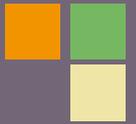




Seasonality Revisited

Perspectives on Seasonal Poverty



Seasonality Revisited

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**Seasonal Neglect?
Aseasonality in agricultural
project design**

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Abstract

Based on a literature review and observation of selected agricultural projects, this paper reflects on whether and how projects that support agriculture-based livelihoods in Africa account for seasonality in their design, delivery and evaluation. The following questions are addressed.

Under which circumstances does seasonality create the greatest stress for farmers and farm households? Seasonality manifests differently in different contexts, and the strategies that farmers adopt to 'cope' with seasonality vary. However, studies of 'coping strategies' reveal common indicators of stress: selling food cheaply after harvest and buying it back later at high prices, rationing food consumption, even selling productive assets like livestock in severe 'hungry seasons'. All of these responses undermine the viability of farm-based livelihoods. How can agricultural projects reduce seasonal stress and minimise the involuntary adoption of damaging 'coping strategies'?

Why isn't seasonality acknowledged more in agricultural project design? Unirrigated agriculture in Africa is entirely dictated by seasonal cycles, but climate change is causing rainfall to become increasingly erratic, seasonal hunger to intensify and agriculture-based livelihoods to become increasingly vulnerable. Yet agricultural projects rarely recognise the centrality of seasonality in rural livelihoods. Why is seasonality neglected in project design, and what are the implications for project outcomes and impacts?

What are the key things that design can do differently? In the past, agricultural interventions were more sensitive to seasonality than they are today. Governments implemented measures that included counter-seasonal grain market operations, pan-seasonal food pricing and subsidised input distribution. These interventions have largely disappeared, leaving poor farmers facing the challenges of seasonality with little protection. This raises fundamental challenges for agricultural project design. How can agricultural projects be better designed to take account of seasonal cycles in rainfall, production, labour requirements and employment opportunities, disease and malnutrition, and food and commodity prices?

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1. Introduction

Agriculture is intrinsically seasonal. In many agricultural projects – e.g. those that promote irrigation technologies to produce a second annual harvest – seasonality is central to conceptualisation and design. But seasonality is not always addressed explicitly in the design of agricultural interventions. In these cases, project managers (and project participants) could benefit by taking relevant features of seasonality into account, potentially resulting in enhanced project outcomes – higher production and welfare outcomes. This paper aims to explore the various ways in which seasonality is important to agricultural projects; how seasonality is considered or why it is overlooked; and how a deeper understanding of seasonality could be factored into improved project design, implementation and evaluation for improved impacts.

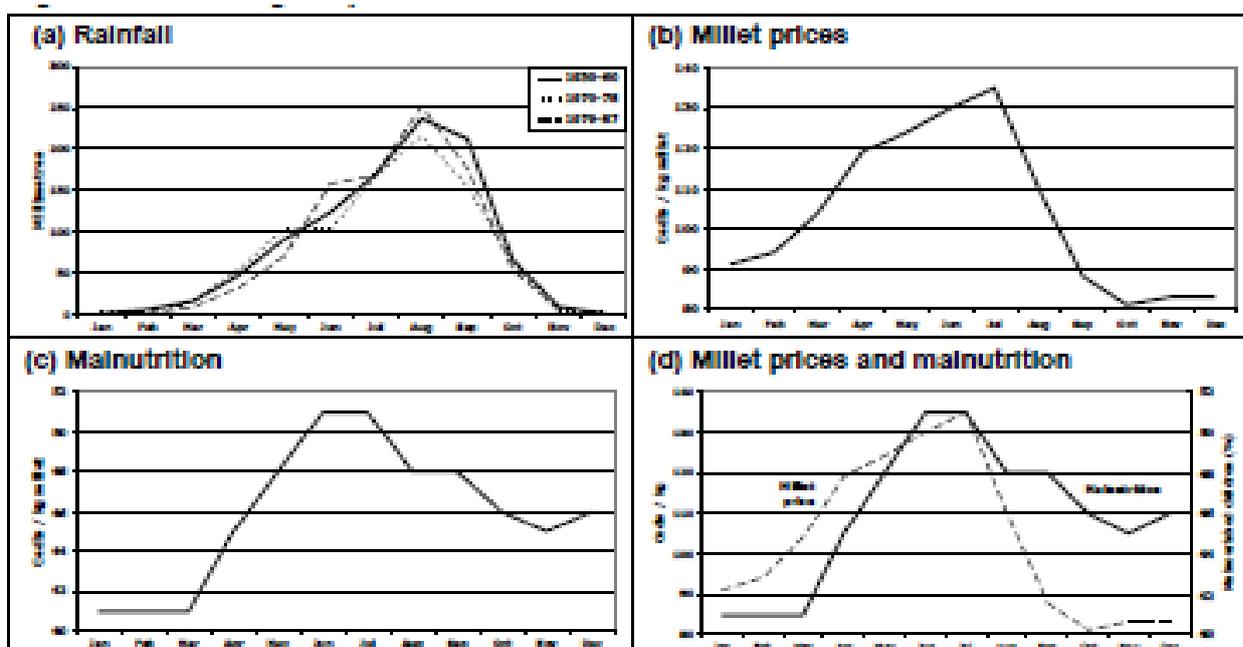
This paper aims to address the following questions:

1. Which dimensions of seasonality are relevant to agricultural projects – rainfall, crop production; farm labour requirements, markets and prices, health; food consumption and nutrition, etc?
2. How is seasonality addressed in the conceptualisation and design of agricultural projects? If seasonality is not explicitly addressed, what are the implications for project outcomes?
3. How can seasonality be factored into project design and impact planning and learning (IPL)?

