VALID Measures

This brochure presents VALID's new range of mapping, impact assessment and market research tools. Our related products and services to customers enable unprecedented and cost effective analytics of Base of Pyramid consumer markets

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VALID MEASURES

MAPPING, IMPACT ASSESSMENT AND MARKET RESEARCH TOOLS

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Glossary

DHS Demographic and Health Surveys
MICS Multiple Indicator Cluster Surveys
IYCF Infant and Young Child Feeding
PPS Population Proportional to Size

Introduction

This document describes some of VALID's bespoke mapping and surveying tools. These tools are designed to assess the impact of developmental and commercial interventions and analyse the different determinants of impact. They are applicable to both rural and urban situations and across both large (country level) and small (district level) geographical areas.

The tools are:

SIMPLE SPATIAL SURVEY METHOD (S3M)

A wide area, high resolution mapping technique that obtains spatially representative information on a range of demographic, behavioural and public health indicators.

SEMI QUANTITATIVE EVALUATION OF ACCESS AND COVERAGE (SQUEAC)

Originally designed and deployed widely to assess coverage of malnutrition treatment programmes (hence the name). We have now developed this tool into a framework to investigate operational issues affecting organisations trying to provide any services or products to target markets in developing countries.

SIMPLIFIED LOT QUALITY ASSURANCE SAMPLING EVALUATION OF ACCESS AND COVERAGE (SLEAC)

Originally designed and deployed widely to assess coverage of malnutrition treatment programmes (hence the name). This is a wide area low cost classification-based technique that maps coverage or market penetration classes (above or below specified threshold figures) attained in service delivery units. It is a rapid / low-resource method often used to identify areas for further investigation using the SQUEAC method. It has now been developed for rapid assessment of a varied range of indicator measures. We have now developed a system consisting of a SLEAC followed by a SQUEAC as a framework for investigating operational issues affecting organisations trying to provide any services or products to target markets.

RAPID ASSESSMENT METHOD (RAM)

Designed as a quick, simple and low-cost method for estimating the prevalence of global acute malnutrition, standard set of Infant and Young Child Feeding (IYCF) and the prevalence of common childhood infections in emergency and developmental situations. RAM is a fast and low resource small area survey method producing spatially representative information on a range of demographic, behavioural and public health indicators. It is highly adaptable to the urban context.

S3M (Simple Spatial Survey Method)

Is a wide area high resolution mapping technique that obtains spatially representative information on a range of demographic, behavioural and public health indicators.

- Provides results that are representative of areas down to sub-areas of < 300 Square Kilometres whilst still producing aggregated results equivalent to Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS)

- Based on "heat mapping" techniques for environmental surveys. Methods drawn from geological / environmental surveying (oil and gold exploration). US Environmental Protection Agency uses similar techniques. Geo-statistical techniques based on peer reviewed published data.

- **VALID's innovation** is to apply these techniques to human populations rather than geology. Others have applied these to animal populations for ecological surveys.

- Uses "three stage stratified sampling" to ensure geographical spread and to closely approximate a simple random sample.

    - Stage one sampling is designed so that the spread of the sampling points is even across the whole of the geographical area being surveyed.
    - This uses a "hexagonal grid" pattern that ensures every geographical point has the same chance of being included in a sample. (c.f. Probability Proportional to Size (PPS) which is weighted to sample higher density populations more exhaustively, or square grids where the distance between sampling points is not even).
    - The results are presented by triangles, meaning that each sampling point is used 6 times, contributing its data to the 6 triangles around the sampling point. This re-cycling of data improves the resolution 6 times over the squares method.
    - Another of **VALID's innovations** is to analyse by these triangles (not the hexagons) thereby increasing the resolution 6 fold for the same amount of sampling.
    - Stage 2 sampling (called map segment sampling), divides up the village or administration area (as defined by official statistics) closest to the stage 1 sampling point, into segments based upon the shape of the village.
    - The stage 3 sample is a random systematic sample of each segment
    - Sample size is based on the population estimate for each triangle in order to correct for finite population sizes.

This analytical approach allows the use of **small area estimation statistics** that utilise the limited variance in the small area, thereby allowing for a smaller sample requirement. In addition, the small areas sampled imply smaller population sizes and this allows us to apply a sample size correction based on **finite population statistics.** This again decreases sample size requirements.

Resource and time requirements:

For an area size of about 4,000 sq. mms with survey results reportable to smaller units of about 130 sq. mms, the following resource and time are required:

Technical input from VALID:

- 3 days of bespoke survey design, survey instrument and indicators development
- 8 – 10 days of practical, field-based training of survey coordinator and surveyors on implementation of survey
- Additional 10 – 12 days of supportive supervision to complete survey data collection. This is optional if client prefers VALID technical input and oversight throughout the data collection process. This number of additional supportive supervision days would increase per increase in area size from 4,000 sq. mms.
- 2 days of survey database development
- 3 days of scripting / coding of analytical workflow
- 3 days of data analysis and production of report.
- 2 days management feedback and presentations

Administrative and logistical input from client:

- A survey coordinator / manager who will work closely with VALID in implementing the survey
- Survey supervisor/s (ideally 1 supervisor for every 2 to 3 survey teams)
- Four survey teams each with 2 surveyors for a total of 8 surveyors.
- Transport support / vehicles for each of the survey teams for the duration of the whole data collection process. Vehicles should be appropriate for the terrain of the survey area and should be driven by someone who knows the area being surveyed. This should also take into account resources for driver costs, fuel costs and maintenance costs for the duration of the data collection process.
- Communications equipment and / or communication resources for survey manager, coordinator, and survey teams
- Materials for the survey to include printing of questionnaires, clipboards, pens, measurement tools as required by the indicators being measured (i.e. MUAC tape for MUAC measurement, weighing scales for weight measurement, etc.) and other equipment relevant to the context in which the survey is being implemented.

VALID offers:

1. Management consultancy services to design, set up and analyse surveys that are implemented by local actors
2. A full surveying package including design, set up, implementation and analysis.

Case Study 1: S3M to assess infant health and nutrition indicators

A client asked VALID to perform a baseline survey to assess current infant and young child health and nutrition related indicators in a zone (12 districts with a total areas of 4,208.64 sq. km) in Wolayita, Ethiopia.

VALID undertook an S3M survey that took 11 days to implement. VALID provided technical support in the design of the survey, trained a team of local surveyors to undertake the fieldwork and undertook data analysis and presentation.

