WORKING PAPER FOR INTERNAL USE

The Potential of Agricultural Value Chains to Improve Nutrition

Through Integrated Nutrition Activities

-

Based on Experiences from current GIZ Projects

GIZ Internal Working Group "Value Chains and Nutrition"
(Responsible: Sector Project Agricultural Trade and Value Chains)

Authors:
Karina Brenneis (Sector Project *Agricultural Trade and Value Chains;* Global Program *Promotion of nutrition-sensitive potato value chains in East Africa*)
Dr. Anika Reinbott (Project *Affordable Nutritious Foods for Women*)
Annekathrin Rosa (Sector Project *Agricultural Policy and Food Security*)

November 2017

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ACi	African Cashew Initiative
AISP	Agricultural Innovation Support Project
ANF4W	Affordable Nutritious Foods for Women
BCC	Behavior Change Campaigns
BMI	Body Mass Index
CARI	Competitive African Rice Initiative
ComCashew	Competitive Cashew Initiative (before African Cashew Initiative (ACi))
COMPACI	Competitive African Cotton Initiative
DHS	Demographic and Health Survey
FAO	Food and Agriculture Organisation of the United Nations
FBS	Farmer Business School
FIES	Food Insecurity Experience Scale
FSNR	Food Security, Nutrition, and Resilience
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GIAE	Green Innovation Centres for the Agriculture and Food Sector
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GVC	Global Value Chain
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
HHS	Household Hunger Scale
ICT	Information and Communications Technology
IDDS	Individual Dietary Diversity Score
M&E	Monitoring and Evaluation
MDD-W	Minimum Dietary Diversity Women
NAPE	Nutrition and access to Primary Education Program
NGO	Non-Governmental Organisation
SBCC	Social and Behavior Change Communication
SNRD	Sector Network Rural Development
SPS	Sanitary and Phytosanitary
SSAB	Sustainable Smallholder Agri-Business
STDF	Standard and Trade Development Facility
ToT	Training of Trainers
VC	Value chain
WASH	Water, Sanitation, and Hygiene
WTO	World Trade Organisation

Acknowledgements

The authors kindly acknowledge contributions from several GIZ project staff from different food and nutrition security as well as value chain projects. They shared valuable experience with us for this working paper. Contributions from the *Value Chain and Nutrition Working Group* were very helpful and greatly appreciated throughout the process of the development of the paper. The support of the GIZ sector projects Agricultural Trade and Value Chains and Agricultural Policy and Food Security as well as the Affordable Nutritious Foods for Women project is acknowledged.

1. Background

In the past, the development of agricultural value chains mainly focused on the promotion of cash crops in developing countries. With the global food price crisis in 2008/2009 the focus shifted towards staple crops. More recently, the professional discourse has once again shifted, highlighting the importance of the production and supply of nutritious foods. The aim thereby is to not only increase income and contribute to increased local availability of nutrient-dense foods to reduce the prevalence of food insecurity but also to reduce the burden of malnutrition. However, there is mounting evidence that neither the availability of nutritious foods nor increased incomes necessarily lead to improved nutrition and food security [LANSA 2015, Galli 2015]. Apart from availability and accessibility of foods, dietary behavior is influenced by food preferences and traditions on the one hand and nutrition knowledge and awareness on the other [Contento 2008]. Though agricultural value chain projects do have the potential to include components of nutrition education and awareness communication for improving food and nutrition security, this potential has not been explored and assessed sufficiently with GIZ.

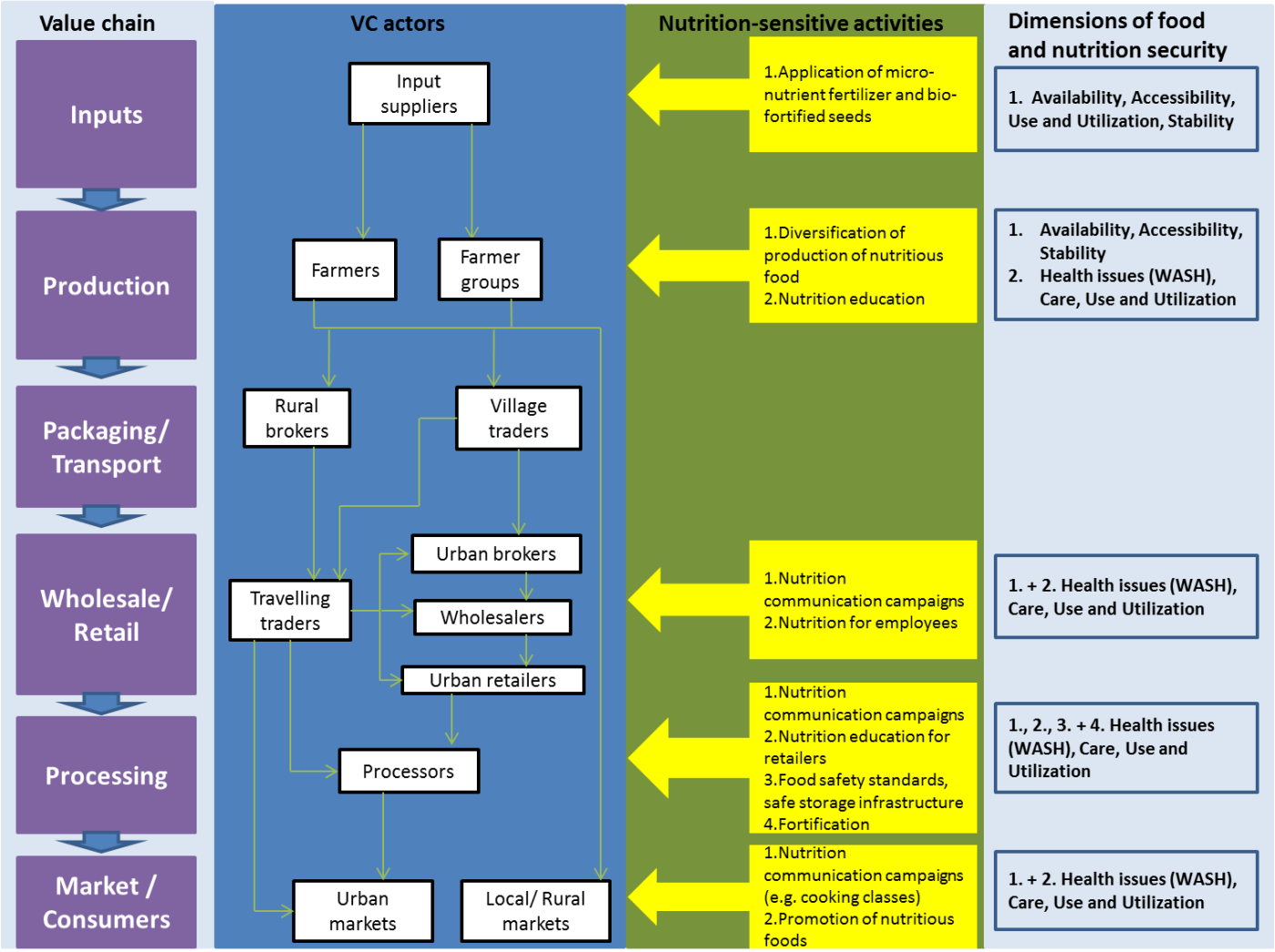
The internal GIZ working group *Value Chains and Nutrition* was founded in May 2016 with the aim to bring together the expertise from both professional groups, value chain development and nutrition. The working group served as a platform for regular exchange. During the first meetings it became clear that certain knowledge on the implementation of nutrition activities in value chain projects is available, however, very fragmented. Moreover, the knowledge mainly stays within the respective projects. Hence, the working group decided to bring together GIZ's knowledge and experience from value chain projects that have integrated nutrition aspects in a working paper to create a resource for similar projects.