2. Seasonality in Agriculture-Based Livelihoods in Africa

Why does seasonality matter? Farming families live in a world where the seasons profoundly affect their well-being. After the main annual harvest, food is plentiful and prices are low. But in the months leading up to the next harvest, food becomes scarce, food prices rise – and so does malnutrition. Figure 1 below illustrates these patterns in Ghana, but is familiar from countries throughout Africa.

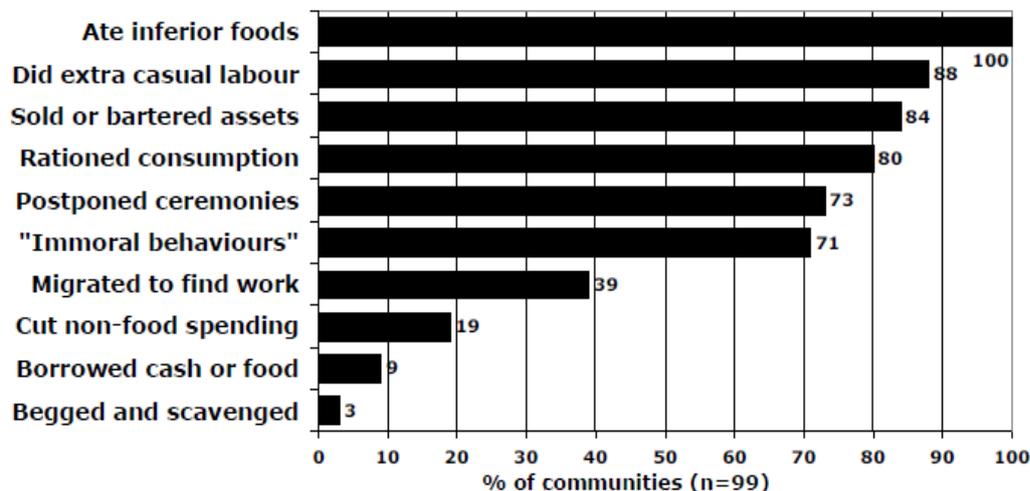
Figure 1. Seasonality in rainfall, grain prices and malnutrition in northern Ghana



Source: Devereux (2009: 5)

In response to seasonality, poor farming households are forced to adopt various 'coping strategies' during the annual hungry season, from going hungry to selling assets or migrating in search of work (see example below from Malawi). Successful agricultural projects should reduce seasonal hunger and enable participating households to avoid damaging coping strategies.

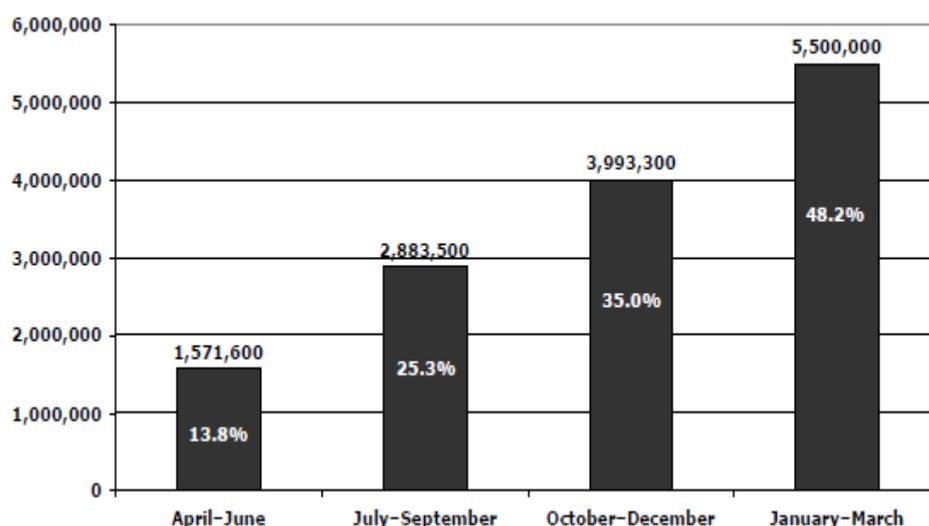
Figure 2. Household responses to seasonal hunger in Malawi, 2001/02



Source: Devereux (2009: 16)

After the 2001/02 food crisis, the Malawi Vulnerability Assessment Committee (MVAC) was set up to monitor household food security – whether rural food production plus incomes generate adequate 'entitlements to food' each year – in order to ensure more timely intervention in future food crises. Figure 3 disaggregates the numbers of Malawians who faced deficits in their entitlements to food each quarter in 2005/06. The figure reveals a dramatic increase in the proportion of the population 'at risk' from the 2005 harvest season (14%) to the following hungry season in early 2006 (48%).

Figure 3. Population facing 'missing food entitlements' in Malawi by quarter, 2005/06



Source: Malawi Vulnerability Assessment Committee (2005: 20)

3. Methodology

Every agricultural project needs to understand how seasonality affects the livelihoods of farming families who will be affected by the intervention. Some dimensions of seasonality that are important for project managers to analyse include the following.

Table 1. Dimensions of seasonality that could affect agricultural project outcomes

Dimension	Season 1	Season 2	Season 3
Rainfall	Minor rains	Dry season	Main rains
Agriculture	Post-harvest season	Off-season	Farming season
Health	'Normal' disease vectors	Dry season diseases	Water-borne diseases
Food security	Food secure	Food stress	Hunger
Nutrition	Low malnutrition	Rising malnutrition	High malnutrition
Food markets	Low prices	Rising prices	High prices
Employment	Local off-farm work	Seasonal migration	On-farm labour

Two methodologies were used to ascertain whether there was any recognition of these features of rural livelihoods in specific agricultural projects: (1) review of project documentation; (2) a short questionnaire administered to project managers.

