Managing Universal Salt Iodization Communications (MUSIC):

A Tool for Setting Supply Side Targets for Universal Salt Iodization programs

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A female border official test presence of adequate iodine in salt samples collected from trucks crossing into Malawi, before allowing them to pass, at the Mwanza check-post that borders with Mozambique.
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I. Background: A New Environment for Universal Salt Iodization Programs

Managers and program officers tasked with planning, developing and sustaining national USI programs for the next decade are facing a new program environment. In many countries, after early successes in establishing USI programs over the past decades, traveling the last mile to reach the Universal Salt Iodization (USI) goal of >90% households consuming adequately iodized salt (AIS) has proven challenging. Initial progress was driven by some mix of: advocacy to promulgate national regulations; capacity building to develop enforcement and monitoring systems; communications, technical assistance and some financial support to the salt industry; and public campaigns, product launches, and other consumer communications. The industries that responded to this mix of strategies were typically larger scale and mechanized producers usually supplying more modern and commercial markets serving more urban and affluent consumers with higher quality often refined salt. While all population segments are benefitting from USI, the remaining gap to reach >90% adequately iodized salt (AIS) is often disproportionately among traditional markets, lower quality salt and more rural and lower income consumers. Consequently, traveling the last mile to reach the remaining unprotected consumers often presents a very different programming environment:

- **Inadequately Iodized Salt** is largely unrefined, larger crystal size, and high moisture salt which predicts poor homogeneity or iodine retention through the distribution and sale chain;
- **Producers** are largely small and medium-scale enterprises that face technical, financial and other obstacles integrating iodization into their production processes and business models;
- **Local government officials** who often hold the mandate and financing authority to regulate and enforce national USI laws have significant discretion in implementing national mandates;
- **Consumers** are generally less affluent, more rural, have relatively less access to modern markets, and tend to consume more traditional, inexpensive and unrefined salt.

Managers and program officers in government, NGOs and UN agencies tasked with developing and updating plans to achieve USI will need to specifically address this challenging and changing program landscape. As they build on past achievements and current opportunities, program planners face qualitatively different challenges in addressing the gaps to reach USI. Just repeating or intensifying past strategies used to achieve current AIS coverage may not achieve success in this new environment.

Mobilizing commitment and resources for the next phase of USI programming will be challenging. The excitement of establishing a new public health program is long past - the easy wins over and the low hanging fruit picked. By definition the remaining work will be more difficult than in the initial years of USI programming. Risks and costs of addressing remaining gaps will be higher relative to rewards and benefits. Initial supporters and key champions may have moved on or burned out. Stakeholder awareness of USI may remain relatively high, but experienced stakeholders are also familiar with the difficulties in addressing the remaining gaps to USI. In this challenging environment, simply re-asserting the importance of achieving USI, 90% coverage of AIS, may not be sufficient to secure support. Stakeholders may give
their tacit approval, but if program objectives are not relevant, realistic and concrete or the road to success not clearly defined, they may not fully engage or feel accountable.

Concrete and quantified objectives can be powerful and persuasive “calls to action” for policy-makers, donors and other stakeholders.

II. Setting Supply Side Targets (SSST): A Tool for Developing USI Program Objectives

*Setting Supply Side Salt Targets* (SSST) is an Excel tool that provides a step-by-step guide to defining detailed, evidence-based and quantitative targets for USI Programs that are firmly grounded in the national context. Six data-based linked worksheets build on the national salt industry environment and USI salt quality monitoring data to systematically develop objectives focusing on two clear indicators: *metrics tons of adequately iodized salt and proportion of the national edible salt supply that is adequately iodized*. The SSST tool organized by 3 essential components:

- 3 Salt Iodization Quality Categories (or QC)
- 5 Salt Industry Supply Segments (or SS)
- 3 Types of Objectives paralleling the 3 QC and based on SS

**3 Quality Categories (QC)**
The tool is founded on widely available national data on household coverage of AIS. SSST segments the salt supply into 3 salt quality categories often reported in national surveys:

- **Salt with > 15 ppm** iodine is considered adequate but will nonetheless require effort to sustain current favorable regulatory, industrial and market environment.
- **Salt with 5-15 ppm** iodine reflects an attempt at iodization, but an unsuccessful or incomplete process that requires efforts improve quality of inputs, processes, packaging and/or motivation.
- **Salt with < 5 ppm** iodine suggests no effort is being made to iodize indicating the program needs to expand to effectively reach new salt production, regulatory and market environments.

**5 Supply Segments (SS)**
Since the key indicator defining USI, proportion of salt retaining >15ppm to the household level, is an industrial and product indicator, SSST takes a supply-side perspective. Although the SSST is a flexible tool enabling planners to apply what they feel is the most appropriate salt industry production segments, the default version uses the following 5 SS to approximate scale and the associated technical and business capacity of national salt production – and associated capacity to iodize adequately and affordably.
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- **Larger-scale High Capacity**: Can easily integrate iodization equipment and amortize capital costs of plant improvement. Relatively sophisticated technical and capacity producing a higher quality product. Registered businesses generally abiding by national laws.

