient National-Level Support:** National coordination teams at SPS were significantly present in the counties to assist county teams with registration. These national teams were prepared to offer guidance and support throughout the process.

- **Communication Channels:** Established mechanisms and channels facilitated open lines of communication, enabling stakeholders to seek clarity and conduct the ESR as intended. Clear communication ensured real-time resolution of any field challenges.

- **Stakeholder Engagement:** The ESR exercise's success hinged on each stakeholder's input, with combined synergies contributing to the overall expected outcome. Stakeholder meetings and training occurred at county and sub-county levels, while stakeholder orientation meetings promoted active participation in achieving registration goals. For example, NGAO teams mobilized communities for the registration exercise.

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3.1.3. Possible Gaps and Opportunities for improvement (National Level Perspectives)

- **Human Resource Capacity:** National-level discussions highlighted a shortage of government staff available to assist with the HH registration process. In some cases, it was evident that not every sub-county had a designated children's officer, who's role in the registration process is critical. Even when an officer was present, they often faced competing priorities due to multiple assignments. Also, there were only a few enumerators dedicated to conducting the listing, which resulted in a delay in the process. In certain instances, the enumerators had to resort to using their personal mobile phones due to inadequate listing gadgets.

- **Strict timelines for Delivery:** The pressure to achieve numerical targets within a narrow timeframe may have negatively impacted the quality of the registration process. It is crucial to allocate sufficient time for such significant registration exercises, as adequate time is important to ensure the accuracy and quality of the data collected.

3.1.4. Possible Gaps and Opportunities for improvement (County Level Perspectives)

- **Insufficient Resources and Delayed Payments:** The activity faced challenges related to inadequate funding, particularly with regard to per-diems and travel allowances for community health volunteers (CHVs) and chiefs. Many participants felt that more funds should be allocated for transportation and payments to village elders and assistant chiefs, who play vital roles in the process. If given another opportunity, most respondents would prefer adding more enumerators to cover a larger area within the given timeframe. A smoother operation could be achieved by providing additional resources to various stakeholders. In addition, there would be a need to dedicate adequate resources towards awareness-raising events in the vast areas that need to be covered.

- **Management Information System (MIS) Issues:** County teams encountered problems with the MIS, particularly during training sessions. They needed to invest extra time in familiarizing enumerators with the system before registration could begin. Moreover, data upload challenges arose, especially during peak work hours across the counties.

- **County-Level Planning:** Although not entirely effective, most respondents acknowledged the planning process was efficient to some degree. Some challenges arose due to expansive coverage areas and the diverse origins of respondents, complicating regular physical meetings. Network connectivity issues also hindered conference or Zoom calls. Nonetheless, overall planning can be considered effective, as all necessary information for decision-making was available.

- **Delays in NDMA Counties:** The start of the project in the NDMA counties was delayed, which had an impact on the project's implementation timeline. The delay was mainly due to the various requirements, including the procurement of laptops needed to support NDMA-MIS. Consequently, even the third-party monitoring in this county was delayed, as the monitoring firm had to wait for the completion of the registration procedure.

3.2. OBJECTIVE 2 | RECOLLECTION OF DATA FROM REGISTERED HOUSEHOLDS

This section provides insights on the variability tests carried out by comparing the household data from 10% of the total number of households registered in a location using the digitized Harmonized Targeting Tool with the initial data set collected by the SDSP. The 10% randomized HH sample was auto-generated by the ESR MIS and a list of the HHs sampled per location. Table 1 provides a summary of the number of households that were recollected in every county.

Table 1: Number of households under data recollection

County	Location	HHs Recollected
Samburu	Kisima	287
Tana River	Chewani	258
Isiolo	Central Location	413
Garissa	Iftin East	254
Makueni	List of locations annex 4	4750
Vihiga	List of locations annex 5	3361

In Samburu, Tana River, Isiolo and Garissa – only one location was registered per county as these are the locations from which data collection had been completed at the time of commissioning. However, in Makueni and Vihiga, the whole county was covered therefore having all the locations in these two counties undergoing the Third- Party Monitoring exercise.

In computing the accuracy scores, we included a set of analyzable control questions, around specific parameters against which significant changes to the household characteristics can be expected/measured – of which output may be used to interpret reasonable deviances in accuracy. 18 variables were identified and computed; some of which included HH size, Education level, Date of birth, type of shelter, and sources of water lighting, and source of cooking energy.

It is worth mentioning that the accuracy scores were expected to be generated by the MIS. Unfortunately, there were challenges in the ability of the MIS to perform a coherent analysis. As a result, the TPQA team had to utilize alternative analytical software to manually compute the accuracy scores.

That said, the accuracy scores obtained for the different locations should have stayed within a 10% variability range, and for the selected variables, the accuracy should not have been lower than 90%. In cases where the desired accuracy threshold was not met, the ESR team had to change the status of all registered households (in the MIS) to pending data collection for recollection. However, as mentioned in earlier sections, **the time lapse of approximately 11 months between the initial data collection and the data recollection made it necessary to analyze the control questions to understand the instances of lower accuracy scores.** Subsequently, a more comprehensive analysis was carried out to better understand the variability scores.

The sections below contain a summary of the variability calculated for each location.

3.2.1. Variability tests for Locations in Makueni County

The purpose of this section is to compare the variability scores between the original dataset collected by the SDSP and the household data obtained from 10% of the total number of registered households per sub-county. Additionally, this section highlights the areas where the variabilities originated and provides an explanation of the factors responsible for the variability.

a. Locations in Kibwezi Sub - County

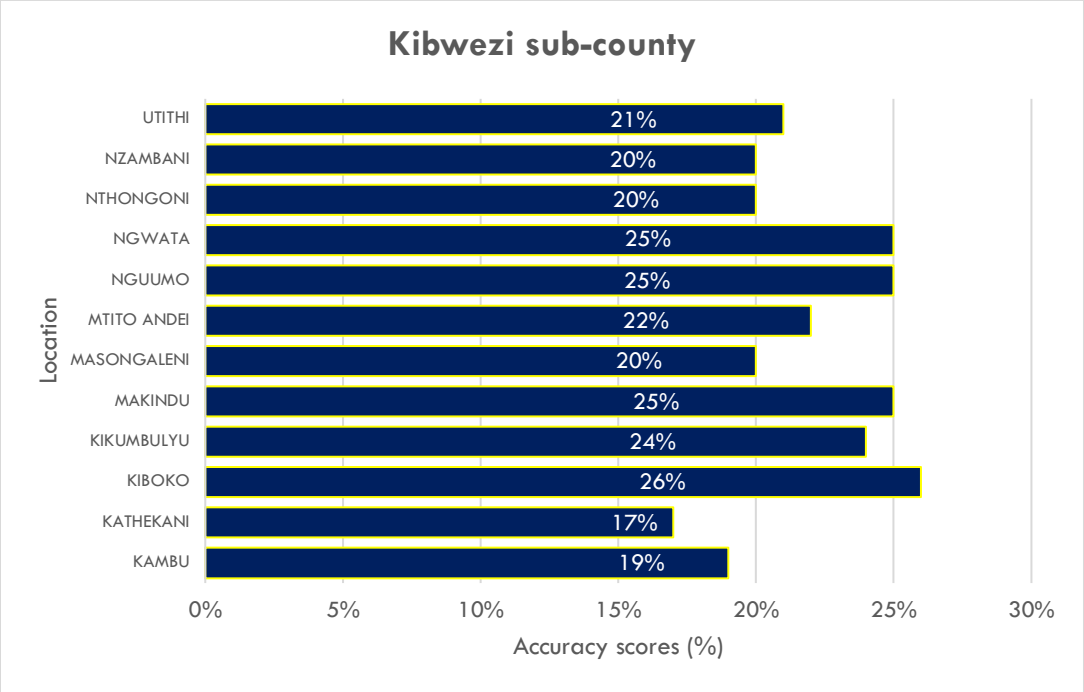


Figure 1: Variability scores for Kibwezi Sub-County

In Kibwezi Sub- County, Kiboko location registered the highest variability score, followed by Ngwata, Nguumo, and Makindu locations. Despite selecting some variables as time-invariant, such as the source of lighting and source of water, they still contributed significantly to the high variances observed across the various locations. Given the time elapsed between the two points of data collection, it is evident that some of these variables were highly likely to change. Specifically, Kibwezi is a semi-arid region with erratic rainfall and extended periods of water scarcity, making it highly probable for water sources to change.

The table below summarizes the variances for all 18 variables across locations in Kibwezi Sub-County.

Table 2: Variances across the 18 variables for locations in Kibwezi sub-county

		KIBWEZI																					
		KAMBU		KATHEKANI		KIBOKO		KIKUMBULYU		MAKINDU		MASONGALENI		MTITO ANDEI		NGUUMO		NGWATA		NTHONGONI		NZAMBANI		UTITHI	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	1/248	0%	6/324	2%	6/191	3%	3/418	1%	3/748	0%	1/402	0%	1/447	0%	2/487	0%	0/321	0%	0/177	0%	0/463	0%	0/75	0%
2	Mismatch of household member names	21/248	8%	12/324	4%	4/191	2%	28/418	7%	83/748	11%	22/402	5%	51/447	11%	19/487	4%	14/321	4%	9/177	5%	10/463	2%	6/75	8%
3	Mismatch of relationships to household head	35/248	14%	70/324	22%	45/191	24%	94/418	22%	85/748	11%	74/402	18%	42/447	9%	19/487	4%	30/321	9%	0/177	0%	15/463	3%	0/75	0%
4	Mismatch of number of main rooms	29/48	60%	38/63	60%	31/50	62%	91/144	63%	110/196	56%	79/112	71%	48/89	54%	87/129	67%	47/69	68%	26/39	67%	43/89	48%	12/20	60%
5	Mismatch of roof	1/48	2%	3/63	5%	7/50	14%	18/144	13%	13/196	7%	1/112	1%	3/89	3%	3/129	2%	4/69	6%	6/39	15%	15/89	17%	5/20	25%
6	Mismatch of wall	17/48	35%	29/63	46%	24/50	48%	91/144	63%	71/196	36%	89/112	79%	47/89	53%	65/129	50%	43/69	62%	20/39	51%	33/89	37%	12/20	60%
7	Mismatch of cooking fuel	1/48	2%	1/63	2%	7/50	14%	24/144	17%	25/196	13%	1/112	1%	9/89	10%	5/129	4%	3/69	4%	1/39	3%	3/89	3%	0/20	0%
8	Mismatch of household size	22/48	46%	8/63	13%	24/50	48%	78/144	54%	87/196	44%	59/112	53%	35/89	39%	54/129	42%	46/69	67%	13/39	33%	30/89	34%	6/20	30%
9	Mismatch of source of lighting	26/48	54%	44/63	70%	33/50	66%	81/144	56%	127/196	65%	54/112	48%	58/89	65%	104/129	81%	54/69	78%	29/39	74%	53/89	60%	2/20	10%
10	Mismatch of floor	9/48	19%	13/63	21%	11/50	22%	49/144	34%	72/196	37%	15/112	13%	42/89	47%	34/129	26%	19/69	28%	5/39	13%	20/89	22%	13/20	65%
11	Mismatch of toilet type	2/48	4%	1/63	2%	1/50	2%	20/144	14%	3/196	2%	1/112	1%	0/89	0%	12/129	9%	4/69	6%	0/39	0%	2/89	2%	0/20	0%
12	Mismatch of source of water	32/48	67%	25/63	40%	38/50	76%	60/144	42%	165/196	84%	19/112	17%	43/89	48%	93/129	72%	49/69	71%	34/39	87%	62/89	70%	19/20	95%
13	Mismatch of HH Head ID Number	0/48	0%	0/63	0%	0/50	0%	0/144	0%	0/196	0%	0/112	0%	0/89	0%	0/129	0%	0/69	0%	0/39	0%	0/89	0%	0/20	0%
14	Mismatch of HH Head Date of Birth	2/48	4%	3/63	5%	22/50	44%	55/144	38%	80/196	41%	37/112	33%	23/89	26%	63/129	49%	2/69	3%	3/39	3%	30/89	34%	1/20	5%
15	Mismatch of education levels of HH Head	11/48	23%	4/63	6%	0/50	0%	8/144	6%	10/196	5%	6/112	5%	9/89	10%	4/129	3%	2/69	3%	0/39	0%	0/89	0%	2/20	10%
16	Mismatch of Spouse ID Number	1/48	2%	2/63	3%	13/50	26%	2/144	1%	32/196	16%	0/112	0%	13/89	15%	14/129	11%	15/69	22%	7/39	0%	10/89	11%	1/20	5%

17	Mismatch of spouse Date of Birth	0/48	0%	2/63	3%	8/50	16%	5/144	3%	28/196	14%	13/112	12%	7/89	8%	23/129	18%	7/69	10%	3/39	8%	11/89	12%	1/20	5%
18	Mismatch of education levels of Spouse	0/48	0%	1/63	2%	0/50	0%	3/144	2%	2/196	1%	2/112	2%	2/89	2%	1/129	1%	3/69	4%	1/39	3%	0/89	0%	0/20	0%
	Average	**19%**		**17%**		**26%**		**24%**		**25%**		**20%**		**22%**		**25%**		**25%**		**20%**		**20%**		**21%**	

Below is a summary explaining the shifts/variances variables with high variances across the two points of data collection by SDSP and during TPQA.