3.1. Review of project documentation

Several hundred project documents were reviewed from two large organisations that provide support to agricultural projects in Africa: the African Development Bank, and the International Fund for Agricultural Development (IFAD).

3.2. Questionnaire

A short questionnaire was designed and administered to managers of agricultural projects.

Box 1 Questionnaire on seasonality for agriculture project managers

1. Does the project aim to raise the incomes and/or improve the nutrition status of participants?
2. If YES, how will the project achieve this outcome? (What is the causal pathway from project activities to participant impacts?)
3. Are there any seasonal dimensions to project activities? (e.g. do crop breeding/ marketing/ storage activities happen at certain times of year?)
4. If YES, how do project activities factor in seasonality? (e.g. are activities planned around an annual calendar?)
5. What are the main seasonal dimensions to the livelihoods (i.e. labour, production, and incomes) of the intended project participants? (e.g. farmers).
6. Has the seasonal dimension of participants livelihoods been assessed (e.g. in a baseline survey)?
7. Will the project help participants to better manage the adverse consequences of seasonality? If YES, how?
9. Are any data available on seasonal hunger and under-nutrition among project participants?
10. How will the project activities factor in the seasonality of livelihoods and/or under-nutrition, in design and implementation?
11. How could the project consider seasonality more explicitly in its design and/or implementation?

4. Case Study: African Development Bank

The total number of evaluation reports and project completion reports scanned was 462, covering different sectors of agriculture, health, human and social development, transport and water and sanitation, and others. All reports in the agriculture and agro-industries [n=79] were given special attention. Overall, the attention paid to seasonality was very low.

4.1. Findings from Agriculture Sector and Agricultural Sector Adjustment programmes

These programmes tend to be heavily biased towards irrigation.

- In Mauritania, Uganda, Malawi, Niger and Tunisia, seasonality was approached through irrigation projects, trying to generate income in the dry season, and extend the wet season. In Mauritania, off-season crops are risky because of uncertainties of river water supplies and costs of pumping water due to energy required. Training of farmers has worked to enhance seasonal sequences of crops in hydro-agricultural projects and productivity has increased.
- In Uganda, rice production is semi-subsistence except that under irrigation (e.g. the Itek/Okile Swamp Rice Irrigation Project) farmers will get a dry season crop with paddy rice in the rainy season and other crops off-season. Some of these crops are more lucrative than rice (e.g. onions, peas, tomatoes). This wide difference in profitability has caused some conflicts in the distribution of labour time for rice production as some rice plots are left uncultivated because farmers tend to other crops that fetch higher prices than rice. In practice, with environmental considerations, limited dam building has minimised the ability to store water (to prevent floods) and release it during the dry season (to mitigate droughts), therefore compromise is needed to become economically viable, while protecting the environment. Production levels could have been stepped up if the environmental impact of controlling floods was sorted out.

4.2. Concept of seasonality used as part of the initial diagnosis of agricultural planning

- Uganda needs to work out 'best practices' that are relevant to its economy – which is based on agriculture – and has to be operationalised to persuade investors to cater for productive agricultural activities with long gestation periods, seasonality, and a variety of risks, as investors concentrate on 'best practices' to achieve operational self-sufficiency and financial viability in the shortest time possible.
- In the Malawi ASAP II, seasonal distress selling was recognised: the inclusion of Rural Public Works was a good idea but not properly articulated. It should have started during the slack seasonal period for labour, which would have boosted demand for labour, raised the market wage rate, and eliminated the need for legislative wage setting.
- In Ethiopia, it was understood that seasonal labour scarcity is aggravated by HIV and AIDS.
- In Tanzania's agriculture sector renting out land seasonally does not provide good prospects for sustainability, because it is *ad hoc* and farmers have no certainty of securing land rights.

4.3. The role of seasonal credit

Seasonal agricultural credit is not so important an issue for the African Development Bank as it is in the programming of other agencies, such as IFAD.

- In the Agricultural Sector Adjustment Programmes in Senegal and Tunisia, the objective was achieving food self-sufficiency by increasing agricultural production, and increasing exports and seasonal credit was seen as one means of doing this.

- Ghana's Agricultural Development Bank (AgDB) has provided seasonal credit, recognising that small farms are those most vulnerable to seasonality. These measures are not costless, as they have resulted in increased administrative expenses as a percentage of total lending – administrative expenses were 8.2% of net loan portfolio in 1979; 11.4% in 1983. This ratio should not have exceeded about 5% as a general norm. The changing structure of Ghana's AgDB portfolio – a gradual shift from long-term to short-term lending – is an example of the Bank's commitment to satisfy the seasonal or working capital requirements of the so-called target groups: small and medium borrowers. This commitment has been backed up with other physical measures, for instance the creation of Branch and Area Offices and an increase in staff.
- The development of four irrigation schemes in Tunisia's Medjerda Valley provided seasonal credit.
- In Morocco, the first line of credit to the Caisse Nationale de Credit Agricole (CNCA): The project was successful despite the unusually low and erratic precipitation hindering crop production (during the 1982/83 season) and the complex problem of land tenure, which prevents many farmers from obtaining the full amount of credit they need. The repayment of the loan by farmers has been regular and CNCA's repayment of ADB's line of credit has been according to schedule. The crop year is limited to the winter-spring period, when rainfall is adequate and evaporation rates are low. The rainfall varies significantly from season to season and consequently, the aggregate production levels fluctuate by as much as 40% around the long term average. CNCA decentralises credit delivery by operating through its regional (SA CRCA), and local branches scattered on a wide network. Moreover, it reaches very small farmers with seasonal branches know as '*guichets saisonieres*'. The organisation and staff strength of CNCA have expanded substantially since the appraisal of the project.