- **Smaller-scale Low Capacity**: Small informal generally falling below the radar of business regulation and food control. With little or no mechanization, integrating iodization with hand spraying and manual mixing of KIO3 requires considerable extra effort and achieving AIS is very difficult.

- **Medium-scale Medium Capacity**: Capacity of medium scale producers varies widely. In some may be registered enterprises with technical capacity similar to larger scale producers. In other cases, they may apply the same technology used by small producers to a larger volume business model.

- **Large Import Enterprises**: These are formal trading companies whose large shipments enter at major ports and are inspected by customs authorities. Often shipments are in container loads or rail cars, and often destined to large domestic enterprises.

- **Small Import Enterprises**: Informal enterprises with small shipments that often crossing borders without much attention to regulatory requirements, tariffs, duties, inspections, product quality or iodization.

SSST Tool focuses on defining the baseline performance of each sector and projecting salt iodization and quality improvements in each sector.

**3 Types of Objectives**

Assuming household data reflects the national supply, SSST develops 3 distinct kinds of objectives based on the coverage and quality of the salt supply. The tool applies the following 3 objectives, each requiring different intensity of intervention and level of investment as well as a wide range of risk-reward or cost-benefit ratios.

- **Sustain current coverage of adequately iodized salt.** Create continued awareness of IDD to ensure USI remains on the national agenda; enforcement mechanisms function; monitoring systems show benefits; and national coalitions remain relevant and active.

- **Improve the iodine content of salt that currently is iodized but inadequately iodized.** Salt that has undergone some attempt at iodization, albeit inadequate, indicates some awareness and capacity. Further efforts are required to build capacity, enable and motivate the producer.

- **Expand iodization to salt producers that do not iodize salt at all.** This indicates no awareness, capacity or outright opposition. Expanding iodization in this environment will involve developing, testing and scaling-up new technical and business models to engage small-scale producers.

**III. SSST Table of Contents: 6 Worksheets**

The tool is based on available national data and your knowledge, experience, judgments and courage to make estimates about the salt industry environment.
• **Blue Worksheet 1: Salt Industry Supply Segments (SS)** Select, describe and define up to 5 SS and define contributions to the national salt supply

• **Red Worksheet 2: Iodized Salt Quality Categories (QC)** Input national household monitoring data for 3 QC and convert to MT supply for each QC

• **Green Tab Worksheet 3: Supply Segment Baseline Quality Estimates** For each SS, provide estimates for the proportion AIS in each QC

• **Yellow Worksheet 4: Challenges to Increasing USI Coverage** Consider, list and rate challenges to increase AIS coverage in for each SS

• **Orange Worksheet 5: S.M.A.R.T. Sub-Objectives** Establish AIS USI Program Sub-Objectives to Sustain, Improve and Expand AIS for each Salt SS

• **Purple Worksheet 6: Summary USI Program Objective** 4 tables summarize USI Program Objectives and provide opportunity to reflect and reality check

**Default country values**

SSST uses some default values based on a hypothetical country with a population of 40 million. Current USI situation includes with 50% AIS, 30% inadequately iodized salt and 20% salt with no iodine added. The national salt supply is comprised of: 40% from large scale producers, 20% each from medium and small scale producers and 10% from large and small scale imports. Based these data inputs, the SSST enables the following statements for USI Program objectives:

- **National Program Objective:**
  - Improve USI coverage of AIS by 32% representing an increase from the current USI coverage of 50% to 66% during the time frame of the current USI Program.

- **The National Program Objective will be achieved via 3 sub-objectives including:**
  - Sustaining current level of ~73 thousand metric tons AIS or 100% with < 15 ppm
  - Improving quality of ~20 thousand metric tons or 46% of currently inadequately iodized salt to AIS
  - Expanding production of iodized salt and converting 2,920 metric tons or 10% of currently non-iodized salt to AIS.

The following sections describe each of the SSST 6 worksheets in depth and will enable program planners to develop similar quantitative and concrete objectives for improvement in AIS indicators.
Blue Worksheet 1: Salt Industry Supply Segments (SS)

Select, describe and define up to 5 SS and define contributions to the national salt supply

1. **Identify the SS in Column A Cells 3-8 and provide definition in Column B Cells 3-8:**

   Generally, the salt supply environment is among the most reliable predictors of AIS coverage. Most often, the more mechanized and easily regulated the salt industry, the higher the coverage of AIS. Conversely, the lower-tech the industry and informal the business model, the less likely high AIS will achieve significant and sustainable scale. SSST enables you to input up to 5 SS. Each SS features a distinct mix of opportunities and challenges to sustainably produce adequately iodized salt. The default version uses the following 5 segments to approximate scale and the associated technical and business capacity.