Location	Source of light	Source of water	Toilet type	Walls	Floor	Roof
KAMBU	Most HHs moved from tin lamp and lantern to solar and electricity	Most HHs indicated that they've moved from using Stream/River water to piped and borehole water	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs cemented the floor or moved to a cemented floor	
KATHEKANI	Most HHs moved from using tin lamps to lantern	Most HHs indicated that they've moved from using Stream/River water to piped and borehole water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to mud/cemented walled houses	Most HHs cemented the floor or moved to a cemented floor	
KIBOKO	Most HHs started using pressure lamp	Most HHs indicated that they've moved from using piped water to Stream/River and borehole water	Most latrines that were covered became uncovered	Most HHs moved from mud to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	
KIKUMBULYU	Most HHs started using lantern and tin lamp	Most HHs indicated that they've moved from using piped water to water from the vendor	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs cemented the floor or moved to a cemented floor	
MAKINDU	Most HHs started using lantern and tin lamp	Most HHs indicated that they've moved from using water from other sources to wells and water vendor	HHs stopped using the bush and moved to pit latrines	Most HHs moved from brick/block to mud walled houses	Most HHs cemented the floor or moved to a cemented floor	
MASONGALENI	Most HHs started using lantern and tin lamp	Most HHs indicated that they've moved from using water from other sources to stream/River and piped water	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs moved to earth floor from cemented	
MTITO ANDEI	Most HHs started using tin lamp	Most HHs indicated that they've moved from using piped water and vendor to other sources	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs moved to earth floor from cemented	
NGUUMO	Most HHs started using tin lamp	Most HHs indicated that they've moved from using piped water and vendor to other sources	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs moved to earth floor from cemented	
NGWATA	Most HHs started using tin lamp	Most HHs indicated that they've moved from using other sources of water to borehole water	Most latrines that were covered became uncovered	Most HHs moved from mud walled to brick/block walled houses	Most HHs cemented the floor or moved to a cemented floor	

NTHONGONI	Most HHs started using lantern	Most HHs indicated that they've moved from using other sources of water to water from the vendor	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs moved to earth floor from cemented	
NZAMBANI	Most HHs started using lantern and tin lamp	Most HHs indicated that they've moved from using other sources of water to borehole water	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs moved to earth floor from cemented	Most HHs moved from a unit with asbestos sheets to one with corrugated iron sheets
UTITHI	Most HHs started using firewood as source of light	Most HHs indicated that they've moved from using Stream/River water to piped and borehole water	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with Corrugated iron sheets to one with asbestos sheets
Possible explanation	In most cases, shifts were noted from lantern to tin lamp. In most rural households these two are the main sources of lighting and the perception of which is the main would depend on the respondent.	Households clearly sought different sources of water as a result of the drought. The shift mainly to the use of borehole water/vendor points to the likelihood of a borehole installation.	Here, the shifts are likely explained by the differing definitions of what covered and uncovered toilets are.	The variances can be explained by differing understanding of the walls amongst the QAOs and enumerators during data collection		Variances in data based on the roof are likely a result of the definitions.

Variances in the number of main rooms can be attributed to the measurement error. Respondents might have provided an inaccurate number of main rooms due to misinterpretation of the question, variations in recall or perception of the individual respondents (if the respondents in the two data points were different -say spouses), cognitive biases that influence how individuals perceive and report the number of rooms in their homes. The variances in the type of wall can be attributed to the varied definitions that the QAOs had while collecting the data. Mismatch in the level of education was also observed, however not in huge numbers. These variances could be attributed to the respondent and how far they have been told the household head's level of education is. On the other hand, given that the data collection happened during the COVID-19 period, there was a lot of movement by household members from the city to their rural dwellings and this could explain the variances in the data when it was collected after most of the restrictions in movement had been lifted.

b. Locations in Makueni Sub - County

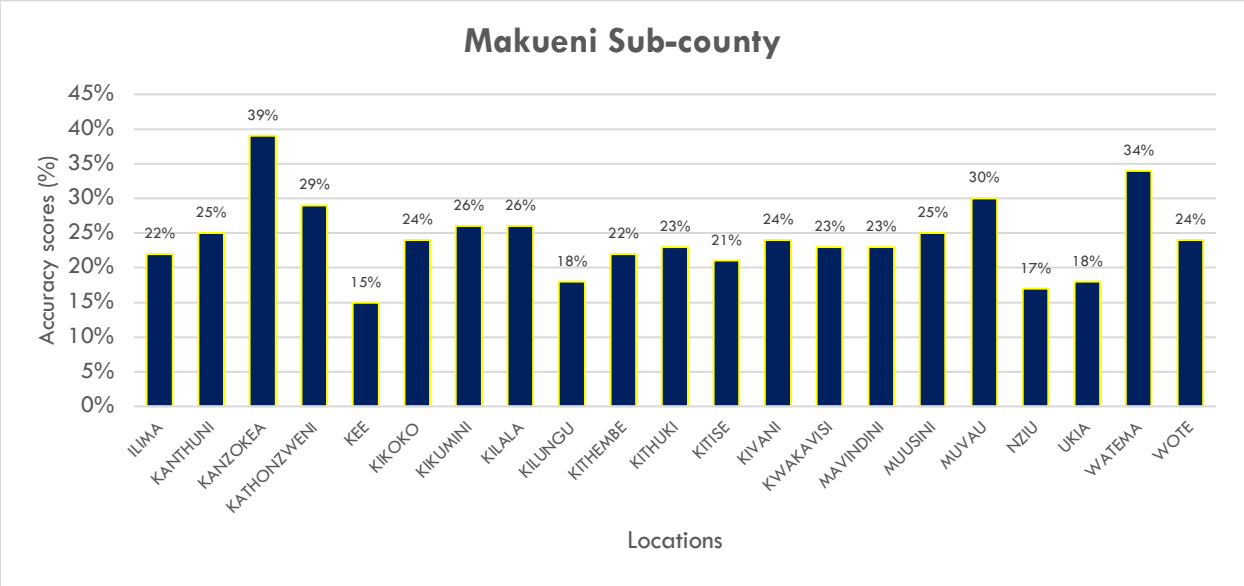


Figure 2: Variability scores for Makueni Sub-County

In Makueni Sub-County, Kanzokea, Watema and Muvau locations had the highest variability scores respectively. In Kanzokea, there was 100% mismatch in the toilet type and water sources, with source of lighting and number of main rooms in the house also posting very high variances. In Watema, source of lighting and water reported highest variability scores while in Muvau, type of wall and water sources had the highest variances. Water sources, consistently contributed to the high variances across all the locations. This can be explained by the sustained drought periods across the country and the climatic conditions of the county. During the TPM data collection households collected water from diverse other sources of water and not necessarily the points where they were collecting water during the initial registration process. The variances in the type of toilet used can mainly be explained by an understanding of definitions of the different types and the ease with which the respondent can correctly explain the toilet type. In this region, there were numerous solar campaigns and this could explain the shift in the sources of lighting. Despite the number of rooms posting high variances, this can largely be attributed to the accuracy and precision with which the responses were captured. It is very unlikely to have very high shifts in this variable. However, it raises the concern of standardization of the trainings of the two data collection point to ensure a similar understanding of what needs to be considered as the main room and what shouldn't.

Table 3: Variances across the 18 variables for locations in Makueni sub-county

		MAKUENI											
		ILIMA	KANTHUNI	KANZOKEA	KATHONZWENI	KEE	KIKOKO	KIKUMINI	KILALA	KILUNGU	KITHEMBE	KITHUKI	KITISE

	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	1/169	1%	1/245	0%	0/20	0%	0/66	0%	0/114	0%	1/276	0%	0/149	0%	0/273	0%	1/264	0%	0/179	0%	0/131	0%	0/322	0%
2	Mismatch of household member names	14/169	8%	25/245	10%	1/20	5%	2/66	3%	3/114	3%	33/276	12%	8/149	5%	8/273	3%	9/264	3%	3/179	2%	14/131	11%	17/322	5%
3	Mismatch of relationships to household head	0/169	0%	3/245	1%	0/20	0%	0/66	0%	0/114	0%	1/276	0%	7/149	5%	23/273	8%	29/264	11%	2/179	1%	14/131	11%	15/322	5%
4	Mismatch of number of main rooms	22/45	49%	35/50	70%	16/18	89%	28/57	49%	15/39	38%	46/90	51%	11/24	46%	38/60	63%	22/69	32%	37/72	51%	18/39	46%	38/70	54%
5	Mismatch of roof	1/45	2%	36/50	72%	13/18	72%	22/57	39%	5/39	13%	1/90	1%	3/24	13%	2/60	3%	0/69	0%	1/72	1%	9/39	23%	4/70	6%
6	Mismatch of wall	4/45	9%	6/50	12%	12/18	67%	39/57	68%	7/39	18%	33/90	37%	10/24	42%	9/60	15%	0/69	0%	25/72	35%	18/39	46%	37/70	53%
7	Mismatch of cooking fuel	7/45	16%	1/50	2%	0/18	0%	8/57	14%	1/39	3%	5/90	6%	1/24	4%	10/60	17%	1/69	1%	2/72	3%	1/39	3%	7/70	10%
8	Mismatch of household size	23/45	51%	23/50	46%	15/18	83%	25/57	44%	12/39	31%	49/90	54%	18/24	75%	43/60	72%	40/69	58%	51/72	71%	10/39	26%	29/70	41%
9	Mismatch of source of lighting	27/45	60%	39/50	78%	16/18	89%	41/57	72%	26/39	67%	63/90	70%	18/24	75%	41/60	68%	43/69	62%	33/72	46%	35/39	90%	41/70	59%
10	Mismatch of floor	19/45	42%	4/50	8%	4/18	22%	9/57	16%	8/39	21%	32/90	36%	9/24	38%	21/60	35%	20/69	29%	16/72	22%	10/39	26%	25/70	36%
11	Mismatch of toilet type	23/45	51%	16/50	32%	18/18	100 %	43/57	75%	6/39	15%	32/90	36%	13/24	54%	34/60	57%	28/69	41%	27/72	38%	16/39	41%	31/70	44%
12	Mismatch of source of water	32/45	71%	25/50	63%	18/18	100 %	51/57	89%	24/39	62%	44/90	49%	8/24	33%	30/60	50%	39/69	57%	58/72	81%	29/39	74%	30/70	43%
13	Mismatch of HH Head ID Number	0/45	0%	0/50	0%	0/18	0%	0/57	0%	0/39	0%	0/90	0%	0/24	0%	0/60	0%	0/69	0%	0/72	0%	0/39	0%	0/70	0%
14	Mismatch of HH Head Date of Birth	10/45	22%	3/50	6%	14/18	78%	26/57	46%	1/39	3%	50/90	56%	15/24	63%	17/60	28%	1/69	1%	22/72	31%	0/39	0%	4/70	6%
15	Mismatch of education levels of HH Head	1/45	2%	1/50	2%	1/18	6%	0/57	0%	0/39	0%	3/90	3%	0/24	0%	2/60	3%	2/69	3%	2/72	3%	4/39	10%	0/70	0%
16	Mismatch of Spouse ID Number	3/45	7%	14/50	28%	0/18	0%	2/57	4%	0/39	0%	8/90	9%	0/24	0%	10/60	17%	17/69	25%	3/72	4%	2/39	5%	8/70	11%
17	Mismatch of spouse Date of Birth	2/45	4%	3/50	6%	0/18	0%	2/57	4%	1/39	3%	11/90	12%	6/24	25%	12/60	20%	3/69	4%	11/72	15%	1/39	3%	2/70	3%
18	Mismatch of education levels of Spouse	2/45	4%	3/50	6%	0/18	0%	1/57	2%	0/39	0%	3/90	3%	0/24	0%	1/60	2%	2/69	3%	0/72	0%	0/39	0%	0/70	0%
	Average	**22%**		**25%**		**39%**		**29%**		**15%**		**24%**		**26%**		**26%**		**18%**		**22%**		**23%**		**21%**	

MAKUENI CONT…																			
		KIVANI		KWAKAVISI		MAVINDINI		MUUSINI		MUVAU		NZIU		UKIA		WATEMA		WOTE	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	0/80	0%	3/331	1%	5/184	3%	1/150	1%	0/93	0%	0/39	0%	1/144	1%	3/102	3%	0/196	0%
2	Mismatch of household member names	4/80	5%	11/331	3%	24/184	13%	9/150	6%	2/93	2%	1/39	3%	6/144	4%	5/102	5%	15/196	8%
3	Mismatch of relationships to household head	3/80	4%	9/331	3%	28/184	15%	6/150	4%	0/93	0%	3/39	8%	10/144	7%	9/102	9%	12/196	6%
4	Mismatch of number of main rooms	16/21	76%	38/62	61%	32/49	65%	36/48	75%	22/37	59%	6/37	16%	30/83	36%	30/40	75%	69/107	64%
5	Mismatch of roof	1/21	5%	5/62	8%	4/49	8%	12/48	25%	1/37	3%	1/37	3%	3/83	4%	8/40	20%	4/107	4%
6	Mismatch of wall	1/21	5%	27/62	44%	11/49	22%	11/48	23%	35/37	95%	3/37	8%	41/83	49%	20/40	50%	31/107	29%
7	Mismatch of cooking fuel	0/21	0%	2/62	3%	0/49	0%	2/48	4%	6/37	16%	0/37	0%	2/83	2%	19/40	48%	15/107	14%
8	Mismatch of household size	14/21	67%	39/62	63%	15/49	31%	31/48	65%	26/37	70%	36/37	97%	53/83	64%	18/40	45%	83/107	78%
9	Mismatch of source of lighting	19/21	90%	37/62	60%	38/49	78%	28/48	58%	21/37	57%	17/37	46%	49/83	59%	36/40	90%	63/107	59%
10	Mismatch of floor	9/21	43%	21/62	34%	6/49	12%	11/48	23%	12/37	32%	8/37	22%	19/83	23%	23/40	58%	43/107	40%
11	Mismatch of toilet type	11/21	52%	22/62	35%	21/49	43%	33/48	69%	21/37	57%	17/37	46%	36/83	43%	24/40	60%	41/107	38%
12	Mismatch of source of water	13/21	62%	49/62	79%	30/49	61%	10/48	21%	30/37	81%	8/37	22%	25/83	30%	34/40	85%	53/107	50%
13	Mismatch of HH Head ID Number	0/21	0%	0/62	0%	0/49	0%	0/48	0%	0/37	0%	0/37	0%	0/83	0%	0/40	0%	0/107	0%
14	Mismatch of HH Head Date of Birth	0/21	0%	5/62	8%	13/49	27%	30/48	63%	22/37	59%	11/37	30%	4/83	5%	14/40	35%	32/107	30%
15	Mismatch of education levels of HH Head	2/21	10%	1/62	2%	2/49	4%	0/48	0%	0/37	0%	1/37	3%	1/83	1%	1/40	3%	4/107	4%
16	Mismatch of Spouse ID Number	3/21	14%	6/62	10%	5/49	10%	1/48	2%	2/37	5%	1/37	3%	3/83	4%	3/40	8%	5/107	5%

17	Mismatch of spouse Date of Birth	1/21	5%	2/62	3%	9/49	18%	10/48	21%	3/37	8%	0/37	0%	0/83	0%	11/40	28%	1/107	1%
18	Mismatch of education levels of Spouse	0/21	0%	0/62	0%	2/49	4%	0/48	0%	0/37	0%	0/37	0%	0/83	0%	0/40	0%	0/107	0%
	Average	**24%**		**23%**		**23%**		**25%**		**30%**		**17%**		**18%**		**34%**		**24%**	

The table below provides a summary explanation of the variations in variables with high variances generated during the comparison.