The outputs indicated that the main issue with regard to infant and young child feeding (IYCF) practices in Wolayita zone is that of age-appropriate dietary diversity (Figure 1, bottom middle) and exclusive breastfeeding (Figure 1, upper middle) in the southwest area of Wolayita zone. Some areas in the north-east of the zone, on the other hand, show relatively good IYCF practices. This geographical information is not available from other survey methods but is extremely useful, providing a clear benefit to programme managers wishing to improve the targeting IYCF interventions in a more cost effective way.

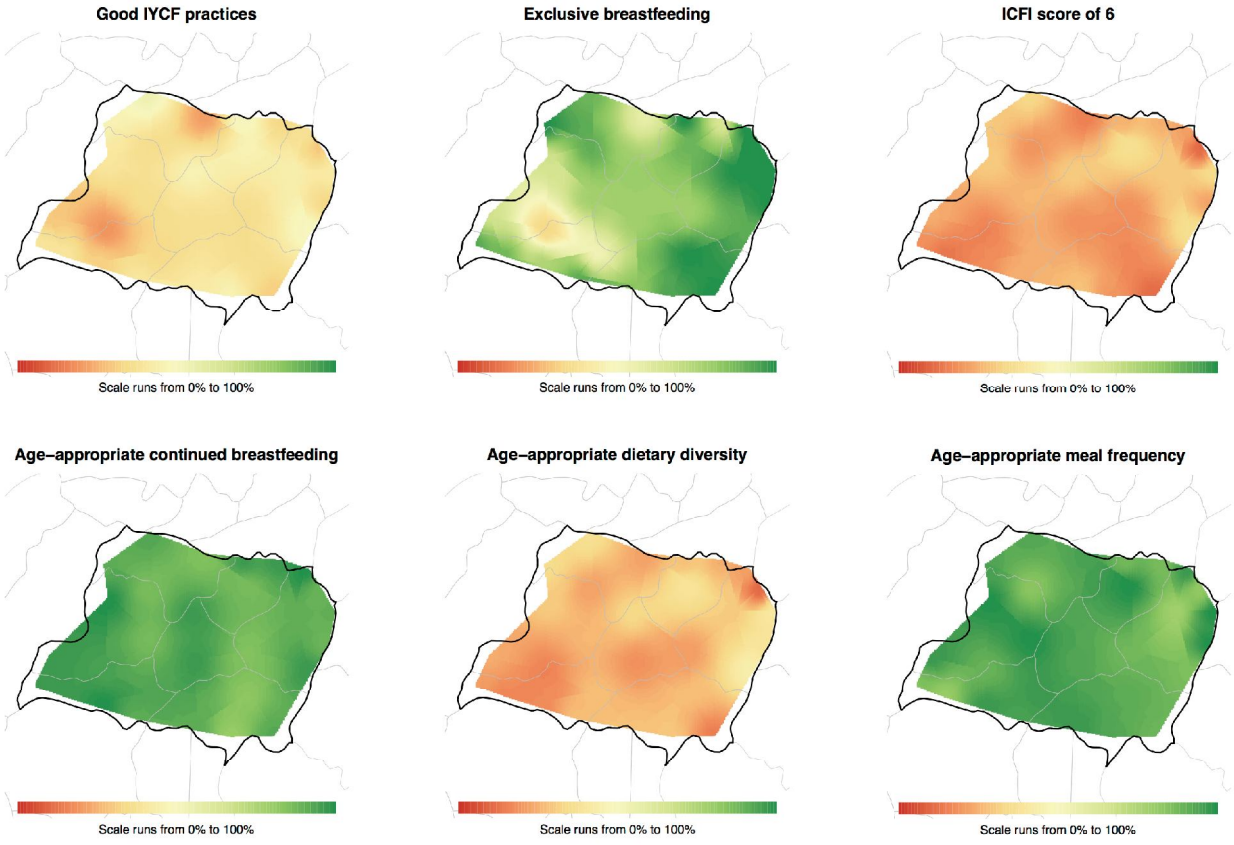

Figure 1: S3M used to assess infant and young child feeding behaviours across a zone in Ethiopia

The method also produces aggregated results similar to conventional surveying methods such as DHS or MICS for the zone as shown in Table 1 below for approximately 80% of all the indicators currently included in DHS or MICS surveys.

Table 1: Wolayita zone estimates for IYCF practices

Indicators	*n*	Estimate (%)	Lower 95% CI	Upper 95% CI
Good IYCF	1328	39.33	35.89	42.76
Exclusive breastfeeding	327	84.18	78.63	89.20
ICFI score of 6	1001	22.98	20.18	25.79
Age-appropriate continued breastfeeding	1001	92.41	90.35	94.34
Age-appropriate dietary diversity	1001	26.23	23.10	29.39
Age-appropriate meal frequency	1001	91.39	89.35	93.49

Case Study 2: S3M to provide commercial market intelligence data

A client has recently launched a new nutritional porridge in West Africa and asked VALID to assess market penetration and the facilitators and barriers to product uptake across a mixed urban, peri-urban and rural population.

We surveyed a total of three districts to establish product uptake and the determinants of market penetration for this product. The survey took 15 days to complete.

Examples of some of the outputs are:

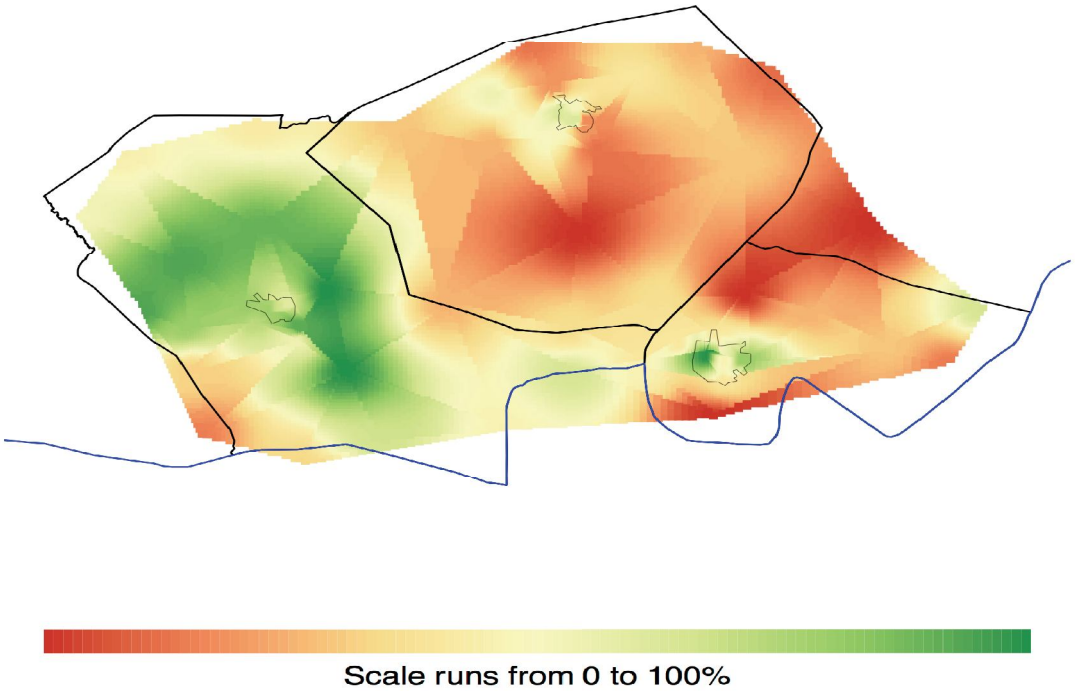

Figure 2: Message coverage: Have the subject ever heard of the nutritional porridge?

Table 2: District results for message coverage

District	Estimate (%)	Lower 95% CI	Upper 95% CI
Akwapim South	59.3	43.4	74.8
Suhum Kraboa Coaltar	49.1	40.4	55.5
West Akim Municipal	71.0	64.6	77.5
Overall	62.1	55.9	68.9

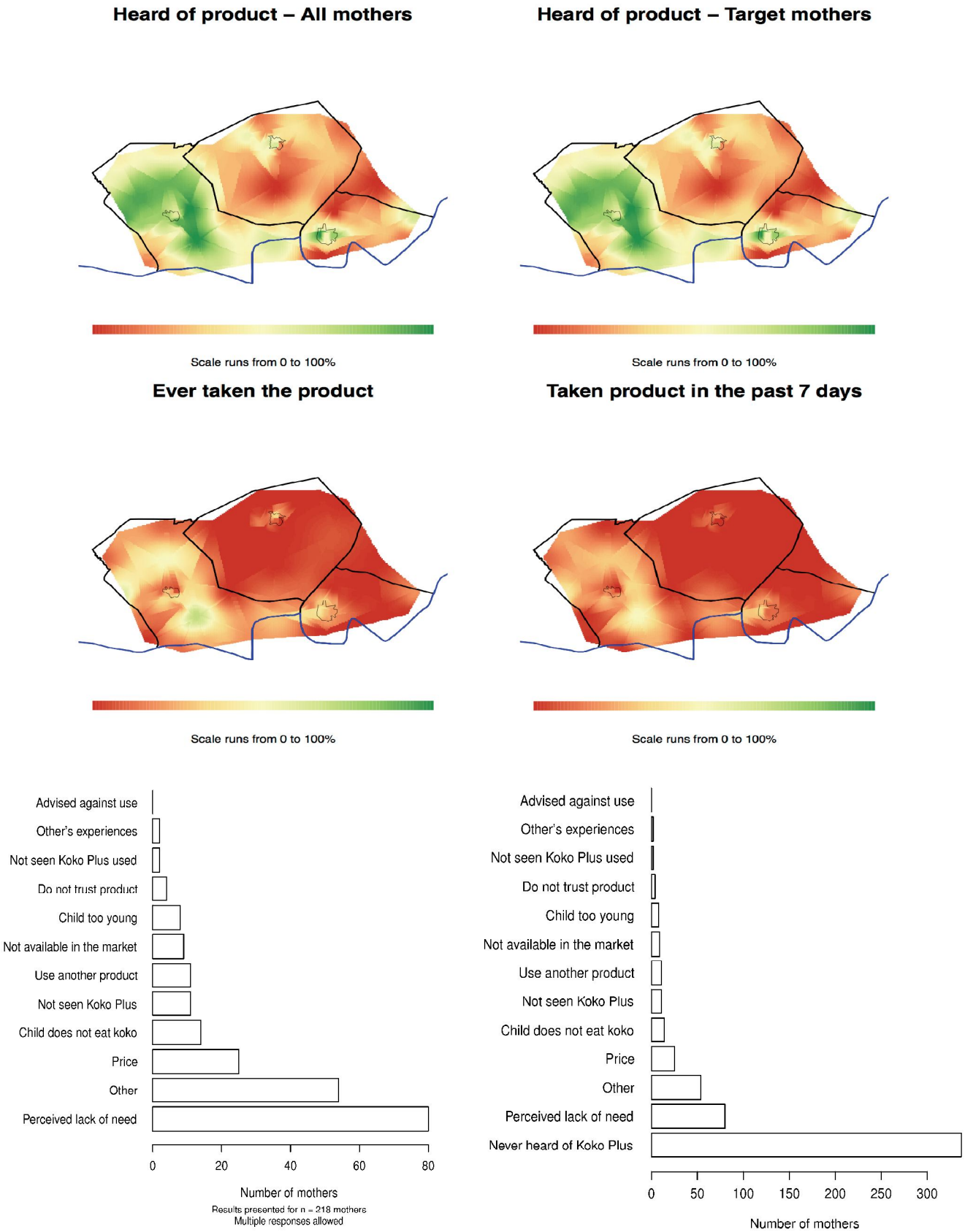

Figure 3: Example of a small selection of the outputs from an S3M used to assess product uptake, promoters and barriers to the retail sale of a nutritional porridge in 3 districts in West Africa.

SQUEAC (Semi Quantitative Evaluation Of Access And Coverage)

SQUEAC is a framework to investigate operational issue affecting organisations trying to provide services or products to target markets. SQUEAC combines data collected from multiple sources by a variety of methods (both qualitative and quantitative), in a way that allows clients to improve programme design. In effect, this is a specialised tool for humanitarian and Base of Pyramid (BOP) management consultancy.

SQUEAC is a highly flexible investigative technique that generates new information to build upon the clients pre-existing knowledge in an iterative process. **VALID's innovation** is to harnesses cutting edge statistical techniques such as Bayesian statistics to maximise the value of both new and old data, thereby reducing sample size and data collection requirements.