   - **Larger-scale High Capacity:** These producers can easily integrate iodization equipment and amortize capital costs of plant improvement. Registered businesses communicating with government regulatory agencies and generally abiding by national laws. Relatively sophisticated technical and capacity producing a higher quality product. In most countries these enterprises provide the salt for processed foods industry. Generally, this segment offers opportunity of achieving >90% for relatively low investment of resources. In most cases this large producers are already largely producing AIS.

   - **Small-scale Low Capacity:** Small, informal and sometimes temporary enterprises, generally falling below the radar of business regulation and food control. With little or no mechanization these producers typically harvest, sun dry and bulk pack. Integrating iodization with hand spraying and manual mixing of KIO3 requires considerable extra effort and achieving AIS is very difficult. While some small pilot trials have shown some limited success, the proportion of AIS achieved across the total sector is low. We know of no models that have successfully scaled and achieved >5% AIS. Improving iodization at small-scale facilities is more operational research than full scale intervention and will require high commitment, investment and risk over a sustained period of time.

   - **Medium-scale Medium Capacity:** Falling between large and small scale in terms of business model, product quality, processing capacity and channels to government regulators. Capacity of medium scale producers varies widely. In some may be registered enterprises with technical capacity similar to larger scale producers and high capacity to reach >90% adequately iodized salt. In other cases, they may apply the same simple basic technology used by smaller producers to a larger volume business model.

   - **Large Import Enterprises:** These are formal trading companies whose large shipments enter at major ports and are inspected by customs authorities. Often shipments are in container loads or rail road cars, and often destined to large domestic enterprises: food processors, super markets, and large distributors. Experience suggests that applying USI regulations to this sector should produce results parallel to large-scale refined domestic sector.
Small Import Enterprises: Informal shipments often crossing borders without much attention to regulatory requirements, tariffs, duties, inspections, product quality or iodization. Transported by truck, small rail, river-boat or animals over porous national border, small shipments of a few tons each are difficult to identify and control. Coverage in this sector is likely not much better than the small scale production sector.

Based on available data and estimates from key stakeholders identify up to 5 SS that make up the national salt supply and input these into Column A. Since these SS categories may not be officially defined, you may want to insert a shorthand definition in column B. If you don’t need 5 different segments, simply leave the cell blank. Or you may choose to redefine and replace the cells with categories that better fit your national salt production environment. For example, countries with high share of small-scale production might replace and unneeded category in order to further segment the small scale category - for example by farmers/harvesters (who essentially perform no processing functions) and (small scale producers who harvest or purchase raw salt to grind, dry and/or package). Or you might replace a cell with smaller scale but more modern and higher technology companies that refine high quality salt for niche markets.

2. Define the Metric Tons Produced Annually by Each SS: Yellow Cells D3-8:
Column D provides cells for your estimate of total metric tons of edible salt supplied by each of the SS, with Cell D8 the total national supply, summing Cells D3-7. This refers to total production of edible salt, whether it’s iodized or not. The data may not be officially available and you may have to make some assumptions and estimates about the industry situation. SSST provides three options for filling in this data in Cells D3-8:

Option 1: First, if you do not have any data, in metric tons, on size of the national market, use the Calculator highlighted in green on lines 10-13 of the worksheet to make some general estimates.

- Identify your country in tables on pages 10-14.
- From the column describing total per capita sodium intake in the year 2010, copy the appropriate figure for your country and paste in the dark yellow cell A12.
- Insert your national population in cell C12. The tool converts sodium to salt intake and, based on national population estimates the national supply in C12 and links to the highlighted yellow cell D8 in the master table above.
- Now that you have established and estimate for the national edible salt supply in metric tons, move to Option 2 below.

Option 2: You may have made an estimate for national edible supply estimates during an industry analysis, when projecting KIO3 requirements for iodization, or you may have developed this estimate in Option 1.
- Fill in cell D8 with the annual national edible salt supply in metric tons.
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- Then add your best estimates for market share, in percent (%), for each SS in the yellow cells C3-7. This may be based on national surveys, industry data, or your best judgment based on years of USI program experience. Based on the national supply figure you entered in cell D8, the SSST will automatically convert the percent market share to metric tons for each SS in the yellow highlighted cells in Column D 3-7.

Option 3: If you have national market data for each SS in metric tons, then simply fill in the shaded cells in Column D 3-7 and include the national supply in Cell D-8. In this case, you do not need to fill in the yellow cells C3-7 with estimates for percent market share.