In May 2017, this internal working group *Value Chains and Nutrition* was merged with the newly founded Sector Network Rural Development (SNRD) working group *Food Security, Nutrition and Resilience* (FSNR) to allow for an even more intense discussion and exchange on the topics of value chains and nutrition in the context of the African project portfolio.

The GIZ Guidelines *Sample Results Models and indicators for projects working in rural development and agriculture* already took this topic up [GIZ 2016]. With a particular focus on nutrition-sensitive agriculture, the guidelines aim to support planning officers during the design stage of new projects as well as during project evaluation. They consist of sample results models and indicators of four different thematic clusters; sustainable agricultural production, water in agriculture, agricultural policy, and agricultural value chains.

This working paper builds on the Guideline's chapter 7 and intends to give a more extensive overview on how to integrate nutrition aspects into agricultural value chain programs. The paper specifically focusses on the potential of agricultural value chain projects to improve the nutrition situation and awareness of the target groups along the value chain by integrating nutrition activities along the chain. The following Figure 1 illustrates actors and potential nutrition activities along a typical food value chain. The right column outlines the dimensions of food and nutrition security for the respective activities according to the UNICEF framework of malnutrition [UNICEF 1997].

***Figure 1**: Example of the Ugandan potato value chain and potential nutrition entry points*



***Source:** Global program Promotion of nutrition-sensitive potato value chains in East Africa, GIZ, 2016*

The value chain illustration as shown in Figure 1 can, be specified through nutrition-sensitive mapping as well as gender-sensitive mapping (see ValueLinks Manual 2.0 Module 2 for more information) in order to get a better understanding of possible bottlenecks and opportunities for the integration of nutrition aspects.

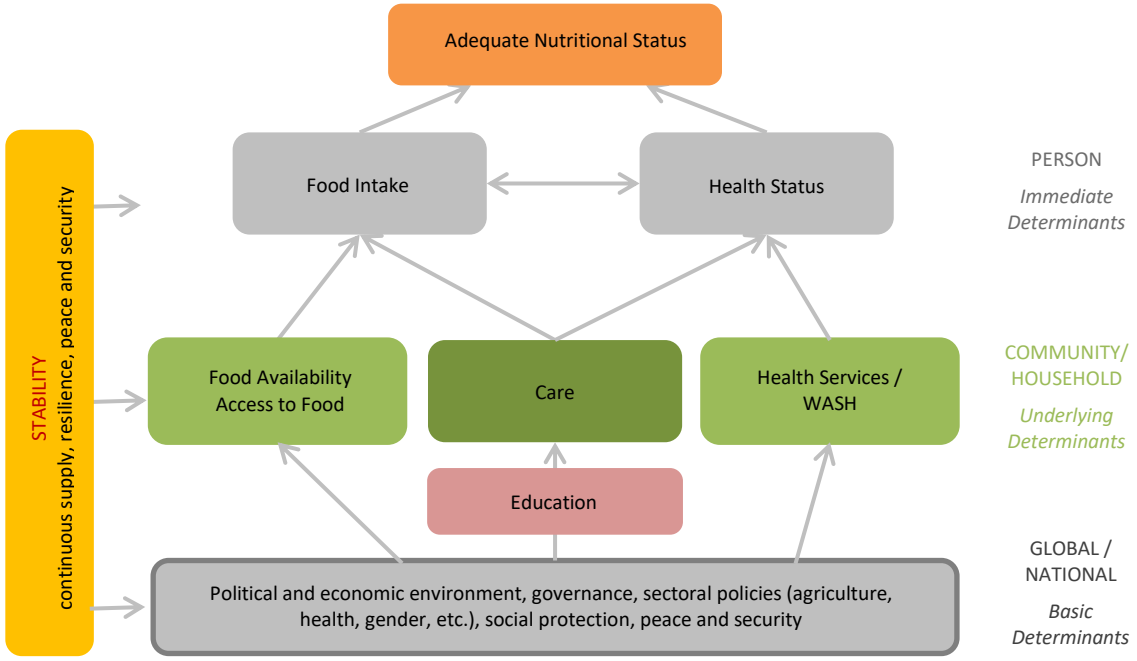
Value chain projects unfold their impact through different pathways such as through (own) production, income or market availability [Committee on World Food Security 2016]. These pathways can further make an impact on aspects evolving around food and nutrition. So-called nutrition-sensitive value chains can include one or more of the following types of interventions [Galli 2016] to address underlying determinants of malnutrition (See also Figure 2: Conceptual Framework of Nutrition adapted from UNICEF (1997) modified by GIZ

- Interventions that enhance pro-nutrition added-value
- Interventions that enhance the supply of nutritious food
- Interventions that enhance the demand for nutritious food

- Introducing new types of nutritious foods
- Interventions that sensitize actors in the value chain regarding the nutritional value of the produced food crop and general nutrition
- Interventions that empower women and address gender differences (e.g. in food needs, women's role in feeding infants etc.)

The underlying impact pathways are known to lead from increased access, availability, (food security dimension) and awareness of nutritious foods, to improved quality of diets (nutrition security dimension) among actors along the value chain. Also other underlying determinants of malnutrition should be considered, such as health and care aspects apply in particular to mothers, which focus on improved hygiene, access to protected drinking water and improved sanitation facilities as well as access to health services (Figure 2).

Figure 2: *Conceptual Framework of Nutrition adapted from UNICEF (1997) modified by GIZ*



Targeting nutrition aspects along value chains including gender leading to better nutrition for producers, consumers, and other stakeholders will improve their nutrition situation and in the long term their nutritional and health status. This is essential since an improved nutritional status increases the work force amongst others [GIZ 2017] through decreased prevalence of diseases and other signs of malnutrition [Hussain 2013, Hoffmann 2015].

2. Operationalization of nutrition indicators within GIZ value chain projects

Nutrition related activities can address macro, meso or micro level activities. This paper focuses on micro level activities.[1]

Starting point – **Requirement to include a nutrition indicator in the results monitoring framework**:

Nutrition indicators assess specific outcomes related to specific nutrition activities. Thus, in a first step, it needs to be understood what kind of information the indicator assesses. One has to distinguish between food security indicators, which assess the availability and affordability of foods and nutrition security indicators, which assess the quality of the diet. Table 1 outlines typical, internationally standardized nutrition indicators, some of them are also used in current GIZ value chain (VC) projects, including definition and required data, their entry point in the VC and the respective nutrition dimension according to the UNICEF framework, as well as respective activities. In a second step, related activities and the corresponding resources have to be allocated. In a third step, these activities have to be monitored and evaluated.