Each SQUEAC investigation involves an audit and analysis of existing information (including maps, anecdotes, previous surveys, monitoring data etc.), a generation of relevant testable hypotheses, the design and implementation of problem specific small-scale surveys and studies, data collection, analysis and feedback.

Typically the SQUEAC process takes 8 – 10 days of fieldwork and produces an analysis of the primary factors affecting supply and demand.

Resource and time requirements for a single district SQUEAC survey:

Technical input from VALID:

- 2 days of preliminary meetings to inform initial collation of existing data
- 8 - 10 days investigative field time
- 2 days management feedback / presentations
- Analysis provided there and then

Administrative and logistical input from client:

- A staff / employee from the client who will serve as the point person/ key contact of VALID for the conduct of the investigation and to whom requests for existing data can be made. Ideally, this can be someone who is already in charge of monitoring / supervision / evaluation of the client's programme that is being investigated.
- Desk or workspace at office and / or at the field with appropriate materials (as needed for the investigation) and facilities for printing and communications including internet access (depending on context).
- Transport support / vehicles appropriate for the terrain of the programme area and should be driven by someone who knows the area being assessed. This should also take into account resources for driver costs, fuel costs and maintenance costs for the duration of the investigation process.
- Translator (as needed) for the VALID technical consultant

VALID offers:

1. Management consultancy services to design, set up and analyse surveys that are implemented by local actors
2. A full surveying package including design, set up, implementation and analysis.
3. Capacity training in SQUEAC
4. Bespoke software