3. Estimating Number of Producers in each SS

These figures in Column E 3-7 and F 3-7 are not linked to the other worksheets in the tool. However, this may provide some insights into the scale of effort needed to reach USI within each SS. If you have data on the number of producers in each SS, or can venture reasonable estimate, enter this estimate in Column E. The corresponding cell in Column F will provide an estimate for average metric tons of salt produced by the average producer within that SS. Consider the cost of converting each producer to adequate iodization - and the return on that investment or the benefit in metric tons of adequately iodized salt.
Red Worksheet 2: Iodized Salt Quality Categories (QC)

*Input national household monitoring data for 3 QC and convert to MT supply for each QC*

1. **Define the Iodized Salt QCs: Column A**

National monitoring for USI Programs usually have salt quality data segmented into the following 3 salt iodization QCs, which are the default definitions used in SSST.

- **Adequately Iodized Salt:** > 15 ppm defined as adequately iodized salt
- **Inadequately Iodized Salt:** > 5 ppm and < 15 ppm defined as inadequately iodized salt
- **No Iodine Added:** < 5 ppm suggests no added iodine – or at least no serious attempt to iodize.

If you have different definitions for iodized salt quality based on national situation enter these in the appropriate cells in Column A3-5. For example, if the intrinsic iodine content of raw salt in a known or accepted value, you may want to adjust the default definitions of 5 ppm iodine as the line between “No iodine added” and for “Inadequate.”

2. **Enter the proportion of salt falling into each QC: Column B**

Fill in the yellow shaded cells in Column B3-5 with the national data for the percent of salt falling into each of the 3 QC. Based on total national edible salt supply entered in Worksheet 1, the metric tons annual consumption for each QC will be projected in Column C3-5. For the values entered in the work sheet below for the hypothetical country, this suggests that the general structure of USI objectives will be:

- Sustain iodization of 73 thousand metric tons of currently quality-iodized salt.
- Improve iodization in 43.8 thousand metric tons of inadequately iodized salt.
- Expand iodization to 29.2 thousand metric tons of salt with no added iodine.

This forms the basis for how many metric tons will be sustained, improved or expanded will be the focus of the remaining worksheets.
1. Using Data, Experience and Best Judgment

This is the most complex worksheet in the SSST. You will need to use a mix of available data and extrapolations from available data along with your knowledge, experience and best judgment. It would be helpful if you have household or market survey data segmented by the type of salt, for example: retail packaged versus bulk package; refined versus unrefined salt; or coarse versus powdered salt. This kind of product data is usually very closely correlated with industry segments and the likelihood of AIS.

- Refined salt tends to originate with larger more sophisticated producers or more well equipped medium processors targeting niche markets. Global data shows refined salt is more likely to be well iodized.
- Coarse raw salt with larger crystal sizes usually has not gone through an industrial process of crushing and drying. Experience suggests this quality of salt tends to have less iodine retention. Usually, medium and small producers supply this kind of salt, though there some are exceptions.
- Retail packaging tends to protect added iodine and reflect more sophisticated production while salt in bulk packages tends to have poorer retention through the distribution chain. Retail packaging is typical from larger or more modern producers.

Essentially the higher the overall quality the salt, the more likely it is to be well iodized and retain iodine through the distribution chain. If there is no official trade and business data or USI survey data to clarify this issue, consider suggestive or surrogate information or rely on your program experience and best judgment.

- What is the over-all mix of refined, crushed and raw salt?
- What do you know about the over-all salt quality produced by the various SS that has implications for iodization quality?
- What do you know about refining, crushing, drying or packaging equipment used by the various SS?

While the hard data may not be available, program planning doesn’t always occur in an optimally transparent environment with full information. Sometimes educated guesses and assumptions are required. The important thing is to be transparent about your assumptions.

2. Estimate proportion of each QC produced in each SS.

The Worksheet includes 3 tables one for each QC, with each divided into 5 SS. For each SS defined in Column A, Column B provides production estimates in metric tons for each SS made in Worksheet 1. In the yellow highlighted cells in Column C, input your best estimate for the proportion of annual production from each SS that might fall in the relevant QC. This may be based on market or survey data or simply represent your best judgment based on your assessment of industry capacity with in each SS.
The default screen shows that:

- For large producer performance is excellent: 94% of production falls into the “Adequate” Category and 6% falls into the “Inadequate” Category and none has < 5ppm iodine.
- For medium scale producers, 15% of production falls into the “Adequate” Category and 85% contains added iodine but falls into the “Inadequate” Category. 0% falls has no iodine added.
- For small producers, 25% production shows some added iodine and another 75% falls into the no iodine added category.
- 92% of the supply from formal large scale importers falls into the “Adequate” Category and 8% falls into the “Inadequate” Category.
- 50% of informal imports falls into the inadequate category with another 50% falling into the no iodine added category.

Based on your inputs in percent for each SS, estimated metric tons of salt production that fall within each QC is calculated in Column D.