Starting point – **Stakeholders are interested in including nutrition activities**:

If stakeholders of a value chain project express their interest in including nutrition activities, it provides the best opportunity for successfully improving nutrition. In a first step, it should be explored who of the stakeholders is interested and would take on responsibilities and tasks. A nutrition-sensitive and gender-sensible value chain stakeholder mapping followed by a meeting of key stakeholders would be a first step to review a project's opportunities to include activities. This meeting could also offer the opportunity to bring all stakeholders on the same page regarding the nutrition situation in the country region. For this, it is recommended to present i.e. the latest Demographic and Health Survey (DHS) results and current activities by other stakeholders [USAID 2016]. This presentation ideally includes objectives of the national nutrition plan of the respective country. Projects could make use of existing nutrition education and behavior change communication tools developed by the national Scaling Up Nutrition (SUN) movement or by other projects – if they are adequate for the project's target group. It is recommended to allocate a certain amount of the budget for nutrition activities for monitoring and evaluation. Once a decision is made on which activities are most adequate and feasible to be included in the respective value chain project[2], the following table provides information on appropriate indicators to measure results and thus, assess the impact of the integrated activities.

[1] An overview of how macro and meso level can be addressed through certain nutrition related activities is shown in annex 2: Diagram on the integration of nutrition aspects along the VC – micro, meso, macro level.

[2] More information and ideas on potential activities in the GIZ Guidelines *Sample Results Models and indicators for projects working in rural development and agriculture*(https://dms.giz.de/dms/llisapi.dll?func=ll&objaction=overview&objid=101329511).

Table 1: *Overview on nutrition and food security indicators*

(More information in the Food and Agriculture Organisation of the United Nations (FAO) FAO Compendium of indicators for nutrition-sensitive agriculture)

Indicator	Gives information on	Activities associated with the indicator	Entry point in value chain/FSN dimension	Risks not to achieve impact	Examples – implemented by GIZ	Other examples
Household Dietary Diversity Score (HDDS)	Food security and availability of foods on household level	Farmer Business School (FBS) nutrition module	Complete VC Use and Utilization	– Limited resources available (men-power, monetary capacities etc.) on the side of the implementing organization – Limited resources available in terms of capacity, time on the side of the target group – Issues with the implementing partners in the respective partner countries	Competitive African Rice Initiative (CARI): Matching grant funds: 5-6 partners implemented nutrition activities Competitive African Cotton Initiative (COMPACI), for example: FBS trainer implemented nutrition activities; stand-alone nutrition module Sustainable Smallholder Agri-Business (SSAB): International staff to develop ICT materials Food Security and Development of Agricultural Markets: Welthungerhilfe and local NGOs	
		Staple crop production trainings	Production Availability, Accessibility, Stability			
		Training of general diet diversification	Complete VC Use and Utilization			
		Family nutrition training	Complete VC Use and Utilization, Health services/WASH			
		ICT (Information and Communications Technology) nutrition materials in addition to income diversification	Production Use and Utilization			

Indicator	Gives information on	Activities associated with the indicator	Entry point in value chain/FSN dimension	Risks not to achieve impact	Examples – implemented by GIZ	Other examples
					implemented respective activities	
Food Insecurity Experience Scale (FIES)	Food security	Diversification and increase of production (higher yields) for increased income	Production Availability, Accessibility, Stability		Green Innovation Centres in the Agriculture and Food Sector (GIAE): No direct activities (indirect through activities that increase productivity and income)	
Household Food Insecurity Access Scale (HFIAS)/ Household Hunger Scale (HHS)	Food security	Trainings on Good Agricultural Practices (GAP)	Production Availability, Accessibility, Stability			
Individual Dietary Diversity Score (IDDS) Minimum Dietary Diversity Women (MDD-W)	Nutrition	Nutrition trainings focusing on individual consumption (i.e. women of reproductive age, children under 2) (including recipes, WASH (Water, Sanitation, and	Complete VC Use and Utilization, Care, Health services/WASH		Promotion of nutrition-sensitive potato value chains in East Africa	Feed the Future program from USAID Helen Keller International – enhanced homestead food production programs in various countries

Indicator	Gives information on	Activities associated with the indicator	Entry point in value chain/FSN dimension	Risks not to achieve impact	Examples – implemented by GIZ	Other examples
		Hygiene), health care, gender)				
		ICT on specific nutrition messages (social behavior change communication campaigns)	Complete VC Use and Utilization		Affordable Nutritious Food For Women (ANF4W), Food and nutrition security, enhanced resilience, SSAB, Promotion of nutrition-sensitive potato value chains in East Africa (from 2018 onwards)	
		Promotion of home gardens	Production Availability, Accessibility, Stability		Food and nutrition security, enhanced resilience	

Source: *Own compilation [GIZ 2017]. (Based on the Food and Agriculture Organisation of the United Nations (FAO) FAO Compendium of indicators for nutrition-sensitive agriculture)*

3. Challenges

Designing a nutrition-sensitive value chain project is different from a traditional value chain project with regard to objectives, M&E (Monitoring and Evaluation), commodity selection criteria, target beneficiaries, and intervention approach, whereas certain aspects should always play a key role, e.g. gender. Table 2 outlines the respective criteria for both, traditional value chain projects and nutrition-sensitive value chain projects per area to highlight challenges and raise awareness of the differences in the approach. Not addressing these differences beforehand can lead to challenges in achieving impact on nutrition. If a "traditional" value chain project is to be transformed into a nutrition-sensitive value chain project, the objective needs to widen and include not only an economic but also a social and health dimension at target level. The focus on increased income shifts to improved diets or even further to improved nutritional status (i.e. Body Mass Index (BMI) in the normal range for adults, decrease in stunting for children under 5 years of age). Be aware that this usually means the creation of a conflict of objctives and that trade-offs between increased income and improved diets have to be carefully monitored, managed and communicated. Ideally, nutrition-sensitive value chains combine their objectives as good as possible.