Location	Source of light	Source of water	Toilet type	Floor	Roof
ILIMA	Most HHs started using solar and Fuel wood / Firewood as a source	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved to earth floor	
KANTHUNI	Most HHs started using lantern and tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved to earth floor	Most HHs moved from a unit with Corrugated iron sheets to the one with plain iron sheets
KANZOKEA	Most HHs started using tin lamp	Most HHs indicated that they've moved from using other sources of water to unprotected spring	Most latrines that were covered became uncovered	Most HHs moved to earth floor	
KATHONZWENI	Most HHs started using tin lamp	Most HHs indicated that they've moved from using other sources of water to unprotected spring and dam	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
KEE	Most HHs started using lantern and tin lamp	Most HHs indicated that they've moved from using other sources of water to Stream/River water	HHs stopped using the bush and moved to pit latrines	Most HHs cemented the floor or moved to a cemented floor	
KIKOKO	Most HHs started using lantern	Most HHs indicated that they've moved from using other sources of water to unprotected spring	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KIKUMINI	Most HHs started using tin lamp from lantern	Most HHs indicated that they've moved from using dam water to boreholes	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KILALA	Most HHs started using lantern from tin lamp	Most HHs indicated that they've moved from using other water sources to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved to earth floor	
KILUNGU	Most HHs moved from using tin lamp to other sources	Most HHs indicated that they've moved from using water from unprotected spring water to unprotected well	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KITHEMBE	Most HHs started using solar from mostly tin lamp	Most HHs indicated that they've moved from using water from unprotected spring water to unprotected well	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KITHUKI	Most HHs started using tin lamp from lantern	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KITISE	Most HHs moved from using fuel wood to mainly solar	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KIVANI	Most HHs moved from using tin lamp to mainly solar	Most HHs indicated that they've moved from using Stream/River water to pond	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
KWAKAVISI	Most HHs moved from using tin lamp to mainly solar	Most HHs indicated that they've moved from using Stream/River water to mostly unprotected wall	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
MAVINDINI	Most HHs started using tin lamp from lantern	Most HHs indicated that they've moved from using other sources of water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
MUUSINI	Most HHs started using tin lamp from lantern	Most HHs indicated that they've moved from using other sources of water to dam	Most latrines that were covered became uncovered	Most HHs moved to earth floor	
MUVAU	Most HHs started using solar from lantern	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved to earth floor	
NZIU	Most HHs started using solar from lantern	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
UKIA	Most HHs moved from using tin lamp and lantern to other sources	Most HHs indicated that they've moved from using unprotected well to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	
WATEMA	Most HHs moved from using tin lamp to other sources	Most HHs indicated that they've moved from using other sources of water to dam	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets

WOTE	Most HHs moved from using lantern to other sources	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
Possible Explanation	Major shifts reported between tin lamp and lantern. Most rural households have both and the main source may be dependent on an respondents perception	Changes in main source of water due to prolonged drought period, hence need to seek alternative water sources	Variances based on definitions		The shifts are based on the definitions

c. Locations in Moni Sub - County

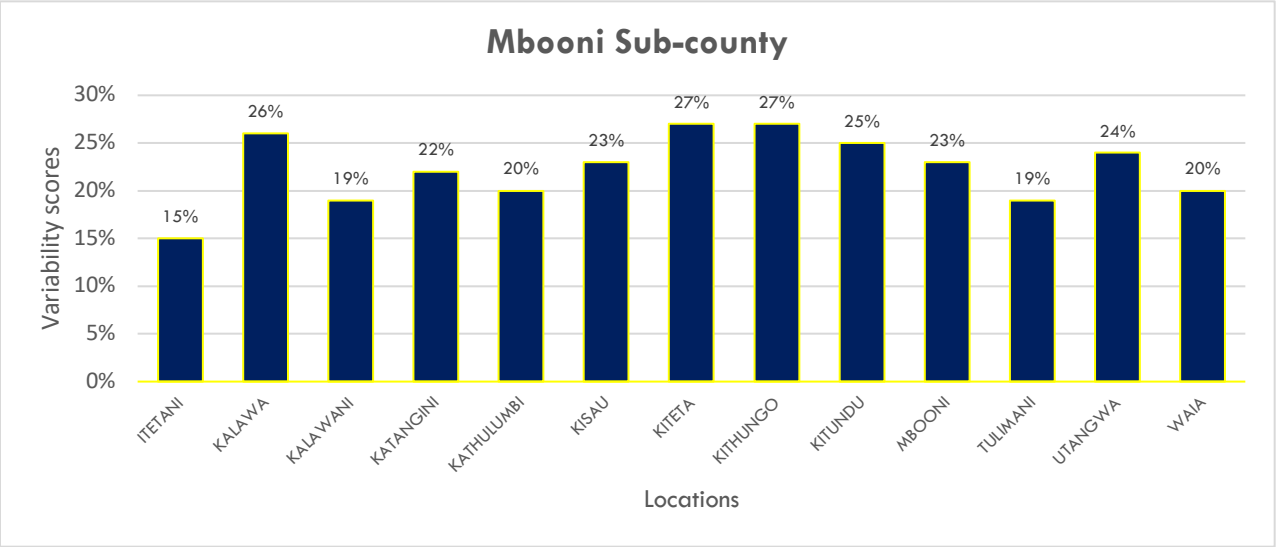


Figure 3: Variability scores for Makueni Sub-County

Kiteta, Kithungo and Kalawa had the highest variability scores in Mbooni Sub-County. In Kiteta, the source of lighting was a significant contributor to the high variances observed, with a shift from other sources to solar power as the primary source. This change can be attributed to various factors, including solar promotion programs that increased the uptake of solar energy equipment. In Kithungo, the source of water, like in other locations in the sub-county, was also a major contributor to the variances, with a switch from other water sources reported during the initial data collection under TPQA. In Kalawa, one of the factors contributing to the variances was the type of toilet, which changed from covered to uncovered. It is crucial to standardize the definition of terms and ensure all enumerators and QAOs have a similar understanding of the terms used across both data collection points. **Thus, there is a strong need for high-quality standardized training to avoid such variances in the future.**

Table 4: Variances across the 18 variables for locations in Mbooni sub-county

		MBOONI												
		ITETANI	**KALAWA**	**KALAWANI**	**KATANGINI**	**KATHULUMBI**	**KISAU**	**KITETA**	**KITHUNGO**	**KITUNDU**	**MBOONI**	**TULIMANI**	**UTANGWA**	**WAIA**

	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	0/103	0%	1/262	0%	0/284	0%	1/414	0%	0/250	0%	3/357	1%	1/333	0%	0/224	0%	2/246	1%	7/1187	1%	3/335	1%	0/99	0%	2/512	0%
2	Mismatch of household member names	3/103	3%	11/262	4%	12/284	4%	15/414	4%	13/250	5%	34/357	10%	20/333	6%	7/224	3%	14/246	6%	71/1187	1%	18/335	5%	8/99	8%	11/512	2%
3	Mismatch of relationships to household head	8/103	8%	14/262	5%	7/284	2%	27/414	7%	23/250	9%	46/357	13%	33/333	10%	7/224	3%	20/246	8%	31/1187	3%	33/335	10%	12/99	12%	16/512	3%
4	Mismatch of number of main rooms	21/39	54%	48/71	68%	78/143	55%	62/91	68%	37/49	76%	68/91	75%	119/147	81%	48/95	51%	34/58	59%	138/275	50%	44/67	66%	40/58	69%	117/208	56%
5	Mismatch of roof	1/39	3%	1/71	1%	2/143	1%	10/91	11%	1/49	2%	37/91	41%	25/147	17%	65/95	68%	0/58	0%	83/275	30%	3/67	4%	8/58	14%	34/208	16%
6	Mismatch of wall	1/39	3%	19/71	27%	12/143	8%	37/91	41%	3/49	6%	5/91	5%	34/147	23%	43/95	45%	26/58	45%	111/275	40%	17/67	25%	21/58	36%	41/208	20%
7	Mismatch of cooking fuel	0/39	0%	1/71	1%	0/143	0%	3/91	3%	2/49	4%	5/91	5%	6/147	4%	1/95	1%	2/58	3%	6/275	2%	1/67	1%	3/58	5%	7/208	3%
8	Mismatch of household size	7/39	18%	49/71	69%	73/143	51%	58/91	64%	21/49	43%	41/91	45%	122/147	83%	60/95	63%	28/58	48%	122/275	44%	22/67	33%	39/58	67%	155/208	75%
9	Mismatch of source of lighting	16/39	41%	40/71	56%	109/143	76%	62/91	68%	31/49	63%	57/91	63%	121/147	82%	52/95	55%	35/58	60%	165/275	60%	46/67	69%	34/58	59%	130/208	63%
10	Mismatch of floor	15/39	38%	21/71	30%	65/143	45%	27/91	30%	6/49	12%	27/91	30%	88/147	60%	13/95	14%	11/58	19%	68/275	25%	18/67	27%	19/58	33%	81/208	39%
11	Mismatch of toilet type	23/39	59%	41/71	58%	49/143	34%	45/91	49%	19/49	39%	47/91	52%	95/147	65%	44/95	46%	30/58	52%	133/275	48%	32/67	48%	31/58	53%	109/208	52%
12	Mismatch of source of water	16/39	41%	33/71	46%	48/143	34%	18/91	18%	4/49	8%	27/91	30%	37/147	25%	66/95	69%	35/58	60%	194/275	71%	18/67	27%	10/58	17%	32/208	15%
13	Mismatch of HH Head ID Number	0/39	0%	0/71	0%	0/143	0%	0/91	0%	0/49	0%	0/91	0%	0/147	0%	0/95	0%	0/58	0%	0/275	0%	0/67	0%	0/58	0%	0/208	0%
14	Mismatch of HH Head Date of Birth	0/39	0%	31/71	44%	10/143	7%	10/91	11%	20/49	41%	13/91	14%	18/147	12%	36/95	38%	27/58	47%	64/275	23%	7/67	10%	20/58	34%	24/208	12%
15	Mismatch of education levels of HH Head	0/39	0%	4/71	6%	7/143	5%	1/91	1%	0/49	0%	6/91	7%	4/147	3%	4/95	4%	1/58	2%	10/275	4%	3/67	4%	7/58	12%	6/208	3%
16	Mismatch of Spouse ID Number	0/39	0%	14/71	20%	16/143	11%	14/91	15%	11/49	22%	6/91	7%	11/147	7%	8/95	8%	2/58	3%	14/275	5%	3/67	4%	2/58	3%	7/208	3%
17	Mismatch of spouse Date of Birth	2/39	5%	15/71	21%	1/143	1%	12/91	13%	13/49	27%	12/91	13%	5/147	3%	17/95	18%	16/58	28%	25/275	9%	7/67	10%	2/58	3%	10/208	5%

18	Mismatch of education levels of Spouse	0/39	0%	3/71	4%	0/143	0%	0/91	0%	0/49	0%	3/91	3%	1/147	1%	1/95	1%	1/58	2%	6/275	2%	2/67	3%	1/58	2%	2/208	1%
	Average	**15%**		**26%**		**19%**		**22%**		**20%**		**23%**		**27%**		**27%**		**25%**		**23%**		**19%**		**24%**		**20%**	

The table below provides an extended explanation in the shifts in the variances on the various variables for every location.

Location	Source of light	Source of water	Toilet type	Walls	Floor	Roof
ITETANI	Most HHs moved from tin lamp to solar	Most HHs indicated that they've moved from using other sources of water to dam water	Most latrines that were covered became uncovered		Most HHs cemented the floor or moved to a cemented floor	
KALAWA	Most HHs moved from tin lamp to solar	Most HHs indicated that they've moved from using other sources of water to dam water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
KALAWANI	Most HHs moved from tin lamp to solar	Most HHs indicated that they've moved from using Unprotected spring water to stream/river	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
KATANGINI	Most HHs moved from tin lamp to lantern	Most HHs indicated that they've moved from stopped using Unprotected spring water to stream/river	HHs stopped using the bush and moved to pit latrines	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
KATHULUMBI	Most HHs moved from tin lamp to solar		Most latrines that were covered became uncovered		Most HHs cemented the floor or moved to a cemented floor	
KISAU	Most HHs moved from using other sources to mainly solar and tin lamp	Most HHs indicated that they've moved from stopped using Stream/River to unprotected spring water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
KITETA	Most HHs moved from using other sources to mainly solar and tin lamp	Most HHs indicated that they've moved from stopped using other sources of water to Stream/River	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
KITHUNGO	Most HHs moved from using tin lamp to other sources of light	Most HHs indicated that they've moved from using other sources of water to Stream/River	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with corrugated iron sheet to the one with asbestos sheets
KITUNDU	Most HHs moved from using tin lamp to other sources of light	Most HHs indicated that they've moved from stopped using other sources of water to dam water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
MBOONI	Most HHs moved from using tin lamp to other sources mainly lantern and gas lamp	Most HHs indicated that they've moved from using Unprotected spring water and stream/River to other sources of water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with corrugated iron sheet to the one with asbestos sheets
TULIMANI	Most HHs moved from tin lamp to lantern	Most HHs indicated that they've moved from using other sources of water to dam water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
UTANGWA	Most HHs moved from using other sources to mainly tin lamp	Most HHs indicated that they've moved from using Stream/River to Protected spring water	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with corrugated iron sheet to the one with asbestos sheets
WAIA	Most HHs moved from using solar and lantern to mainly tin lamp	Most HHs indicated that they've moved from using other sources of water to Stream/River	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
Possible Explanation	Most households shifted from other sources of lighting to solar as a result of the witnessed solar promotion programs that increased adoption of solar energy use.	Due to the adverse drought effects households had to seek alternative sources of water for use.	Shifts mainly as a result of definition of terms	Shifts based on definition of terms		Definition of terms

d. Locations in Nzaui Sub - County

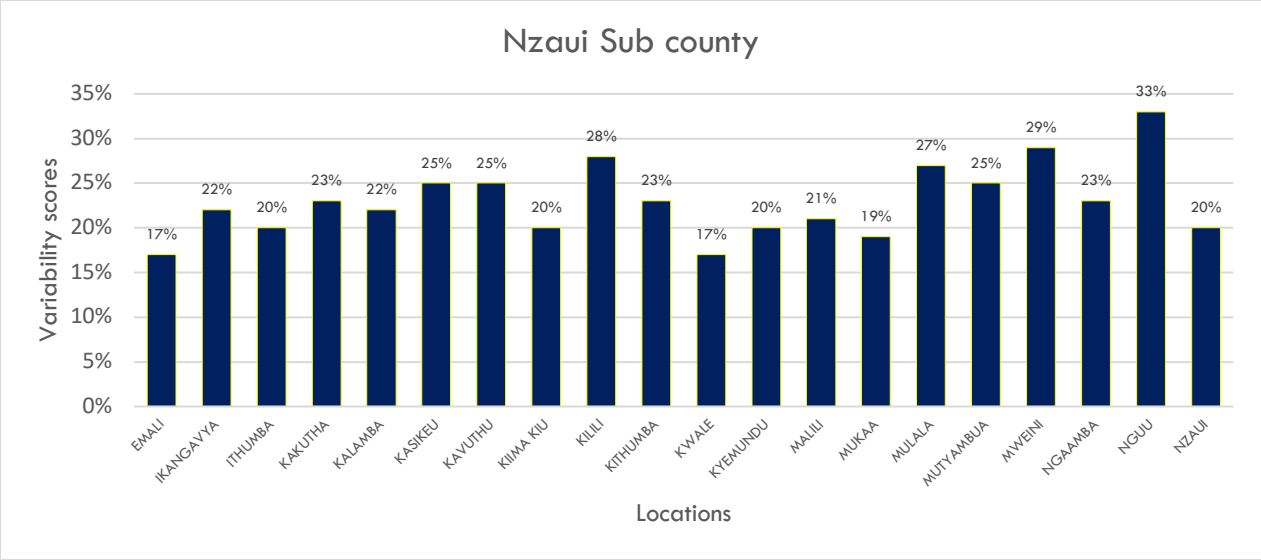


Figure 4: Variability scores for Nzaui Sub-County

In Nzaui Sub-County, Nguu, Mweni and Kilili had the highest variability scores as shown in figure 4. Across the 3 locations mismatch in the type of toilet was consistent with the mismatch in source of lighting featuring in Kilili and Mweni locations and source of water being a huge contributor for the location variance in Nguu. Given the time lapse between the two data collection points, it is possible for changes to occur in lighting and water sources. Additionally, high variances were observed in Nzaui Sub-County for variables such as household size, type of roof, and type of toilet. While changes in these variables are expected due to the time elapsed, it is essential to have a registration protocol that defines the terms and ensures consistency in the training of data collectors (enumerators and QAOs) to minimize the identified variances. The table below shows the mismatch across variables for all locations in Nzaui Sub-County.

