

Realigning Agriculture to Improve Nutrition: RAIN Project

Impact Evaluation: Methods and Baseline Results

Background

Child malnutrition is a stubborn development challenge in Zambia, with 45% of children less than 5 years old found to be short for their age, or stunted, resulting from chronically deficient diets and poor health. The Realigning Agriculture to Improve Nutrition (RAIN) project is a partnership between Concern Worldwide Zambia and the International Food Policy Research Institute (IFPRI), aiming to design, implement and evaluate a model of linked agricultural and health interventions at the community level, and alignment of the agriculture and health sectors at district level, to reduce child malnutrition rates in Mumbwa district, Zambia. This brief outlines the rationale and design for the evaluation of RAIN, and highlights some key findings from the baseline survey undertaken for the impact evaluation.

Rationale

Several reviews have been undertaken in recent years looking at evidence of the impact of agricultural interventions on nutrition outcomes (World Bank, 2007, Berti et al., 2003, Masset et al., 2011). While these reviews did find some evidence of positive impact of agricultural interventions on dietary outcomes, little impact was seen on nutritional status in children; it is important to note that these reviews concluded that the lack of impact on nutritional status was a result of weak evaluation designs rather than flawed interventions and approaches. These reviews further conclude that rigorous evaluations of agriculture interventions to improve child nutrition are critically needed. The evaluation of RAIN therefore intends to address the methodological concerns seen in many previous evaluations, and to apply rigorous evaluation methodologies to produce strong evidence of both the impact of an integrated agriculture and health intervention on nutrition outcomes, as well as an understanding of the critical pathways to impact.

Objectives

A key feature of RAIN is the focus on a rigorous evaluation that is aimed at addressing two distinct objectives

- a. To document *what* impact interventions implemented through RAIN activities have.
- b. To document *how* these impacts are achieved, and how they can be replicated at scale.

The negative health and productivity effects of chronic malnutrition, stunting, are largely irreversible if they are not addressed within the 'window of opportunity' of the first 1000 days of life, from conception to two years of age. The primary objective of the evaluation is therefore to assess the impact of the two different RAIN intervention packages (agriculture only, or agriculture and health) on stunting among children 24 months and older. The evaluation will also assess the impact of the different RAIN packages of interventions on availability of and access to a year-round supply of diverse and micronutrient-rich plant and animal source foods at household level, infant and young child feeding (IYCF) indicators among children 0-23 months of age, and preventive and curative health and nutrition knowledge among mothers; these objectives address the food, health and care determinants of malnutrition outlined in the UNICEF framework (UNICEF, 1990).

Design

A hybrid design was adopted to evaluate the impact of RAIN. This combines a cluster randomized probability design comparing the two RAIN interventions of agriculture *and* nutrition/health activities vs agriculture activities *only*, with a plausibility design that compares the interventions to a control group. A fully randomized cluster evaluation design was

determined to be infeasible primarily for practical project implementation reasons. In addition to the impact evaluation, a process evaluation will be undertaken to assess program delivery from 2012-2014 (Figure 1). Six wards in Mumbwa District were identified as RAIN project areas. Two wards were randomly assigned to act as a control group. The remaining four wards were split into 26 clusters (geographical areas defined in the Zambian census for data collection), and these clusters were further randomized to receive the agriculture intervention alone, or the agriculture plus health intervention. All randomization was carried out by Mumbwa District government officials, so as to ensure complete transparency. The baseline survey was undertaken in June-August 2011, and the endline survey will be completed in the same season in 2015, using a household questionnaire and anthropometry methods. The survey assessed 3000 children aged 24-59 months (1000 from each study arm), providing the statistical power to detect an 8 percentage point difference in the prevalence of stunting, and a 0.2 z-score difference in the mean height-for-age Z-score (HAZ).