Table 2: *Areas of convergence and tensions [adapted from the Committee on World Food Security 2016]*

Areas	**Traditional value chain development**	**Additional focus in nutrition-sensitive value chain**	**Traditional and nutrition-sensitive value chains try to combine these different areas as good as possible. The extent to which this is feasible always depends on the focus, activities, and indicators of each program.**
Objectives	Market access / Income	Diets / Nutritional status	
Monitoring and Evaluation	Market Access / Production / Income	Dietary Diversity / Nutritional status / Food security	
Commodity selection criteria	Market potential	Nutrition improvement potential	
Beneficiaries	Producers (economically active)	Consumers (nutritional vulnerable)	
Intervention approach	Strategies to enhance supply	Strategies to stimulate demand and nutrition value	

The following challenges and lessons learnt have been encountered in GIZ value chain projects that have engaged in nutrition-sensitive value chain activities so far (Table 3):

Table 3: *Challenges and lessons learnt that have been encountered in GIZ VC projects*

Topic	Challenges	Lessons learnt	Additional ideas to overcome challenges
Resources	– Even though nutrition was added (i.e. in form of a results indicator), no additional funds were available for the implementation – Insufficient budget allocation of the districts/counties – Dependence on the commitment to reform of national/regional ministries – Time constraints on the part of the partners, i.e. the agriculture extension agents	– Partners actually implemented the nutrition topic. Otherwise, it would not have been possible	– Dialogue with the respective ministry – Exchange with other programs that are implemented in the same region/country on resource sharing, overlap of activities, etc. – Communication on what is feasible with the resources given
Education level	– Low education level of farmers	– Engagement of local nutrition experts and social behavior change communication specialists for context- and country-specific adjustment of materials was beneficial – Trainings of trainers (ToT) can be conducted by the same local experts	– Create interest and awareness of nutrition topics among implementing partners
Farmers' training	– For example, farmers are only trained once within the nutrition module of the Farmer Business School (FBS) approach. No further follow-ups – No monitoring or systematic documentation in place	– Difficult to measure an impact, i.e. which indicator to use? What type of data needed? – Systematic documentation is essential for impact measurement	– Follow-up visits – Create an exchange platform, i.e. in the form of *community dialogues* where farmers can exchange information and further learn about nutrition relevant topics
Training materials	– Inadequate training materials available	– Staff who implements the trainings need regular updates on nutrition related issues (double burden of malnutrition – high prevalence of over- and undernutrition)	– Take training materials from other programs, organizations etc. and adapt them to the specific country/cultural context

Topic	Challenges	Lessons learnt	Additional ideas to overcome challenges
		– Development of information manuals	– Consider local nutrition challenges: double burden of malnutrition
Cooking demonstrations	– Inability to organize/implement cooking demonstrations due to various food items not being available within the targeted community	– It needs to be checked beforehand what kind of foods are available in the respective target regions/communities when planning cooking demonstrations etc.	– Support family/farming households to consciously implement feeding regimes that take into consideration the nutritional requirement of all members of the family especially children, adolescents and the women of reproductive age (15-49 years) – If diverse food is not available, take this point up and consider it in your training materials
Participation of women	– Due to the selected value chains, women's participation, e.g. in FBS, is very low (only 20-25%)		– Make sure to also include if possible value chains where women play an important role, e.g. rice – parboiling – Take into consideration the time/daily schedule of women/men when planning trainings/meetings etc. – Encourage men to bring their women when a nutrition session is carried out within FBS
Tools (i.e. Matching Grant Fund)	– Focus of the project is the promotion of the rice value chain. As an additional topic, diet diversification was added to the project. However, the partners which are mainly rice processors are not really interested in promoting diet diversification (Competitive African Rice Initiative) – The partners only do it through additional funds	– The tool Matching Grant Fund is not the most suitable in this case – The topic diversification should have been outsourced to local non-governmental organisations (NGOs)/food processors/etc.	– Try to find tools that are applicable for the respective topic to be implemented. – Partners need to understand that the respective topics, i.e. diversification are important ones as well

Topic	Challenges	Lessons learnt	Additional ideas to overcome challenges
Government involvement	– Government wanted to be more and more involved in implementation which meant in this specific case that the government wanted to decide where the activities are being implemented with which specific partners and who shall be the target group	– GIZ program tendered some topics where local NGOs could apply for as a good compromise with the government and their involvement	– Dialogue with the respective ministry – Try to find compromises in the cooperation and align activities with other partners and stakeholders in the country
Institutional structure within the partner countries	– Efficient organisations often mainly exist in the form of international organisations. – Government structures are weak		– Dialogue/cooperation with existing organisations
Understanding of the different concepts with regard to food security, nutrition security etc.	– Neither the concept of the program nor the indicators are targeted towards nutrition, however, food security is targeted	Delimitation of the different concepts and clarification of meaning beforehand is important	

Source: *Own compilation used on interviews (see also Annex 4)*

4. Recommendations for project design

The following recommendations are based on GIZ experience and summarize these with international evidence to guide future project design with the aim of increasing effectiveness of nutrition interventions within value chain projects:

1. Impact pathway development:
   Use the guidelines *Sample Results Models and indicators for rural development and agriculture projects.* An impact pathway should be developed prior to project start. This pathway should be filled with information from research results as well as project experience. Ideally, nutrition indicators are included in the results framework at this stage (or the opposite: an informed decision on why to leave them out has been taken).

2. "*Decision trees*":
   To become clearer on what approach makes sense with regard to your budget and target group walk through decision trees (see also examples in Annex 3).

3. Circumstances under which nutrition activities are difficult to be integrated:
   a. If there is no budget allocated to respective activities at all
   b. If the nutrition situation of the target group needs other approaches than value chains (e.g. target group is chronically poor) to integrate nutrition aspects, i.e. resilience, building social safety.
   c. If the target group is severely food insecure, it makes sense to only start addressing the nutrition specific situation when the target group became food secure

4. Careful selection of nutrition indicators:
   Dependent on the project time frame, resources, availability of training material, exchange with other value chain projects and SNRD working group members.

5. Budget for nutrition activities:
   Nutrition activities come with a certain budget that needs to be available. Unfortunately, only vague information could be obtained from current interventions. Mostly nutrition was implemented through FBS, combined with other activities and not as stand-alone activity. Also budget calculations are country and context-specific and thus, no general estimations can be provided with this paper.

6. Gender- and nutrition-sensitive capacity development of staff and partners.

7. Gender- and nutrition-sensitive engagement of local nutrition communities:
   Engaging in local nutrition communities, e.g. local nutrition working group with members from universities, other NGOs, health sector, etc. to share results and lessons learnt

5. GIZ Material/Practical Application

Over the past years, different GIZ projects have developed materials for nutrition activities. The following table gives an overview of the materials available and provides the link that directly leads you to the respective material.

Table 4: *Nutrition materials developed by GIZ projects*

No.	Activity	GIZ project with experience and materials
1	Nutrition integrated in Farmer Business School	COMPACI CARI SSAB
2	Nutrition module	COMPACI CARI SSAB
3	ICT on nutrition	SSAB
4	Home garden trainings if availability of diverse foods on local markets is limited	ANF4W
5	Nutrition training modules, Materials for behavior change campaigns (BCC)	Global program Food and nutrition security, enhanced resilience, ANF4W
6	Community dialogues, school programs	Global program Promotion of nutrition-sensitive potato value chains in East Africa (from October 2017)
7	Cook book	Promotion of sustainable and rural development in Tunisia
8	School Nutrition Handbook	Nutrition and access to Primary Education (NAPE)
9	Cooks training manual (Draft)	Nutrition and access to Primary Education (NAPE)

Source: *Own compilation*

References

Allen L, de Benoist B, Dary O, Hurrell H. (2006). Guidelines on food fortification with micronutrients. WHO. FAO 2006. Available from: http://www.who.int/nutrition/publications/micronutrients/9241594012/en/

Ballard T, Coates J, Swindale A, Deitchler M (2011). Household Hunger Scale: indicator Definition and Measurement Guide. Washington, DC: Food and Nutrition Technical Assistance II Project, FHI 360.