3. **Reality Check #1: Matching Estimates for QCs in Worksheets 2 and 3**

Totals for each QC are found in the red highlighted cells: D-8 metric tons adequately iodized salt; D-19 metric tons inadequately iodized salt; and D-29 metric tons with no iodine added. Since the estimates for each QC are made individually, its possible that the total shown in these red cells may be more or less that the original estimates for QC in Worksheet 2. Your original estimate in Worksheet 2 for total metric tons salt falling into each QC is shown just below the red cells in the blue shaded Cells D-9, D-20 and D-30. Any discrepancy between the estimates in Worksheet 2 and Worksheet 3 is calculated, in metric tons, in the blue Cells D-10, D-21, and D-31 - and in percent in the cells immediately below, D-11, D-22 and D-31. Adjust you estimates in Column C so that these match as closely as possible. It’s not necessary that the discrepancy is zero and figures match exactly. However, by trial and error adjust the inputs in Column C so the difference shown in cells D-11, D-23, and D-33, is within 1-3% of your original estimate, which for planning purposes this is not significant. In the case of the default worksheet there is a discrepancy is < 1%.

4. **Reality Check #2: Matching Estimates for SSS in Worksheets 1 and 3**

Since the estimates for each SS is made 3 times, once for each QC, it is possible that the sum of total metric tons, shown Column D, may be more or less than the original SS estimate in Worksheet 1. As a check, when you have finished all inputs for the yellow cells check the blue highlighted area at the bottom of the worksheet, lines 34-41. Column B in this blue box links with your original SS estimates from Worksheet 1 while Column C sums the total of your projections from this Worksheet 3. Column D and E show any difference between these metric tons and percent. Adjust your estimates in the yellow cells to ensure that these total substantially match. For the purposes of this model, it’s not necessary that the figures match exactly, but its important to adjust the inputs so the total is within 1-3% of the original SS estimates made in Worksheet 1. In the default sheet, these just happen to match precisely.
### Table 1: Quality Category > 15 ppm

<table>
<thead>
<tr>
<th>Supply Segments</th>
<th>MT Production for each Supply Segment</th>
<th>Hypothesis or Data: Quality Iodized Salt For Each Supply Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Scale High Capacity</td>
<td>58,400</td>
<td>94% MT</td>
</tr>
<tr>
<td>Medium</td>
<td>29,200</td>
<td>15% MT</td>
</tr>
<tr>
<td>Small/Informal Sector</td>
<td>29,200</td>
<td>0% MT</td>
</tr>
<tr>
<td>Imports Large/Formal</td>
<td>14,600</td>
<td>92% MT</td>
</tr>
<tr>
<td>Imports Small/Informal Sector</td>
<td>14,600</td>
<td>0% MT</td>
</tr>
</tbody>
</table>

Total Projection: 77,708

- Reality Check #1: Total Quality Category
  - CHECK Difference: 292
  - % Difference: 0.40%

### Table 2: Quality Category >5-<15 ppm

<table>
<thead>
<tr>
<th>Supply Segments</th>
<th>MT Production for each Supply Segment</th>
<th>Hypothesis or Data: Inadequately Iodized for Each Supply Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Scale High Capacity</td>
<td>58,400</td>
<td>6% MT</td>
</tr>
<tr>
<td>Medium</td>
<td>29,200</td>
<td>85% MT</td>
</tr>
<tr>
<td>Small/Informal Sector</td>
<td>29,200</td>
<td>25% MT</td>
</tr>
<tr>
<td>Imports Large/Formal</td>
<td>14,600</td>
<td>8% MT</td>
</tr>
<tr>
<td>Imports Small/Informal Sector</td>
<td>14,600</td>
<td>50% MT</td>
</tr>
</tbody>
</table>

Total Projection: 44,092

- Reality Check #1: Total Quality Category
  - CHECK Difference: (292)
  - % Difference: -0.67%

### Table 3: Quality Category < 5 ppm

<table>
<thead>
<tr>
<th>Supply Segments</th>
<th>MT Production for each Supply Segment</th>
<th>Hypothesis or Data: Non-Iodized for each Supply Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Scale High Capacity</td>
<td>58,400</td>
<td>-</td>
</tr>
<tr>
<td>Medium</td>
<td>29,200</td>
<td>-</td>
</tr>
<tr>
<td>Small/Informal Sector</td>
<td>29,200</td>
<td>75% MT</td>
</tr>
<tr>
<td>Imports Large/Formal</td>
<td>14,600</td>
<td>-</td>
</tr>
<tr>
<td>Imports Small/Informal Sector</td>
<td>14,600</td>
<td>50% MT</td>
</tr>
</tbody>
</table>

Total Projection: 29,200

- Reality Check #1: Total Quality Category
  - CHECK Difference: -
  - % Difference: 0.00%