Table 5: Variances across the 18 variables for locations in Nzaui sub-county

		NZAUI																			
		EMALI		IKANGAVYA		ITHUMBA		KAKUTHA		KALAMBA		KASIKEU		KAVUTHU		KIIMA KIU		KILILI		KITHUMBA	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	0/139	0%	1/86	1%	1/272	1%	0/139	0%	0/196	0%	2/199	1%	0/342	0%	0/301	0%	3/157	2%	0/125	0%

2	Mismatch of household member names	8/139	6%	9/86	10%	6/272	3%	11/139	8%	8/196	4%	13/199	7%	25/342	7%	15/301	5%	9/157	6%	14/125	11%
3	Mismatch of relationships to household head	10/139	7%	0/86	0%	17/272	10%	9/139	6%	5/196	3%	15/199	8%	8/342	2%	16/301	5%	15/157	10%	14/125	11%
4	Mismatch of number of main rooms	16/58	28%	13/22	59%	24/60	40%	25/36	69%	25/51	49%	34/53	64%	38/69	55%	33/57	58%	24/39	62%	12/25	48%
5	Mismatch of roof	1/58	2%	1/22	5%	4/60	7%	1/36	3%	2/51	4%	0/53	0%	0/69	0%	1/57	2%	3/39	8%	0/25	0%
6	Mismatch of wall	17/58	29%	10/22	45%	26/60	43%	5/36	14%	21/51	41%	10/53	19%	21/69	30%	8/57	14%	8/39	21%	7/25	28%
7	Mismatch of cooking fuel	12/58	21%	0/22	0%	1/60	2%	1/36	3%	0/51	0%	2/53	4%	1/69	1%	6/57	11%	0/39	0%	0/25	0%
8	Mismatch of household size	35/58	60%	9/22	41%	19/60	32%	0/36	0%	8/51	16%	32/53	60%	46/69	67%	34/57	60%	29/39	74%	1/25	4%
9	Mismatch of source of lighting	25/58	43%	15/22	68%	36/60	60%	26/36	72%	44/51	86%	35/53	66%	57/69	83%	25/57	44%	33/39	85%	21/25	84%
10	Mismatch of floor	13/58	22%	4/22	18%	22/60	37%	11/36	31%	20/51	39%	24/53	45%	46/69	67%	19/57	33%	5/39	13%	4/25	16%
11	Mismatch of toilet type	15/58	26%	14/22	64%	43/60	72%	14/36	39%	44/51	86%	43/53	81%	34/69	49%	37/57	65%	28/39	72%	13/25	52%
12	Mismatch of source of water	35/58	7%	1/22	5%	9/60	15%	24/36	67%	7/51	14%	12/53	23%	5/69	7%	31/57	54%	20/39	51%	7/25	28%
13	Mismatch of HH Head ID Number	0/58	0%	0/22	0%	0/60	0%	0/36	0%	0/51	0%	0/53	0%	0/69	0%	0/57	0%	0/39	0%	0/25	0%
14	Mismatch of HH Head Date of Birth	20/58	34%	7/22	32%	5/60	8%	19/36	53%	19/51	37%	21/53	40%	41/69	59%	0/57	0%	15/39	38%	16/25	64%
15	Mismatch of education levels of HH Head	2/58	3%	2/22	9%	1/60	2%	8/36	22%	0/51	0%	2/53	4%	2/69	3%	1/57	2%	2/39	5%	3/25	12%
16	Mismatch of Spouse ID Number	2/58	3%	2/22	9%	9/60	15%	2/36	6%	2/51	4%	7/53	13%	0/69	0%	5/57	9%	9/39	23%	3/25	12%
17	Mismatch of spouse Date of Birth	3/58	5%	6/22	27%	5/60	8%	7/36	19%	6/51	12%	8/53	15%	16/69	23%	1/57	2%	11/39	28%	10/25	40%
18	Mismatch of education levels of Spouse	0/58	0%	1/22	5%	5/60	8%	0/36	0%	2/51	4%	2/53	4%	3/69	4%	2/57	4%	0/39	0%	1/25	4%
	Average	**17%**		**22%**		**20%**		**23%**		**22%**		**25%**		**25%**		**20%**		**28%**		**23%**	

NZAUI CONT…																					
		KWALE		KYEMUNDU		MALILI		MUKAA		MULALA		MUTYAMBUA		MWEINI		NGAAMBA		NGUU		NZAUI	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	0/178	0%	0/152	0%	1/427	0%	0/230	0%	0/321	0%	3/421	1%	0/170	0%	2/279	1%	0/59	0%	6/352	2%
2	Mismatch of household member names	6/178	3%	4/152	3%	23/427	5%	17/230	7%	19/321	6%	31/421	7%	12/170	7%	25/279	9%	5/59	8%	27/352	8%
3	Mismatch of relationships to household head	8/178	4%	5/152	3%	26/427	6%	20/230	9%	12/321	4%	36/421	9%	17/170	10%	27/279	10%	6/59	10%	26/352	7%
4	Mismatch of number of main rooms	11/35	31%	21/36	58%	44/92	48%	24/53	45%	84/114	74%	47/80	59%	24/41	59%	53/82	65%	24/58	41%	56/108	52%
5	Mismatch of roof	0/35	0%	1/36	3%	5/92	5%	0/53	0%	21/114	18%	1/80	1%	27/41	66%	3/82	4%	51/58	88%	86/108	80%
6	Mismatch of wall	9/35	26%	4/36	11%	12/92	13%	8/53	15%	66/114	58%	3/80	4%	12/41	29%	17/82	21%	42/58	72%	41/108	38%
7	Mismatch of cooking fuel	0/35	0%	0/36	0%	7/92	8%	3/53	6%	1/114	1%	2/80	3%	1/41	2%	4/82	5%	2/58	3%	3/108	3%
8	Mismatch of household size	17/35	49%	10/36	28%	57/92	62%	11/53	21%	76/114	67%	31/80	39%	7/41	17%	56/82	68%	55/58	95%	10/108	9%
9	Mismatch of source of lighting	16/35	46%	19/36	53%	54/92	59%	39/53	74%	60/114	53%	73/80	91%	39/41	95%	49/82	60%	9/58	16%	48/108	44%
10	Mismatch of floor	8/35	23%	5/36	14%	38/92	41%	18/53	34%	45/114	39%	38/80	48%	18/41	44%	32/82	39%	18/58	31%	34/108	31%
11	Mismatch of toilet type	18/35	51%	33/36	92%	48/92	52%	33/53	62%	43/114	38%	58/80	73%	29/41	71%	47/82	57%	29/58	50%	45/108	42%
12	Mismatch of source of water	18/35	51%	5/36	14%	41/92	45%	19/53	36%	47/114	41%	11/80	14%	8/41	20%	29/82	35%	54/58	93%	14/108	6%
13	Mismatch of HH Head ID Number	0/35	0%	0/36	0%	2/92	2%	0/53	0%	0/114	0%	0/80	0%	0/41	0%	0/82	0%	6/58	10%	0/108	0%
14	Mismatch of HH Head Date of Birth	2/35	6%	19/36	53%	17/92	18%	3/53	6%	63/114	55%	40/80	50%	16/41	39%	6/82	7%	45/58	78%	23/108	21%
15	Mismatch of education levels of HH Head	0/35	0%	0/36	0%	4/92	4%	0/53	0%	4/114	4%	3/80	4%	2/41	5%	4/82	5%	3/58	5%	3/108	3%
16	Mismatch of Spouse ID Number	5/35	14%	4/36	11%	3/92	3%	7/53	13%	10/114	9%	4/80	5%	13/41	32%	10/82	12%	0/58	0%	7/108	6%
17	Mismatch of spouse Date of Birth	3/35	9%	6/36	17%	10/92	11%	4/53	8%	18/114	16%	30/80	38%	7/41	17%	8/82	10%	0/58	0%	4/108	4%

18	Mismatch of education levels of Spouse	0/35	0%	0/36	0%	3/92	3%	1/53	2%	1/114	1%	3/80	4%	2/41	5%	4/82	5%	0/58	0%	0/108	0%
	Average	**17%**		**20%**		**21%**		**19%**		**27%**		**25%**		**29%**		**23%**		**33%**		**20%**	

The table below provides an explains the variations in some of the variables with high variances per location in Nzaui sub-county.

Location	Source of light	Source of water	Toilet type	Walls	Floor	Roof
EMALI	Most HHs moved from using other sources to tin lamp	Most HHs indicated that they've moved from using other sources to piped water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
IKANGAVYA	Most HHs moved from using other sources to Fuel wood / Firewood		Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
ITHUMBA	Most HHs moved from using solar and tin lamps to lantern	Most HHs indicated that they've moved from using Dam water to Stream/River	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
KAKUTHA	Most HHs moved from using solar and tin lamps to lantern	Most HHs indicated that they've moved from using stream/river water to Unprotected well	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	
KALAMBA	Most HHs moved from using other sources to Fuel wood / Firewood	Most HHs indicated that they've moved from using Unprotected spring water to stream/river water	HHs stopped using the bush and moved to pit latrines	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
KASIKEU	Most HHs moved from using tin lamp and lantern to other sources	Most HHs indicated that they've moved from using Unprotected well water to stream/river water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
KAVUTHU	Most HHs moved from using other sources to mainly tin lamp	Most HHs indicated that they've moved from using other sources to Stream/River	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
KIIMA KIU	Most HHs moved from using other sources to and tin lamp	Most HHs indicated that they've moved from using other sources to vendors	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
KILILI	Most HHs moved from using tin lamp and lantern toother sources to mainly solar	Most HHs indicated that they've moved from using other sources to piped water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
KITHUMBA	Most HHs moved from using other sources to mainly electricity and tin lamp	Most HHs indicated that they've moved from using other sources to piped water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
KWALE	Most HHs moved from using tin lamp and lantern toother sources to mainly solar	Most HHs indicated that they've moved from using other sources to piped water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
KYEMUNDU	Most HHs moved from using other sources to mainly lantern	Most HHs indicated that they've moved from using other sources to piped water	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	
MALILI	Most HHs moved from using other sources to mainly solar and tin lamp	Most HHs indicated that they've moved from using other sources to Stream/River	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	
MUKAA	Most HHs moved from using other sources to mainly lantern and tin lamp	Most HHs indicated that they've moved from using stream/river water to dam	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
MULALA	Most HHs moved from using other sources to mainly solar and tin lamp	Most HHs indicated that they've moved from using borehole to stream/River	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	
MUTYAMBUA	Most HHs moved from using other sources to mainly fuel wood/firewood and tin lamp	Most HHs indicated that they've moved from using borehole to stream/River	Most latrines that were covered became uncovered		Most HHs moved to earth floor	

MWEINI	Most HHs moved from using lantern and tin lamp to Fuel wood / Firewood	Most HHs indicated that they've moved from using other sources to stream/River	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with corrugated iron sheets to the one with asbestos sheets
NGAAMBA	Most HHs moved from using other sources to mainly tin lamp	Most HHs indicated that they've moved from using other sources to borehole water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs cemented the floor or moved to a cemented floor	
NGUU	Most HHs moved from using other sources to mainly tin lamp	Most HHs indicated that they've moved from using other sources to stream/River	Most latrines that were covered became uncovered	Most HHs moved from Brick/Block to mud/wood walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
NZAUI	Most HHs moved from using other sources to mainly tin lamp	Most HHs indicated that they've moved from using other sources to stream/River	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to Brick/Block walled houses	Most HHs moved to earth floor	Most HHs moved from a unit with corrugated iron sheets to the one with asbestos sheets
Possible Explanation	Most shifts were from tin lamp and lantern which are the main sources of lighting in households. The choice of the main source may not be consistent across data collection points	Shifts in water sources were likely due to drought	Here, definition of covered and uncovered toilet types must have been contradictory.	Similar to toilet types shifts here are likely as a result of definition of terms		Shifts likely due to definition of terms

3.2.2. Variability tests for Locations in Vihiga County

e. Locations in Vihiga Sub - County

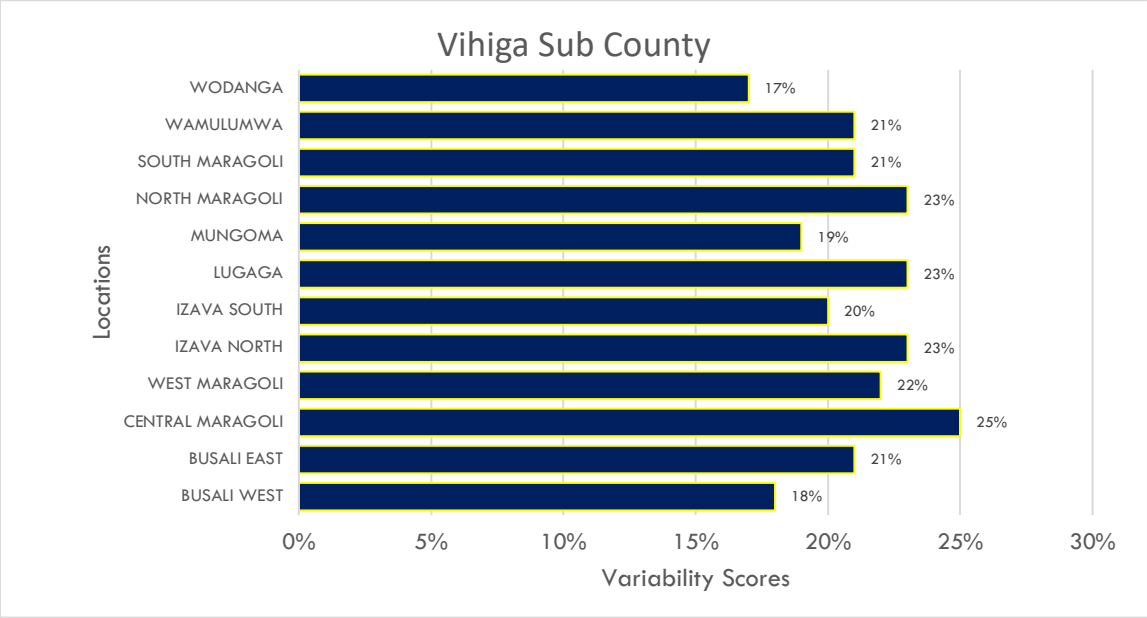


Figure 5: Variability scores for Vihiga Sub-County

In Vihiga sub-county, Busali East, Lugaga and Izava North reported the highest variances respectively. Across the 3 locations the source of water presented the highest variances. The data shows that most of the registered households showed a shift from using protected springs as their main source of water to stream/river. Clearly, this speaks to the different seasons across which the data was collected. Other variables with huge variances amongst the 3 locations are main rooms and household size. Table 7 provides a illustrates the variations across the 18 variables for locations in Vihiga sub-county.