Ballard T, Kepple A, Cafiero C (2013). The Food insecurity Experience Scale. Development of a Global Standard for Monitoring Hunger Worldwide. Technical Paper. Rome, FAO. Available from: http://www.fao.org/economic/ess/ess-fs/voices/en/.

Barbier E. B. (1987). Cash crops, Food Crops and Agricultural Sustainability. Gatekeeper Series No. 2, International Insitute for Environment and Development (IIED), Sustainable Agriculture and Rural Livelihoods Programme. Available from: http://pubs.iied.org/6024IIED/

Coates J, Swindale A, Bilinsky Paula (2007). Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide. Version 3. Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development.

Committee on World Food Security. Working Group on Sustainable Value Chains for Nutrition (2016). Sustainable Food Value Chains for Nutrition: A common framework. Presentation during CFS Conference. Available from: http://www.fao.org/fileadmin/templates/cfs/Docs1516/cfs43/Pres/CFS43_RBA_Special_Event.pdf.

Contento IR (2008). Nutrition Education – Linking Research, Theory and Practice. Asia Pac J Clin Nutr. 17 Suppl 1:176-9.

Drewnowski A. (2005). Concept of a nutritious food: toward a nutrient density score, Am J Clin Nutr 2005;82:721–32. 2005 American Society for Clinical Nutrition. Available from: http://ajcn.nutrition.org/content/82/4/721.full

FAO (2016). Compendium of indicators for nutrition-sensitive agriculture. FAO, Rome. Available from: http://www.fao.org/3/a-i6275e.pdf.

FAO and FHI 360 (2016). Minimum Dietary Diversity for Women: A Guide for Measurement. Rome: FAO.

FAO (2014). Value chain dynamics and the small-scale sector: Policy recommendations for small-scale fisheries and aquaculture trade. Rome: FAO. Available from: http://www.fao.org/fileadmin/user_upload/fisheries/docs/Value_chain_dynamics_and_the_small-scale_sector.pdf.

FAO (1). Available from: http://www.fao.org/docrep/u8480e/u8480e07.htm

FATA Side Event Documentation (October 2015): Contribution of agricultural projects to food and nutrition security, https://dms.giz.de/dms/llisapi.dll?func=ll&objaction=overview&objid=99955956.

Galli et al. (2015). Value chains and nutrition: A framework to support the identification, design and evaluation of interventions. IFPRI discussion paper 01413. Available from: http://www.a4nh.cgiar.org/files/2012/07/Value_chains_and_nutrition_A_framework_to_support_the_identification_design_and_evaluation_of_interventions.pdf.

GIZ (2017). Food and Nutrition Security (FNS) Projects, Myanmar - Draft Working Paper - Cost-Benefit of Food and Nutrition Security Interventions. Available from:

https://dms.giz.de/dms/llisapi.dll?func=ll&objaction=overview&objid=203537978

GIZ (2016). Handreichung Beispielwirkungsmodelle und –indikatoren für Vorhaben der ländlichen Entwicklung und Agrarwirtschaft. GIZ Germany. Available from: https://dms.giz.de/dms/llisapi.dll?func=ll&objaction=overview&objid=129537097.

GIZ (2016). ValueLinks Manual 2.0. GIZ. Available from: http://valuelinks.org/wp-content/uploads/2015/09/ValueLinks-Manual-2.0-Vol-2-final-draft-July-2017.pdf.

Gross R., Schoeneberger H., Pfeifer H., Preuss HJA. (2000). The Four Dimensions of Food and Nutrition Security:Definitions and Concepts. Available from: http://www.fao.org/elearning/course/FA/en/pdf/P-01_RG_Concept.pdf.

GTZ (2007). Food quality and safety standards as required by EU law and the private industry with special reference to the MEDA countries' exports of fresh and processed fruit and vegetables, herbs and spices. A practitioners' reference book. Available from: http://star-www.giz.de/starweb/giz/pub/servlet.starweb?path=giz/pub/pfm.web&r=26280&id=web-bi

Hoffmann S, Maculloch B, Batz M (2015). Economic Burden of Major Foodborne Illnesses Acquired in the United States. United States Department of Agriculture. Available from: https://www.ers.usda.gov/webdocs/publications/eib140/52806_eib140_summary.pdf.

Hussain MA, Dawson CO (2013). Economic Impact of Food Safety Outbreaks on Food Businesses. Foods. 2: 585-589. Available from: http://www.mdpi.com/2304-8158/2/4/585.

Kennedy G, Ballard T, Dop MC (2011). Guidelines for Measuring Household and Individual Dietary Diversity. Rome, FAO.

Mucha N. (2012). Implementing Nutrition-Sensitive Development: Reaching Consensus, Bread for the World Institute. Available from: http://www.wageningenportals.nl/sites/default/files/resource/implementing_nutrition-sensitive_development.pdf.

LANSA Working paper series (2015). Volume 2015, No 04: Review of Agri-Food Value Chain Interventions. Assessing the Effectiveness of Agri-Foods Value Chain Interventions Aimed at Enhancing Consumption of Nutritious Food by the Poor: Conceptual Framework.

OECD (2017). Investing in Innovation and Skills – Thriving in Global Value Chains. OECD Science, Technology and Innovation Policy Papers No. 44. Available from: http://www.oecd-ilibrary.org/docserver/download/9e296b43-en.pdf?expires=1511271590&id=id&accname=guest&checksum=960D38D9893160B3276AD5BC1B95E137.

Ruel M T, Alderman H. (2013). The Maternal and Child Nutrition Study Group. Nutrition-sensitive interventions and programmes: How can they help to accelerate progress in improving maternal and child nutrition? Lancet 2013; 382: 536–51. Available from: http://www.thelancet.com/series/maternal-and-child-nutrition

Springer-Heinze A. (2017). ValueLinks 2.0, Manual on Sustainable Value Chain Development. Available from: http://valuelinks.org/manual/

UNICEF (1997). UNICEF conceptual framework on causes of child malnutrition. Available from: http://www.unicef.org/sowc98/silent4.htm.

USAID. The DHS program. Available from: http://dhsprogram.com/What-We-Do/Survey-Types/DHS.cfm.