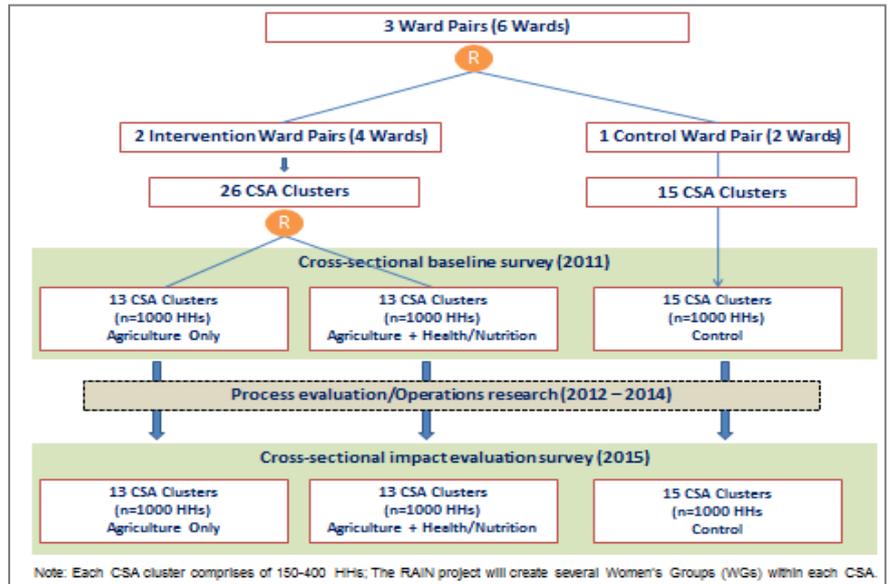


Figure 1: RAIN evaluation design.

Baseline Survey Results

Child nutrition

The overall prevalence of stunting among children less than 5 years of age was high at 43 %, in line with the national average of 45% (Central Statistical Office [Zambia] et al., 2007). As expected, the prevalence of stunting increases with age, peaking at 18 months of age and remaining high. Prevalence of underweight was 10.4%, below the national average of 15%, and prevalence of wasting was 3.6%, below the national average of 5%. All three prevalence measures were higher in boys than girls.

As can be seen in Figure 2 below, mean HAZ was very low at -1.64 (±1.68), starting low in the youngest age group and deteriorating markedly with age. Overall, the patterns reinforce what is known in the global literature on child growth: The first two years of life are a critical period within which growth-faltering is rapid, and mean HAZ falls steeply in the first 18 months here, and remains low. Mean WAZ was also low at -0.64 (±1.19). Mean WHZ remained above the median of the reference data at 0.39 (±1.36). Boys had poorer outcomes in all three measures.

Infant and young child feeding (IYCF)

The overall patterns of IYCF practices in the first two years of life are presented in Figure 3. Virtually all (99 %) infants were breastfed until 8 months of age, and rates remained high into the second year of life. Ninety percentage of infants were given colostrum during the first 3 days after birth; 8 % were given pre-lacteal feeds, the most common being cooking oil and herbal drinks. Approximately 90 % of infants at 1 month of age were exclusively fed breast milk (in line with recommendations for exclusive breastfeeding (EBF) to 6 months of age), but thereafter the rate of EBF