Table 6: Variances across the 18 variables for locations in Vihiga sub-county

		VIHIGA																					
		BUSALI WEST		BUSALI EAST		CENTRAL MARAGOLI		WEST MARAGOLI		IZAVA NORTH		IZAVA SOUTH		LUGAGA		MUNGOMA		NORTH MARAGOLI		SOUTH MARAGOLI		WAMULUMWA		WODANGA	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	1/132	1%	1/193	1%	5/433	1%	1/217	0%	1/207	0%	1/305	23%	4/259	2%	0/300	0%	1/413	0%	1/343	0%	2/410	0%	0/373	0%
2	Mismatch of household member names	21/132	16%	60/193	31%	98/433	23%	1/217	0%	44/207	21%	70/305	23%	57/259	22%	80/300	27%	54/413	13%	40/343	12%	48/410	12%	7/373	2%
3	Mismatch of relationships to household head	0/132	0%	0/193	0%	2/433	0%	4/217	2%	0/207	0%	6/305	2%	14/259	5%	7/300	2%	5/413	1%	4/343	1%	32/410	8%	15/373	4%
4	Mismatch of number of main rooms	19/38	50%	33/45	73%	49/102	48%	41/61	67%	29/48	60%	47/63	75%	32/65	49%	62/94	66%	59/99	60%	45/90	50%	53/97	55%	44/101	44%
5	Mismatch of roof	10/38	26%	5/45	11%	45/102	44%	8/61	13%	0/48	0%	2/63	3%	37/65	57%	9/94	10%	39/99	39%	75/90	83%	25/97	26%	6/101	6%
6	Mismatch of wall	5/38	13%	5/45	11%	39/102	38%	9/61	15%	8/48	17%	7/63	11%	12/65	18%	10/94	11%	19/99	19%	12/90	13%	23/97	24%	9/101	9%
7	Mismatch of cooking fuel	1/38	3%	1/45	2%	4/102	4%	0/61	0%	2/48	4%	2/63	3%	2/65	3%	2/94	2%	1/99	1%	2/90	2%	3/97	3%	4/101	4%
8	Mismatch of household size	17/38	45%	20/45	44%	29/102	28%	41/61	67%	32/48	67%	25/63	40%	41/65	63%	46/94	49%	41/99	41%	28/90	31%	34/97	35%	42/101	42%
9	Mismatch of source of lighting	14/38	37%	22/45	49%	57/102	56%	34/61	56%	20/48	42%	21/63	33%	33/65	51%	27/94	29%	43/99	43%	25/90	28%	53/97	55%	47/101	47%
10	Mismatch of floor	6/38	16%	5/45	11%	23/102	23%	9/61	15%	10/48	21%	12/63	19%	15/65	23%	11/94	12%	14/99	14%	15/90	17%	14/97	14%	18/101	18%
11	Mismatch of toilet type	15/38	39%	9/45	20%	55/102	54%	24/61	39%	23/48	48%	18/63	29%	9/65	14%	34/94	36%	62/99	63%	31/90	34%	57/97	59%	40/101	40%
12	Mismatch of source of water	23/38	61%	42/45	93%	78/102	76%	52/61	85%	40/48	83%	40/63	63%	55/65	85%	49/94	52%	75/99	76%	44/90	49%	58/97	60%	49/101	49%
13	Mismatch of HH Head ID Number	0/38	0%	0/45	0%	0/102	0%	0/61	0%	0/48	0%	0/63	0%	0/65	0%	0/94	0%	0/99	0%	0/90	0%	0/97	0%	0/101	0%
14	Mismatch of HH Head Date of Birth	4/38	11%	6/45	13%	32/102	31%	16/61	26%	7/48	15%	14/63	22%	6/65	9%	29/94	31%	23/99	23%	37/90	41%	4/97	4%	16/101	16%
15	Mismatch of education levels of HH Head	0/38	0%	0/45	0%	2/102	2%	0/61	0%	0/48	0%	0/63	0%	3/65	5%	0/94	0%	1/99	1%	0/90	0%	2/97	2%	0/101	0%
16	Mismatch of Spouse ID Number	2/38	5%	1/45	2%	4/102	4%	1/61	2%	9/48	19%	4/63	6%	8/65	12%	9/94	10%	7/99	7%	5/90	6%	9/97	9%	15/101	15%

17	Mismatch of spouse Date of Birth	1/38	3%	4/45	9%	19/102	19%	2/61	3%	6/48	13%	7/63	11%	2/65	3%	8/94	9%	11/99	11%	14/90	16%	3/97	3%	13/101	13%
18	Mismatch of education levels of Spouse	0/38	0%	0/45	0%	0/102	0%	0/61	0%	0/48	0%	1/63	2%	1/65	2%	0/94	0%	0/99	0%	0/90	0%	1/97	1%	1/101	1%
	Average	**18%**		**21%**		**25%**		**22%**		**23%**		**20%**		**23%**		**19%**		**23%**		**21%**		**21%**		**17%**	

Location	Source of light	Source of water	Toilet type	Floor	Roof
BUSALI WEST	Most HHs moved from using other sources of light to tin lamp and solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
BUSALI EAST	Most HHs moved from using tin lamp to other sources of light	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
CENTRAL MARAGOLI	Most HHs moved from using other sources of light to tin lamp and lantern	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
WEST MARAGOLI	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
IZAVA NORTH	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
IZAVA SOUTH	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
LUGAGA	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
MUNGOMA	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
NORTH MARAGOLI	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
SOUTH MARAGOLI	Most HHs moved from using tin lamp to other sources of light	Most HHs members stopped using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
WAMULUMWA	Most HHs moved from using other sources of light to mostly tin lamp and electricity	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
WODANGA	Most HHs moved from using other sources of light to mostly tin lamp and electricity	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
Possible Explanation	Most of the households seem to shift from other sources of lighting to tin lamp.	Shifts from spring water to River/Stream as main source of water can be attributed to long periods of dry spells that result in the drying up of most springs	Definition based variances		Definition based variances

f. Locations in Emuhaya Sub - County

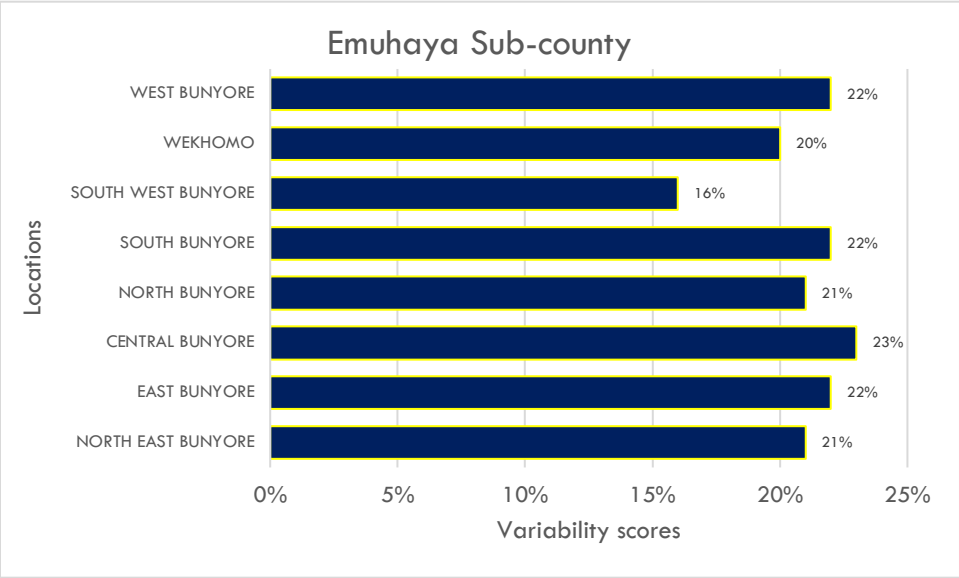


Figure 6: Variability scores for Emuhaya Sub-County

In Central Bunyore had the highest variance compared to other locations in Emuhaya Sub-County. Source of water, household size, and household member names were the variables with the highest variances. As in other locations in Vihiga County, registered households in Central Bunyore reported a shift from covered springs to streams/rivers as the main source of water. This change can be attributed to seasonal variations during the registration and data collection period. Changes in household size and member names can be attributed to obvious household movements. However, the high variances also suggest a lack of clarity in the definition of terms among the data collectors.

Table 8 below provides a detailed breakdown of the mismatch in the 18 variables when compared across the two data sets.

Table 7: Variances across the 18 variables for locations in Emuhaya sub-county

		EMUHAYA															
		NORTHEAST BUNYORE		EAST BUNYORE		CENTRAL BUNYORE		NORTH BUNYORE		SOUTH BUNYORE		SOUTHWEST BUNYORE		WEKHOMO		WEST BUNYORE	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	8/1115	1%	1/375	0%	4/1122	0%	4/524	1%	14/560	3%	1/349	0%	2/127	2%	14/1220	1%
2	Mismatch of household member names	166/1115	15%	190/375	51%	655/1122	58%	94/524	18%	210/560	38%	57/349	16%	26/127	20%	264/1220	22%
3	Mismatch of relationships to household head	19/1115	2%	3/375	1%	2/1122	0%	68/524	13%	0/560	0%	0/349	0%	0/127	0%	17/1220	1%
4	Mismatch of number of main rooms	139/247	56%	48/107	45%	153/298	51%	79/136	58%	63/136	46%	48/125	38%	18/29	62%	199/373	53%
5	Mismatch of roof	95/247	38%	15/107	14%	81/298	27%	6/136	4%	9/136	7%	0/125	0%	6/29	21%	80/373	21%
6	Mismatch of wall	48/247	19%	14/107	13%	45/298	15%	27/136	20%	25/136	18%	33/125	26%	6/29	21%	78/373	21%
7	Mismatch of cooking fuel	4/247	2%	3/107	3%	16/298	5%	2/136	1%	5/136	4%	3/125	2%	5/29	17%	18/373	5%

8	Mismatch of household size	137/247	55%	64/107	60%	157/298	53%	82/136	60%	82/136	60%	77/125	62%	13/29	45%	183/373	49%
9	Mismatch of source of lighting	124/247	50%	40/107	37%	141/298	47%	62/136	46%	50/136	37%	40/125	32%	8/29	28%	155/373	42%
10	Mismatch of floor	30/247	12%	25/107	23%	50/298	17%	15/136	11%	33/136	24%	21/125	17%	7/29	24%	71/373	19%
11	Mismatch of toilet type	97/247	39%	54/107	50%	134/298	45%	41/136	30%	58/136	43%	15/125	12%	19/29	66%	155/373	42%
12	Mismatch of source of water	106/247	43%	69/107	64%	208/298	70%	80/136	59%	84/136	62%	73/125	58%	3/29	10%	245/373	66%
13	Mismatch of HH Head ID Number	0/247	0%	0/107	0%	0/298	0%	0/136	0%	0/136	0%	0/125	0%	0/29	0%	0/373	0%
14	Mismatch of HH Head Date of Birth	25/247	10%	5/107	5%	12/298	4%	35/136	26%	47/136	35%	6/125	5%	6/29	21%	88/373	24%
15	Mismatch of education levels of HH Head	2/247	1%	2/107	2%	1/298	0%	7/136	5%	0/136	0%	0/125	0%	0/29	0%	4/373	1%
16	Mismatch of Spouse ID Number	34/247	14%	11/107	10%	47/298	16%	7/136	5%	15/136	11%	15/125	12%	1/29	3%	38/373	10%
17	Mismatch of spouse Date of Birth	34/247	14%	9/107	8%	29/298	10%	25/136	18%	24/136	18%	8/125	6%	5/29	17%	66/373	18%
18	Mismatch of education levels of Spouse	4/247	2%	1/107	1%	0/298	0%	6/136	4%	0/136	0%	0/125	0%	0/29	0%	3/373	1%
	Average	**21%**		**22%**		**23%**		**21%**		**22%**		**16%**		**20%**		**22%**	

Summary of the key variables showing the changes across the two data sets.