4.4. Irrigation development

- In Tunisia's Ras Djebel-Galaat Irrigation project, the impact of feeder roads on the marketing of agricultural and livestock produce is good. The quality of the works and the high level of maintenance carried out by the CRDAs have made it possible for farmers to receive traders throughout the year, or to transport their produce themselves to the markets in all seasons.
- Investments for dry season production were also made in Cape Verde (IADP Assomada) and Niger (Kourani Baria Irrigated Development Project). But none of these projects have been trouble-free in terms of profitability, returns and development of infrastructure and land rights.

4.5. Rural roads development

Wet season destruction of roads is recognised as an impediment, but some investments have also been made in upgrading dry season roads.

- Ghana's Cocoa Rehabilitation Project developed feeder roads rehabilitated under the project and have made rural communities more accessible, especially during the rainy season, and improved produce evacuation. In addition, the labour-intensive road works would contribute to reducing rural unemployment and/or under-employment and rural poverty.

4.6. Livestock projects and forage

Support to livestock is implemented under three subcomponents: (i) pasture seed production, through contract outgrower seed producers; (ii) rangeland improvement, through bush clearing and re-seeding of degraded rangelands and through over-sowing natural pastures with adaptable forage legumes to improve the quantity and nutrition quality of the pastures; and (iii) support to dry season feeding, aimed at alleviating feed shortages experienced during the dry seasons through forage conservation and supplementary feeding.

4.7. Relief interventions

- In Malawi, nutrition and food security was supported through ASAP, which availed Balance of Payments support for the purchase of maize as well as other goods for drought relief. Food security and nutrition had worsened for some households; partly because burley tobacco was preferred to maize in land and labour allocation, and by credit agencies; burley (cash) income was depleted shortly after the marketing season. ASAPs scored 1 = highly unsatisfactory, in this area.

4.8. Non-agricultural sectors

In transport and infrastructure projects there is sometimes reference to wet season logistics – such as roads becoming impassable in the wet season (see for example the need for all-season roads in Lesotho, and roads again in Bauchi township water supply project).

- In Niger, the Niamey Sewerage Project reduced flooding in the rainy season and hence improved sanitation.

5. Case Study: IFAD

The following documents relating to seasonality and agricultural and rural development projects were trawled:

- Annual Reports on Results and Impact of IFAD Operations (ARRI), 2002–2007 (the latest). The ARRIs of 2003 and 2004 drew attention to a seasonal issue.
- Corporate-level Evaluations, miscellaneous, 8 in number 2002–2008, of which one – Rural Finance Policy – addressed seasonality.
- Country-level Evaluations (23), of which Egypt, Papua New Guinea, Tanzania, Vietnam and Pakistan had significant seasonal elements.
- Project Evaluations (84), of which about 23 addressed seasonality as an issue: 17 from Africa and of these, 8 from West Africa in particular (Ghana, Burkina Faso, and Gambia).

5.1. General comments

IFAD staff do recognise seasonality in project design; in all parts of the world after all there are seasons when crops are grown. In the West Africa projects where seasonality is marked it is understood that there are periods when food is very short or non-existent and that this is also the period of maximum workload when people are very busy (and less receptive to some forms of seasonal projects such as taking advice, training programmes, etc.). It is also understood (and noted in many project documents) that this is the time when weak infrastructure is exposed and project areas cannot be reached. At the same time as the wet season is seen as a problem, so several projects address themselves to the dry season. This is a time when employment is non-existent, crops cannot be grown so easily and there may be out-migration. Therefore, IFAD projects target both the wet season – to increase agricultural productivity to ensure there is sufficient food through the season – and the dry season – to provide extra income sources and food, which in turn can raise seasonal sufficiency thresholds. Investment in livestock projects, especially to raise dry season productivity, addresses seasonality in pastoralist societies.

IFAD is an investment fund, and sees production credit and improved input supplies as important components, but its remit also extends to ensuring that women (fully recognised as full-time farmers in many parts of the world) are included as beneficiaries and that institutions such as cooperatives and community-based organisations are properly established and supported as important drivers of change in rural communities. They also recognise improving child nutrition as the ultimate test of their investments (*à la* BMGF), but in the documentation reviewed there are

only 5 project and country documents that provide qualitative nutrition data while other evaluation documents speculate using inferences.

5.2. Key components in IFAD's seasonal project components

The key components include: seasonal agricultural credit, irrigation and other forms of water control, rural access roads, and impacts on women.

5.2.1. Seasonal credit is incorporated in many projects

Incorporating credit does raise many challenges, and IFAD recognises that seasonal credit has high transaction costs. The Corporate Evaluation of IFAD Rural Finance Policy emphasised that seasonality presents constraints to serving the rural areas with financial services. The main and constant constraints are distance and low population density. High transaction costs are compounded by risk management tools not well suited to rural environments that suffer from frequent external shocks, natural disasters and cyclical crop failures with other risks. At the household level, service provision is challenged by a lack of reliable information about borrowers, lack of collateral, seasonal income and loan demand cycles that hamper traditional approaches to financial service provision. Overlying these conditions is a typically inhospitable policy, legal and regulatory environment. As a result of all these factors, financial services are often provided to less than 10% of rural areas. This means that rural finance interventions are often high risk and low profit.