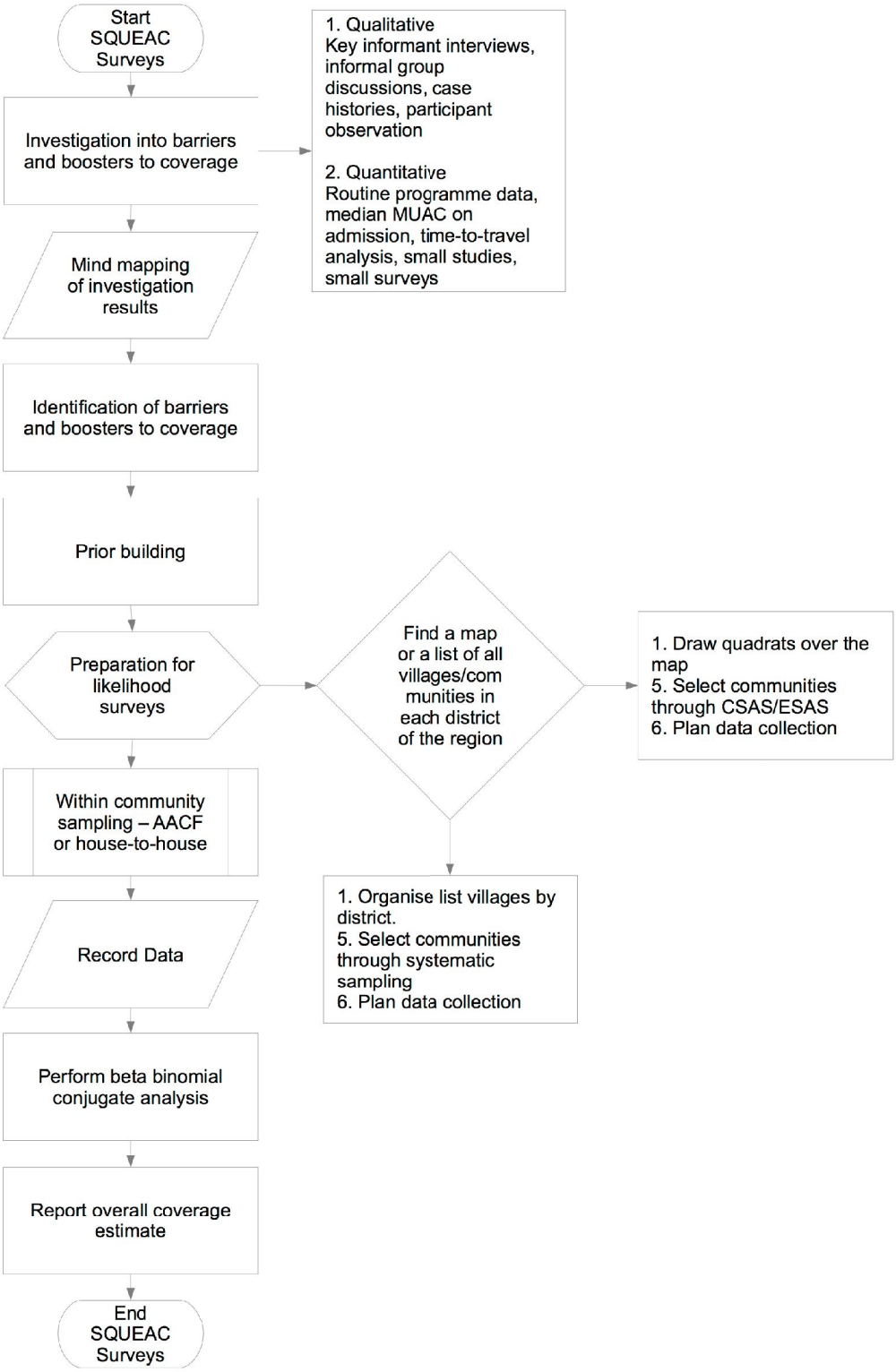

Figure 4 The SQUEAC approach

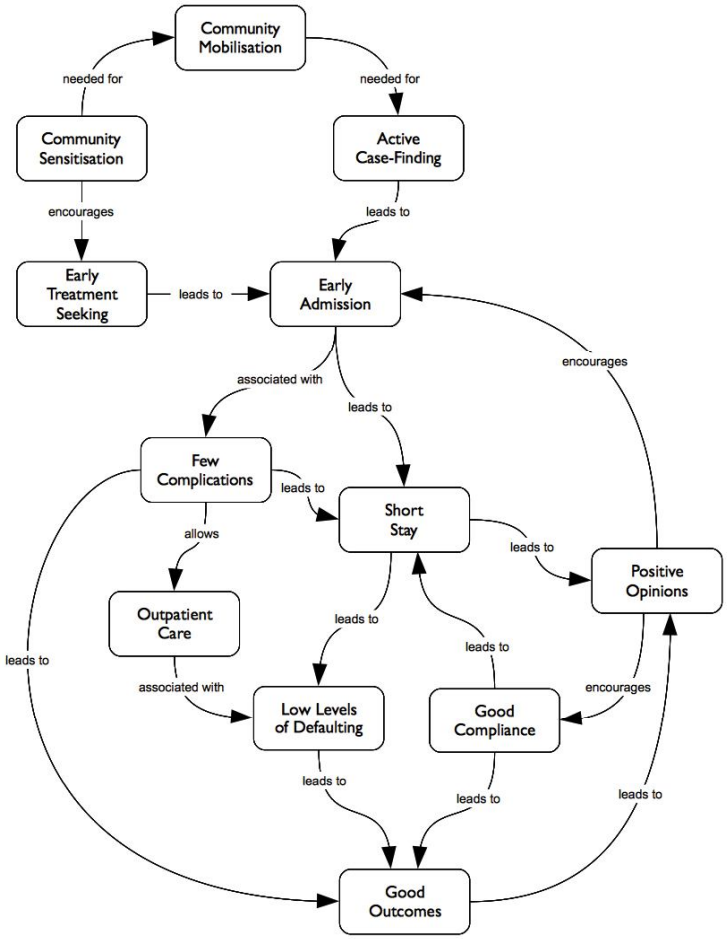

Figure 5 Example output from a SQUEAC investigation into malnutrition programme coverage

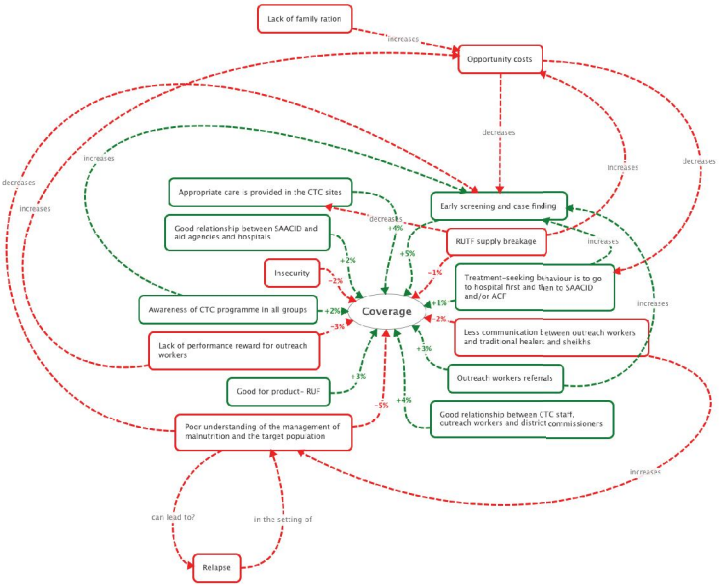

Figure 6 Example of SQUEAC analysis used to investigate the determinants of the coverage of malnutrition treatment programme.

Case Study 3: SQUEAC to investigate defaulting in a malnutrition treatment programme

A malnutrition treatment programme in northern Nigeria had been suffering from low coverage since its initiation and was facing high levels of default from the programme before patients had been cured. VALID designed a bespoke SQUEAC investigation to investigate the reasons behind these problems. The investigation took 10 days of fieldwork to complete.

The output of the investigation was identified that defaulting was largely confined to one population area served by two to the five Outpatient Therapeutic Programme sites and was closely associated with mortality rather than factors intrinsic to the treatment programme. This directed programme planners to turn their attention to public health measures in the affected community rather than focus on intra-programme issues.

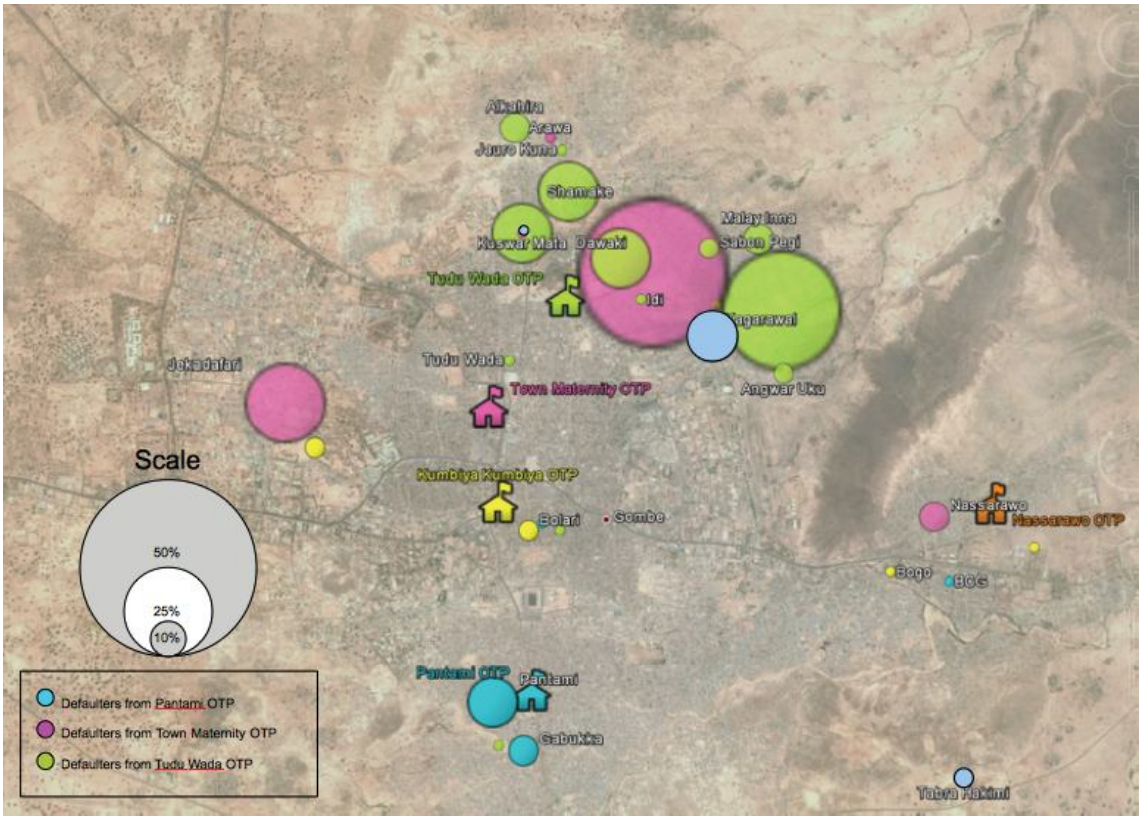

Figure 7: Mapping of defaulters across programme areas

Figure 8: Reasons for defaulting

SLEAC (Simplified Lot quality assurance sampling Evaluation of Access & Coverage)

SLEAC is a rapid low-resource survey method that classifies indicators of interest into three category or classes (e.g. “low”, “medium” or “high” with cut off thresholds determined in consultations with the clients requirements and maps the output. SLEAC uses the principles of lot quality assurance sampling (LQAS), a sampling technique developed for quality control in industrial production. The advantage of using the lot quality assurance sampling approach is that relatively small sample sizes are required in order to make an accurate and reliable classification of the indicators of interest.