Location	Source of light	Source of water	Toilet type	Walls	Floor	Roof
CENTRAL BUNYORE	Most households (HHs) moved from tin lamp and lantern to solar and electricity	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved from brick/block to mud walled houses	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
EAST BUNYORE	Most HHs moved from using tin lamps to solar and electricity	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved from mud/wood to mud/cemented walled houses	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
NORTH BUNYORE	Most HHs moved from using tin lamps to other sources	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs moved from mud to mud/wood walled houses	Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
NORTHEAST BUNYORE	Most HHs moved from using other sources to mainly electricity and tin lamp	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
SOUTH BUNYORE	Most HHs moved from using other sources to mainly electricity and tin lamp	Most HHs indicated that they've moved from using spring water to Stream/River water	HHs stopped using the bush and moved to pit latrines		Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
SOUTHWEST BUNYORE	Most HHs moved from using other sources to mainly electricity and tin lamp	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
WEKHOMO	Most HHs moved from using other sources to mainly electricity and tin lamp	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
WEST BUNYORE	Most HHs moved from using other sources to mainly electricity and tin lamp	Most HHs indicated that they've moved from using spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs cemented the floor or moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
Possible Explanation	Major shifts to use of electricity and tin lamp – possible that households had increased electricity connectivity	Shifts due to prolonged dry spells	Definition based variances	Definition based variances		Definition of terms-based variances

g. Locations in Hamisi Sub - County

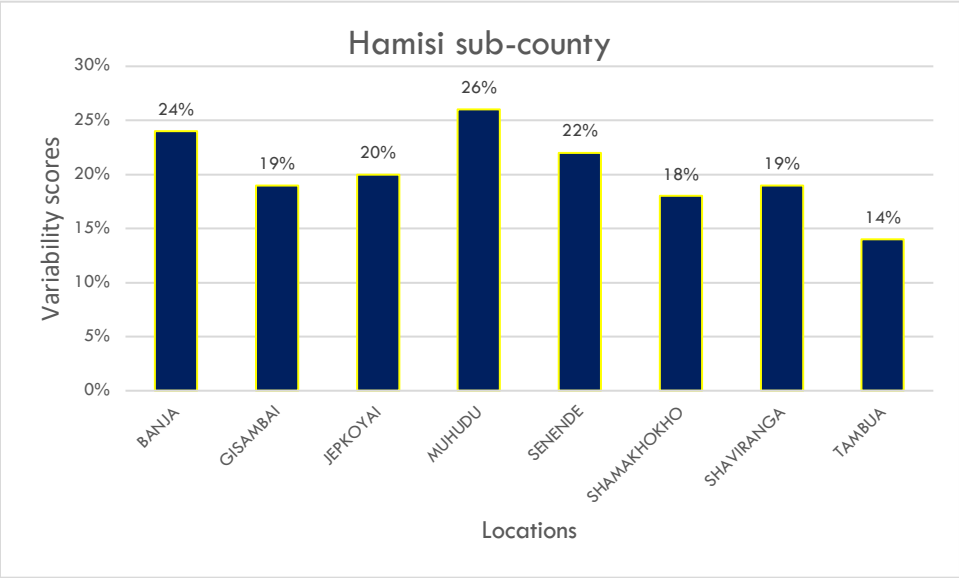


Figure 7: Variability scores for Hamisi Sub-County

Muhudu and Banja have the highest variability scores in Hamisi sub-county respectively. In Muhudu, number of main rooms, source of water and toilet type had the highest variances. Similarly, in Banja, number of main rooms, household head, date of birth, and source of water were the main contributors. In Hamisi sub-county, source of water was a main contributor to the high variability scores and there was a noted shift in the data from the utilization of spring water to stream/river as the main source of water.

Table 8: Variances across the 18 variables for locations in Hamisi sub-county

	HAMISI															
		BANJA		GISAMBAI		JEPKOYAI		MUHUDU		SENENDE		SHAMAKHOKHO		SHAVIRANGA		TAMBUA	
	Variable	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%	No of occurrences	%
1	Mismatch of any disabled or orphan members	6/345	2%	6/550	1%	4/604	1%	2/367	1%	5/295	2%	1/267	0%	2/333	1%	1/811	0%
2	Mismatch of household member names	90/345	26%	96/550	17%	70/604	12%	65/367	18%	20/295	7%	37/267	14%	36/333	11%	108/811	13%
3	Mismatch of relationships to household head	0/345	0%	5/550	1%	0/604	0%	0/367	0%	0/295	0%	0/267	0%	0/333	0%	0/811	0%
4	Mismatch of number of main rooms	127/194	65%	77/132	58%	67	50%	102/131	78%	44/62	71%	53/83	64%	35/90	39%	106/192	55%
5	Mismatch of roof	20/194	10%	11/132	8%	6	5%	46/131	35%	1/62	2%	0/83	0%	15/90	17%	5/192	3%
6	Mismatch of wall	65/194	34%	24/132	18%	28	21%	37/131	28%	14/62	23%	16/83	19%	31/90	34%	34/192	18%
7	Mismatch of cooking fuel	10/194	5%	7/132	5%	3/133	2%	11/131	8%	6/62	10%	3/83	4%	5/90	6%	12/192	6%

8	Mismatch of household size	60/194	31%	37/132	28%	40/133	30%	40/131	31%	16/62	26%	16/83	19%	15/90	17%	30/192	16%
9	Mismatch of source of lighting	100/194	52%	60/132	45%	59/133	44%	60/131	46%	34/62	55%	40/83	48%	42/90	47%	50/192	26%
10	Mismatch of floor	46/194	24%	21/132	16%	28/133	21%	44/131	34%	8/62	13%	21/83	25%	22/90	24%	41/192	21%
11	Mismatch of toilet type	80/194	41%	49/132	37%	67/133	50%	83/131	63%	39/62	63%	36/83	43%	41/90	46%	40/192	21%
12	Mismatch of source of water	114/194	59%	71/132	54%	77/133	58%	93/131	71%	53/62	85%	48/83	58%	63/90	70%	60/192	31%
13	Mismatch of HH Head ID Number	0/194	0%	1/132	1%	0/133	0%	0/131	0%	0/62	0%	0/83	0%	0/90	0%	0/192	0%
14	Mismatch of HH Head Date of Birth	120/194	62%	20/132	15%	38/133	29%	38/131	29%	8/62	13%	11/83	13%	12/90	13%	35/192	18%
15	Mismatch of education levels of HH Head	0/194	0%	0/132	0%	0/133	0%	0/131	0%	0/62	0%	0/83	0%	0/90	0%	0/192	0%
16	Mismatch of Spouse ID Number	13/194	7%	16/132	12%	12/133	9%	24/131	18%	6/62	10%	5/83	6%	12/90	13%	11/192	6%
17	Mismatch of spouse Date of Birth	21/194	11%	25/132	19%	26/133	20%	14/131	11%	12/62	19%	7/83	8%	8/90	9%	21/192	11%
18	Mismatch of education levels of Spouse	0/194	0%	1/132	1%	0/133	0%	0/131	0%	0/62	0%	0/83	0%	0/90	0%	0/192	0%
	Average	**24%**		**19%**		**20%**		**26%**		**22%**		**18%**		**19%**		**14%**	

Summary of the key variables showing the changes across the two data sets in Hamisi Sub County

Location	Source of light	Source of water	Toilet type	cooking fuel	Walls	Floor	Roof
BANJA	Most HHs moved from using other sources of light to tin lamp	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered	Most HHs stopped using other sources and moved to Firewood	Most HHs moved to mud/wood walled houses	Most HHs moved from a cemented floor to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
GISAMBAI	Most HHs moved from using other sources to mainly electricity and solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved to mud/wood walled houses	Most HHs moved from earth floor to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
JEPKOYAI	Most HHs moved from using other sources to mainly tin lamp and solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved to mud/wood walled houses	Most HHs moved from a cemented floor to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
MUHUDU	Most HHs moved from using other sources to mainly tin lamp and solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved to mud/wood walled houses	Most HHs moved from a cemented floor to earth floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
SENENDE	Most HHs moved from using other sources to mainly solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved from mud/wood to mud/cemented walled houses	Most HHs moved from earth floor to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
SHAMAKHOKHO	Most HHs moved from using other sources to mainly electricity and solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved to mud/wood walled houses	Most HHs moved from earth floor to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
SHAVIRANGA	Most HHs moved from using other sources of light to tin lamp and solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved to mud/wood walled houses	Most HHs moved from earth floor to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets
TAMBUA	Most HHs moved from using tin lamp and electricity to mostly solar	Most HHs indicated that they've moved from using protected spring water to Stream/River water	Most latrines that were covered became uncovered		Most HHs moved to mud/wood walled houses	Most HHs moved to a cemented floor	Most HHs moved from a unit with asbestos sheets to the one with corrugated iron sheets

Possible explanations	The shift from other sources of lighting to solar shows	Sustained periods of dry spells	Definition of terms-based variances		Definition of terms-based variances		Definition of terms-based variances

3.2.3. Locations in NDMA Counties

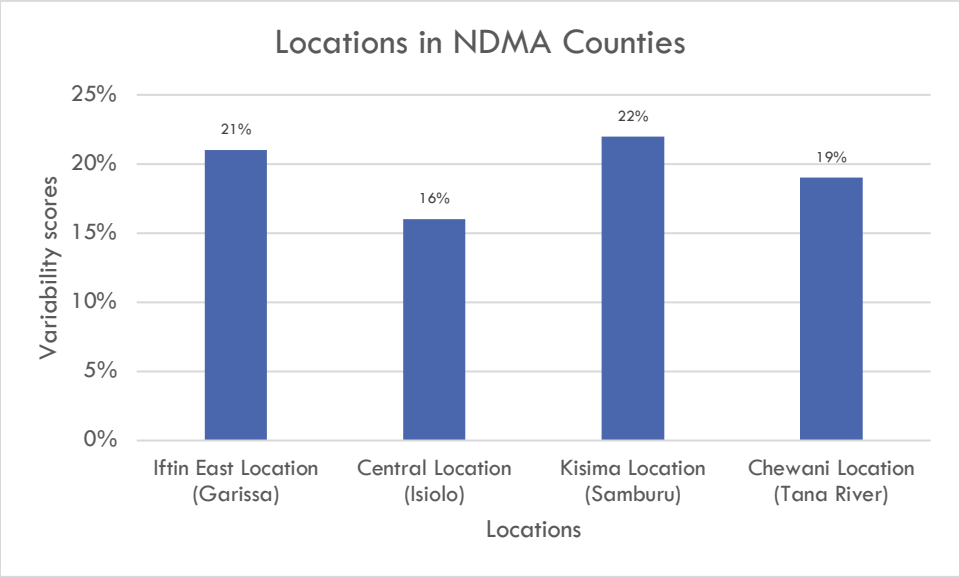


Figure 8: Variability scores for NDMA Counties

NDMA counties had a single location that underwent the TPQA exercise. The TPM exercise was done 12 months after the initial data collection.

- **Kisima:** Here, source of water, household head date of birth and education level were the largest contributor to the variability scores.
- **Iftin East:** Toilet type and source of water were the main contributors to the overall location variance of 21%.
- **Chewani:** Despite the household head ID number remaining the same (pointing to the same HH head), their date of birth and education level differed. This points to the inaccuracies in the data collected.
- **Central:** As in Chewani, the main contributors to the variances in central were the household heads' date of birth and education level.

In NDMA counties, variances in the main source of water for the households can simply be explained by the drought situation that hit the country during the data collection periods. However, changes in the date of birth and education level should not exist. However, most of the said beneficiaries have IDs that only capture the year of birth. In this case, the two data collection points adopted to use different systems of capturing the data. This clearly points to the need of data collection training standardization to ensure that similar practices are adopted during similar occurrences in the future. Enumerators need to perform due diligence and ensure that they accurately take the date of birth (a picture should be taken – need to collate the date of birth entered vis a vis the number appearing on the IDs) as a priority. Supervisor role in checking this data against the pictures will aid in curbing similar errors in the future.

Table 9: Variances across the 18 variables for locations in NDMA Counties

		Iftin East Location (Garissa)		Central Location (Isiolo)		Kisima Location (Samburu)		Chewani Location (Tana River)	
	Variable	**No of occurrences**	Percentage	**No of occurrences**	Percentage	**No of occurrences**	Percentage	**No of occurrences**	Percentage
1	Mismatch of relationships to household head	254/1031	25%	371/1745	21%	227/1126	20%	390/1081	36%
2	Mismatch of wall	79/254	31%	95/413	23%	75/287	26%	34/258	13%
3	Mismatch of roof	32/254	13%	7/413	2%	96/287	33%	11/258	4%
4	Mismatch of floor	57/254	37%	103/413	25%	32/287	11%	24/258	9%
5	Mismatch of toilet type	115/254	45%	36/413	9%	60/287	21%	94/258	36%
6	Mismatch of source of water	101/254	40%	94/413	23%	144/287	50%	96/258	37%
7	Mismatch of source of lighting	76/254	30%	101/413	23%	131/287	46%	77/258	30%
8	Mismatch of cooking fuel	75/254	30%	125/413	30%	59/287	21%	54/258	21%
9	Mismatch of number of main rooms	77/254	30%	106/413	26%	123/287	43%	80/258	31%
10	Mismatch of household member names	9/1031	1%	5/1745	0%	0/1126	0%	3/1081	0%
11	Mismatch of any disabled or orphan members	4/1031	0%	60/1745	3%	16/1126	1%	16/1081	1%
12	Mismatch of household size	1/254	0%	2/413	0%	3/287	1%	4/258	2%
13	Mismatch of HH Head ID Number	0/254	0%	0/413	0%	0/287	0%	0/258	0%
14	Mismatch of HH Head Date of Birth	87/254	34%	155/413	38%	146/287	51%	101/258	39%
15	Mismatch of education levels of HH Head	63/254	25%	151/413	37%	144//287	50%	99/258	38%
16	Mismatch of Spouse ID Number	0/254	0%	0/413	0%	0/287	0%	0/258	0%
17	Mismatch of spouse Date of Birth	45/254	18%	72/413	17%	44/287	15%	42/258	16%
18	Mismatch of education levels of Spouse	39/254	15%	67/413	16%	29/287	10%	50/258	19%
	Average	21%		16%		22%		19%	

The table below provides a summary for the shifts in the variables of interest from the initial data collection to the TPQA exercise.

Location	Source of light	Source of water	Toilet type	cooking fuel	Walls	Floor	Roof
IFTIN EAST	Most HH moved from other sources of light to electricity	Most HH moved from sourcing water from a vendor to a piped one	Most HH covered their pit latrines	Most HH moved from using firewood to mainly charcoal	Most HH moved from Brick/block/cement walled unit to stone walled ones	Most HH moved from earth floor house to cemented one	Most HH moved from Grass house to Corrugated iron sheet
CENTRAL	Most HH moved from using electricity and started using other sources of light mainly tin lamp	Most HH started using piped water in place of other sources of water	Most HH moved from using covered Pit Latrine	Most HH moved from using firewood to mainly charcoal	Most HH moved from Wood only walled units to the ones with other materials	Most HH moved from earth floor house to cemented one	
KISIMA	Most HH moved from using firewood as source of light to mainly solar	Most HH started sourcing water from dams and boreholes in place of other sources of water mainly unprotected well	Most HH moved from using bush and covered Pit Latrine to other toilet types	Most HH moved from using firewood to mainly charcoal	Most HH moved from Mud/wood walled unit to walls with other materials	Most HH moved from cemented floors house to earth floors	Most HH moved from Mud/Dung to units with other materials
CHEWANI	Most hh moved from using tin lamp as a source of light to other sources	Most HH started sourcing water from boreholes and Stream/River	Most HH moved from using covered Pit Latrines to other toilet types	Most HH moved from using firewood to mainly charcoal	Most hh moved from Mud/wood walled unit to stone and Brick/block/cement walled ones	Most HH moved from earth floor house to cemented one	

4. RECOMMENDATIONS & CONCLUSIONS

Community Mobilization and Sensitization

A robust mobilization and sensitization strategy is necessary for all phases of data collection, taking into consideration adequate timelines and livelihood practices. County and sub-county implementation teams should develop detailed, costed sensitization plans that describe the required resources, including monitoring activities and any other engagement during the registration exercise.