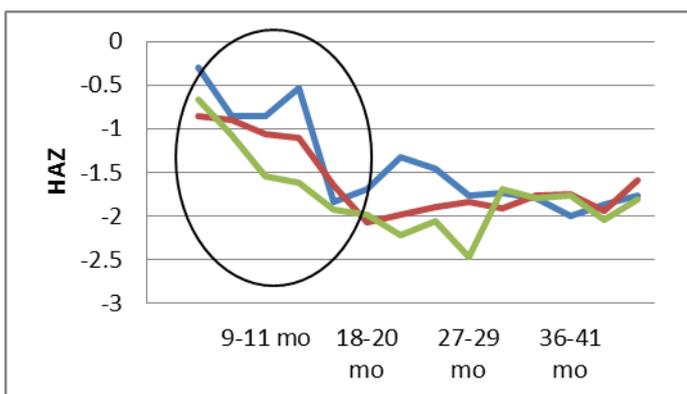


Figure 2: Child malnutrition (HAZ-scores), by study arm

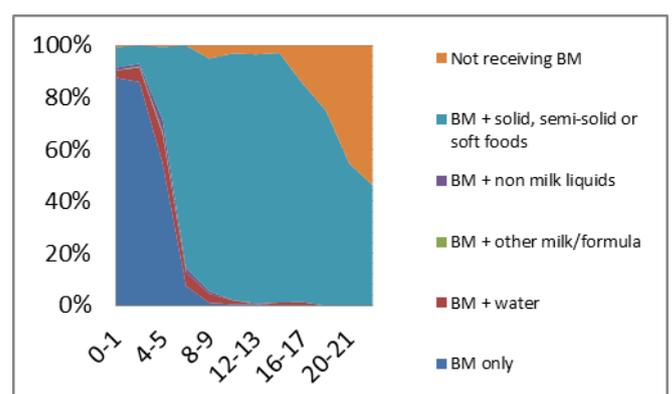


Figure 3: IYCF practices, 0-23 months.

declined gradually, and in the 5th month of life only 40 % of children were exclusively breastfed. The proportions of children receiving water increased with age, with water and other complementary foods being the most common displacers of EBF. Some infants were fed semi-solid and solid foods at a very early age, and in general complementary feeding was poor, with a lack of diet diversity and very few children receiving the minimum meal frequency or iron-rich foods. In general, IYCF practices are sub-optimal in this population, with complementary feeding practices faring worse than breastfeeding practices.

Child health

A majority of children had a health card (94 %); a majority had received a full vaccination schedule by 12 months of age (75 %), and de-worming (77 %) and vitamin A (85 %) in the past 6 months. Incidence of child illness (fever, diarrhea, cough) peaked between 6-24 months of age (**Figure 4**), as is often seen when children become more independently mobile, and this spike in illness corresponds to the decrease in HAZ-scores.

Maternal characteristics

Mean maternal body mass index (BMI; kg/m²) was 22.55 (± 3.01); most women were of normal weight for their height (77%), with 6.3% underweight and 16.8% overweight. Most women (80.9%) were involved in income-earning work, though almost a quarter of women (22.2%) received no remuneration for their work; the rest received money and/or in-kind remuneration. A third of young children (33.8%) were always left at home when their mother worked, and a further 11.4% were sometimes left. If a child is left, a quarter of the time it is with another child, and in almost half of cases it is for more than 5 hours at a time. Maternal knowledge on HIV, child feeding, health seeking and nutrition was variable, but a key finding was that reported practice on these same issues was significantly poorer than knowledge would suggest. This confirms that education of women is not enough; barriers to improved practices need to be removed.

Household hunger and dietary diversity

Two measures of household food security were used. The Household Hunger Scale is a validated set of three questions on experiences of hunger over the past 30 days, and the frequency of occurrence. Almost all households (97%) had experienced little or no hunger, likely reflecting the fact that the survey was undertaken at harvest time so households had access to maize. The Household Dietary Diversity Score asks about the food groups consumed by the household over the past 24 hours (**Figure 5**). Over half of households (56%) had consumed 4-7 food groups, and 42% had consumed 8-12. Most households had consumed cereals (99%), oil (90%), vegetables (86%), and miscellaneous foods such as spices or salt (93%); however diversity within food groups was low, with a monotonous diet overall.

Agriculture

A majority of households (87%) had access to land, normally under the traditional land tenure system of allocation by a chief, and therefore without title deed (94%). Households had an average of 3.3 hectares (± 8.4). Most land held is farmed, predominantly with field crops (93%) in rain-fed systems (95%). Seed purchase was high (61% bought seed last season), but use of other inputs relatively low (fertilizer use 36%; pesticide use 32%). Poultry were the most commonly owned animal, followed by cattle and goats; vaccination rates were low (39% having at least one animal vaccinated).

Use of agricultural and health services

A third of households had used a loan for agricultural purposes in the past season (33%), provided mainly by private groups (78%) or the Government (20%); 14% used the Government's Farmer Input Support Programme. 30% of households had received agricultural training in the past season, mainly provided by the Government (78%). A majority of children had visited the clinic in the past 6 months (84%); most children were weighed at these visits (98%) but few were measured (3%) and few mothers were given corresponding advice on child growth (48%) or feeding and care practices (12%).