SLEAC was originally developed by VALID as a companion method to direct SQUEAC investigations. **VALID’s innovation** is to adapt the use of LQAS to map indicator classes within multiple service delivery units over very wide-areas at country level. Such application potentiated the low-resource requirement of SLEAC by using it to cover more area at cheaper costs.

SLEAC reports indicator/s classification over wide through a map that indicates the classification of the indicator for each local or administrative unit within the wide area. An overall classification for each indicator across the whole area is also reported and an estimation of actual indicator levels can also be reported if overall sample size is achieved.

Resource and time requirements:

For a wide area application of SLEAC for 6 service delivery units or districts, the following resource and time are needed:

Technical input form VALID:

- 3 days of survey design, survey instrument and indicators development
- 8 – 10 days of practical, field-based training of survey manager, survey coordinator and surveyors survey teams
- Additional 10 – 12 days of supportive supervision to complete survey data collection. This is optional if client prefers VALID technical input and oversight throughout the data collection process. This number of additional supportive supervision days would increase per increase in number of service delivery units or districts to be surveyed. A service delivery unit / district can be surveyed in 3 to 4 days by 4 survey teams.
- 3 days of analysis and reporting for multi-indicator sets or analysis and reporting there and then for single indicator set
- 2 days management feedback / presentations

Administrative and logistical inputs from client:

- A survey coordinator / manager who will work closely with VALID in implementing the survey
- Survey supervisor/s (ideally 1 supervisor for every 2 to 3 survey teams)
- Four survey teams each with 2 surveyors for a total of 8 surveyors.

- Transport support / vehicles for each of the survey teams for the duration of the whole data collection process. Vehicles should be appropriate for the terrain of the survey area and should be driven by someone who knows the area being surveyed. This should also take into account resources for driver costs, fuel costs and maintenance costs for the duration of the data collection process.
- Communications equipment and / or communication resources for survey manager, coordinator, and survey teams
- Materials for the survey to include printing of questionnaires, clipboards, pens, measurement tools as required by the indicators being measured (i.e. MUAC tape for MUAC measurement, weighing scales for weight measurement, etc.) and other equipment relevant to the context in which the survey is being implemented.

VALID offers:

1. Management consultancy services to design, set up and analyse surveys that are implemented by local actors
2. A full surveying package including design, set up, implementation and analysis.
3. Bespoke mapping software

Case study 4: SLEAC to assess coverage of national malnutrition treatment programme

The Ministry of Health of Sierra Leone with support from UNICEF requested a national survey to assess the coverage of the malnutrition treatment programme implemented throughout the country.

Sierra Leone has an area of 71,740 sq. mms and is divided into 14 administrative districts. VALID conducted a SLEAC in each district to classify the coverage of the treatment of malnutrition in each district and also provide an overall figure for the whole of Sierra Leone. This national SLEAC survey took 6 weeks to complete with 5 survey teams.

The outputs of the national Sierra Leone SLEAC survey are presented below.

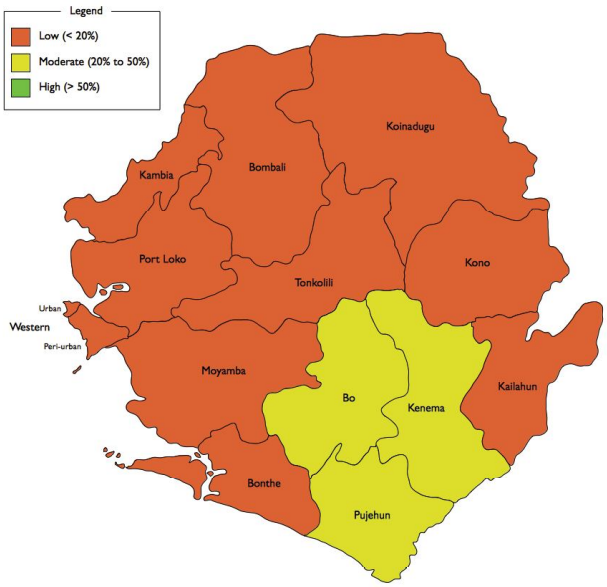

Figure 9: Map of coverage classification across 14 districts of Sierra Leone

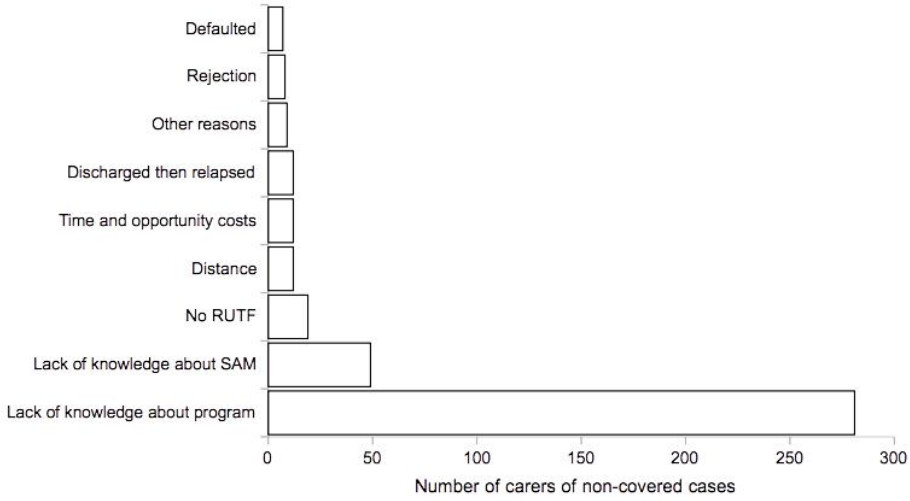

Figure 10: Reasons for not being enrolled in the treatment programme

RAM – Rapid Assessment Method

RAM is a multi-purpose, fast, low resource small area survey method producing spatially representative information on a range of demographic, behavioural and public health indicators. It is ideally adapted to the urban context.