WHO (2010). Nutrition Landscape Information System (NLIS) country profile indicators: interpretation guide. WHO 2010. Available from: https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi_tZWqstTXAhWMa1AKHfZ4CcUQFggyMAA&url=http%3A%2F%2Fwww.who.int%2Fnutrition%2Fnlis_interpretation_guide.pdf&usg=AOvVaw3MzC8i2164op50eELVmN4O

Annex

Annex 1: Definitions of technical terms

Table 5: *Definitions of technical terms*

Global Value chain	Over the last decades, the world has witnessed an ever growing movement of capital, intermediate inputs, final goods and people. Technological progress, innovation, and trade and investment liberalization, among others, have led to an operational and geographical unbundling of production, which makes it possible to produce and assemble parts of goods and services in distant locations, often geographically clustered at the local and regional level (Baldwin, 2012). Such fragmented production patterns happening in the context of greater international economic integration are generally termed "global value chains" (GVC), to emphasize the value added generated over the production chain. (OECD, 2017)
Supply chain	A supply chain is a network of product-related business enterprises through which products move from the point of production to consumption, including pre-production and post-consumption activities. In supply chains, production is focused on efficient logistics using upstream and downstream businesses aimed mostly at pushing products to market. Supply chains are mostly concerned with costs and how long it takes to present the product for sale. (FAO, 2014))
Value chain	A value chain is defined as - the sequence of related business activities from the provision of specific inputs for a particular product to primary production, transformation (processing) and marketing, up to the final sale of the particular product to the consumer; - the set of enterprises that perform these business activities, i.e. the producers, processors, traders and distributors of a particular product. Enterprises are linked by a series of business transactions by which the product is passed on from primary producers to end consumers. (ValueLinks 2.0 Manual) Agricultural value chain projects focus on one product (e.g. a crop) and target small-scale farmers with market access (especially important are the local and regional markets) – mostly informal and other actors along the value chains ("from field to plate"). Primary objectives focus on increasing productivity and income.
Cash crop	A cash crop may be sold at home or abroad and may be either a food or non-food commodity. The major non-food cash crops that are exported are cocoa, coffee, fibre crops, rubber, tea, and tobacco (Barbier, 1987).

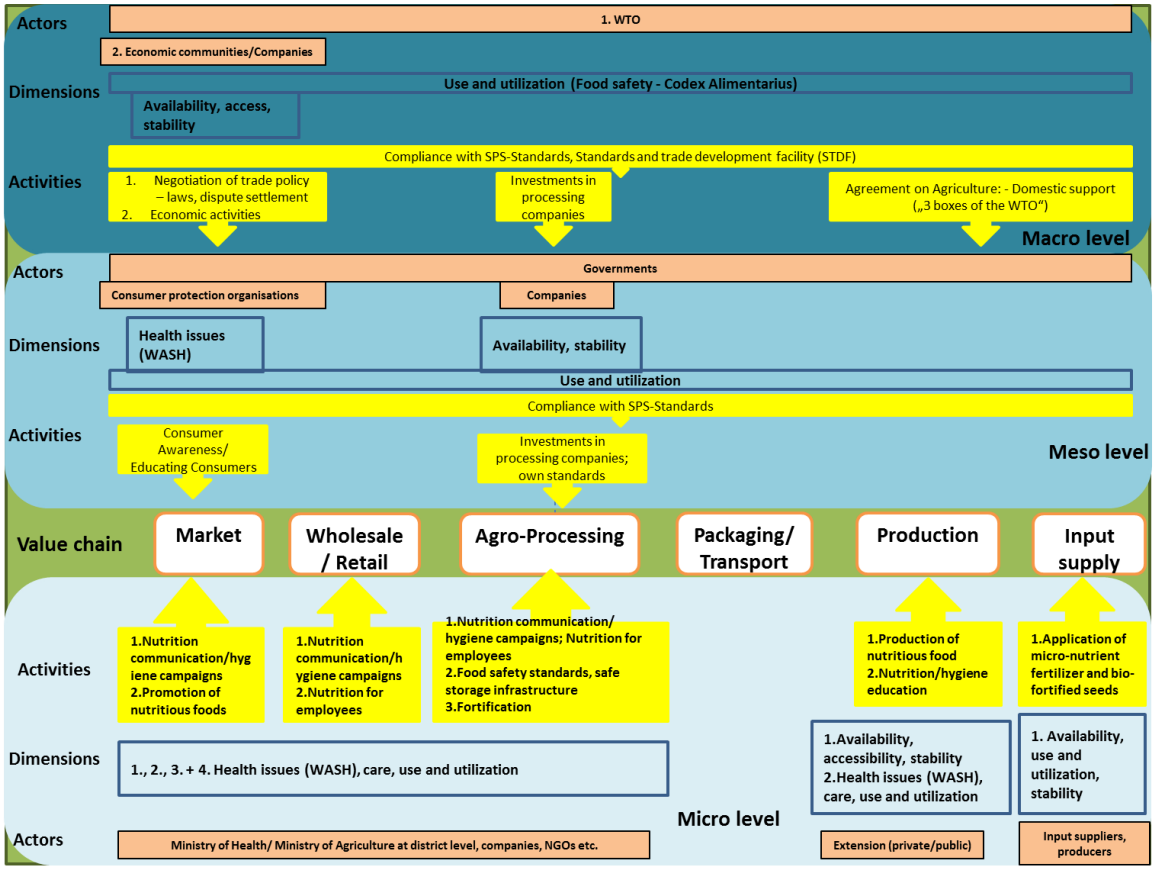
Food crop	The term food crop usually refers to domestic production of basic staples (cereals, pulses, roots, and tubers). Although these are the principle staple crops, they are also often marketed (Barbier, 1987).
Staple crop	A staple food is one that is eaten regularly and in such quantities as to constitute the dominant part of the diet and supply a major proportion of energy and nutrient needs. A staple food does not meet a population's total nutritional needs: a variety of foods is required. This is particularly the case for children and other nutritionally vulnerable groups. Typically, staple foods are well adapted to the growth conditions in their source areas. For example, they may be tolerant of drought, pests or soils low in nutrients. Farmers often rely on staple crops to reduce risk and increase the resilience of their agricultural systems. (FAO (1))
Nutrition-sensitive value chains	There is currently not one generally accepted definition of what nutrition sensitive intervention is. However, Noreen Mucha (Table 5 of "Implementing Nutrition-Sensitive Development: Reaching Consensus") provides an overview of several definitions at play, including those of the EU, SUN Movement, World Bank and WHO. The common denominator among these definitions are the following: • Nutrition sensitive interventions address the underlying determinants of nutrition. According to the World Bank, these underlying determinants include adequate access to food, healthy environments, adequate health services and care practices. In general, sectors are involved where they can play a role in stimulating access to nutritious food. • Nutrition sensitive interventions involve multiple sectors. Across definitions, several sectors that play an important role in nutrition sensitive interventions are reappearing. They are summed up by the 1,000 days movement: food security and agriculture, social protection, health, education, water supply and sanitation. Interestingly, only DFID specifically mentions women empowerment. • Nutrition sensitive interventions include clear nutrition objectives. In particular objectives that enable communities to achieve food and nutrition security. In several of the definitions of nutrition sensitive development it is stressed that interventions will only contribute to nutrition sensitive development when these objectives are included and supported by national development policies. (Mucha N., 2012)
Nutrient-density	The term nutrient density means different things to different people. To epidemiologists, the term nutrient density of the diet means crude nutrient intakes (in g or mg) divided by the total energy intakes. In epidemiologic studies, nutrient density often means diet composition, as indexed by the percentage of energy from carbohydrate, protein, and fat. In developmental nutrition, a nutrient-dense food is one that delivers a complete nutritional package and can be used to sustain life. By contrast, in the cancer prevention literature, vegetables and fruit are classified as being nutrient-dense, whereas the presence of oil and sugar would be enough to classify a food as being nutrient-poor (Drewnowski, 2005).