There are some project evaluations that emphasised how hard it was to reach the food insecure with seasonal credit, compounded by difficulties in project design. For example:

1. In Sudan Southern Rosieires, where there was physical lack of access in the wet season to carry out transactions, this led to problems with seasonal credit.
2. In the Bangladesh Netrakona Integrated Agricultural Programme, the mismatch between the repayment schedule and farmer income cycles was one of the major design flaws of the product that ultimately ensured its collapse. While some NGOs insisted on weekly repayments, farmers could only manage a seasonal repayment schedule based on crop harvests. This insensitivity towards timing led to massive overdues on the part of the NGOs and resulted in the lending bank becoming further rigid in its approach.
3. IFAD's Market Access Issues paper recognises that, because demand for farm inputs is very seasonal, traditional micro-credit schemes are not always the best vehicle for addressing associated financing constraints.
4. In Syria as elsewhere it is recognised that credit has to be used for consumption in some cases for project credit schemes, to help people meet part of their seasonal needs. Farmers asked for some means of evening out the seasonality of production. This is in the face of a government Ministry of Finance with a problem with seasonality of government payments – MoF has to expend 1/12 every month but this is only appropriate where there is a steady flow of services, it does not work for development projects given the seasonal needs of projects. This has affected IFAD projects in the area of incentive payments for land development units.
5. In the Bhutan Punakha Wangdi Valley Development Project there was poor uptake of credit due to fear about repayment and long procedures for disbursement, given the short time periods involved to get the funds.
6. In the Armenia NW Agricultural Services Project, village associations were very effective in providing small seasonal loans.
7. Malawi's Kasungu ADP provides seasonal crop production credit and strengthens existing infrastructure. Many food insecure households lie outside the range of the project, and credit is not expected to reach the poorest.

8. The Vietnam Country Report notes that those households experiencing seasonal hunger problems did not face lack of food in the markets but the lack of means to acquire food. The credit programme aimed to respond to the credit needs of the poor but its implementation had problems. This is partly due to institutional weaknesses of credit delivery mechanisms and partly due to ambiguity in the governments' policy approach to micro-credit as an instrument of poverty reduction.

5.2.2. Irrigation and other forms of water control are an important seasonal strategy

Irrigation, dams and bunds and rerouting rivers are used to raise yields of existing wet season crops, extend the growing season to take a second or even third crop and introduce new crops in the dry season for income and employment. Improved water control is also implemented to improve livestock management.

1. In the area of food security, the building of dams in Ghana led to greater agricultural output, and in the Land Conservation and Smallholder Rehabilitation Project the credit obtained and cash earned during the dry season had the same effect. Mexico and India also reported improvements. In other projects in Mongolia and Mozambique there was little effect, either because of livestock losses in hard winters or no markets for surplus (ARRI 2005).
2. The Bangladesh 1994 Country Report mentioned that groundwater irrigation models coupled with seasonal credit for inputs are replicable and sustainable in view of the large groundwater potential.
3. The Egypt Country Report states that IFAD projects have successfully addressed in their irrigation, water supply and drainage infrastructure work, shortages of water during peak seasons and unreliable water supplies from main systems.
4. The Tanzania Country Report (2003): On irrigation structures, it is too early to assess but there are some reservations about appropriateness of water harvesting from seasonal sources using diversion-scheme technology, as it is considered to be a high risk and technically complex intervention; choice of technology in terms of promoting diversion schemes using seasonal rivers as against primarily using dams also requires further consideration.
5. The Jahaly Pacharr Project in Gambia (about which much research has been carried out): was to improve swamp rice production as women as major beneficiaries, to try and produce an additional crop to reduce hungry season. It was partly successful because it did not respect the farmers' choices for crops by season.
6. A clutch of projects in Ghana:
 - Upper West ADP: seasonal hunger was recognised, so the intention was to increase crop production to reduce this, develop dry season gardening, improve market feeder roads, infrastructure development (dams), and try to introduce tubers to bridge the hungry season – but these were ignored.
 - Upper East ADP: aimed to improve cropping in the dry season through irrigation and marketing and credit support. Some participants reported adequacy now in the hungry season while others said the hungry season was reduced. Construction of new dams may not necessarily target the poor.
 - Upper East Regional Land Conservation: improvements to wet season crops and developing high value dry season crops, dam rehabilitation, and availability of credit improved dry season farming activities.

5.2.3. Rehabilitating rural roads to improve access

Road improvements are recognised as being a major means of opening up access to markets, and getting in supplies during the wet season.

1. The Papua New Guinea Country Report notes that rural roads are not well maintained and are inaccessible during and after the rainy season. On average every second household experiences difficulties in selling or buying goods in the rainy season and having access to health services.
2. In the Bangladesh Netrakona Integrated Agricultural Programme rainy season roads go under water; improved roads help with seasonal employment migration which is part of a local livelihood strategy.
3. Zambia's Small-Holder Services Rehabilitation Project finances input supply, credit, upgrading of feeder roads, and support to extension and cooperatives.

5.2.4. Projects have a mixed impact on women and their seasonal incomes and workloads

The ARRI 2003 reports in its human assets section that the impact of projects on workload has been mixed for women but more positive for children. Improved water supplies in two projects have reduced the workload on women and children, while caring for livestock has tended to increase workload for children (and men). The introduction of new production techniques in Benin has overburdened women given their lack of access to appropriate equipment. Women's seasonal workloads, but also their cash incomes, have increased through their seasonal employment in production cooperatives in Lebanon. ARRI 2004 also mentioned this.