### Reality Check #2: Per Total Supply Segment

<table>
<thead>
<tr>
<th>Supply Segments</th>
<th>Total Supply Segment from Worksheet 1</th>
<th>Total Projection Above</th>
<th>DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Scale High Capacity</td>
<td>58,400</td>
<td>58,400</td>
<td>-</td>
</tr>
<tr>
<td>Medium</td>
<td>29,200</td>
<td>29,200</td>
<td>-</td>
</tr>
<tr>
<td>Small/Informal Sector</td>
<td>29,200</td>
<td>29,200</td>
<td>-</td>
</tr>
<tr>
<td>Imports Large/Formal</td>
<td>14,600</td>
<td>14,600</td>
<td>-</td>
</tr>
<tr>
<td>Imports Small/Informal Sector</td>
<td>14,600</td>
<td>14,600</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>146,000</td>
<td>146,000</td>
<td>-</td>
</tr>
</tbody>
</table>
Yellow Worksheet 4: Challenges to Increasing USI Coverage
Consider, list and rate challenges to increase AIS coverage in for each SS

1. Consider Situation Analysis Described in Worksheets 1-3
The previous 3 Worksheets built a quantitative situation analysis segmented by SS, which is summarized in Columns B and C of this Worksheet. Your estimate for metric tons from each SS that is either AIS, inadequately iodized or not iodized at all is summarized in Column B. The estimate for the percent of total production from each SS that falls into each of the 3 QC is shown in Column C. This represents your best assessment for the current or baseline performance of each individual SS.

Worksheet 4 asks you to reflect on the implications of this analysis and consider the challenges to moving ahead from this status quo. Therefore, in this Worksheet, the categories shift from describing the status quo based on the 3 QCs (Adequate, Inadequate and None) to a more action oriented perspective organized around 3 types of Objectives: Sustain AIS, Improve Inadequate IS and Expand into iodization where no iodine is added.

2. List Challenges to Improved Performance in Column D
For each SS list the distinct challenges to: sustaining the current level of AIS; improving quality of the current inadequately iodized IS to > 15ppm; and expanding among producers who have not been adding iodine at all to achieve > 15ppm. This is a qualitative discussion to explore opportunities and challenges for USI. It will not fit in the cells of the worksheet and are not linked into the next sheets of the tool. There is space to record more detailed explanations of the challenges to the right of the table. Some points to consider regarding the opportunities and challenges of sustaining, improving or expanding include:

- **Sustaining Current Level of AIS:** This may require only modest effort to ensure continued monitoring of the market place and population UIE status along. Some level of continuing communication to industry and key government stakeholders may be needed. In some cases, sustaining current levels of AIS may be more difficult. For example, if KIO3 is being subsidized, sustainability may require considerable work to transition financing to the marketplace.

- **Improving Quality of Inadequately IS to achieve AIS:** Challenges to improving iodization range from relatively simple to difficult and intractable.

  - **Producer motivation:** Producers have adequate awareness and capacity to add at least some iodine, but not sufficiently motivated to invest in the added financing or work effort to produce AIS - quality assuring iodization may be far down the list of things to do. Raising the priority of iodization among these producers may include motivational communications but a key component will be stricter regulatory enforcement or other incentives like pressure from local NGOs, consumers and other groups. Progress will be largely related to how well the USI program can mobilize and sustain pressure from these public and private groups.
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OBJECTIVES

✓ **Producer technical capacity and product:** In some cases, improving inadequately iodized salt might involve by building capacity to apply simple quality assurance processes. However, poor iodization is often associated with basic non-mechanized salt production model. Improvement may involve basic changes to introduce: refining or washing to remove impurities; crushing process to minimize crystal size; sun drying for longer periods of time or investing in energy driven drying processes; packaging in smaller packs with higher quality moisture proof materials; and mechanized iodization and quality assurance.

✓ **Producer Business Model:** Some medium scale producers may not have the market sophistication, capital, cash flow or capacity to invest in improving their operations to integrate new technology needed for iodization. For example, they may not be accustomed procuring outside value added inputs like KIO3.

If challenges to improving quality involve only a handful of producers or modest technical adjustments to the production process, the required technical and capacity enhancements may feasible within 2-5 year program time frame.

Expanding iodization to producers who have not been adding iodine at all: Salt with no added iodine suggests producer with no awareness, outright opposition and/or no capacity to iodize. The effort and investment needed to build awareness and capacity overcome will depend on the available channels of communication – and the number of producers who need to be reached. While motivational communications remain a part of the mix, law enforcement remains one of the most powerful communications. However, law and motivation cannot create capacity. Small producers face the most extreme form of the technical and business challenges described in the previous section on improving iodization quality for medium scale producers. However, with hundreds or even thousands of small scale producers requiring significant changes to production and business models, designing programs and securing sufficient resources and implement activities to build capacity this may be very challenging. Expanding iodization will involve researching, piloting, developing, testing and scaling-up innovative production and business models. It may not be possible to develop and scale up this process within a short to medium-term USI program time frame.