Figure 4: Child health

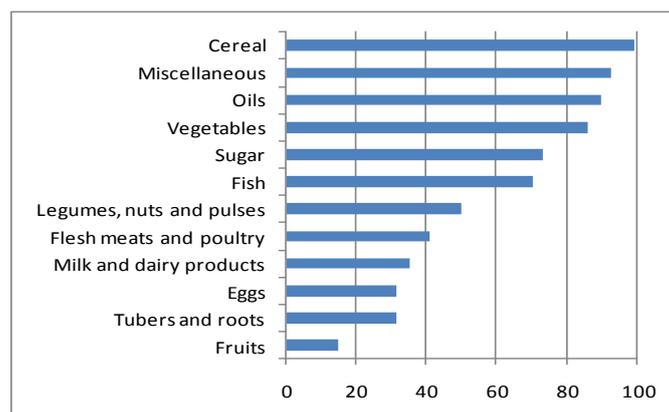
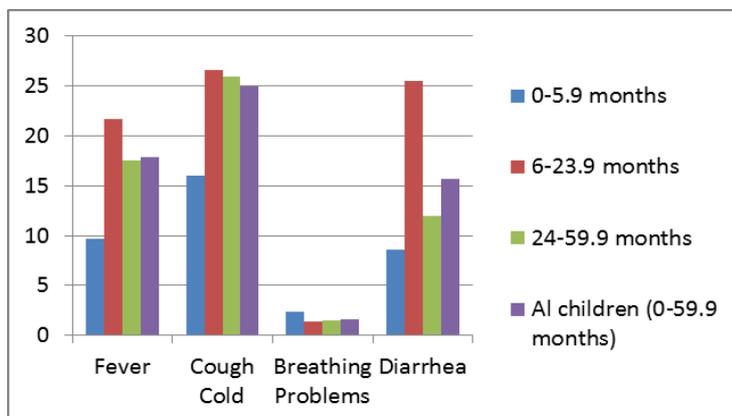


Figure 5: Household dietary diversity

Summary

- Wasting low; stunting high- chronic malnutrition from poor diet diversity, poor feeding practices, and fairly high disease levels was the major problem here. This confirms what we know about Zambia in general, and tackling this aligns with Zambian national policy.
- Breastfeeding strong; complementary feeding weak- some breastfeeding practices could be improved, but on the whole breastfeeding is started early and maintained into year two. Quality, frequency and timing of complementary feeding were poor, and are contributing to chronic malnutrition along with childhood disease rates.
- Knowledge good; some practices poor- mothers knew what they should be feeding their children, but constraints over access to the right foods, and conflicts for women's time between childcare and agricultural work, make doing this difficult.
- Household hunger low; diet diversity low- there was enough energy available that people were not going hungry (probably due to the survey being conducted after the maize and cotton harvests, so food- and financial-security was highest), but diet quality was poor, with a lack of animal-source foods and variety of nutrient-rich fruits and vegetables.

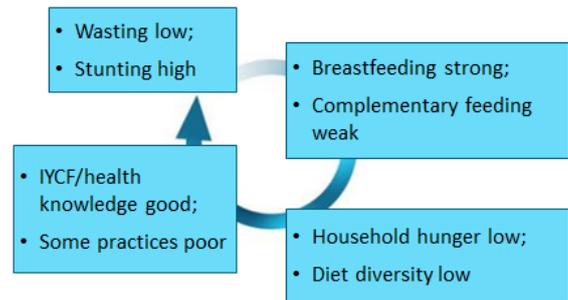


Figure 6. Key conclusions.

Implications

- Use of health and agricultural services is fairly high, which is a good point of entry for RAIN.
- There are several key points at which RAIN could make a difference:
 - ◊ Linking growth monitoring programs with nutrition advice,
 - ◊ Home gardening for dietary diversity,
 - ◊ Aligning health and agricultural services for nutrition outcomes.

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