Further examples:

1. The Papua New Guinea Country Report noted that there are severe time constraints for mothers in terms of availability of time for child-care: time available to breast-feed and ensure proper frequency of well-prepared meals all directly impact nutritional status. This is all exacerbated in the workload peak season and even during the non-peak seasons.
2. In a Syria Country Report it was recognised that seasonal unemployment in the non-farming season was identified, training programmes were coordinated with seasonal demands of women's work, where off-season survival strategies include temporary migration. Training courses were tailored to seasonal workloads.
3. In Bhutan, the Eastern Zone Agricultural Development Project recognised seasonal food insecurity, emergency borrowing and high women labour inputs as issues. Government taxes households by labour contributions and these did not fit easily into the seasonal farming calendar.
4. In Burkina Faso's SWC/AGF Central Plateau project, women obtained no particular advantage from the programme as their workload had increased due to their work on the erosion control sites (not intended by the project) and they requested assistance to reduce their domestic workload (mills, wells and carts).
5. In China's SW Anhui IADP, one-quarter of the loan was devoted to seasonal credit, of a food and tree crops credit loan. Now there is no food deficit due to a doubling of crop yields, but women find themselves busier than ever, with different activities demanding their attention at different seasons. But (apparently) they are pleased because it is more income and they are able to hire people to take on the extra load if necessary. As a result of the project, new items such as medicinal plants and off-season vegetables are being added.
6. Thematic evaluations on organic food crop growing show the importance of understanding seasonal labour needs and seasonal availability of funds to buy inputs, when introducing new crops.

5.2.5. Nutrition and miscellaneous issues

1. A Papua New Guinea country report presents a lot of seasonal problems of food insecurity – high levels of seasonal malnutrition – which surveys suggest could be reduced by improving

the safety of drinking water, supporting savings and credit groups, and improving access to land and health services.

2. Training has to be organised at a convenient time and season. Project experience indicates that the maturity of the community, as supported by community-based organisations, have a positive impact on malnutrition, as seasonal fluctuations are eliminated. Rural livelihoods for women CBOs are influential.
3. The Gambia Rural Finance and Communities Initiatives project has multiple components: to try to increase dry season crop production through subsidised farm inputs and equipment and developing bunds to water livestock in the dry season; cassava processing to deal with surplus in bumper years; small-scale water control: for rice, expected to increase dry season yields: a rather narrow focus on one crop to enhance food security (should have taken other crops into account). The main positive effects on women (who grow the swamp rice) was the upgrading of the roads to reduce travel time.
4. The Ghana Root and Tuber Improvement Programme aimed to improve hungry season food consumption. The project did have beneficial effect of increasing incomes and consumption by the expected amounts.

6. Case Study: Vegetable Production in Africa

Although agricultural research in Africa (which has been under-invested for 2–3 decades) has focused on staple cereals (e.g. maize) and to a lesser extent legumes (e.g. beans), vegetables are an important component of African diets, an essential food group for dietary diversity and a major source of essential micronutrients. But negligible investment has been made in promoting vegetable production and consumption in Africa, where crop breeding programmes generally have a problematic history. One reason for this might be that inadequate attention is typically paid to seasonality of production, consumption and marketing in the design and implementation of crop breeding programmes. A recent baseline survey in several African countries is a notable exception to this rule; some of the findings are reported here.

6.1. Seasonality of vegetable production, consumption and marketing in Africa

Baseline surveys were conducted in four countries – Cameroon, Mali, Tanzania and Madagascar – representing different regions and agro-ecological zones within sub-Saharan Africa.¹

6.1.1. Vegetable production

Vegetables grown by smallholder farmers in Africa are classified into ‘indigenous’ and ‘exotic’ (or introduced). African indigenous vegetables include: amaranth, African eggplant, African nightshade, Roselle, okra, Ethiopian kale, jute mallow, sun-hemp, hyacinth bean, vegetable cowpea, pumpkin, and spider-plant. The 5 most widely used exotic (or introduced) vegetables include: tomato, chilli, sweet pepper, onion, cabbage.

In Cameroon, which has a unimodal rainfall system in some parts and a bimodal rainfall system in others, vegetable production occurs all year round, but follows different cycles for ‘indigenous’ and ‘exotic’ vegetables. Indigenous vegetables are grown mainly during the rainy season – or seasons, in bimodal areas – for home consumption and sale, and are planted alongside staple cereals and root crops. Exotic vegetables are grown mainly under irrigation during the dry season – in unimodal areas where irrigation is available – and are mostly sold for cash income on the market. However, indigenous vegetables are also grown for sale – they are more popular than exotic vegetables, so the local market is larger.

¹ All findings reported in this section are derived from Ellis-Jones *et al.* 2008.

According to focus group discussions with farmers in Cameroon, their reasons for growing exotic vegetables in the dry season are that crop pests and diseases are less prevalent, so crop yields and quality are higher. Dry season cultivation also competes less for land and labour, which are dominated by staple crops during the rains. We might also speculate that irrigation technology is relatively costly, so is allocated to crops that will generate the highest economic returns, while vegetables for the cooking pot are grown at very low cost using little more than rainfall and family labour on kitchen garden plots, or intercropped.

Similar production cycles were recorded in Madagascar, where most vegetables are cultivated in both the rainy season and (under irrigation) in the dry season. Indigenous vegetables and tomatoes are grown all year round, while some exotic vegetables – especially onions and cabbage – are mainly dry season irrigated crops, while other vegetables – notably chillies and sweet pepper – are grown mainly during the rainy season.

