## Supplemental Table 1: Semi-structured instrument used in Phase 1

### STRUCTURED OBSERVATION FORM

| #  | Question                  | Code                        | Response |
|----|---------------------------|-----------------------------|----------|
| 1  | Maternal ID               | FW number + M + household number |          |
| 2  | Date                      | DAY / MONTH / YEAR          |          |
| 3  | Fieldworker ID            | Fieldworker initials        |          |

### Infant Development Observation

- **Motor development:**
  - a. Laying, no sitting or movement
  - b. Sitting with support
  - c. Sitting without support
  - d. Creep on stomach
  - e. Hands-and-knees crawling
  - f. Standing with assistance
  - g. Standing along
  - h. Walking alone
  - i. Run
  - j. Other (please note)

- **Behavior & health:**
  - a. Infant appears healthy. (Infant is alert and active when awake, is feeding well, and can be comforted when crying)
  - b. Infant is lethargic. (Has little or no energy, drowsy or sluggish, difficult to wake for feedings, Not alert or attentive to sounds and visual stimulation)
  - c. Infant is persistently crying or irritable (Continuously fretful and fussy, Cries for long periods or very suddenly, Has a cry that sounds unusual)
  - d. Infant seems sick (is pale or flushed, has problems breathing, is vomiting or has diarrhea)

### Child Behavioral Ratings

| Question             | Responses             | On arrival | Hour 1 | Hour 2 | Hour 3 | Hour 4 | Hour 5 |
|----------------------|-----------------------|------------|--------|--------|--------|--------|--------|
| Child positive mood  | 1 (unhappy)-5 (joyful)|            |        |        |        |        |        |
| Child negative mood  | 1 (content)-5 (constantly negative) |            |        |        |        |        |        |
| Lively/active          | 1 (inactive)-5 (highly active) |
|-----------------------|--------------------------------|
| Sociability           | 1 (not social) -5 (highly social) |
| Sustained Attention   | 1 (distracted, inattentive) -5 (child is focused and involved) |
| Demandingness         | 1 (communicates needs appropriately) -5 (crying and tantrums for attention) |

### Hourly Observations

| Question                                      | Responses | On arrival | Hour 1 | Hour 2 | Hour 3 | Hour 4 | Hour 5 |
|------------------------------------------------|-----------|------------|--------|--------|--------|--------|--------|
| Caregiver's hands visibly clean?             | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| Baby's hands visibly clean?                  | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| Diaper or child's bottom is clean?           | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| There is stagnant water visible?             | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| There are unwashed utensils?                  | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| There is uncovered food that is not being eaten? | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| Spill on kitchen floor (food or drink)       | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| There are poultry feces visible on kitchen floor? | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| There are animals in the house?              | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
| If yes, list animal types & number           | e.g. 2 goats, 3 chickens |            |        |        |        |        |        |
| Kitchen yard is swept                         | No=00; Yes=01; Cannot see=09 |            |        |        |        |        |        |
Where is the child at this time? Dirt floor inside=01; finished floor inside=02; dirt floor outside=03; finished floor outside=04; on mother (hip)=05; on mother (lap)=06, on mother (back)=07; on mat or blanket=08; Other (specify)=09

| How many chickens are within 5 meters of meters? | Number of chickens |
| Are feces visible within 5 meters of the child? | No=00; Yes=01; Cannot see=02 |
| Is the area where the child is playing swept/clean? | No=00; Yes=01; Cannot see=02; Not applicable=04 |

### Number of animals present in yard at time of observation

| Question                  | Responses | On arrival | Hour 1 | Hour 2 | Hour 3 | Hour 4 | Hour 5 |
|---------------------------|-----------|------------|--------|--------|--------|--------|--------|
| Cattle - corralled        | Number of animals |
| Cattle - not corralled    | Number of animals |
| Goats - corralled         | Number of animals |
| Goats - not corralled     | Number of animals |
| Chickens - corralled      | Number of animals |
| Chickens - not corralled  | Number of animals |
| Ducks - corralled         | Number of animals |
| Ducks - not corralled     | Number of animals |
| Dogs                      | Number of animals |
| Cats                      | Number of animals |
| Other animal 1:           | Number of animals |
| Other animal 2:           | Number of animals |
| Other animal 3: | Number of animals |
|----------------|-----------------|