To ensure the achievement of target numbers within the provided timelines, there is need for SDSP's national-level commitment to facilitate county teams in a timely manner. Additional investment is necessary to properly induct community gatekeepers such as chiefs and other community level frontline workers on the registration process.

Improvements on the ESR-MIS

There is need to review functionalities with the ESR MIS and ensure it is more responsive to issues emerging from both the initial registration by SDSP and the third-party monitoring exercise (TPQA). These issues include system downtimes/glitches, the role of supervisors during the initial registration, access rights of supervisors as field monitors officers overseeing the registration assistants, and the need to update the TPQA module to prevent enumerators from being assigned households from different sub-counties for registration. A dashboard with real-time quality checks needs to be provided as part of the TPQA Module and the TPQA firm need to be granted reasonable access to data within its module.

Additionally, the MIS should be able to generate accuracy scores, and efforts should be made to ensure that the MIS functions without interruption during the exercise. Technical support should be readily available to address any system hitches that may arise.

Training, Enumeration and Supervision

One of the main concerns is the standardization of enumerators' understanding of terms to ensure consistent data collection from the given variables across the two data collection points, and even among themselves during a single data collection point. As such, there is need to review the standard training manual to include definitions and understanding of various terminologies used in the exercise and the enumerators should also be guided on the importance of the data they collect and reminded of data ethics regularly.

As stated in the Operations Manual, field supervisors should conduct random checks on the households registered. Sufficient resources should be allocated to ensure that this is done, and the

MIS should provide for their functional role. The data collected during this exercise has far-reaching effects, so prioritizing investments in achieving high-quality data is essential.

Verdict on the Variability/Accuracy test

The variability scores across all locations are higher than expected, mainly due to the time difference between the two data collection points. Nevertheless, one of the primary concerns is ensuring standardization of the enumerators' comprehension of terms to achieve consistent data collection across the given variables in both data collection points and even within the same data collection point. Furthermore, it is worth noting that the 18 variables utilized in computing the variability score ought to be weighted, as they have differing implications for program implementation.

Our observations reveal that the mean variability across all counties is 23%, consistent with the explanations provided by control questions. Based on our assessment of the initial data collection process and the thoroughness of the TPQA exercise, **we submit that the variability can be adequately accounted for by the time lapse between the two data points, and any possible discrepancies in the definition of key terms by the enumeration team and the Quality Assurance team**. As a result, we endorse the quality of data (relevant to the locations targeted), as contained in the ESR database and do not suggest re-collection, despite the lower accuracy score. However, to ensure continuous program benefit from the data in the ESR-MIS, it is essential to promptly implement a case management and updates module to facilitate capturing changes in households.

This phase of the Third-Party Quality Assurance process has provided the ESR with the critical practice-based experience necessary to improve the roll-out and monitoring of the subsequent phases data collection.

ANNEXES.

ANNEX 1: LIST OF QUALITY ASSURANCE OFFICERS

Tana River County

No.	Name	Telephone Number
1.	Mohammed Ademaro Bwanaldi	0792440801
2.	Ali Shurie Kediye	0718908241
3.	Elias Yusuf Omar	0723528587
4.	Nina Hailu Komora	0728074865
5.	Adnan Bocha OSman	0717937222
6.	Purirty Mucee Kageni	0797889987

Garissa County

No.	Name	Telephone Number
1.	Katra Ali Omar	0726109382
2.	Ibrahim Abdi Ali	724029128
3.	Hussein AliBundid	0720463627
4.	Mohamed Abdullahi Salat	0723019275
5.	Abdisamad Ibrahim Farah	0741732160
6.	Abdifatah Shukri Sheikh	0722522538
7.	Hussein Tawane Dabar	0725939203
8.	Halima Saadiyah Farah	0113033068

Isiolo County

No.	Name	Telephone Number
1.	Thomas Lorot	254768966728
2.	Harun Galma	254720674130
3.	Mohamed Abdullahi	254705225528
4.	Osman Roba	254721865215
5.	Fatuma Wario	254700498432
6.	Boru Watu	254716228244
7.	Ambrose Losintiyo	254706745082
8.	Bosna Guyo	254741741940
9.	Caroline Kanana	254729846930
10.	Swalex Muktar	254721609622
11.	AhmedKheir Abdi	254721724485

Samburu County

No.	Name	Telephone Number
1.	Silantoi Lengaina	254705823013
2.	Smart Lepadaasa	254701128179
3.	Sammy Lenkoyo	254790637586
4.	Soila Lemantaan	254790641601
5.	Diana Malkia	254702458041
6.	Lopisai Lemadada	254742928820

Vihiga County

No.	Name	Telephone Number	No.	Name	Telephone Number
1.	Brian Alubisa	254795422547	42	Carren Lucy	254708637265
2.	Immaculate Mercy	254743409452	43	Felician Nasimiyu	254714335032
3.	Vera Achieng	254716883490	44	Celine Akinyi	254114911029
4.	Dinah Opati	254724064315	45	Mitchelle Grace	254799303157
5.	Anne Atiang'	254799669589	46	Emillie Imali	254725054872
6.	Beverlyne Andeyo	254746954094	47	Antony Okwako	254705953307
7.	Vincent Ayilo	254728615474	48	Hannington Njite	254712443068
8.	Doris Achando	254741985742	49	Nelma Lovega	254740199498
9.	Faith Lodenyi	254769735923	50	Majrie Tsimuli	254703119626
10.	SHALYNE ABALE	254702685434	51	Fridah Ayoti	254720541305
11.	Clarice Akinyi	254716919587	52	Florence Osita	254740833090
12.	Judith Abuya	254707484280	53	Phyllis Tata	254725921240
13.	Kolla wilson	254715105993	54	Effie Musiomi	254721736989
14.	Dennis Irangi	254716326335	55	Steve Liyenga	254715710697
15.	Benedict Tsimango	254703909093	56	Sharon Vuguza	254704829712
16.	Victor Amutabi	254710952012	57	Caleb Chogo	254700483871
17.	Electine Andisi	254714686680	58	Betty Mbalia	254714779768
18.	Eunice Indiasi	254712102741	59	Mourine Owiti	254791046811
19.	Dina Amakobe	254757749163	60	Niclair Alivitsa	254728931994
20.	Mike Wanjala	254794111385	61	Moureen Atieno	254710986198
21.	Sadik Kassim	254711682657	62	Marylizer Akinyi	254727686871
22.	Sadik Kassim	254711682657	63	Nelson Amugune	254717982706
23.	Leah Chumba	254724295946	64	Festus Aholi	254799158919
24.	Rita Ambiyo	254757317475	65	Joyce Kamonya	254723318068
25.	Carlson Silingi	254704655276	66	Skylet Amunga	254799400596
26.	Angeline Kisanya	254726659424	67	Shandy Mathanye	254715775435
27.	Dorine Mmbone	254703976959	68	Mercyline Phanice	254796404817
28.	Magret Anyango	254741416787	69	Samuel Malova	254740716339
29.	Myler Ambogo	254719346767	70	Ruth Ahono	254711550940
30.	Peris Nyamoita	254700487110	71	Phoebe Aleyo	254725992971
31.	Benfred Shiroko	254796740685	72	Morrine Musimbi	254726010933
32.	Prudence Minayo	254741921629	73	Ferdinand Mayuguva	254798337689
33.	BERYL ATIENO	254716137604	74	Joan Amboya	254701917986
34.	Rebecca Nasio	254712870777	75	Lavenda Akoth	254724007980
35.	Miriam Musanga	254720630902	76	Dennis Ayodi	254113555165
36.	Walter Agala	254799082437	77	Eunice Anguzuzu	254797393310
37.	Nelson Lujiha	254710143535	78	Beverlyne Mwaniga	254746954094

38.	Diana	Vugutsa	254759977665	79	Denis Osundwa	254724115875
39.	Maureen	Kasindaha	254703975386	80	Joyce Midika	254701569510
40.	Nelson	Amugune	254717982706	81	Ruth Chamwada	254727112548
41.	Mourine	Anyona	254717619820	82	Phoebe Diana	254791508219

Makueni County

No.	Name	Telephone Number	No.	Name	Telephone Number
1.	Harrison Musyoka	254710361714	46	Charity Mutuku	254798689435
2.	Judith Mwikali	254710712001	47	Emmanuel Mutune	254704173146
3.	Shedrack Muasya	254792985298	48	Mercy Kula	254742698280
4.	Purity Mwendwa	254748024046	49	Catherine Mutinda	254715685350
5.	Abednego Kimanthi	254715094271	50	Alex Mumo	254758986892
6.	Hellen Kimanthi	254769076574	51	Francis Kyumwa	254725519594
7.	Faith Mulwa	254706929242	52	Kalondu Rosemary	254726327920
8.	Michael Mwaka	254727147616	53	Felistus Muli	254706603609
9.	Winfred Nathan	254768074566	54	Reuben Boniface	254723767960
10.	Justus Mutula	254704072470	55	Judy Muindi	254705171859
11.	Sammuel Musyimi	254792702601	56	Meshack Mutune	254707020532
12.	James Mutie	254748940595	57	George Malavi	254700003548
13.	Musyoka Mutua	254708981982	58	Lynx Kaloki	254112950738
14.	Alexander Kimilu	254790246642	59	Brian Kioko	254719568818
15.	Jackson Musau	254715635442	60	Joseph Kyangau	254790893322
16.	Tabitha Musau	254716637960	61	Oscar Mwangangi	254703129561
17.	Christopher Subano	254707966977	62	Francis Nduva	254705235616
18.	Charles Maithya	254790485660	63	Eunice Kasuva	254798099193
19.	Zipporah Mbinya	254712478070	64	Grace Kinyili	254721921811
20.	Kennedy Mutinda	254723050525	65	Mumo Grace	254721921811
21.	Gabriel Musila	254790156417	66	Rachael Ndanu	254795615438
22.	Josphat Mutuku	254726540777	67	Sharon Nduku	254743916030
23.	Glen Maliti	254111494859	68	Musembi Mutuku	254799680584
24.	Esther Mutinda	254797347429	69	Faith Mutheu	254758433702
25.	Faith Ngui	254742935620	70	Juliet Mwangangi	254757199090
26.	Mwende Mutua	254791635407	71	Stephen Jeremia	254748197906
27.	Douglas Muli	254790606326	72	Fridah Kamwau	254792353842
28.	Sabina Mutinda	254795449357	73	Christine muindi	254748451277
29.	Esther Mwende	254721994166	74	Derrick Mulu	254708804463
30.	Christine Mutunga	254713193732	75	Oscar Mulu	254799959872
31.	Faith Muinde	254115622697	76	Dorcus Kimeu	25497078786
32.	Pius Kaloki	254727261424	77	Mirriam Mueni	254721310141
33.	Michael Mbango	254710494219	78	William Mwendwa	254703804627
34.	Victor Mutunga	254711294067	79	Trizer Ndanu	254740143490
35.	Sabina Nthenya	254718472002	80	Urbanus Muthoka	254790098265
36.	Imelda David	254708176527	81	Japheth Mutuku	254717718753
37.	Daniel Mutava	254705539985	82	Faith ndanu	254790111365
38.	Priscila Kyalo	254705816800	83	Mwongeli kimolo	254741960292

39.	Joshua Mutunga	254759260365	84	Damaris Esokon	254757496669
40.	Frida Mumbua	254791290351	85	Mirriam Mutuku	254708669725
41.	Kimanthi Musyoka	254799809836	86	Alex maithya	254701653742
42.	Julius Mwania	254799265651	87	Wambua Munyiva	254717795840
43.	Eunice King'oo	254797275003	88	Mumbua Ng'ata	254717628280
44.	Samuel Kitavi	254701297812	89	Mutheu Grishon	254701253415
45.	Onesmus Mumo	254726024704	90	Frank Mumo	254799135785

ANNEX 2: QUESTION GUIDES FOR TPQA

THIRD PARTY QUALITY ASSURANCE FOR ESR DATA COLLECTION

KEY INFORMAT INTERVIEW GUIDE

TARGET | National, County and Sub-County level staff of SPS involved in the ESR data collection exercise.

CONSENT

Good morning/afternoon, my name is ..... and I work for CHASP Advisory, a consulting firm that has been contracted by the Government of Kenya to undertake an independent assessment of the process of data collection (Household Registration) that was undertaken in this location. The information you provide will be useful for Government and partners to improve on the process of undertaking a similar exercise and subsequently improve the accuracy of data captured from the household.

You have been selected to participate in this interview due to the role you played in the exercise. We therefore seek your consent to participate (voluntarily) in this interview as part of the Quality Assurance on the data collection exercise. If you choose to participate in this interview, any information you will provide to us will be confidential and will only be used to improve data collection activities under the Enhanced Single Registry (ESR) for social protection. Please note that the interview will only be recorded, and transcriptions will only be used for the purposes of this study.

Your responses will be confidential and at no point will you be quoted directly, nor will your responses be associated with you.

RESPONDENT DETAILS

Name (Optional)	
Institution/Department	
Position/Role	
Role in the Registration Process	

GUIDING QUESTIONS

1. Kindly describe how you were involved in the data collection exercise, providing details of the actions / activities you undertook.

2. Do you feel you had adequate training, orientation /sensitization, and access to key guiding documents such as the operations manual? Please explain your answer. As a follow up; would you say the trainings and guidelines provided were comprehensive? Why? Why not? What improvements would you suggest?

3. What is your general observation of the following processes? Please provide your responses to each indicating what worked, what did not work and why? How can each of these processes be improved?
    - Overall Planning
    - Enumerator and Supervisor recruitment and training
    - Community Sensitization,

- Community Listing,
- Household Data Collection
- Monitoring and Reporting

4. Kindly help us understand how stakeholders were involved in the process. Who was involved and how, and what more do you think could have been done to improve the level of stakeholder involvement?
5. Would you say the exercise was well resourced? Why? Or why not? Were there any delays or disruptions to the process occasioned by funding flows? What more could/should be done?