In those parts of Tanzania that have a bimodal rainfall system – both ‘long rains’ and ‘short rains’ – onions and tomatoes are planted twice each year, but at different times (Table 2).

Table 2. Seasonal calendar of onion and tomato production in Tanzania

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Dry season</i>		<i>Long rains</i>			<i>Dry season</i>				<i>Short rains</i>		

Onions												
1 st season					2 nd season							
Planting		Harvest			Planting		Harvest					

Tomatoes															
				1 st season								2 nd season			
				Planting		Harvest						Planting		Harvest	

Source: Ellis-Jones *et al.* 2008

6.1.2. Vegetable consumption

Across all four countries, farmers reported consuming “very little” of their vegetable production at home – especially exotic vegetables, which are regarded primarily as cash crops. In Cameroon, for instance, most producers consume tomatoes, onions and chillies almost every day in both the rainy season and the dry season, but in small quantities that leaves the bulk of the harvest available for sale. Larger proportions of indigenous vegetables harvested are consumed in Cameroon, but significant quantities of okra, nightshade and other indigenous vegetables are marketed.

Similarly, several vegetables are essential ingredients in rural Malian cooking, and are consumed by most families almost every day, with little difference in consumption patterns between seasons. The most popular vegetables, in terms of households reporting consumption every day all year round, include chilli (42% of households), onion (41%), okra (37%) and tomato (36%).

On the other hand, 95% of 1,056 farmers interviewed in Mali stated that they consume “some” (47%), “very little” (47%) or “none” (1%) of their home-produced vegetables – both exotic and indigenous – at home, implying that most of their vegetable production is sold. In Madagascar, most households interviewed described the quantity of vegetables consumed at home as very little or none, reflecting the importance of vegetables as a cash crop. At the same time tomatoes were eaten either every day or at least 2-4 times a week by over 90% of households in both rainy and dry seasons with onions being eaten as regularly by over 70% of households and indigenous vegetables by 60% of households. Other vegetables were consumed less regularly.

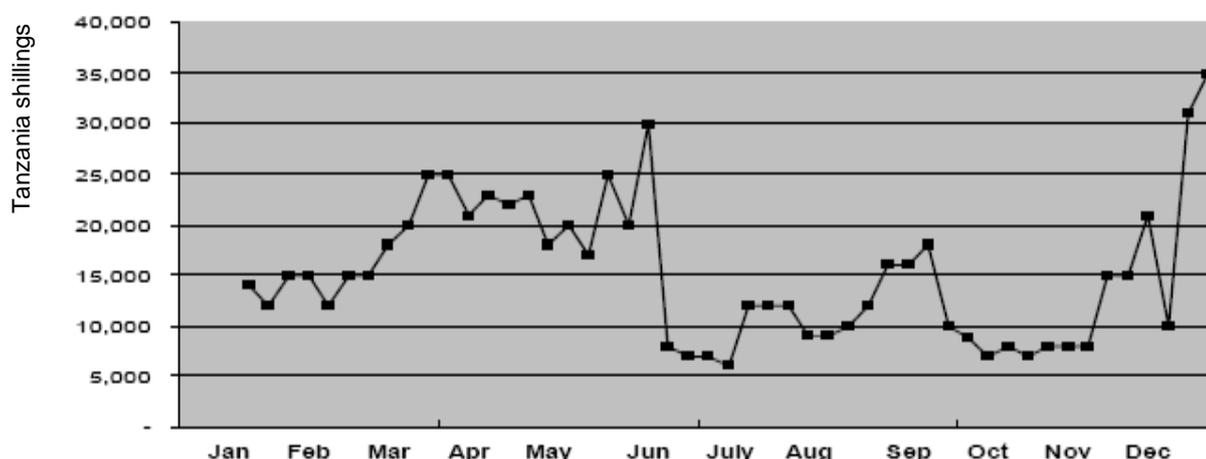
6.1.3. Vegetable marketing

Although vegetables are an indispensable ingredient of the daily diet, their value as a source of income is reflected in the small proportion of vegetable production that is consumed by farmers and the high proportion that is sold. In many countries of sub-Saharan Africa, most vegetables, both 'indigenous' and 'exotic', are seen primarily as 'cash crops' for sale and only secondarily as food crops for consumption.

Vegetable prices reflect the seasonality of production cycles. In Cameroon, prices of indigenous vegetables, which are grown mainly in the rainy season(s), are higher in the dry season when supplies are relatively scarce. Conversely, prices of exotic vegetables, which are grown mainly in the dry season, are lower during the dry season and higher during the rains.

In Tanzania there is marked price seasonality of vegetable crops. Leafy vegetables tend to be cheapest during the rainy season and most expensive late in the dry season. Conversely, tomatoes and sweet peppers attain their highest market value during the rains and fall after the harvest in mid-year, remaining low until the next rainy season begins (Figure 4).

Figure 4. Tomato price per crate in Arusha, Tanzania, 2005



Source: Ellis-Jones *et al.* 2008

This price variability translates into very different levels of profitability for farmers depending on whether they are at the mercy of seasonal cycles or can take advantage of them, for instance by investing in irrigation to benefit from counter-seasonal production and earn maximum prices. This is illustrated by a study of profit margins for tomatoes and onions in Tanzania, which revealed that profits are negligible or even negative during the long rains, but relatively high during the short rainy season (Table 3).