### Child Sanitation practices

| Diaper Changing / Cleaning Event # | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------------------|---|---|---|---|---|---|
| Time of Event, HH :MM; use military time |   |   |   |   |   |   |
| Who initiated cleaning the child? Child indicated need=01; caregiver=02; not able to observe=09 |   |   |   |   |   |   |
| What was done with the fecal materials? disposed of via toilet/latrine=01; wrapped up for disposal in garbage=02; buried=03; tossed in yard=03; left untreated for >30 min=05; not able to observe=09 |   |   |   |   |   |   |
| How was the child’s bottom cleaned? Soap and water=01; rinsed only with water=02; wiped with cloth only=03; wiped with paper=04; not able to observe=09 |   |   |   |   |   |   |
| Did caregiver wash his/her hands within 5 min after cleaning the child’s bottom (nappy change)? (skip) SKIP if child does not use nappies none/no=00; one hand=01; two hands=02; water only/no rubbing agent=03; Soap=04; Ash=05; Other=06; Run to waste water=07; still water=08; unable to observe=09 |   |   |   |   |   |   |
| Did caregiver wash his/her hands within 5 min after assisting a toddler to clean up after defecation? none/no=00; one hand=01; two hands=02; water only/no rubbing agent=03; Soap=04; Ash=05; Other=06; Run to waste water=07; still water=08; unable to observe=09 |   |   |   |   |   |   |

### Behavior Checklist

| Behavior | Number of Times Behavior was Observed in this Hour Block (TALLY) |
|----------|------------------------------------------------------------------|
|          | Hour 0 to 1 | Hour 1 to 2 | Hour 2 to 3 | Hour 3 to 4 | Hour 4 to 5 |
| Baby put in fingers in mouth? |   |   |   |   |   |
| Behavior                                                                 | Yes | No | Unknown |
|-------------------------------------------------------------------------|-----|----|---------|
| Baby put dirt in mouth?                                                 |     |    |         |
| Baby put visibly dirty object in mouth                                  |     |    |         |
| Baby put not visibly dirty object in mouth                              |     |    |         |
| Baby touched an animal                                                  |     |    |         |
| Baby ate freshly cooked food                                           |     |    |         |
| Baby ate leftover food that was not covered                             |     |    |         |
| Baby drank water                                                        |     |    |         |
| Baby’s hands were washed without soap / cleaning agent                 |     |    |         |
| Baby’s hands were washed with soap / cleaning agent                    |     |    |         |
| Mother’s hands were washed without soap / cleaning agent               |     |    |         |
| Mother’s hands were washed with soap / cleaning agent                  |     |    |         |
| Other behavior #1                                                       |     |    |         |
| Other behavior #2                                                       |     |    |         |
| Other behavior #3                                                       |     |    |         |
| Other behavior #4                                                       |     |    |         |
| Other behavior #5                                                       |     |    |         |

Researcher Field Notes: Please describe any other details of behaviors observed during your observation today, interactions or other interesting or relevant information.
### Supplemental Table 2: Semi-structured instrument used in Phase 2

**STRUCTURED OBSERVATION FORM**

| #  | Question                                      | Code                              |
|----|-----------------------------------------------|-----------------------------------|
| 1  | Child ID                                      | FW number + C + household number  |
| 2  | Date                                          | DAY / MONTH / YEAR e.g. 04/FEB/18 |
| 3  | Fieldworker ID                                | Fieldworker ID                    |
| 4  | Age of Child                                  | Number of Months                  |
| 5  | Start Time of Observation                     | HH:MM                             |
| 6  | End Time of Observation                       | HH:MM                             |

**Infant Development Observation**

| 1   | Motor development: Observe and check all that apply throughout the 5 hour observation |
|----|----------------------------------------------------------------------------------|
|    | a. Laying, no sitting or movement                                                  |
|    | b. Sitting with support                                                            |
|    | c. Sitting without support                                                         |
|    | d. Creeping on stomach                                                             |
|    | e. hands-and-knees crawling                                                        |
|    | f. standing with assistance                                                        |
|    | g. standing alone                                                                  |
|    | h. standing alone                                                                  |
|    | i. running                                                                        |
|    | j. other                                                                          |
|    | (please note)                                                                     |

| 2   | Behavior & health: Observe and check all that apply throughout the 5 hour observation |
|----|----------------------------------------------------------------------------------|
|    | a. Infant appears healthy.                                                        |
|    | b. Infant is lethargic.                                                           |
|    | c. Infant is persistently crying or irritable                                     |
|    | d. Infant seems sick                                                              |
|    | e. Other (please note):                                                           |

| 3   | What animals are present on the property anytime throughout the 5 hour observation? |
|----|----------------------------------------------------------------------------------|
|    | a. corralled cattle                                                               |
|    | b. not corralled cattle                                                            |
|    | c. corralled goats                                                                |
|    | d. not corralled goats                                                             |
|    | e. corralled chickens/baby chicks/roosters                                        |
|    | f. not corralled chickens/baby chicks/roosters                                    |
|    | g. corralled ducks                                                                |
|    | h. not corralled ducks                                                             |
|    | i. dogs                                                                          |
|    | j. cats                                                                          |
|    | k. Other animal 1:                                                                 |
|    | l. No animals belong to the property                                              |
4. **Does an animal enter or attempt to enter the house at least once? (do not include dogs or cats)**
   Please describe.