6. Was there a feedback mechanism (known to the communities) and used in receiving and addressing any issues emerging from the registered beneficiaries? Please explain your response speaking to how well it worked (if one was present), or the alternative mechanisms used to receive feedback (in the event one did not exist). Please share any additional thoughts/recommendations related to a feedback mechanism.

7. Were there clear mechanisms and protocols for monitoring quality of data gathered during the exercise? Please provide details and suggest improvements.

8. Other than those that you could have mentioned above? Are there any other overall challenges encountered during the exercise? How were these resolved? Probe for Challenges of access to parts of the county/location

9. What lessons can you draw from your participation in this exercise?

10. Other than the recommendations captured under each of the questions above, are there any additional changes you would like to see/recommend to ensure the data collection process becomes more efficient, effective and of high quality?

FGDs interview Guide

Target Participants: (Approx 10 pax per Meeting)

1. Beneficiary Welfare Committee (2 persons 1 male, 1 female)
2. Head of already Registered Households (2 persons 1 male, 1 female)
3. Local Leader(Asst Chief, Village Elder)- 1 male, 1 female)
4. Representatives of the youth- 1 male, 1 female
5. Representatives of women- 1 Male, 1 female

Consent:

Good morning/afternoon, my name is …….and I work for CHASP, Advisory, a consulting firm that has been contracted by the Government of Kenya to undertake an independent assessment of the process of Beneficiary Registration process that seeks to Develop an Enhanced Single Registry of Household data across select counties in Kenya. The information you provide will be useful for Government and partners to improve on their processes in the ongoing exercise and other future engagements. We hope you can participate fully as any information you provide would be very important to the exercise.

We shall keep your responses confidential.

Do you agree to participate in the Discussion 1=Yes 2=No If No Terminate the interview(s)

Guiding Questions:

- **Sensitization:**
  1. Were you involved in the sensitization phase of the exercise? If so, How.
  2. What mechanisms were used in sensitizing the community in this area?
  3. Was the process effective? Was the message clear? Was it done on time? Did it reach the different target audiences?
  4. If sensitization was done again, what changes would you suggest in the process?

- **Listing:**
  1. How was listing done in this community?
  2. Who undertook the listing exercise
  3. Where was listing done?
  4. Were the sites selected convenient and accessible by the target Households?
  5. If there was another opportunity for listing, what changes would you suggest in the way it is done?

- **Household Registration**
  1. Did you understand the Questions? In the language, content
  2. Did the interviewed create a conducive environment for undertaking the interviews
  3. Did you clearly understand why the process/Data collection was being undertaken
  4. If there was another opportunity for registration, what changes would you suggest in the way it is done?

KEY INFORMAT INTERVIEW GUIDE

This tool will target:

- National Level Players and County and Sub county Level staff

Consent:

Good morning/afternoon, my name is …….and I work for CHASP, Advisory, a consulting firm that has been contracted by the Government of Kenya to undertake an independent assessment of the process of Beneficiary Registration process that seeks to Develop an Enhanced Single Registry of Household data across select counties in Kenya. The information you provide will be useful for Government and partners to improve on their processes in the ongoing exercise and other future engagements. We hope you can participate fully as any information you provide would be very important to the exercise.
We shall keep your responses.

Do you agree to participate in the Discussion 1=Yes 2=No If No Terminate the interview(s)

Respondent Details:

Name (Optional)……
Organization/Department……
Position/Role……
Role in the Registration Process……

Guiding Questions

1. How exactly where you involved in the Process?
2. Did you have access to the Operations Manual, PAD and other guiding documents related to the exercise?
3. Would you say the Guidelines provided were comprehensive? Why? Why not?
4. What mechanisms were set up for planning of the exercise?
5. Were you involved in these engagements? If Yes, How?
6. Would you say the planning process was effective? Why? Why not?
7. Did you have access to all the information you required to plan for the exercise or make decisions?
8. Were field teams involved in the planning? If yes, how?
9. Were stakeholders involved in the exercise? If yes, Who were these? And how were they involved?
10. Would you say the exercise was well resources? Why? Or why not?
11. Were there clear mechanisms for seeking clarity on any issues when this was necessary?
12. Did the exercise proceed as planned? If not, what were some of the reasons for this?
13. Were there clear mechanisms and protocols for monitoring and evaluating progress of the exercise
14. What lessons did you draw from your participation in this exercise?
15. If there was another opportunity what changes would you suggest in the way the exercise is done??

Additional Questions for Field/County staff:

16. What specific challenges did you face and how were these addressed?
    - Sensitization
    - Listing
    - Registration
    - Reporting

ANNEX 3: CONTROL QUESTIONS

These questions will be used to check for any material changes that may occurred at the household level between the time the initial data was captured and now.

The appropriate section of the form **will only be filled** when the Respondent confirms that there has been a change in the specific parameter

County:……
Sub County:……..
Location:……..
Form Number:……..

Question	**Response at HH Registration**	**Response Now**
What is your Marital Status		
Is your father alive?		
Is your mother alive?		
Who are the members of your nuclear family?		
Is your father alive?		
Is your mother alive?		
Have there been deaths over the last 12 months?		
What are the livestock Numbers?		
• Exotic Cattle		
• Indigenous Cattle		
• Camels		
• Sheep		
• Pigs		
• Donkeys		
• Goats		
• Chicken		
Does the HH own any of the following Assets?		
• TV		
• Car		
• Mobile Phone		
• Tuk-Tuk		
• Bicycle		
• Refrigerator		

ANNEX 4: LIST OF LOCATIONS IN MAKUENI AND NUMBER OF HOUSEHOLDS RECOLLECTED

Subcounty	Location	Registered HHs
KIBWEZI	KAMBU	48
	KATHEKANI	63
	KIBOKO	50
	KIKUMBULYU	144
	MAKINDU	196
	MASONGALENI	112
	MTITO ANDEI	89
	NGUUMO	129
	NGWATA	69
	NTHONGONI	39
	NZAMBANI	89
	UTITHI	20
MAKUENI	ILIMA	45
	KANTHUNI	50
	KANZOKEA	18
	KATHONZWENI	57
	KEE	39
	KIKOKO	90
	KIKUMINI	24
	KILALA	60
	KILUNGU	69
	KITHEMBE	72
	KITHUKI	39
	KITISE	70
	KIVANI	25
	KWAKAVISI	62
	MAVINDINI	49
	MUUSINI	48
	MUVAU	37
	NZIU	37
	UKIA	83
	WATEMA	40
	WOTE	107
MBOONI	ITETANI	39
	KALAWA	71
	KALAWANI	143
	KATANGINI	91
	KATHULUMBI	49
	KISAU	91
	KITETA	167
	KITHUNGO	95
	KITUNDU	58
	MBOONI	275
	TULIMANI	67

	UTANGWA	58
	WAIA	208
NZAUI	EMALI	58
	IKANGAVYA	22
	ITHUMBA	60
	KAKUTHA	36
	KALAMBA	51
	KASIKEU	53
	KAVUTHU	69
	KIIMA KIU	57
	KILILI	39
	KITHUMBA	25
	KWALE	35
	KYEMUNDU	36
	MALILI	92
	MUKAA	53
	MULALA	114
	MUTYAMBUA	80
	MWEINI	41
	NGAAMBA	82
	NGUU	58
	NZAUI	108
	Total	4750

ANNEX 5: LIST OF LOCATIONS IN VIHIGA AND NUMBER OF HOUSEHOLDS RECOLLECTED

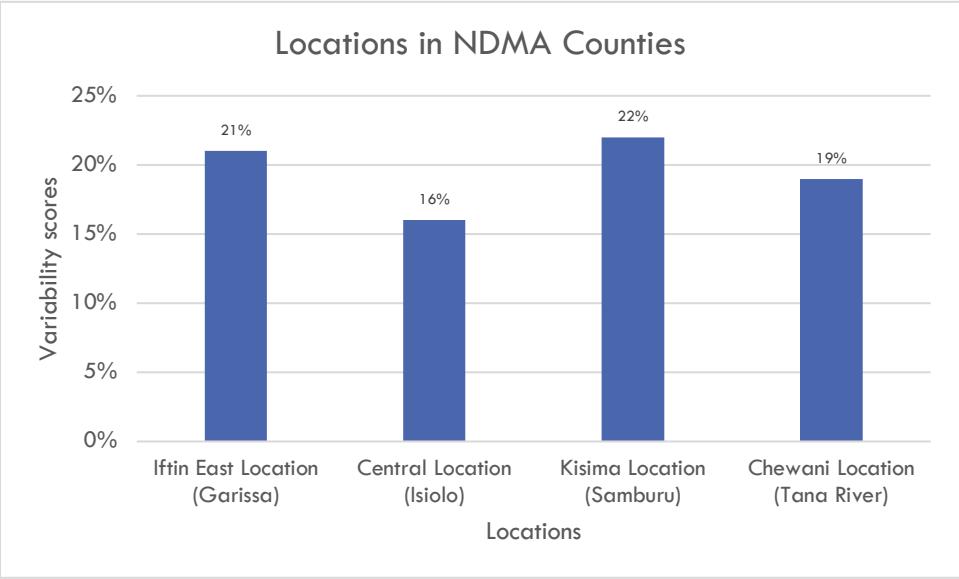
Subcounty	Location	Registered HHs
EMUHAYA	CENTRAL BUNYORE	298
	EAST BUNYORE	107
	NORTH BUNYORE	136
	NORTHEAST BUNYORE	247
	SOUTH BUNYORE	126
	SOUTHWEST BUNYORE	125
	WEKHOMO	29
	WEST BUNYORE	373
HAMISI	BANJA	194
	GISAMBAI	132
	JEPKOYAI	133
	MUHUDU	131
	SENENDE	62
	SHAMAKHOKHO	83
	SHAVIRANGA	90
	TAMBUA	192
VIHIGA	BUSALI EAST	45
	BUSALI WEST	38

	CENTRAL MARAGOLI	102
	IZAVA NORTH	48
	IZAVA SOUTH	63
	LUGAGA	65
	MUNGOMA	94
	NORTH MARAGOLI	99
	SOUTH MARAGOLI	90
	WAMULUMWA	97
	WEST MARAGOLI	61
	WODANGA	101
	Total	3361

ANNEX 6: OUTPUT FROM NDMA COUNTIES (4% OF DATA TO COMPLETE THE DATA COLLECTION MILESTONE).

The TPQA exercise in the NDMA Counties covered the following locations.

- **Kisima Location (Samburu):** Here, source of water, household head date of birth and education level were the largest contributor to the variability scores.
- **Iftin East (Garissa):** Toilet type and source of water were the main contributors to the overall location variance of 21%.
- **Chewani Location (Tana River):** Despite the household head ID number remaining the same (pointing to the same HH head), their date of birth and education level differed. This points to the inaccuracies in the data collected.
- **Central Location (Isiolo):** As in Chewani, the main contributors to the variances in central were the household heads' date of birth and education level.



Variances across the 18 variables for locations in NDMA Counties.

		Iftin East Location (Garissa)		Central Location (Isiolo)		Kisima Location (Samburu)		Chewani Location (Tana River)	
	Variable	**No of occurrences**	Percentage	**No of occurrences**	Percentage	**No of occurrences**	Percentage	**No of occurrences**	Percentage
1	Mismatch of relationships to household head	254/1031	25%	371/1745	21%	227/1126	20%	390/1081	36%
2	Mismatch of wall	79/254	31%	95/413	23%	75/287	26%	34/258	13%
3	Mismatch of roof	32/254	13%	7/413	2%	96/287	33%	11/258	4%
4	Mismatch of floor	57/254	37%	103/413	25%	32/287	11%	24/258	9%
5	Mismatch of toilet type	115/254	45%	36/413	9%	60/287	21%	94/258	36%
6	Mismatch of source of water	101/254	40%	94/413	23%	144/287	50%	96/258	37%
7	Mismatch of source of lighting	76/254	30%	101/413	23%	131/287	46%	77/258	30%
8	Mismatch of cooking fuel	75/254	30%	125/413	30%	59/287	21%	54/258	21%
9	Mismatch of number of main rooms	77/254	30%	106/413	26%	123/287	43%	80/258	31%
10	Mismatch of household member names	9/1031	1%	5/1745	0%	0/1126	0%	3/1081	0%
11	Mismatch of any disabled or orphan members	4/1031	0%	60/1745	3%	16/1126	1%	16/1081	1%
12	Mismatch of household size	1/254	0%	2/413	0%	3/287	1%	4/258	2%
13	Mismatch of HH Head ID Number	0/254	0%	0/413	0%	0/287	0%	0/258	0%
14	Mismatch of HH Head Date of Birth	87/254	34%	155/413	38%	146/287	51%	101/258	39%
15	Mismatch of education levels of HH Head	63/254	25%	151/413	37%	144//287	50%	99/258	38%
16	Mismatch of Spouse ID Number	0/254	0%	0/413	0%	0/287	0%	0/258	0%
17	Mismatch of spouse Date of Birth	45/254	18%	72/413	17%	44/287	15%	42/258	16%
18	Mismatch of education levels of Spouse	39/254	15%	67/413	16%	29/287	10%	50/258	19%
	Average	21%		16%		22%		19%	

The table below provides a summary for the shifts in the variables of interest from the initial data collection to the TPQA exercise.

≈	Source of light	Source of water	Toilet type	cooking fuel	Walls	Floor	Roof
IFTIN EAST	Most HH moved from other sources of light to electricity	Most HH moved from sourcing water from a vendor to a piped one	Most HH covered their pit latrines	Most HH moved from using firewood to mainly charcoal	Most HH moved from Brick/block/cement walled unit to stone walled ones	Most HH moved from earth floor house to cemented one	Most HH moved from Grass house to Corrugated iron sheet
CENTRAL	Most HH moved from using electricity and started using other sources of light mainly tin lamp	Most HH started using piped water in place of other sources of water	Most HH moved from using covered Pit Latrine	Most HH moved from using firewood to mainly charcoal	Most HH moved from Wood only walled units to the ones with other materials	Most HH moved from earth floor house to cemented one	
KISIMA	Most HH moved from using firewood as source of light to mainly solar	Most HH started sourcing water from dams and boreholes in place of other sources of water mainly unprotected well	Most HH moved from using bush and covered Pit Latrine to other toilet types	Most HH moved from using firewood to mainly charcoal	Most HH moved from Mud/wood walled unit to walls with other materials	Most HH moved from cemented floors house to earth floors	Most HH moved from Mud/Dung to units with other materials
CHEWANI	Most hh moved from using tin lamp as a source of light to other sources	Most HH started sourcing water from boreholes and Stream/River	Most HH moved from using covered Pit Latrines to other toilet types	Most HH moved from using firewood to mainly charcoal	Most hh moved from Mud/wood walled unit to stone and Brick/block/cement walled ones	Most HH moved from earth floor house to cemented one	