The analysis in the default worksheet shown below suggests that:

- **Sustaining AIS:** 10 large producers and 2 large importers supply 50% of national consumption and their performance is excellent: ~92-94% of AIS, 6-8% inadequate and no salt without any added iodine. Since sustaining current performance involves controlling only 12 points of production or businesses that are already producing at a high level, this seems feasible and may require only modest effort and resources.
- **Improving AIS**: The medium scale sector represents 20% of national consumption but since production is only 15% adequately iodized, this sector contributes only 3% to national AIS supply. However, 85% of production showing some added iodine suggests these producers are aware of iodization requirements and have some level of capacity to achieve them. As discussed above, reasons for this inadequate iodization performance range from lack of motivation and enforcement, to difficulties with hand spraying and manual mixing, to over-all salt quality that is not conducive to KI03 retention. The resources and effort to improve quality may range from modest to substantial depending on the root causes of inadequate iodization. However, with only 50 producers to target, large improvements may be feasible.

- The informal small-scale production sector accounts for 20% of the national supply (consumption from this sector may well be concentrated among rural and high-risk consumers). One quarter of production shows >5ppm<15ppm iodine, suggesting some effort has been made to reach a significant share of the estimated 800 producers in this sector. However, none of this production has achieved AIS and three-quarters remains with no iodine added. Lessons learned from capacity building among a limited number of small producers, along with program resources and effort expended to reach the current level of AIS, need to be carefully evaluated to assess pathways and costs for further expansion. Improving and sustaining the performance of producers currently iodizing as well as scaling up to the remaining 600 producers may be very challenging.

3. **Rating Potential Progress within the Next USI Program Time Frame in Column E**

The challenges to sustaining, improving and expanding may range from relatively “easy fixes” to basic tests of USI program capacity. For each SS, consider the degree of difficulty or feasibility of significant improvement based on the issues discussed above as well as:

- Available or potential resources;
- Your knowledge of the stakeholder landscape;
- Your experience of what has worked or not worked in past programs;
- The time-frame for the next phase of the USI Program.

For the sake of simplicity, rate the potential for progress for each SS and QC on a scale of 1-5 with:

- 1 representing the most pessimistic perspective where you feel the problem is intractable and even with application of considerable effort and resources improvement would be < 10%.
- 2 representing a less pessimistic perspective where you feel that with application of considerable effort and resources improvement would be 10-25%.
- 3 representing a situation where you feel that with application of available resources improvements 25%-75%.
- 4 representing a moderately optimistic perspective where you feel that with application of available resources it’s very feasible to convert the performance to 75%-90% AIS.
- 5 representing a most optimistic perspective where you feel it’s very feasible to convert the performance of the SS and QC >90% AIS.
In the default case shown in the figure below the analysis concludes that:

- **Large Scale Production and Imports**
  - Rating of 5 indicates high confidence in sustaining current production
  - Rating of 5 indicates improving currently inadequately iodized supply to > 90%.

- **Medium Scale Sector**
  - Rating of 5 indicates high confidence in sustaining current production
  - Rating of 4 indicates that 85% currently inadequately iodized salt produced can be reduced by dramatically by >75%.

- **Small Scale Sector**
  - Rating of 3 indicates that 25-50% of currently inadequately iodized salt might be converted to > 15ppm.
  - Rating 2 indicates that of the 75% of production from this sector that is not iodized at all, up to 25% may achieve AIS during the program period.

- **Small Scale Imports**
  - Rating of 1 suggests that the USI program has very little control over border trade in the smaller scale sector.

This is not the place or time for a full program planning – use your program experience and knowledge of the situation provide your best and educated judgment. Planning is an iterative process and there will be opportunities to revisit and refine these assessments.
Orange Worksheet 5: S.M.A.R.T. Sub-Objectives

*Establish S.M.A.R.T. (Sustainable, Measurable, Achievable, Realistic, and Timely) AIS USI Program Sub-Objectives to Sustain, Improve and Expand AIS for each Salt SS*

1. **Structure of Worksheet**

Worksheet 5 is organized by into 3 Tables based on the 3 types of objectives: Sustain, Improve and Expand.

- For each type of objective, Column A is segmented by the 5 SS.
- For each SS, columns B and C are linked to your previous estimates for baseline status of iodized salt quality (<5ppm, <5-<15ppm and > 15ppm).
- Column D is linked to your 1-5 rating of challenges from Worksheet 5 - representing your assessment of feasibility to sustain, improve or expand that baseline situation within the time frame, resource and capacity limitations of you USI program.

Based on this background data and analysis, the yellow cells in Column E ask you to input targets for proportion of salt from the appropriate SS that will be sustained, improved or expanded to reach AIS during the program timeframe.