5. **People who come in contact with baby**

| Hourly Observations                                      | Question                                                                                                                                  | Responses                                                                                      | On arrival | Hour 1 | Hour 2 | Hour 3 |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------|--------|--------|--------|
| 1 Caregiver’s hands visibly clean?                       | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| 2 Baby’s hands visibly clean?                            | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| 3 Is the baby sleeping? Note the time or for how long    | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| 4 Stagnant water visible indoors? E.g. buckets of water with or without lid | No=00; Yes, both covered and uncovered=01; Yes, covered only =02; Yes, uncovered only =03; Cannot see=09 |                                                                                               |            |        |        |        |
| 5 Stagnant water visible outdoors? E.g. large puddles of water or standing pool | No=00; Yes, both covered and uncovered=01; Yes, covered only=02; Yes, uncovered only =03; Cannot see=09 |                                                                                               |            |        |        |        |
| 6 Are there unwashed utensils or cookware?               | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| 7 Is there uncovered food that is not being eaten? (do not include food being cooked or in process of being cooked) | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| 8 Spill on kitchen floor (food or drink)?                | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| 9 Are there any type of feces visible in the             | No=00; Yes=01; Cannot see=09                                                                                                           |                                                                                               |            |        |        |        |
| Behavior | single event | sustained for more than 5 | single event | sustained for more than 5 | single event | sustained for more than 5 |
|----------|--------------|---------------------------|--------------|---------------------------|--------------|---------------------------|
| Home or yard? | No=00; Yes=01; Cannot see=09 | | | | | |
| Is the kitchen and dining area swept? | | | | | | |
| Where is the child at this time? | Dirt floor inside=01; Tiled floor inside=02; Dirt floor outside=03; Tiled floor outside=04; On mother (hip or lap)=05; On bed=07; On mattress or sofa=08; On baby seat=10; Cement floor inside=11; Cement floor outside=12; Wood floor inside=13; Wood floor outside=14; Cannot see=09; Other=888 | | | | | |
| Is the area where the child is playing swept/clean? | No=00; Yes=01; Cannot see=02; A little clean=03; Mostly clean=04; Very clean=05; Not applicable/on top mother=06 | | | | | |
| Behavior Checklist | | | | | | |
| Number of Times Behavior was Observed in this Hour Block (TALLY) | | | | | | |
| Hour 0 to 1 | | | | | | |
| Hour 1 to 2 | | | | | | |
| Hour 2 to 3 | | | | | | |
| No. | Event                                                                 | Time (seconds) |
|-----|----------------------------------------------------------------------|----------------|
| 1   | Baby put fingers in mouth                                            |                |
| 2   | Baby puts outside objects in mouth like rocks or garbage from the street |                |
| 4   | Baby touched an animal                                                |                |
| 3   | Baby walks or crawls out of the house on their own                    |                |
| 5   | Animal enters area with baby. Animal Type: __________________________ |                |
| 7   | Baby breastfed                                                        |                |
| 8   | Baby ate food                                                         |                |
| 9   | Baby ate food previously dropped                                      |                |
| 10  | Baby drank water, juice or other drink                                |                |
| 11  | Baby's hands were washed without soap                                 |                |
| 12  | Baby's hands were washed with soap                                    |                |
| 13  | Baby's hands were washed (unclear with or without soap)              |                |
| 14  | Others kiss or touch baby on the face                                 |                |
| 15  | Baby initiates touching other people                                  |                |
| 16  | Baby touched wall or ground with fingers                               |                |
| 17  | Baby is on the ground with at least one barefoot                      |                |
|   | List objects the baby puts in mouth or licks |
|---|------------------------------------------|
|   | Number of Times Behavior was Observed in this Hour Block (TALLY) |
|   | Hour 0 to 1 | Hour 1 to 2 | Hour 2 to 3 |
|   | **Other Behaviors** | **single event** | **sustained event for more than 5 seconds** | **single event** | **sustained event for more than 5 seconds** |
| 1 9 | Object being put in mouth #1 |   |   |   |   |
| 2 0 | Object being put in mouth #2 |   |   |   |   |
| 2 1 | Object being put in mouth #3 |   |   |   |   |
| 2 2 | Object being put in mouth #4 |   |   |   |   |
| 2 3 | Object being put in mouth #5 |   |   |   |   |
| 2 4 | Other behavior #1 |   |   |   |   |
| 2 5 | Other behavior #2 |   |   |   |   |
| 2 6 | Other behavior #3 |   |   |   |   |
| 2 7 | Other behavior #4 |   |   |   |   |
| 2 8 | Other behavior #5 |   |   |   |   |