Table 3. Profitability of tomato and onion production over two growing seasons in Arusha (\$ kg⁻¹)

Season	Tomatoes		Onions	
	High season Long rains	Low season Short rains	1 st season Long rains	2 nd season Short rains
Selling prices	0.01 – 0.23	0.27 – 0.71	0.06 – 0.10	0.22 – 0.40
Median	0.13	0.50	0.08	0.31
Costs (median)	0.14	0.10	0.08	0.06
Profit	-0.01	0.40	0.00	0.25

Source: Centre for Advanced Training in Rural Development (SLE 2008)

6.2. A vegetable breeding programme

An interview conducted for this paper with the manager of a vegetable crop breeding programme in Africa revealed that seasonality had emerged as an issue in relation to the assessment of 'downstream' impacts, but was not considered in the initial conceptualisation of the project.

"In the original project design we never really thought about seasonality, or how the project could alleviate some of the seasonality constraints. We have not done any livelihood analysis. The investments we are making are upstream – we expect there to be a trickle-down effect from adoption to producers' and consumers' wellbeing. Now we are trying to integrate the two approaches and focus more on downstream impacts – how can new varieties that are released or in the pipeline have maximum impact on consumers?"

The project manager does have a theory of change that identifies two distinct ways in which the well-being of vegetable producers and consumers should be enhanced by the project.

"There are two causal pathways from project activities to positive impacts on participants' wellbeing. Firstly, improved seed production and commercialisation will help raise the income of contract farmers. Secondly, the availability of seed of improved varieties will stimulate an increase in production and consumption. Since vegetables – especially indigenous vegetables – are quite nutritious, there will be an improvement in the nutrition status of the population."

After the project started, the manager realised that the two ways in which the project could enhance well-being do not necessarily reinforce each other, but might affect different groups of people in different ways, and that pursuing each pathway requires adopting a different strategic emphasis.

"We never thought of the difference between income and nutrition impacts. If we focus only on income, that is a different pathway to focusing on nutrition. If we focus on high-value (income) crops we might be working with contract farmers who produce exotic vegetables. If we focus on nutrition impacts it means working mainly with smallholder farmers producing nutritious vegetables consumed on-farm. There are different actors in the value chain in each case."

The implication is that the project has to choose, whether to focus on maximising production and income, or maximising consumption and nutrition. As noted, the former objective implies working mainly with contract farmers, who are likely to be better off on average than subsistence-oriented smallholders. Also, working with contract farmers would require emphasising exotic vegetables in the breeding programme, as these are most commercially profitable. Pursuing the second objective implies working directly with smallholders to improve their household food security. The breeding programme would also then concentrate on indigenous vegetables, as these have higher nutritional value, not just for their micronutrient content, but also vitamins and proteins.

Maximising the production and incomes of contract farmers could be interpreted as more 'developmental', but might exclude the poorest and exacerbate inequality. Maximising the consumption and nutrition of smallholders could have bigger impacts in terms of reducing poverty and seasonal hunger, but would arguably make a smaller and less sustainable impact on the development of markets and local economies.

7. Conclusion

Seasonality is very often ignored in the conceptualisation and design of agricultural projects, with detrimental consequences for project performance and (especially) for participants' wellbeing. Many explanations for this 'aseasonality' are plausible.

- The full implications of seasonality are not understood, especially by people who are not familiar with the local context (urban bias, professional insularity, middle-class lifestyle insulated against the 'sick and hungry season', etc.).
- There is a view that seasonality is a product of climatic determinism that cannot be altered (sometimes this has some validity, e.g. if irrigation is not feasible, the appropriate alternative intervention is not always clear).
- Related to this is a perception that local communities live with the consequences of seasonality every year, so they must be well adapted to it (nutrition and morbidity statistics tell us this is not true).
- It is difficult to incorporate seasonal aspects of rural livelihoods into a project design (e.g. seasons are cyclical, projects are linear: more inputs = more outputs).
- Seasonality is a cross-sectoral issue that goes beyond agriculture – e.g. there is a need to combine agriculture with health services (health problems cannot be solved by fertiliser subsidies), or with roads and infrastructure. Sometimes the complementarities are recognised (some irrigation projects include roads to enhance market access for project produce) but more often they are not.
- The hungry season is also the time of year when family labour is most scarce and most needed – this limits the room for manoeuvre of interventions.
- Seasonality generates recurrent costs – a need to intervene every year – but donors can't easily commit to multi-annual funding, and governments are often reluctant to do so (Ethiopia's Productive Safety Net Programme is a seasonal intervention with a five-year funding cycle; after five years participants are expected to 'graduate' out of seasonal and chronic food insecurity – an ambitious but unrealistic programme objective).
- Seasonality also has international dimensions – global food prices, export markets etc. – which influence local outcomes but are largely beyond the control of the individual farmer or the designers and implementers of an agricultural project.
- Agricultural projects are rarely designed to address seasonality, they were usually intended to address something else, so it might be unfair to blame project staff for ignoring seasonality – unless this neglect proves to be the reason why the project fails.

What can be done differently?

1. A 'seasonality assessment' should be routinely incorporated into the design phase of all agricultural projects.
2. Seasonality should be incorporated into every project's analytical framework – how project outcomes might be affected by seasonality, how seasonal risks will be addressed.
3. Agricultural projects should aim not only to raise production and incomes (especially if this implies incurring higher risk) but also to stabilise incomes and smooth consumption.
4. More innovation is needed in 'seasonality proofing' of agriculture-based livelihoods, for instance by extending innovative insurance mechanisms to the most vulnerable farmers.
5. Development professionals, agricultural advisers, programme officers and project staff all need to be made aware of seasonality, in each local context where they are operating.

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