Food Security	Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (WFS, 1996)
Nutrition Security	Nutrition security exists when people at all times consume food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care. (FAO, 2012)
Food and nutrition security	The definition of food security stated above emphasizes 'Availability', 'Accessibility', and 'Utilization' of food. The inclusion of utilization underlines that 'Nutrition Security' is more than 'Food Security.' (Gross R. et al., 2000) The concept of FNS has four dimensions: 1. categorical dimension 2. socio-organizational dimension 3. managerial dimension 4. situation-related dimension
Nutrition-specific interventions	Interventions that address the immediate determinants of maternal, fetal, infant, and child nutrition and development: adequate food and nutrient intake, feeding and caregiving practices, and low burden of infectious diseases. (Mucha N., 2012) Examples: Food fortification, nutrition education training, maternal dietary or micronutrient supplementation; promotion of optimum breastfeeding; complementary feeding etc. (Ruel et al., 2013)
Nutrition-sensitive interventions	Interventions or programs that address the underlying determinants of maternal, fetal, infant, and child nutrition and development and incorporate specific nutrition goals and actions: food security; adequate caregiving resources at the maternal, household and community levels; access to health services and a safe and hygienic environment. Examples: Production of nutritious foods; social safety net programs; maternal mental health; women's empowerment; child protection; schooling; water, sanitation, and hygiene; health and family planning services etc. (Ruel et al., 2013).
Nutrition education	Nutrition education is defined as "any combination of educational strategies designed to facilitate voluntary adaption of food choices and other food- and nutrition-related behaviors conducive to health and well-being. Nutrition education is delivered through multiple venues and involves activities at the individual, community and policy levels." (Contento, 2011, p. 15).

Social Behavior change communication	"Social and Behavior Change Communication (SBCC) for health is a research-based, consultative process that uses communication to promote and facilitate behavior change and support the requisite social change for the purpose of improving health outcomes." (The Manoff Group, 2012,p. 4).
Nutritional status	A person's nutritional status gives information on whether the person is malnourished or not. Indicators to assess the nutritional status are anthropometric assessments (body-mass-index, mid-upper-arm-circumference, children's growth indicators as height-for-age, weight-for-age, weight-for-height) and biomarkers (capillary or venous blood for assessment of micronutrient status of i.e. iron, vitamin A, iodine, etc.). (WHO, 2010)
Food safety (regulations)	Food safety means the assurance that food will not cause adverse health effects to the final costumer (GTZ, 2007). Food safety regulations aim at ensuring that all food is safe for consumption. The principle is to minimize or avoid hazards caused by chemical (Aflatoxin, Dioxin) and parasitic contaminants (Salmonella spp, Escherichia spp.). To fend off these hazards both the legislators as well as private industry and retailers set standards for food safety. The "Agreement on Sanitary and Phytosanitary Measures" (SPS agreement) of the WTO provides an international framework for national food safety legislation. For all technical aspects, the SPS Agreement refers to the international food safety norms of the joint FAO/WHO Codex Alimentarius Commission. It should be noted that food safety standards apply to all food products equally. They are specified for particular products and value chains by technical guidelines, e.g. for milk or meat (Springer-Heinze, 2017).
Fortification	Food fortification or enrichment is the process of adding micronutrients (essential trace elements and vitamins) to food. (Allen et al. 2006)

Annex 2: Diagram on the integration of nutrition aspects along the VC – micro, meso, macro level

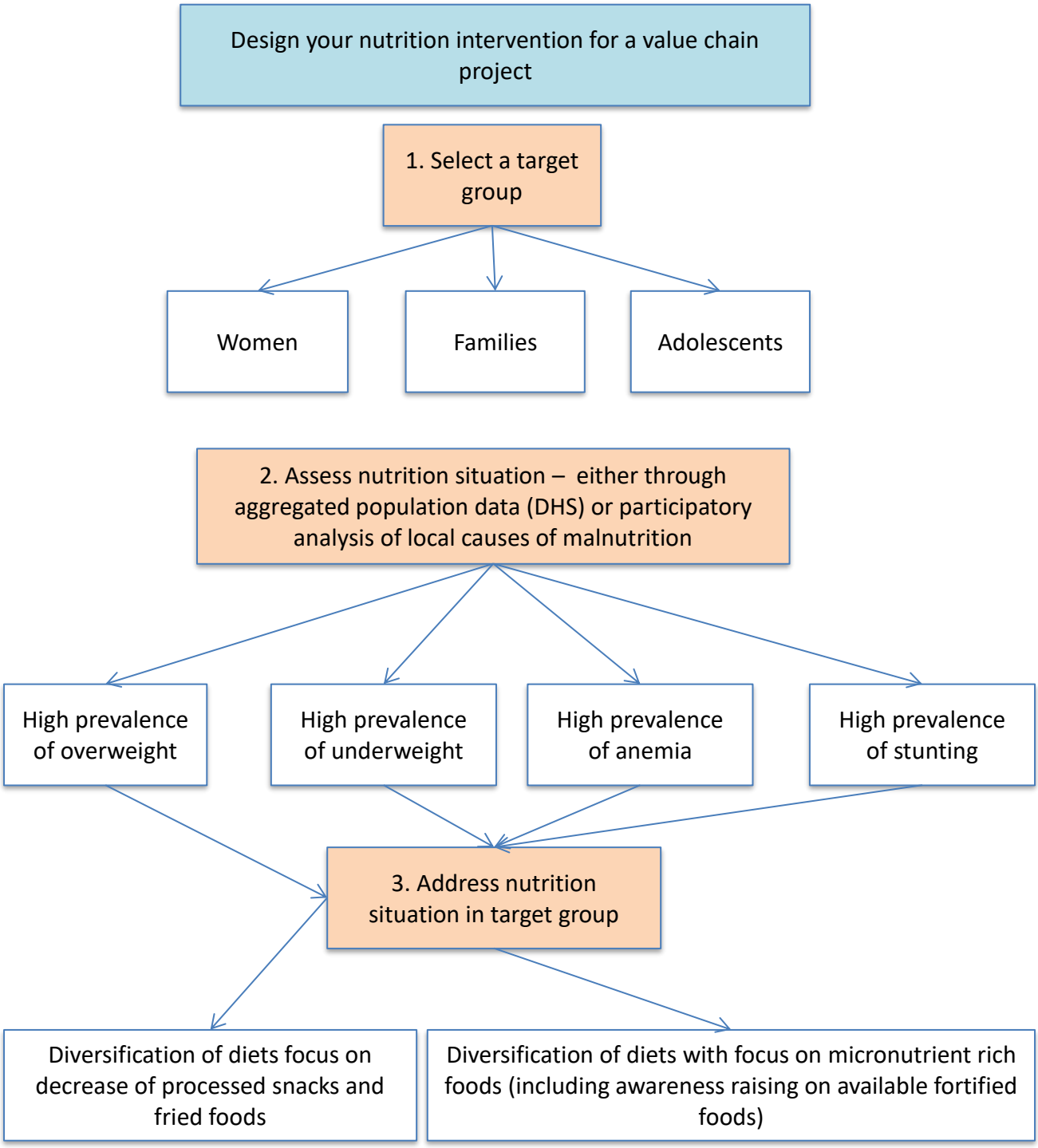
Figure 3: *Diagram on the integration of nutrition aspects along the VC – micro, meso, macro level*