VALID's innovation is to apply technique drawn from the social sciences and clinical drug trials to the humanitarian or development public health sectors. RAM uses various robust sampling and statistical techniques that although common in the social sciences and in high level clinical drug trials are not standard practice in public health. These techniques increase efficiency with which the survey uses the data that is collected allowing smaller sample sizes to produce the same levels of precision. For example a standard "SMART" 30*30 cluster survey usually requires a sample size of 900 (minimum 600), whereas a RAM survey can produce the sample level of statistical precision from a sample of only 200, thereby saving time and cost.

These techniques include **probit analysis** otherwise known as the "area under distribution curves" technique that include basic statistical measures such as the mean and standard deviation to provide more data and information compared to a simple analysis of binary or dichotomous variables. Probit analysis is a proven technique in a wide range of statistical applications public health.

Instead of parametric analysis RAM analysis also uses a system called **bootstrapping** (also known more technically as computer-intensive re-sampling statistical methods). In simple terms, this approach basically harnesses computing power to fully maximise the survey sample in order to provide as much, if not more precision, precise of survey results compared to conventional higher sample size type of surveys such as DHS or MICS.

By lowering resource requirement RAM has a role in a range of monitoring and impact evaluations that require a series of measurements over time conducted through multiple surveys.

Resource and time requirements:

For a wide area application of RAM for 6 service delivery units or districts, the following resource and time are needed:

Technical inputs from VALID:

- 3 days of survey design, survey instrument and indicators development
- 8 – 10 days of practical, field-based training of survey manager, survey coordinator and surveyors / survey teams
- Additional 10 – 12 days of supportive supervision to complete survey data collection. This is optional if client prefers VALID technical input and oversight throughout the data collection process. This number of additional supportive supervision days would increase per increase in number of service delivery units or districts to be surveyed. A service delivery unit / district can be surveyed in 4 to 5 days by 4 survey teams.
- 3 days of scripting / coding of analytical workflow
- 3 days of analysis and reporting
- 2 days management feedback / presentations

Administrative and logistical inputs from client:

- A survey coordinator / manager who will work closely with VALID in implementing the survey
- Survey supervisor/s (ideally 1 supervisor for every 2 to 3 survey teams)
- Four survey teams each with 2 surveyors for a total of 8 surveyors.
- Transport support / vehicles for each of the survey teams for the duration of the whole data collection process. Vehicles should be appropriate for the terrain of the survey area and should be driven by someone who knows the area being surveyed. This should also take into account resources for driver costs, fuel costs and maintenance costs for the duration of the data collection process.
- Communications equipment and / or communication resources for survey manager, coordinator, and survey teams
- Materials for the survey to include printing of questionnaires, clipboards, pens, measurement tools as required by the indicators being measured (i.e. MUAC tape for MUAC measurement, weighing scales for weight measurement, etc.) and other equipment relevant to the context in which the survey is being implemented.

VALID offers:

1. Management consultancy services to design, set up and analyse RAM surveys that are implemented by local actors
2. A full surveying package including design, set up, implementation and analysis.
3. Bespoke analysis and reporting software

Case study 5: Impact evaluation of a large-scale multi-year nutrition intervention

VALID designed and is supporting the implementation of a quasi-experimental study to assess the impact of a multi-million dollar USAID-funded nutrition intervention programme in 100 districts across 4 regions of Ethiopia. The study requires serial surveys at programme baseline and 3 years after at the end (a total of 42 surveys each at baseline and at the end). RAM was well-suited as it was quick to implement each survey at each district (5 – 6 data collection days per district) which meant the technical details of the overall study design was maintained and ensured (i.e. controlling for seasonality requiring each survey to be done at very specific periods of time and as the project was rolling out into the districts). The baseline surveys have been completed and all districts in the study were assessed at the appropriate time.

Data analysis was done using bespoke software created for this purpose. The software also automatically produced a formatted report of the results after analysis. Baseline results were made available within a week of baseline completion.