2. **Objective 1: Proportion of Current AIS to be Sustained**

Based on your assessment of program resources and capacity along with challenges to changing the current status, what is a realistic, affordable and ambitious objective for sustaining AIS? Enter the appropriate percent for each SS in yellow highlighted Cells 4-8 in Column E. Hopefully, the objective is to sustain 100% of the current level, or very close to this level. But this is not automatic and will require continuing activities and investment. After the percent target is entered in Column E, a summary for metric tons sustained in each SS is shown in Column F and summed in Cell F-9. For the default spreadsheet, the target is to sustain 72,708 metric tons or 100% of current AIS.

3. **Objective 2: Proportion of Inadequate Iodization to be Improved**

Based on your understanding of the challenges to improve performance of producers who currently inadequately iodize, what is a realistic, affordable and ambitious objective for the proportion that can be improved to > 15 ppm? Enter your target percent in the appropriate in yellow shaded Cells 13-17 of Column E. This represents the proportion of salt converted from inadequate category to adequate. A summary for total metric tons improved, or converted to > 15 ppm iodine, is shown in Column F-18. For the default spreadsheet, the target is to improve 20,148 metric tons or convert 46% of inadequately iodized salt current AIS from all 5 sectors.

4. **Objective 3: Expanding by Converting Non-Iodized Salt to AIS**

Based on your understanding of the challenges to expanding iodization to producers who currently do not iodize at all, what is a realistic, affordable and ambitious objective for the proportion that can be expanded to > 15 ppm? Enter your target percent in the appropriate in yellow shaded Cells 22-26 of Column E. A summary for total metric tons expanded or converted to > 15 ppm iodine at household level is shown in...
Column F-27. Expanding iodization from none to inadequate may be an achievement of sorts, and might be defined as a sub-objective. However, this is not included in the over-all USI objective. For the default spreadsheet, the target is to improve 2920 metric tons or convert 10% of currently inadequately iodized salt current AIS from the small scale and informal domestic and import sector.
Purple Worksheet 6: Summary USI Program Objective

4 Tables Summarize USI Program Objectives and provide opportunity to reflect and reality check.

1. National USI Objective by QC
   The orange table in lines 1-6, summarizes the sub-objectives from Worksheet 5 into an over-all USI Program Objective, expressed as total metric tons supply and percent ASI. This over-all USI Program Objective is derived by summing the metric tons of AIS projected for each SS with each category of objectives in Worksheet 5. In turn, worksheet 5 has been linked to all the previous inputs, estimates and assumptions entered in Worksheets 1-4.

   In the default sheet, the objective is to achieve 66% ASI. While this is a simple number, the sub-objectives provide a substantiation and clear pathway of the types of program activities and improvements on which the national program objective is founded. The default country analysis can communicate very concrete and specific objectives for USI coverage as follows:

   - **National Program Objective:**
     - Improve USI coverage of AIS by 32% representing an increase from the current USI coverage of 50% to 66% during the time frame of the current USI Program.

   - **The National Program Objective will be achieved via 3 pathways including:**
     - Sustaining 100% of the current level of ~73 thousand metric tons of AIS.
     - Improving performance of inadequately iodized salt by 46% by converting ~20 thousand metric tons of currently inadequately iodized salt to AIS.
     - Expanding production of iodized salt and converting 2,920 metric tons or 10% of currently non-iodized salt to AIS with < 15 ppm at the HH.

2. National Objectives by Supply Segment
   The green table in lines 8-15, aggregates targets for each SS to highlight the relative contributions to the over-all USI Program Objective. In the case of the default country, the large-scale sector contributes 61% of the national objective, medium scale 18%, small producers 4%, large scale import sector 15% and small informal imports 3%. The relative contributions to the over-all objective roughly suggest relative importance or priority of the various sectors to the success of the USI program. In this case, sustaining and expanding gains in the large scale sector is the most critical component of success.

3. Percent Improvements by Supply Sector Reality
   The pink table in lines 20-28, summarizes the relative improvements, measured in metric tons AIS, from each of the SS. In the case of the default worksheet, 54% of the improvements come from medium scale producers, 17% from small scale producers and 15% from the import sector. The relative improvement of the various sectors might roughly suggest the share of effort and resources that might be devoted to supporting each SS. In this case, since medium-scale producers are supplying 12.4 thousand of 23
thousand added metric tons of iodized salt, this suggests that program activities and expenditures might focus on support for this sector.

4. Reality Check

The blue table in lines 30-36 sector provides a summary of current and target AIS in each sector. This offers an opportunity for a reality check. Program managers from the default country might ask themselves:

- Improvements from 92-94% to 98-99% for the large scale production and import sector seem modest and feasible. But is 99% realistic?
- Nearly quadrupling AIS from 15% to 58% represents magnitudes of improvement. To warrant this magnitude of improvement, are strategies and activities targeting this sector well conceived and resources – and are they substantially different or improved from past efforts which produced only 15% AIS?
- For small scale production and imports sector improving from no AIS production to 15-18% represents a modest target but achieving AIS in these conditions is very challenging. Programmers might ask what alternatives are there to protect families consuming salt from small scale production.