Source: *Own compilation (GIZ, 2017)*

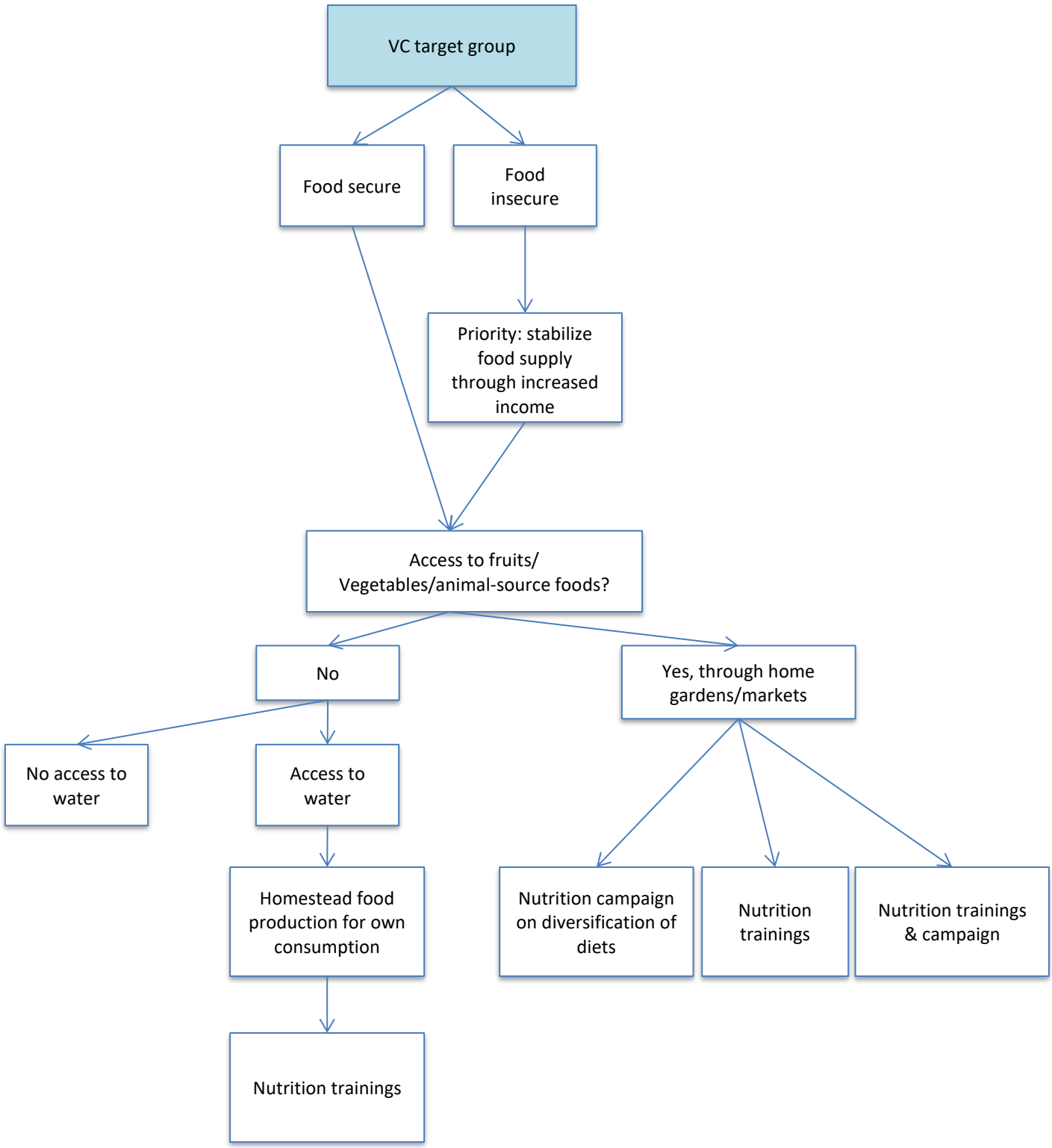
Annex 3: Decision trees

Figure 4: Which intervention for which group?



Source: *Own compilation (GIZ, 2017)*

Figure 5: Get to know your target group!



Source: *Own compilation (GIZ, 2017)*

Annex 4: List of GIZ projects that provided information or were interviewed by the authors (Time frame: January 2017 – March 2017)

No.	Project name	Countries
1	Competitive African Rice Initiative (CARI)	Burkina Faso, Ghana, Nigeria, Tanzania
2	Global program Food Security and Strengthening of Resilience	Burkina Faso, Benin, Ethiopia, India, Kenya, Cambodia, Mali, Malawi, Togo, Yemen, Zambia
3	Umbrella program of the following value chain projects: CARI, SSAB, COMPACI, Competitive Cashew Initiative (ComCashew (before ACi))	Burkina Faso, Ghana, Nigeria, Tanzania, Benin, Côte d'Ivoire, Mozambique, Sierra Leone, Cameroon, Togo
4	Global program Promotion of nutrition-sensitive potato value chains in East Africa	Kenya, Uganda
5	Global program Green Innovation Centres for the Agriculture and Food Sector (GIAE)	Burkina Faso, Benin, Cameroon, Ethiopia, Ghana, India, Kenya, Mali, Malawi, Nigeria, Togo, Tunisia, Zambia
6	Affordable Nutritious Foods for Women (ANF4W)	Ghana, Tanzania, Bangladesh, Kenya
7	Competitive African Cotton Initiative (COMPACI)	Benin, of Côte d'Ivoire, Cameroon, Ghana, Malawi, Mozambique, Tanzania, Uganda, Zambia
8	Competitive Cashew Initiative (ComCashew)	Burkina Faso, Benin, of Côte d'Ivoire, Ghana, Mozambique, Sierra Leone
9	Sustainable Smallholder Agri-Business (SSAB)	Côte d'Ivoire, Cameroon, Ghana, Nigeria, Togo
10	Agricultural Innovation Support Project (AISP IV)	Zimbabwe
11	Food Security and Development of Agricultural Markets	South Sudan
12	Agricultural Development Program	Burkina Faso
13	Promotion of sustainable agriculture and rural development in Tunisia	Tunisia
14	Rural Development and Agriculture	Togo
15	More Income and Employment in Rural Areas through selected value chains	Malawi
16	Promotion of agriculture	Benin
17	Promotion of Market Oriented Agriculture	Ghana
18	Food Security through improved agricultural productivity in Western Kenya	Kenya

Source: *Own compilation (GIZ, 2017)*