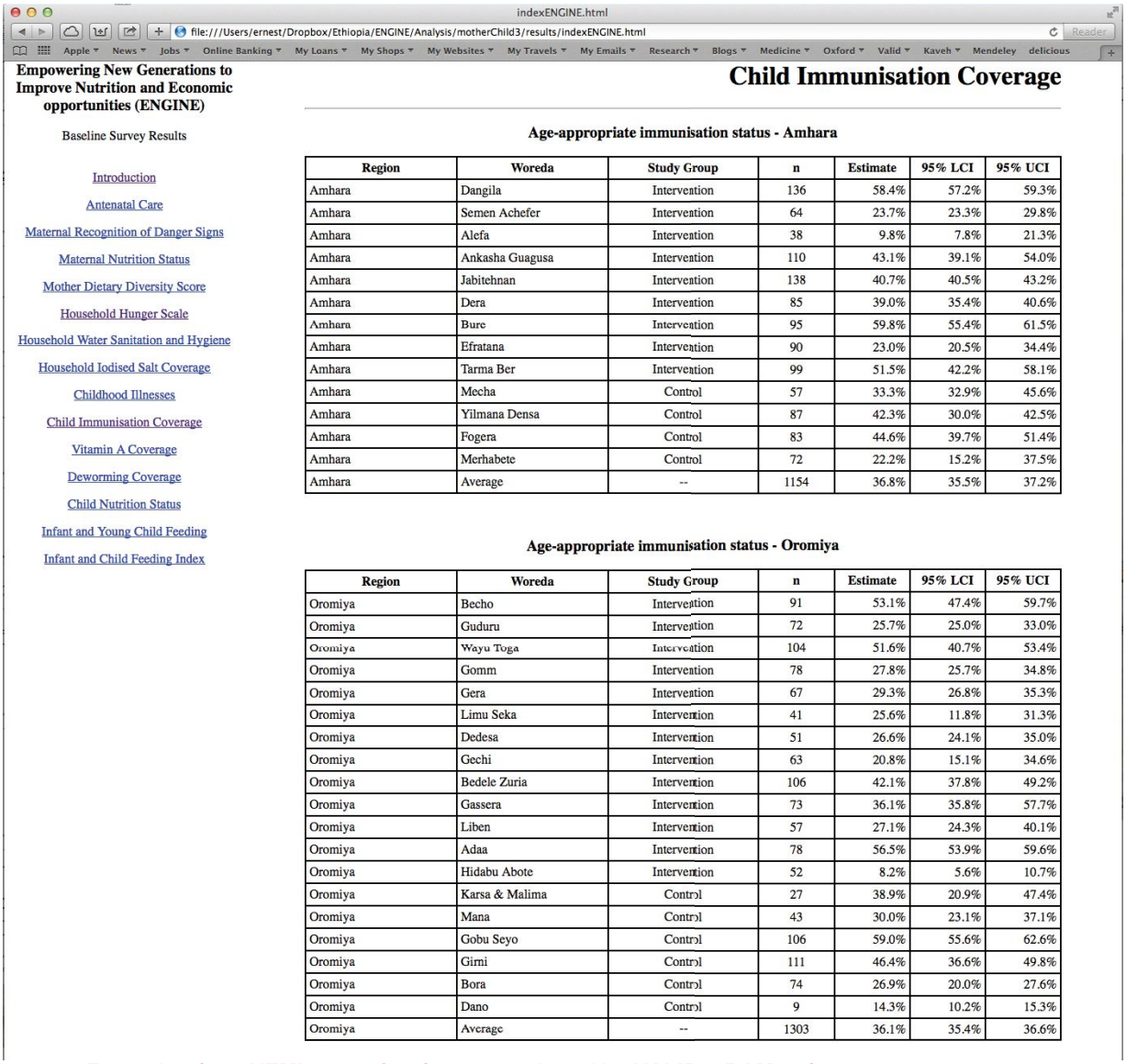

Figure 11: Example of the HTML reporting format produced by VALID's RAM software

Appendix: Potential applications of VALID's measurement tools

Possible clients / consumers	Information needs / requirements	VALID products to address information needs/ requirements
UNICEF Country Offices	• Data for whole country needed for programming • Either Demographic Health Survey (DHS) or Multiple Indicators Cluster Survey (MICS) are the survey methods-of-choice • DHS done every 5 years in DHS countries. Countries that don't run DHS do MICS every 3 years • Results are at best reportable at sub-country level / region level and not lower • Results take at least a year (best case scenario) to be reported and published	S3M provides: • the same aggregated results at national and regional levels on about 80% of the indicator sets that DHS and MICS report on • However, this is just a small by-product of S3M. Its main outputs for the client is a map / maps of all indicator results at high resolution (i.e. small areas within the overall area generally between 200 to 300 sq. km)
World Food Programme	• Running country programmes on prevention of chronic malnutrition which require routine monitoring and evaluation, assessment of coverage, and impact evaluation	Routine monitoring and evaluation and impact evaluation package which consists of: • Serial RAM surveys or S3M used for the routine monitoring and evaluation of programme indicators • SQUEACs done at midterm of programme focusing on diagnosing programme bottlenecks (i.e. barriers and boosters) and other issues related to service delivery and access. Information can then be used to improve programming • Quasi-experimental impact evaluation design (i.e. stepped-wedge, difference-in-difference, regression discontinuity, case-control)

USAID / World Bank / ECHO / Other funders	• Require routine monitoring and evaluation and impact evaluation of programmes they fund / support – health and nutrition, livelihoods, etc.	Routine monitoring and evaluation and impact evaluation package which consists of: • Serial RAM surveys or S3M used for the routine monitoring and evaluation of programme indicators • SQUEACs done at midterm of programme focusing on diagnosing programme bottlenecks (i.e. barriers and boosters) and other issues related to service delivery and access. Information can then be used to improve programming • Quasi-experimental impact evaluation design (i.e. stepped-wedge, difference-in-difference, regression discontinuity, case-control)
GAIN / other organisation marketing nutritional products	• Assessing coverage of nutritional products / inputs	A support package to assess market penetrance, technology usage behaviour and impact evaluation that will consist of: • S3M either as is or re-designed based on mapping requirements and on indicators to be measured. Possible re-design will use geo-statistical concepts of half-distance to markets, polygons of influence, inverse distance squares and the like • Clever use of SQUEAC to investigate attitudes and behaviours and provide nuanced analysis of the market. SQUEAC can also produce risk maps identify pockets of low and / or high market penetrance and identifies reasons for such • Use of some classic social science methods such as cluster analysis, discriminant analysis, q analysis / q methodology and test their applicability to our mapping techniques

Food and beverage multi-nationals	• A lot of food and beverage multi-nationals getting into the healthy and nutritious bandwagon • Whilst most of these companies collect voluminous users data and have huge IT and analytics departments that can crunch this big data, they lack the "heart and soul" that will bridge their numbers analysis with understanding behaviours and attitudes of the market especially with regard to health behaviours and practices	A support package to assess market penetrance, technology usage behaviour and impact evaluation that will consist of: • S3M either as is or re-designed based on mapping requirements and on indicators to be measured. Possible re-design will use geo-statistical concepts of half-distance to markets, polygons of influence, inverse distance squares and the like • Clever use of SQUEAC to investigate attitudes and behaviours and provide nuanced analysis of the market. SQUEAC can also produce risk maps identify pockets of low and / or high market penetrance and identifies reasons for such • Use of some classic social science methods such as cluster analysis, discriminant analysis, q analysis / q methodology and test their applicability to our mapping techniques
Mobile technology companies / mobile application developers / large multi-national telecom companies	• A lot of telecom and mobile technology companies are getting more and more into the use of mobile technology for health and nutrition • Whilst most of these companies collect voluminous users data and have huge IT and analytics departments that can crunch this big data, they lack the "heart and soul" that will bridge their numbers analysis with understanding behaviours and attitudes of the market especially with regard to health behaviours and practices • There is a growing demand by both mobile companies and those donors / funders / investors who fund projects on mHealth and the like to show impact of these technologies on health and nutrition	A support package to assess market penetrance, technology usage behaviour and impact evaluation that will consist of: • S3M either as is or re-designed based on mapping requirements and on indicators to be measured. Possible re-design will use geo-statistical concepts of half-distance to markets, polygons of influence, inverse distance squares and the like • Clever use of SQUEAC to investigate attitudes and behaviours and provide nuanced analysis of the market. SQUEAC can also produce risk maps identify pockets of low and / or high market penetrance and identifies reasons for such • Use of some classic social science methods such as cluster analysis, discriminant analysis, q analysis / q methodology and test their applicability to our mapping techniques